RELATIONSHIPS BETWEEN RELIGIOSITY,
SPIRITUALITY & HEALTH BEHAVIORS
AMONG COLLEGE STUDENTS

by
MICHELLE SENTER HARCROW

A DISSERTATION

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ABSTRACT

The influence of religion and spirituality on factors relating to an individual’s health behaviors has emerged as an area of interest for researchers, in recent years. Religiosity (formal and informal religious practice, both public and private) and spirituality (individual’s relationship to something sacred; meaning and values of one’s purpose) are regarded as having extensive influence on an individual’s cognitions, emotions and behaviors.

The purpose of this study was to examine the association between religion, spirituality, and social support in relation to physical activity and intakes of dietary fat among a sample of college students (n = 914) from a large, public university in the southeastern United States. Data of interest were collected via a classroom-based assessment battery and analyzed.

Most relationships between religiosity, spirituality, physical activity and dietary fat intake were not statistically significant. Intakes of dietary fat were found to be higher in students that reported greater levels of behavioral and functional religiosity. Greater levels of reported social support were found to be significantly related to higher levels of both moderate and vigorous physical activity. The magnitude of the relationships between the variables did not appear to be affected after controlling for demographics and social support. Overall, a few significant relationships were identified between religiosity, spirituality, physical activity and dietary fat intake, suggesting that the influence and function of religiosity and spirituality on the development and maintenance of health behaviors among college students may be small.
This research has several implications for researchers and other college health professionals, with an interest in promoting chronic disease prevention through physical activity and dietary behaviors. This research provides a better understanding of the religious and spiritual landscape, as well as, the physical activity behaviors and intakes of dietary fat of college students. Thus, this examination of religiosity, spirituality, physical activity, and dietary fat intake among college students should be of interest to researchers of chronic disease prevention and to entities fostering programs to support these health-promoting behaviors.
DEDICATION

This dissertation is dedicated to my precious husband and family. Praise the Lord – it is finished!

“Now to Him who is able to do far more abundantly beyond all that we ask or think, according to the power that works within us, to Him be the glory in the church and in Christ Jesus to all generations forever and ever. Amen.” Ephesians 3:20-21
LIST OF ABBREVIATIONS AND SYMBOLS

\( a \)  
Cronbach’s index of internal consistency

ACHA-NCHA  
American College Health Association- National College Health Assessment

BMI  
Body Mass Index

BRFSS  
Behavioral Risk Factor Surveillance System

CDC  
Centers for Disease Control and Prevention

\( df \)  
Degrees of freedom

\( F \)  
Fisher’s \( F \) ratio: A ration of two variances

\( M \)  
Mean

\( p \)  
Probability

\( r \)  
Pearson product-moment correlation

\( t \)  
Computed value of \( t \) test

\(<\)  
Less than

\( = \)  
Equal to
ACKNOWLEDGMENTS

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Chapter I
Introduction

Healthy lifestyle behaviors are known to reduce prevalence and incidence of many diseases among all populations. Despite the overwhelming evidence that physical activity and low-fat dietary practices favorably affect weight control, disease prevention, and overall health at all ages, data reveal that in America, 65 percent of adolescents do not meet the recommended levels of daily physical activity and more than 40 percent of adults do not participate in any leisure time physical activity (Centers for Disease Control and Prevention [CDC], 2001; CDC, 2009a). Additionally, the daily dietary intake consists of approximately 34 percent fat for both groups (United States Department of Agriculture, 2008).

According to the Behavioral Risk Factor Surveillance System (BRFSS), the greatest increases in overweight and obesity seem to occur between the ages 18 and 29 years and evidence from the 1995 College Health Risk Behavior Survey indicates that dietary and physical activity patterns of many college students predispose them to future health problems (Racette, 2005). These are often marked by increased sedentary lifestyles and excessive intake of calories and fat. Data from the National Health Interview Survey and the National Heart, Lung, and Blood Institute’s Growth and Health Study have indicated a progressive decline in vigorous aerobic and strengthening activities between the ages of 12 and 21 years; the greatest problem seems to occur between 15 and 18 years of age, with continuous decline from 18 to 29 years of age (Caspersen, 2000; Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). The lack of
physical activity and healthy dietary patterns often predispose individuals to chronic health conditions and premature health disparities. A most alarming trend is the indiscriminate rate at which these issues are affecting younger individuals.

Purpose of Study

The purpose of this study was to examine the relationship between physical activity levels, dietary fat intake, and how factors of religiosity and spirituality influence these behaviors among college students. Social support was included in the study as an independent control variable. Several studies have focused on the physical activity level or diet of college students, independently (Adams & Colner, 2008; Caspersen, Pereira, & Curran, 2000; Dinger, 1999; Racette et al., 2005; Serdula et al., 2004). A few studies have examined religious preferences and spiritual beliefs among college students (Denton, Pearce, & Smith, 2008; Higher Education and Research Institute, 2003; Myers & Kyle, 2008; Oleckno and Blacconiere, 1991; Pargament et al., 1984). However, no study has been identified that has examined the relationship between physical activity levels, dietary fat intake and the influence of religiosity and spirituality specifically among the college population.

Chronic disease within the college population is becoming a greater public health concern as diets continue to be less healthy, rates of obesity continue to increase, and physical activity levels continue to decrease. By identifying relationships that influence these factors, comprehensive health education and promotion interventions can be developed that will better serve the college population.
Significance of the Study

Chronic diseases are a major public health concern for the United States. They are the leading cause of disparity and death, accounting for limitations in daily living of approximately 25 million Americans and approximately 1.7 million deaths annually. They are the most prevalent, costly and preventable of all diseases and result in extensive pain and suffering for their victims, thus, decreasing their quality of life. The influence of religion and spirituality on factors relating to an individual’s psychosocial behaviors has emerged as an area of interest for researchers, in recent years. Despite the skepticism of earlier researchers, religiosity and spirituality are regarded as having extensive influence on individual’s cognitions, emotions and behaviors and merit further investigation among various population groups (Kim & Sobal, 2004; Neff, 2006).

As a result of many years of research and these types of initiatives, the federal government has encouraged people to incorporate healthy behaviors, such as regular physical activity and healthy dietary behaviors, into their everyday life. Healthy People 2010 and the American College Health Association’s (ACHA) companion guide to Healthy People 2010, Healthy Campus 2010, addresses the need for health promotion and disease prevention on college campuses. The two leading health indicators for Healthy People 2010 and Healthy Campus 2010 are 1) physical activity and 2) overweight and obesity. Properly addressed, each of these behaviors has been shown to reduce health disparities and improve quality of life. Although these are significant strides in our nation’s attempt to reduce health disparities and chronic disease, the latest information shows that inactivity among American adults and youth
remains relatively high and that little progress has been made in meeting these objectives (DHHS, 2008b).

In recent studies, religion and spirituality has been shown to reduce risky behaviors such as alcohol use, unsafe sexual practices, and seatbelt noncompliance among adolescents (Johnson, Sheets, & Kristeller, 2008; Koenig et al., 2001; Poulson et al., 1998; Wallace et al., 2003;). Additional findings include those studies of religion and spirituality in relation to coping. These studies suggested lower rates of depression and improved mental health among those who consider themselves to be religious or spiritual (Ellison, 1995; Glas, 2007; Kim & Sobal, 2004). Similar findings exist in the area of religion and social support. An interesting correlation between religion and general health found that on average, people who attended church on a regular basis have an average life expectancy of eight years longer compared to those who never attend church, even when adjustments were made for initial health status and behavioral and social risk factors (Hummer et al., 1999; Idler et al., 2003).

Until recently, there was very little distinction made between religiosity and spirituality. This is partly due to the lack of available objective, validated, concise research measures and partly due to the lack of distinct, operational definitions. Through progressive research efforts, however, terminology and instrumentation has improved and more recent studies are needed that utilize the objective measures and distinct concepts. Additionally, the majority of previous studies targeted older adults or broad-range, mixed populations. There are very few studies that directly target college-aged students. More specifically, the number of studies that address religion, physical activity and fat intake within the college population are almost void. Religiosity is strongly associated with positive health outcomes for all population groups and
merits further investigation in efforts to continue to advance the field of study and for the development of health education interventions. Data exists from numerous studies, as seen above, to support that those who are more religious tend to have healthier lifestyles, overall. From a socio-cultural context, those who are more religious tend to have a greater social network which often leads to higher levels of physical activity, and for some religious groups, healthier dietary practices. As mentioned before, chronic diseases continues to increase, as does their negative association with physical activity and dietary behaviors. Although very little distinction has been made regarding these relationships and the college population, previous research has provided support for a need to further investigate religion’s relationship to fat intake and physical activity among the college population.

Health behaviors are developed and maintained through various methods, making it difficult to identify causal relationships when studying these variables. In effort to better understand this process, research has suggested that they be conceptualized through a social context (Heaney & Israel, 2008; Kim & Sobal, 2004). Accordingly, their association with social institutions may provide a more useful context for examining proximate risk factors for health such as physical activity and dietary practices. A social institution that may provide insights about health behaviors that has been under-investigated is religion. This is an important and unique approach, as research in this area typically has not focused on this aspect of dietary behavior and physical activity but rather on their relationship to health as proximate causes of disease (Link & Phelan, 1995).

Social institutions, such as religion, often define individual members and how they relate to society as a whole (Shatenstein & Ghadirian, 1998). They are comprised of a multi-faceted
set of influential social organizations, norms, values and experiences, which are used to distinguish a particular community from others (Kim & Sobal, 2004). For example, among certain religious groups and denominations, there are often prescribed health behaviors, typically relating to diet. However, theological teachings surrounding general religiosity in the United States promotes that the body is a sacred manifestation of God, as quoted in I Corinthians 6:19, “the body is a temple of the Holy Spirit” where God resides (New American Standard Version). These teachings may serve to encourage members to choose to consume healthier diets and engage in regular physical activity. According to Kim and Sobal (2004), diet and physical activity may be shaped directly through specific theological teachings of religion and indirectly through general teachings about the body and its relationship to God.

Among individuals who do not necessarily adhere to traditional religious views, they may still ascribe sanctified qualities to certain objects. In a study by Mahoney and colleagues (2005), they discussed the relationship between religion and health among college students from this perspective, suggesting that the notion of sanctification extends many aspects of life beyond the psychological influence of religion and spirituality. This includes objectives, which may be seemingly secular. An example of this non-theistic sanctification process could involve ascribing divine significance and character to the human body and viewing it as something that is holy, blessed or sacred (Mahoney et al., 2005). This process could facilitate health-promoting behaviors.

The assumption that religion and spirituality play an integral role in the lives of many people, despite advances in medicine, psychology and education, has been supported through research for many years (Koenig et al., 2001). To put this potential relationship into perspective,
according to Thoresen and Harris (2002), approximately ninety-six percent of Americans claim to believe in God and two-thirds consider their religious/spiritual beliefs as very important in their lives. Among high-school aged adolescents, ninety-five percent believe in God and eighty-five to ninety-five percent report that religion is important in their life (Cotton, Zebracki, Rosenthal, Tsevat, & Drotar, 2006). This trend continues into college, as entering college students report high levels of spiritual interest and involvement with reports of four in five freshmen having attended religious services in the past year (Astin et al., 2007). Since an individual’s beliefs and values are reported as a factor of influence towards health behaviors (Ajzen & Timko, 1986; Ajzen & Madden, 1992), and over 95 percent of Americans claim that these personal beliefs are very important to them, then it is possible that this relationship could be significant for health-promoting efforts.

Research in the area of religion, spirituality, and health has included the investigation of chronic diseases, as well as, general well-being and a host of other health issues (Miller & Thoresen, 2003). The majority of studies involving religion and spirituality has been conducted among older adults and has commonly involved patients who were in a hospital or nursing home setting (Koenig et al., 2001; McBride et al., 1998). Although there has been great debate over the efficacy of previous research in this area, since the 1990s, the quality and quantity of studies have improved through the onset of controlled investigations and formal hypothesis testing. Consequently, research initiatives have been launched with the National Institutes for Health and there have been increased publications in scientific journals (Miller & Thoresen, 2003).
Social Support

Social relationships and social support are key elements of the social environment that influence health behaviors and health status. Several reviews have addressed the positive influence of social relationships on health (Lansford, Sherman, & Antonucci, 1998; Turner & Marino, 1994). Although there are some inconsistencies in the findings and conclusions of the reviews, Heaney and Israel (1996) concluded that social support together with social networks have an important causal effect on health, exposure to stress and the relationship between stress and health. The reviews conducted also provide consistent evidence that social relationships influence health behavior choices (Heaney & Israel, 2008).

Religion as a social institution provides opportunities for social interaction among people of like values and interests. Therefore, religious adherents have the opportunity to develop greater social networks and establish social relationships within their institutions. According to research, an important function of social relationships is the provision of social support (Heaney & Israel, 2008). This concept refers to both the structure and function of an individual’s social life, including group memberships, familial ties, and emotional support. Its psychological and behavioral pathways often facilitate healthy behaviors such as healthy eating and exercise, thereby establishing it as a health-promoting concept (Uchino, 2006). In a study by Kirkpatrick, Shillito, & Kellas (1999), religion was related to greater emotional support and better perceived support among college students. Because it may reduce an individual’s susceptibility to harmful effects of stress, it is considered to be a psychosocial protective factor for health. However, social supports role in the etiology of disease is unclear and therefore, may influence the incidence and prevalence of many health outcomes (Heaney & Israel, 2008). Even so, social
institutions may also influence the development and maintenance of healthy diets and physical activity through the concept of social support.

According to the literature, the mere perception of social support can be just as effective as tangible social support in promoting healthy behaviors. For example, in an international study of determinants of physical activity by Stahl and associates (2001), perceived social support from the personal environment was identified as the strongest predictor of physical activity. Those reporting low social support were more than twice as likely to be sedentary compared to those who reported high levels of perceived social support. In another study examining the relationship between physical activity and actual social support among Australian college students, Leslie and colleagues (1999) found that those reporting low levels of social support from either family or friends were 23-55% more likely to be inadequately active for health benefits than were those reporting high levels of support.

Significant findings exist within the literature for social support and dietary change (Kelsey, Earp, & Kirkley, 1997; Marcus et al., 2001; McIntosh, Shifflett, & Picou, 1989; Silverman, Hecht, & McMillian, 2002). The majority of existing research is limited by study design and sampling and has involved cross-sectional samples of elderly groups located in predominantly white, rural regions. However, positive relationships have been identified for various aspects of social support and the consumption of sugar, salt, and fat (Silverman, Hecht, & McMillian, 2002), fiber and fruit (Marcus et al., 2001), and vitamins and minerals (McIntosh, Shifflett, & Picou, 1989). Although these limitations make it difficult to identify causal relationships between social support and diet, the findings suggest that the role of social support
in the development and maintenance of healthy dietary changes may be significant (Kelsey, Earp, & Kirkley, 1997).

Examining this relationship is of particular importance due to the strong associations between diet and morbidity and mortality (Koenig et al., 2001; Kristal et al., 1995). Dietary factors contribute to disease development and disease prevention. This is evident by the fact that diets that are high in fats and low in fruit, vegetable, and grain consumption are considered to be unhealthy and put individual consumers at increased risk for developing chronic diseases such as cardiovascular disease, strokes, obesity, diabetes, and some cancers (CDC, 2008c; CDC, 2008e; Racette et al., 2005; Kristal, et al., 1995; Koenig et al., 2001). On the contrary, healthy diets that are low in fat and refined sugar and high in fruits, vegetables, fiber and complex carbohydrates contribute to factors that reduce chronic disease risk, such as lower cholesterol levels, lower blood pressure, improved digestive function, increased energy, and improved body composition (decreased total body weight and body fat); thus, to a healthier individual (Koenig et al., 2001; Racette et al., 2005).

Religion is regarded as a protective factor for health. Among children, adolescents, adults and elderly groups, studies have found positive associations for religion and healthy behaviors such as increased physical activity and diet (Koenig et al., 2001). However, the strength of association tends to vary between studies, depending on how the dimension of religiosity is being measured and the population being studied. From these findings, it is presumable that religion may facilitate increased physical activity and healthy intakes of dietary fat among certain population groups either through its theological nature or by the general social support available to religious adherents via physical institution or perception.
Social support that is provided by religion may serve to facilitate healthy dietary practices and decreased body weight. However, a fundamental aspect of religious theology is that it typically encourages healthy dietary practices and discourages obesity; therefore, religion may independently influence healthy dietary practices (Kim, Sobal, & Wethington, 2003). Nonetheless, religion’s role in promoting the consumption of a healthy diet appears significant and merits further investigation.

Regarding spirituality’s relationship to health behaviors, recent study findings have warranted additional investigations. For example, Nagel and Sgoutas-Emch found that religion and spirituality did not negatively correlate with risky health behaviors, specifically alcohol and caffeine consumption, smoking and illicit drug use (2007). Another study examined the effects of religion and spirituality among young, healthy college students in a small liberal arts college in California and found small positive correlations between religious measures and positive health-promoting behaviors, specifically exercise (Koenig et al., 2001). This positive relationship appears to be consistent throughout adolescence and adulthood; however, additional research is necessary to confirm these assumptions and better determine if there is an actual relationship between the variables and the mechanisms by which the relationship is facilitated.

Although there has been less research among college students in the area of religion, spirituality, and health, findings from related studies have suggested positive correlations between health-promoting behaviors and religion and spirituality. Based on such findings, it is evident that there is a need for research that specifically addresses the relationship between religion, spirituality, physical activity and diet within the college population. The relevance of this research will continue to escalate as the burden of chronic diseases among college-aged
individuals continues to increase, as will the need for the development of health education interventions.

Chronic Disease

Chronic diseases are a major public health concern for the United States. They are the leading cause of disparity and death, accounting for limitations in daily living of approximately 25 million Americans and approximately 1.7 million deaths annually (CDC, 2008e). They adversely affect quality of life and account for approximately one-third of the years of potential life lost before age 65 (CDC, 2008e). In 2005, 133 million Americans were living with at least one chronic disease. From an economical perspective, 75% of the nation’s $2 trillion medical care costs are spent on chronic diseases (CDCd., Chronic Disease Overview, 2008).

In addition to being an economic burden, chronic diseases are the most common cause of death in America, seven out of every ten deaths is the result of chronic disease. Common chronic diseases include cardiovascular disease (CVD), stroke, cancer, diabetes, hypertension, dyslipidemia, arthritis, pulmonary diseases and psychological disorders and occur in almost half of the American population. The most prevalent, costly and preventable among these include CVD, stroke and diabetes (CDC, 2008c). These diseases result in extensive pain and suffering for their victims, thus, decreasing their quality of life.

The increased prevalence of chronic diseases has burdened society and created concern in public health. Of particular interest is the obesity epidemic which has had a major influence on the development of these diseases (Kumanyika, 2008). According to the National Health and Nutrition Examination Survey (NHANES) of 2003-2004, approximately 66.3 million American
adults, aged 20 to 74 years, are overweight and obese and 32.3 million are obese (Kumanyika, 2008). Among adolescents between the ages of 12 and 19 years, 5.7 million children are overweight (Kumanyika, 2008; DHHS, 2008b; DHHS, 2008c). That equates to approximately 32 percent of adults and 17 percent of adolescents in the United States who are at least overweight. For adults, there was a 112.6 percent increase in obesity from the 1976-1980 NHANES to the 2003-2004 NHANES; for adolescents, there was a 278 percent increase in overweight between the 1966-1970 NHANES and 2003-2004 NHANES (Kumanyika, 2008). This places the U.S. as having the highest prevalence of obesity among the developed nations (CDC, 2007b).

Risk factors for chronic disease often trace back to adolescence or beyond. Events and behaviors learned very early in life have profound influence on adult outcomes associated with chronic disease. Childhood overweight and obesity is associated with increased risk for chronic disease morbidity and psychosocial effects into adulthood (Kumanyika, 2008). Additionally, the risk for adult obesity increases among those who are overweight as children. Since religious teachings are often paired with instructions for what to eat, when to eat, how to prepare food, or how much one should eat (temperance and moderation), many of these teachings have benefitted not only the individual but also the society within which the individual resides.

Contributing factors to overweight and obesity are diet and low levels of physical activity. Energy consumed must not exceed energy used or else there will be a net weight gain; weight loss is the result of energy used in excess of energy consumed. Therefore, the quality and the quantity of food consumed are important components to weight management. These aspects affect not only the body’s tendency to gain fat mass but also negatively impact vital bodily
functions such as cardiovascular, respiratory, and cellular activity (Koenig et al., 2001).

Excessive fat intake - greater than 30 percent of total calories from fat - is often a chief culprit in health disparities. Not surprising, the average American diet consists of approximately 36 percent of total calories from fat. Reducing the amount of calories consumed from fat, saturated fat, and cholesterol and increasing consumption of fruits, vegetables, and grain products has proven to produce remarkable health outcomes (Kim et al., 2003; Koenig et al., 2001).

In addition to a healthy diet, increasing physical activity will aid in reducing body weight and improving physiological functioning. The U.S. has very low levels of physical activity, with less than half of adults regularly engaging in the recommended amounts (CDC, 2008b). The CDC recommends that individuals regularly engage in at least 30 minutes of moderate intensity exercise in order to reduce the risk for chronic disease (2008b). In order to maintain or lose weight, individuals must increase the duration of moderate intensity physical activity to 60 minutes and 90 minutes, respectively, and not increase energy intake beyond their daily caloric needs. These physical activity recommendations are in addition to regular daily activities and should be performed most days of the week (CDC, 2008e). Some recent research has even suggested that simply increasing physical activity by 150 minutes per week, regardless of incremental duration, will have positive effects on health (DHHS, 2008b). However, any increase in physical activity is recommended and beneficial for individuals whose lifestyle is more sedentary than active. Interestingly, this recommendation is a normal part of daily life for some religious groups, based on their religious beliefs. For other groups, it is facilitated by the teaching of religious consequences vis-à-vis “the body as a temple”, which has served to
encourage better care of the body through the use of physical activity. Regardless of proximate cause, religion can influence participation in physical activity.

Public Health Interest

National health initiatives, such as the 1980 *Promoting Health/Preventing Disease: Objectives for the Nation*, and *Healthy People 2000: National Health Promotion and Disease Prevention Objectives outline the need to improve the health status of Americans*. A more recent initiative to target adolescents was *The National Initiative to Improve Adolescent Health by the Year 2010* (DHHS, 2000). The Surgeon General’s Calls to Action addresses salient health issues, such as overweight and obesity, in the United States (Yancey, 2004). As a result of many years of research and these types of initiatives and in efforts to reduce health disparities and improve quality of life, the federal government continues to encourage people to incorporate healthy behaviors, such as regular physical activity and a healthy diet, into their everyday life.

In addition to being costly health problems with a strong potential for death, chronic diseases are among the most preventable (DHHS, 2008b). Healthy lifestyle behaviors, such as a healthy diet and regular physical activity, have been shown to reduce prevalence and prevent incidence of these diseases (DHHS, 2008b). The Healthy People initiative, which establishes the health objectives for the nation, has identified two primary goals for Healthy People 2010: 1) increase the quality and years of healthy life and 2) eliminate health disparities (DHHSb., 2008; ACHA, 2002). The American College Health Association’s (ACHA) companion guide to Healthy People 2010, *Healthy Campus 2010*, addresses the need for health promotion and disease prevention on college campuses. The two leading health indicators for both initiatives,
Healthy People 2010 and Healthy Campus 2010, are 1) Physical Activity and 2) Overweight and obesity. This national and collegiate agenda is evidence to the need for health education and promotion efforts that attempt to reshape the culture by addressing these health issues. However, the health outcomes previously sited suggest that the historical approaches to addressing these issues have not been as successful as anticipated by researchers. Therefore, it is necessary to determine the factors and mechanisms people use to influence their health-related decisions and use this information when developing health education and promotion interventions.

Religion is an area that has been examined for relationships of personal beliefs and attitudes and health outcomes. This notion for research among faith-based communities has gained support during recent years. On June 1, 2004, funding was made available by the Center for Faith-Based and Community Initiatives for the purpose of helping faith-based and community groups compete for funding on a level playing field with other organizations. This effort raised awareness for funding needs in this area by private funders and issued support for current research in faith-based, religious-based research. This type of research has been supported through the assumption that religion plays an integral part in the lives of many people, despite advances in medicine, psychology and education (Koenig et al., 2001). These are significant strides in our nation’s attempt to improve the United States health status by reducing health disparities and chronic diseases. It is also quite timely, since approximately ninety-six percent of Americans claim to believe in God and two-thirds consider their religious/spiritual beliefs to be very important in their lives (Thoresen, 2002).

Spirituality has had a great deal of attention in recent years, as it has been the focus of books, conferences and journal articles. Due to the rise in secularism during this century,
religion has been somewhat distinguished from spirituality. Prior to now, spirituality may have been described as subjective religion. It was not until the past 25 years that spirituality began to be of interest to researchers (Roof, 1993). During this time, there has been a decline in church membership beginning in the late 1940s with a significant increase during the 1960s and 1970s, especially among the “Baby Boomers”. With this decline in organized religious affiliation came an increase in the popularity of new forms of faith under the auspices of spirituality (Zinnbauer, Pargament, & Scott, 1999).

In the 1980s and 1990s, there was an attachment of the term spirituality to numerous political, religious and social movements (Zinnbauer et al., 1999). Religious institutions have been viewed as a hindrance to experiencing the sacred, therefore the current culture has sought to find elements that are more spiritual rather than religious (Zinnbauer et al., 1997). In a study by Roof (1993), where he examined 1,599 baby boomers, he found a defection of baby boomers who have left organized religion in the 1960’s and 1970’s and an increase in spiritually-based religion or “new religion”. This cohort was labeled as highly active seekers and was characterized as being “more educated, more individualist, more likely to engage in “mystical” religion which may contain various New Age beliefs and practices, less likely to hold a “theist” belief about God, more likely to view their faith as a “spiritual journey” or a “quest” and more likely to come from homes of infrequent attendance by their parents” (Zinnbauer et al., 1997).

Although there seems to be a distinction between religion and spirituality, there are still many overlapping concepts. Several studies have shown that there are some common threads that weave between them. A common phrase and finding is often the generalized classification/comparison of spirituality and religion: “Spirituality is a broader concept than
religion and includes religion” (Hyman, 2006). This may be due to the fact that common definitions of spirituality and religion do not differ in regards to the sacred. The common references to God, Christ and the Church are often incorporated in both types of definitions, suggesting that they are not fully independent. In a study by Zinnbauer and colleagues (1997), interestingly, they identified a group who is classified as “spiritual, not religious” who are closely linked to the highly active seekers in the Baby Boomer generation. This idea of being spiritual but not religious is likely to stem from the negative connotation associated with religion among the baby boomer culture. As a result of this ideology, many Americans are trying to experience the sacred without using religion as a vehicle. Since spirituality is noted as an integral dimension of health and since several studies have identified it as an important part of an individual’s life, it is important to consider its influence when examining health behaviors.

Research in the area of religiosity and spirituality and health have included the investigation of chronic disease prevention, as well as, general well-being and a host of other health issues. Much of this research has found positive relationships between religion/spirituality and health. In a 42-article meta-analysis, McCullough and colleagues found that people who attended church more frequently and prayed more frequently had lower mortality rates (2000). In a large study by Koenig and colleagues, lower mortality rates were found among adults over the age of 65 who frequently attended religious functions (1999). An interesting correlation between religion and general health noted that on average, people who attended church on a regular basis had an average life expectancy of eight years longer compared to those who never attended church, even when adjustments were made for initial health status and behavioral and social risk factors (Hummer et al., 1999; Idler et al., 2003). Additionally,
religion has been shown to be a significantly positive contribution to end-of-life events (Koenig et al., 2001).

Despite the skepticism of earlier researchers, religiosity (formal and informal religious practice, both public and private) and spirituality (individual’s relationship to something sacred; meaning and values of one’s purpose) are regarded as having extensive influence on individual’s cognitions, emotions and behaviors (Koenig et al., 2001; Neff, 2006). For example, religion has been shown to reduce the onset of depression (Koenig et al., 2001) and hasten the recovery for those already suffering from it (Koenig, George, & Peterson, 1998). Additional studies suggested lower rates of depression and improved mental health among those who consider themselves to be religious or spiritual (Ellison, 1995; Glas, 2007; Kim & Sobal, 2004).

Among African-Americans, church-based hypertension intervention programs have been shown to reduce systolic and diastolic blood pressures (Livingston, Levine, & Moore, 1991). Women have been found to have stronger relationships between religion, social support and health, compared to their male counterpart. In a 28-year longitudinal study focused on mortality rates and frequent church attendance, women who reported attending church most frequently also had the lowest mortality rates (McCullough, Hoyt, Larson, Koenig, & Thoresen, 2000; Strawbridge, 1997; Waite, 1999). Social support’s role in these findings was not causative but had a significant correlation to the outcomes.

Among high-school aged adolescents, studies show that ninety-five percent believe in God and eighty-five to ninety-five percent report that religion is important in their life (Cotton, 2006). This trend continues into college, as entering college students report high levels of
spiritual interest and involvement and four in five freshmen having attended religious services in
the past year (Astin, 2007).

There is less previous research in the area of college students, health and
religiosity/spirituality, yet findings from these studies having suggested various positive
correlations between the health behavior of interest and the religiosity and spirituality variables.
For example, a study by Nagel found that religion and spirituality did not negatively correlate
with risky health behaviors, specifically alcohol and caffeine consumption, smoking and illicit
drug use (2007). However, another study examined the effects of religion and spirituality among
young, healthy college students in a small liberal arts college in California and found small
positive correlations between religious measures and positive health promoting behaviors (i.e.
exercise) (Koenig et al., 2001). A more recent study found an interesting correlation between
ethnicity and physical activity, suggesting that Caucasian students are more likely than African
American students to voluntarily engage in physical activity in efforts to improve one’s physical
health (Blanchard, 2008).

The most recent reports from the American College Health Association-National College
Health Assessment (26,685 student participants) (2009) found that over 44 percent of college
students did not meet the recommendations for physical activity, 20.4 percent of who were
classified as overweight and 10.9 percent were obese. Additionally, 94.9 percent did not meet the
daily recommendation for fruit and vegetable consumption, with 6.4 percent reporting that they
do not eat fruits and vegetables. Therefore, research should attempt to identify comprehensive
methods for identifying determinants of health behaviors and developing effective health
interventions.
Research Questions

In order to examine the relationships between physical activity levels, dietary fat intake, and how factors of religiosity and spirituality influence these behaviors among college students, and include social support as an independent control variable, the following research questions were addressed:

1. Were greater levels of religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
2. Were greater levels of spirituality associated with higher levels of physical activity and lower intakes of dietary fat among college students?
3. Were greater levels of social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?
4. Were greater levels of religiosity and spirituality and social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?
5. Were greater levels of behavioral religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
6. Were greater levels of subjective religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
7. Were greater levels of functional religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Limitations

This study was limited by self-report data. Participants may respond to the item of interest from a biased perspective. Rather than reporting their true opinions, they may reflect the attitude or behavior that is of interest to (or expected by) the researcher. Additionally, students who consider themselves to be religious may be more likely to complete the survey, whereas, students who do not consider themselves to be religious may either leave it incomplete or not complete it at all. Due to the nature of this study, participants may have misunderstood or
assigned their own definitions to terminology. Additionally, error may have occurred due to the phrasing of the survey items. There is also the possibility of a biased response due to the type of person who is willing to voluntarily complete any survey.

Instrumentation for this study involved modifying an existing survey and adding some relevant items, which was necessary to make it appropriate for college students. This may have limited the findings of the research to be less generalizable to populations other than college students.

Each of the variables of interest in this study may be definitively considered subjective (religiosity, spirituality, physical activity, dietary fat intake). Therefore, individuals may have chosen to answer the survey using his or her personal definitions, rather than the operational definitions as assigned by the study design.

Delimitations

This study was delimited to college students currently enrolled in classes at The University of Alabama at Tuscaloosa. Participants were asked to voluntarily complete a classroom-based.

Definitions of Terms

**Behavioral Religiosity** – a measurement of religiosity, consisting of a broad conceptual subscale, which includes the dimensions of religious denomination, religious attendance, and religious application.

**Duration** – a characteristic of physical activity examined by the length of time in which an activity or exercise is performed. Duration is generally expressed in minutes (U.S. Department of Health and Human Services, 2008b).
Exercise - a subcategory of physical activity that is "planned, structured, and repetitive and purposive in the sense that the improvement or maintenance of one or more components of physical fitness is the objective" (U.S. Department of Health and Human Services, 2008b).

Frequency - a characteristic of physical activity examined by the number of times an exercise or activity is performed. Frequency is generally expressed in sessions, episodes, or bouts per week (U.S. Department of Health and Human Services, 2008b).

Functional Religiosity – a measurement of religiosity, consisting of a broad conceptual subscale, which includes the dimensions of religious coping and religious (Divine) social support.

Health – state of complete physical, mental, emotional, spiritual, social and environmental well-being and not merely the absence of disease or infirmity (WHO, 1946; Eberst, 1984).

Health Behavior – an activity undertaken by a person for the purpose of preventing disease or detecting disease in a very early stage.

Health Education – Education that increases the awareness and favorably influences the attitudes and knowledge relating to the improvement of health on a personal or community basis.

Health Promotion – the combination of educational, organizational, and environmental activities designed to support behavior conducive to the health of individuals and their families.

Healthy Diet – involves knowledgeable selection and consumption of foods essential for sustenance, health, and well-being (e.g. fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products, lean meats, poultry, fish, beans, eggs, and nuts low in saturated fats, trans fats, cholesterol, sodium, and added sugars that stays within your daily calorie needs) (Walker, S.N., & Hill-Polerecky, D.M., 2007; CDCg., 2008).

Intesity - a characteristic of physical activity that refers to how much work is being performed or the magnitude of the effort required to perform an activity or exercise (U.S. Department of Health and Human Services, 2008b).

Lifestyle – a manner of living that reflects a person's values and attitudes, typically expressed through behaviors, interests, or opinions (Princeton University, 2006)

Low-fat diet – a diet allowing a maximum of 30 percent of the daily energy intake from fat (Nordmann, Nordmann, Briel, Keller, Yancy, Brehm, et al., 2006).

Moderate Intensity Physical Activity – for young adults, activity requiring approximately 3 to 6 times as much energy as rest; equivalent to brisk walking (Sallis & Owen, 1999).
**Physical Activity** - any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above a basal level (U.S. Department of Health and Human Services, 2008b).

**Physical Fitness** – a set of attributes that people have or achieve that relates to the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure-time pursuits and meet unforeseen emergencies. Health-related fitness includes cardiorespiratory fitness, muscular strength and endurance, body composition, flexibility, and balance (U.S. Department of Health and Human Services, 2008b; Caspersen, Powell, & Christenson, 1985).

**Religiosity/Religion** - an organized system of beliefs, practices, rituals, and symbols designed (a) to facilitate closeness to the sacred or transcendent (God, higher power, or ultimate truth/reality) and (b) to foster an understanding of one’s relationship and responsibility to others in living together in a community. (Formal and informal religious practice, both public and private) (Koenig et al., 2001, p.18).

**Sanctification** – perceiving aspects of life as having divine significance and character (Mahoney et al., 2005).

**Spirituality** - the personal quest for understanding answers to ultimate questions about life, about meaning, and about relationship to the sacred or transcendent, which may (or may not) lead to or arise from the development of religious rituals and the formation of community. (Individual’s relationship to something sacred; meaning and values of one’s purpose) (Koenig et al., 2001, p.18).

**Spiritual Well-being** – a sense of life purpose and welfare in relation to a power, being, or reality greater than the self (Cotton, 2006).

**Social Integration** – the existence of social ties (Heaney & Israel, 2008).

**Social Network** – linkages between people or the web of social relationships that surround an individual (Heaney & Israel, 2008).

**Social Support** – the functional content of a relationship that can be characterized by four intentional, supportive behaviors: emotional support, instrumental support, informational support, and appraisal support (Heaney & Israel, 2008; House, 1981).

**Subjective Religiosity** – a measurement of religiosity, comprised of a broad conceptual subscale, which includes the dimensions of religious identity and religious commitment.

**Vigorous Intensity Physical Activity** – for young adults, activity requiring 7 times as much energy as rest, or greater (Sallis & Owen, 1999).
CHAPTER 2
REVIEW OF THE LITERATURE

Purpose

The overall purpose of this chapter is to identify the potential benefit of examining the relationships between religion and spirituality, physical activity, fat intake, and social support among the college student population, as well as to review current literature that substantiates research among these variables within this population. This chapter includes the following topics: (1) the emerging need for religion- and spirituality-based health education programs in the areas of physical activity and diet (fat intake) in the college population; (2) the health benefits associated with religion and spirituality; (3) the health benefits associated with physical activity and reduced fat intake in the college population; (4) the behavioral epidemiology of religion and spirituality and physical activity and dietary fat in the college population; and (5) a review of current theoretical influences for religiosity, physical activity, and dietary fat intake interventions in the college population.

The Need for Religion and Spirituality-based Health Education Programs in the area of Physical Activity and Dietary Behaviors in the College Population

Healthy lifestyle behaviors are known to reduce prevalence and incidence of many diseases among all populations. Despite the overwhelming evidence that physical activity and low-fat dietary practices favorably affect weight control, disease prevention, and overall health at all ages, data reveal that in America, 65 percent of adolescents do not meet the recommended...
levels of daily physical activity and more than 40 percent of adults do not participate in
any leisure time physical activity (National Center for Chronic Disease Prevention and Health
Promotion, 2009; Centers for Disease Control and Prevention [CDC], 2001). Additionally, the
daily dietary intake consists of approximately 34 percent fat for both groups (United States
Department of Agriculture [USDA], 2008c).

According to the Behavioral Risk Factor Surveillance System (BRFSS), the greatest
increases in overweight and obesity seem to occur between the ages 18 and 29 years and
evidence from the 1995 National College Health Risk Behavior Survey (NCHRBS) indicates that
dietary and physical activity patterns of many college students predispose them to future health
problems (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). These are often marked
by increased sedentary lifestyles and excessive intake of calories and fat. Data from the National
Health Interview Survey and the National Heart, Lung, and Blood Institute’s Growth and Health
Study have indicated a progressive decline in vigorous aerobic and strengthening activities
between the ages of 12 and 21 years; the greatest corrosion seems to occur between 15 and 18
years of age, with continuous decline from 18 to 29 years of age (Caspersen, Pereira, & Curran,
2000; Racette et al., 2005). These physical activity and dietary patterns are unhealthy and often
predispose individuals to chronic health conditions and premature health disparities. A most
alarming trend has been the indiscriminate rate at which these issues are affecting younger
individuals.

As previously mentioned, healthy lifestyle behaviors, such as physical activity and
reduced fat intake, are strongly associated with disease prevention. This is important to consider
since the leading cause of disparity and death in the United States are chronic diseases,
accounting for limitations in daily living of approximately 25 million Americans and
approximately 1.7 million deaths annually (CDC, 2008c). In 2005, 133 million Americans were living with at least one chronic disease. These diseases adversely affect quality of life and account for approximately one-third of potential life lost before age 65 (CDC, 2008f).

From an economical perspective, each year approximately 75% of the nation’s $2 trillion in medical care costs are attributed to chronic diseases (CDC, 2008f). The annual average amount spent on diabetes is $174 billion; on arthritis, $128 billion; direct medical costs associated with cancer are approximately $89 billion. Comparably, in 2000, the estimated total costs of obesity were nearly $117 billion with projected costs for heart disease and stroke to be $448 billion by 2008 (CDC, 2008f). Based on this information, it is apparent that there is an immediate need for comprehensive health education and promotion efforts, targeting health behavior etiology and factors that influence behavior change, in hopes of positively impacting the epidemic proportion of chronic diseases that currently plague society. Since health is conceptualized by physical, mental [psychological], emotional, social, environmental, and spiritual dimensions, health education and promotion efforts should focus on these areas and examine how they interact with each other to promote positive outcomes. Particularly, the effects of spirituality and religion among college students, which has been given scant attention by previous researchers in relation to health-related research (Taliaferro, Rienzo, Pigg, Miller, & Dodd, 2009).

Increased prevalence of chronic diseases continues to burden society and has created great concern in public health. The obesity epidemic, which has had a major influence on the development of many chronic diseases, has resulted from a host of biological, environmental, and behavioral determinants. Although there is evidence for a predisposition to being overweight, lifestyle behaviors appear to be the greatest contributing factor to these outcomes
Factors reported that may affect increased obesity have included increased portion sizes; increased convenience food eating; increased frequency of eating out; increased consumption of sugar-sweetened drinks; changing labor markets; increased “screen” time including television, computer, and electronic gaming time; and decreased outdoor exercising (possibly due to fear and/or accessibility). The United States is reported as having the highest prevalence of obesity among all the developed nations with steady increases in trends (US Department of Health and Human Services [DHHS], 2007a).

Overweight and obesity are typically measured and reported using the Body Mass Index (BMI) universal standard, which is calculated as weight in kilograms divided by height in square meters (kg/m²). Using this standardized system, normal weight is a BMI of 18.6 to 24.9; overweight is a BMI of 25 to 29.9; and obese is a BMI greater than 30 (National Institutes of Health, 1998).

According to the National Health and Nutrition Examination Survey (NHANES IV) findings of 2003-2004, approximately 66.3 million American adults, aged 20 to 74 years, were overweight and obese and 32.3 million were obese (Kumanyika et al., 2008). Among adolescents between the ages of 12 and 19 years, 5.7 million children were overweight (DHHS, 2008c; DHHS, 2008b; Kumanyika et al., 2008). According to the recent National College Health Assessment and College Health Risk Behavior Survey, self-reported height and weight values indicated that 29.9 percent of college students are overweight or obese (Racette et al., 2008). These numbers are a far reach from the national goal for obesity of 15 percent prevalence among adults and 5 percent prevalence among children in Healthy People 2010 (DHHS, 2008a). Actually, these numbers equate to the highest prevalence ever observed with approximately 64.5
percent of adults and 17 percent of adolescents in the United States being at least overweight (Racette et al., 2005).

Within the last 30 to 40 years, according to the 2003-2004 NHANES, there was a 112.6 percent increase in obesity among the adult population and a 278 percent increase in overweight among adolescents (Kumanyika et al., 2008). This places the U.S. as having the highest prevalence of obesity among the developed nations (DHHS, 2007a). Although these statistics are not too surprising when examined in comparison to the previously mentioned increased sedentary lifestyles and increased consumption of high fat diets among Americans, the greatest increase in overweight and obesity tends to occur between 18 and 29 years of age. Since this is the age range of more than 10 million full-time college students in the United States, it is important to understand how college life can affect this trend (Racette et al., 2008).

Risk factors for chronic diseases often trace back to adolescence or beyond. Events and behaviors learned very early in life have a profound influence on adult outcomes associated with chronic diseases. Childhood overweight and obesity, characterized by excessive body fat, is associated with increased risk for chronic disease morbidity and psychosocial effects into adulthood (Kumanyika et al., 2008). Additionally, the risk for adult obesity increases among those who are overweight as children.

Well-studied antecedents for overweight and obesity are unhealthy, high-fat diets and low levels of physical activity. These conditions are thought to be the result of an imbalance in the intake and expenditure of energy (Sallis & Owens, 1999). In essence, energy consumed must not exceed energy used or else there will be a net weight gain. Conversely, weight loss is the result
of energy used in excess of energy consumed. Therefore, the quality and the quantity of food consumed are important components to weight management, as is physical activity. These aspects affect not only the body’s tendency to gain fat mass but also negatively impact vital bodily functions such as cardiovascular, respiratory, and cellular activity (Koenig, Larson, & McCullough, 2001), thus, linking them to cardiovascular diseases, hypertension, and cancers (Sallis & Owen, 1999). Coupled with the research that suggests that the second leading cause of premature death in the United States is the result of inadequate exercise and an unhealthy diet, resulting in some 300,000 deaths annually, the obesity issue is far from being a simple concern of outward appearance (Rozmus, Evans, Wysochansky, & Mixon, 2005).

Religion has served as a protective factor for many diseases. It has also served as a major influence on diet, particularly in regards to religious affiliation and rules about dietary practices (Koenig et al., 2001). Since religious teachings are often paired with instructions for what to eat, when to eat, how to prepare food, or how much one should eat (temperance and moderation), members may inadvertently receive health benefits and improve society by helping to reduce disease rates and healthcare costs.

Excessive fat intake, characterized as greater than 30 percent of total calories from fat, is often a chief culprit in health disparities. Not surprising, the average American diet consists of approximately 36 percent of total calories from fat. Reducing the amount of calories consumed from fat, saturated fat, and cholesterol and increasing consumption of fruits, vegetables, and grain products has proven to produce remarkable health outcomes (Kim, Sobal, & Wethington, 2003; Koenig et al., 2001). Many religious groups often adhere to a diet void of caffeine, nicotine, alcohol, and some or all meats, depending on their religious proscriptions. These
practices have been shown to improve the health of their members and reduce certain related deaths. For example, Seventh-Day Adventists and Mormons typically abstain from alcohol, tobacco, and drinks containing caffeine, as well as highly refined foods. Among Seventh-Day Adventists’, it is common practice to completely abstain from meat. Among these groups, researchers found lower rates of non-smoking related cancers and cancer-related deaths, as well as lower serum cholesterol levels. Consequently, they also have lower death rates of coronary artery disease (CAD) (often the result of high fat dietary practices). Similar findings have also been noted among Orthodox Jews who follow the Mosaic code for a kosher diet, void of pork and very moderate alcohol consumption (Koenig et al., 2001). These findings suggest that religion has a positive influence on diet and subsequent related disparity and death.

In addition to healthy dietary practices, increased physical activity aids in reducing body weight and improving physiological functioning. Members of the U.S. population have very low levels of physical activity. According to a recent study of physical activity in the United States using accelerometers, only 3.5 percent of adults regularly engage in the recommended 30 minutes of moderate intensity physical activity on most days of the week (American College of Sports Medicine, 2009; Troiano, Berrigan, Dodd, Masse, Tilert, & McDowell, 2008). Other research has suggested that only 12 to 22 percent of American adults engage in some leisure physical activity (CDC, 2008b; Martin, Morrow, Jackson, & Dunn, 2000). These findings are quite remarkable and suggest a strong possible relationship to the recent increase in chronic diseases and specifically, the current obesity epidemic in the United States.

In order to maintain or lose weight, individuals need to increase the duration of moderate intensity physical activity and not increase energy intake beyond their daily caloric needs. These
physical activity recommendations are in addition to regular daily activities and should be performed on most days of the week (CDC, 2008c). Some recent research has even suggested that simply increasing physical activity by 150 minutes per week, regardless of incremental duration, will have positive effects on health (DHHS, 2008a). However, any increase in physical activity is recommended and beneficial for individuals whose lifestyle is more sedentary than active. Interestingly, this recommendation is a normal part of daily life for some religious groups, based on their religious beliefs and practices. For other groups, it is facilitated by the teaching of religious consequences vis-à-vis “the body as a temple”, which has served to encourage better care of the body through the use of physical activity. Regardless of proximate cause, religion may positively influence participation in physical activity.

Health issues remain a regular item on the research agendas of Americans. This is evident through the emergence of national health initiatives, such as the 1980 Promoting Health/Preventing Disease: Objectives for the Nation, and Healthy People 2000: National Health Promotion and Disease Prevention Objectives. In connection with the 1996 Olympic Games in Atlanta, Georgia, the U.S. Surgeon General launched a report on physical activity and health to acknowledge the health benefits of physical activity. A more recent initiative to target adolescents was The National Initiative to Improve Adolescent Health by the Year 2010 (“The National Initiative”) (CDC, 2007c; DHHS, 2000). Additional support has been provided through the Surgeon General’s Calls to Action to address other salient health issues in the United States, such as overweight and obesity (Yancey, 2004). As a result of many years of research and these types of initiatives and in efforts to reduce health disparities and improve quality of life, the federal government continues to encourage people to incorporate healthy behaviors, such as regular physical activity and a healthy, low-fat diet, into their daily life.
Among the most widely recognized public health initiatives, the Healthy People initiative has established the health objectives for the nation for over two decades and has consistently maintained two primary goals: 1) increase the quality and years of healthy life and 2) eliminate health disparities (DHHS, 2000). Based on these goals, ten leading health indicators have been identified to reflect the major health concerns in the United States. The two leading health indicators have been and remain to be 1) Physical Activity and 2) Overweight and obesity. These outcomes led to the inception of the American College Health Association’s (ACHA) companion initiative, Healthy Campus 2010, which reflected the national college health objectives and has served as an impetus for improving the health of college and university students in America through health promotion and disease prevention efforts on college campuses (ACHA, 2002). Containing over 200 health objectives for American colleges and universities to address, physical activity and overweight/obesity maintained the position of leading health indicators. However, despite the national awareness of these issues, recent college health data revealed that college student patterns of physical activity and diet do not meet the recommendations of health professionals (Racette et al, 2008). Based on these assumptions, college health research and programming should focus on issues related to physical activity and overweight and obesity, with particular attention given to influential areas of health, such as religion and spirituality, which may lead to greater sustained impact.

The assumption that religion and spirituality plays an integral role in the lives of many people, despite advances in medicine, psychology and education, has been supported through research for many years (Koenig et al., 2001). To put this potential relationship into perspective, according to Thoresen and Harris (2002), approximately ninety-six percent of Americans claim to believe in God and two-thirds consider their religious/spiritual beliefs as very important in
their lives. Among high-school aged adolescents, ninety-five percent believe in God and eighty-five to ninety-five percent report that religion is important in their life (Cotton, Zebracki, Rosenthal, Tsevat, & Drotar, 2006). This trend continues into college, as entering college students report high levels of spiritual interest and involvement with reports of four in five freshmen having attended religious services in the past year (Astin et al., 2007). Since an individual’s beliefs and values are reported as a factor of influence towards health behaviors (Ajzen & Timko, 1986; Ajzen & Madden, 1992), and over 95 percent of Americans claim that these personal beliefs are very important to them, then it is possible that this relationship could be significant for health-promoting efforts.

Research in the area of religion, spirituality, and health has included the investigation of chronic diseases, as well as, general well-being and a host of other health issues (Miller & Thoresen, 2003). The majority of studies involving religion and spirituality has been conducted among older adults and has commonly involved patients who were in a hospital or nursing home setting (Koenig et al., 2001; McBride et al., 1998). Although there has been great debate over the efficacy of previous research in this area, since the 1990s, the quality and quantity of studies have improved through the onset of controlled investigations and formal hypothesis testing. Consequently, research initiatives have been launched with the National Institutes for Health and there have been increased publications in scientific journals (Miller & Thoresen, 2003).

Findings from these studies have shown promise for researchers interested in examining the relationship between religion and spirituality and health among other populations and settings. For example, in a 42-article meta-analysis by McCullough and colleagues, they found that people who attended church more frequently and prayed more frequently had a lower
mortality rate (2000). In a large study by Koenig and colleagues, they found a lower mortality rate among adults over the age of 65 who frequently attended religious functions (Koenig et al., 2001). An interesting correlation between religion and general health found that on average, people who attended church on a regular basis have an average life expectancy of eight years longer compared to those who never attend church, even when adjustments were made for initial health status and behavioral and social risk factors (Hummer, Rogers, Nam, & Ellison, 1999; Idler et al., 2003). Additionally, religion has been shown to be a significantly positive contribution to end-of-life events (Koenig et al., 2001).

Religion and spirituality have been shown to serve as protective factors for multiple risky behaviors including alcohol and drug use and abuse, marijuana, tobacco, and sexual promiscuity, especially among adolescents (Kim & Sobal, 2004; Koenig et al., 2001; Oleckno & Blacconiere, 1991). Additionally, they have been associated with healthy lifestyle practices (Blanchard et al., 2008; Kim & Sobal, 2004; Koenig et al., 2001; Oleckno & Blacconiere, 1991; Yancey et al., 2004). Findings suggest that adolescents who are more religious are less likely to engage in risky health behaviors such as marijuana use and more likely to participate in health promoting behaviors such as seatbelt compliance, healthy eating and exercise (Hadaway, 1984; Johnson, Sheets, & Kristeller, 2008; Koenig et al., 2001; Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998; Wallace & Forman, 1998; Wallace, Brown, Bachman, & LaVeist, 2003). There is also evidence of an inverse relationship between adolescent and adult delinquency and religion (Evans, 1995).

In a study among college students, religion was found to increase positive health behaviors and decrease negative behaviors (Oleckno & Blacconiere, 1991). Nagel and Sgoutas-
Emch found that religion and spirituality did not negatively correlate with risky health behaviors, specifically alcohol and caffeine consumption, smoking and illicit drug use (2007). Another study examined the effects of religion and spirituality among young, healthy college students in a small liberal arts college in California and found small positive correlations between religious measures and positive health-promoting behaviors, specifically exercise (Koenig et al., 2001). This positive relationship appears to be consistent throughout adolescence and adulthood.

Although there has been less research among college students in the area of religion, spirituality, and health, findings from related studies have suggested positive correlations between health-promoting behaviors and religion and spirituality. Based on such findings, it is evident that there is a need for research that specifically addresses the relationship between religion, spirituality, physical activity and diet within the college population. The relevance of this research will continue to escalate as the burden of chronic diseases among college-aged individuals continues to increase, as will the need for the development of health education interventions.

Social relationships and social support are key elements of the social environment in which individuals operate (Heaney & Israel, 2008). The sense of connectedness to others and to key institutions has been shown to be protective against an array of health risk behaviors as well as produce better mental health outcomes among adolescents (Bernat & Resnick, 1996). The 2003 Commission on Children at Risk reported that there is an innate need for children to connect to others from birth and behavioral problems tend to decrease the more these needs are met. Additionally, this group addressed the deteriorating behavioral and mental health among American youth suggesting it was majorly due to a lack of connectedness, which is more
commonly referred to as protective relationships between children and their environment (Bernat & Resnick, 2009; Commission on Children at Risk, 2003). Specifically, the Commission concluded:

In large measure, what’s causing this crisis of American childhood is a lack of connectedness. We mean two kinds of connectedness – close connections to other people, and deep connections to moral and spiritual meaning. Where does this connectedness come from? It comes from groups of people organized around certain purposes – what scholars call social institutions. In recent decades, the U.S. social institutions that foster these two forms of connectedness for children have gotten significantly weaker. That weakening, this report argues, is a major cause of the current mental and behavioral health crisis among U.S. children [pp.1-2].

These relationships are considered to be anchoring points in life that prevent social isolation and disconnection, thereby reducing adverse health outcomes attributable to a lack in social support. Social relationships have been reported to have profound influence on health behaviors and health status and are important to consider when examining health-related variables. Several studies have addressed the positive influence of social relationships on health (Antonucci, 1990; House, Umberson & Landis, 1988a; Quick, Nelson, Matuszek, Whittington & Quick, 1996; Turner & Marino, 1994). Although there are some inconsistencies in the findings and conclusions of the reviews, Heaney and Israel (1996) conclude that social support together with social networks have an important causal effect on health, exposure to stress, and the relationship between stress and health.

The reviews conducted have also provided consistent evidence that social relationships may strongly influence health behavior choices (Heaney & Israel, 2008). Health behaviors are often influenced by the social context in which someone lives, whether that context is prosocial
or antisocial (Bernat & Resnick, 2009). It is often referred to, theoretically, as social conformity, or taking on the norms and behaviors of one’s environment while seeking a sense of connection with others. It is through this experience that individuals tend to acquire identity and meaning and that they internalize norms, beliefs, values, and behaviors reflective of their standards or relationships (Bernat & Resnick, 2009). Therefore, it is useful to consider factors at many levels of influence including religiosity and spirituality, as well as the possible influence of its propensity towards social support and social involvement.

A fundamental tenet of most all the world’s major religions encourages help and support of others. Religion as a social institution provides opportunities for social interaction among people of like values and interests (Koenig et al., 2001). Therefore, religious adherents have the opportunity to develop greater social networks and establish social relationships within their institutions. In a meta-analysis by Koenig, McCullough, & Larson (2001), they identified 20 studies that quantitatively examined the religion and social support relationship. They found that within 19 of the studies, at least one relationship between a religious variable and greater social support was found to be statistically significant. In the remaining study, the findings were mixed with 50 percent of the older African American study sample reporting that their family members were their closest and most important friends and 40 percent reported that the members of their church were their most important and closest friends. These findings support the belief that religious involvement facilitates social contacts and social integration, reducing alienation and anomie. The social affiliation within religious communities helps to bind the community together by providing shared experiences, beliefs and values (Koenig et al., 2001). Among adolescents, research has suggested that in addition to exposing them to more conventional
beliefs and values, religion may encourage more prosocial behaviors and connect them to the broader community (Bernat & Resnick, 2009). Through mechanisms such as social support, religion affects attitudes, beliefs, and behaviors (Regnerus, 2003). In a study by Good & Willoughby (2006), they found that regardless of adolescent’s belief in a higher power, church attendance was associated with more positive outcomes. This finding supports the view that through church attendance, individuals are exposed to conventional beliefs, opportunities and connections with others which may facilitate religiosity’s role as an overall protective factor (Bernat & Resnick, 2009).

According to research, an important function of social relationships is the provision of social support (Heaney & Israel, 2008). This concept refers to both the structure and function of an individual’s social life, including group memberships, familial ties, and emotional support. Its psychological and behavioral pathways often facilitate healthy behaviors such as healthy eating and exercise, thereby establishing it as a health-promoting concept (Uchino, 2006). Among religious group membership, the social context may serve to encourage a tendency toward positive affiliative behaviors beyond the basic need for meaning and belonging (Bernat & Resnick, 2009). In a study by Kirkpatrick, Shillito, & Kellas (1999), religion was related to greater emotional support and better perceived support among college students. Because it may reduce an individual’s susceptibility to harmful effects of stress, it is considered to be a psychosocial protective factor for health. However, social support’s role in the etiology of disease is unclear and therefore, may influence the incidence and prevalence of many health outcomes (Heaney & Israel, 2008). Even so, social institutions may influence the development
and maintenance of healthy dietary practices and physical activity through the concept of social support.

Most studies that have examined the relationship between social support and physical activity have found a strong positive association. Cross-sectional and prospective studies have consistently reported these relationships among a broad range of population groups (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Leslie, Owen, Salmon, Bauman, Sallis, & Kai Lo, 1999; Sallis, Hovell, & Hofstetter, 1992; Stahl, Ruttenb, Nutbeam, Bauman, Kannasa, Abele et al., 2001; Steptoe, Andrew, Wardle, Fuller, Holte, Justo et al., 1997; Sternfield, Ainsworth, & Quesenberry, 1999). Regarding gender, this relationship appears to be especially strong among females, particularly social support provided by family members (Leslie et al., 1999). Interestingly, this relationship appears to be significant irrespective of whether participants actually received social support or only perceive it.

According to the literature, the mere perception of social support can be just as effective in promoting healthy behaviors as tangible social support. For example, in an international study of determinants of physical activity by Stahl and associates (2001), perceived social support from the personal environment was identified as the strongest predictor of physical activity. Those reporting low social support were more than twice as likely to be sedentary compared to those who reported high levels of perceived social support. In another study examining the relationship between physical activity and actual social support among Australian college students, Leslie and colleagues (1999) found that those reporting low levels of social support from either family or friends were 23-55% more likely to be inadequately active for health benefits than were those reporting high levels of support. According to Eyler, Brownson, and
Dona (1999), women who reported high levels of physical activity and social support were approximately twice as likely to be active at least 30 minutes per day on 5 or more days of the week compared to women reporting low support. However, lack of social support from family and friends has been associated with lower levels of physical activity among all groups (Stahl et al., 2001). Since physical activity is known to be beneficial for most areas of health, particularly the areas pertaining to physical and mental health, and aids in reducing chronic disease, identifying strong associations or significant relationships may aid in developing and maintaining this health behavior.

Religion is regarded as a protective factor for health. Among children, adolescents, adults and elderly groups, studies have found positive associations for religion and healthy behaviors such as increased physical activity and diet (Koenig et al., 2001). However, the strength of association tends to vary between studies, depending on how the dimension of religion is being measured and the population being studied. From these findings, it is presumable that religion may facilitate increased physical activity and healthy dietary practices among certain population groups either through its theological nature or by the general social support available to religious adherents via physical institution or perception.

Significant findings exist within the literature for social support and dietary change. The majority of existing research is limited by study design and sampling and has involved cross-sectional samples of elderly groups located in predominantly white, rural regions. However, positive relationships have been identified for various aspects of social support and the consumption of sugar, salt, and fat (Silverman, Hecht, & McMillian, 2002), fiber and fruit (Marcus, Heimendinger, Wolfe, Fairclough, Rimer, Morra et al., 2001), and vitamins and minerals (McIntosh, Shifflett, & Picou, 1989). Although these limitations make it difficult to
identify causal relationships between social support and diet, the findings suggest that the role of social support in the development and maintenance of healthy dietary changes may be significant (Kelsey, Earp, & Kirkley, 1997).

Examining this relationship is of particular importance due to the strong associations between diet and morbidity and mortality (Koenig et al., 2001; Kristal et al., 1995). Dietary practices contribute to disease development and disease prevention. This is evident by the fact that diets that are high in fats and low in fruit, vegetable, and grain consumption are considered to be unhealthy and put individual consumers at increased risk for developing chronic diseases such as cardiovascular disease, strokes, obesity, diabetes, and some cancers (CDC, 2008c; CDC, 2008d; Koenig et al., 2001; Kristal et al., 1995; Racette et al., 2005). On the contrary, healthy diets that are low in fat and refined sugar and high in fruits, vegetables, fiber and complex carbohydrates contribute to factors that reduce chronic disease risk, such as lower cholesterol levels, lower blood pressure, improved digestive function, increased energy, and improved body composition (decreased total body weight and body fat); thus, to a healthier individual (Kim & Sobal, 2004; Kim et al., 2002; Koenig et al., 2001).

Social support has been positively correlated to weight management programs and dietary change (Kristal et al., 1995). A significant relationship also exists between religion and dietary factors. Therefore, social support that is provided through religion may serve to facilitate healthy dietary practices and decreased body weight. However, a fundamental aspect of religious theology is that it typically encourages healthy dietary practices and discourages obesity; therefore, religion may independently influence healthy dietary practices (Kim et al., 2003). Nonetheless, religion’s role in promoting the consumption of a healthy diet appears significant and merits further investigation.
Religion is a term that has been often viewed as a societal phenomenon that involves a social institution comprised of members brought together by shared beliefs and rules, rituals, covenants, and formal procedures. Spirituality, by contrast, is viewed as more the personal experience (Thoresen & Harris, 2002). According to the literature, religion and spirituality share a common element that is referred to throughout the literature as a search for the “sacred”. The sacred core is comprised of thoughts, feeling, behaviors and experiences of an individual as he or she seeks his or her perception of a divine being, the Ultimate Truth or Ultimate Reality. The concept of searching may involve a desire to articulate, identify, maintain or transform something. This sacred element is viewed as the core of religiosity and spirituality. It is not seen as a mere object or thing that is very important to an individual (i.e. children, spouse, job), but rather it is something that relates with the divine and has divine attributes (Koenig et al., 2001; Zinnbauer, 1997).

Religion is a term that has been used since the 13th century and stems from the Latin religio, which refers to “reverence for God or gods, careful pondering of divine things; piety, religion, both pure inward piety and that which is manifested in religious rites and ceremonies. Possible derivations of religio that are favored by modern scholars may include the term ligare, which means “to bind or connect” and may have an added prefix of re (again) which suggests a reconnection. It is an obscure term that often emphasizes experiential, emotive, intuitive, valuation and ethical factors. It is difficult to formalize the concept of religion into an objective definition that can be easily generalized, as most definitions range between meaningless generalities to overly sharp. Definitions have often varied, based on the discipline of the researcher. For example, an early definition states, “the feelings, acts, and experiences of
individual men in their solitude, so far as they apprehend themselves to stand in relation to whatever they may consider the divine” (James, 1902). A concrete definition from Doyle (1992, p. 303) states, “practices carried out by those who profess a faith”. This factors in a new term, “faith”, which is defined as a “a strong belief in a supernatural power or powers that control human destiny” (WorldNet 3.0, 2006).

Until the last couple of decades, the term “Spirituality” has often been used synonymously with religion. There was little effort made to differentiate between to two terms. It is derived from the Latin spiritus, which means “the breath”, that which is vital to life (Thoresen & Harris, 2002). Spirituality has been defined as “the human response to God’s gracious call to a relationship with himself” (Novak, 1999). Carl Jung describes religiousness and spirituality as abstract, stating “the attitude peculiar to a consciousness which has been altered by the experience of the numinosum (religious/spiritual experiences, a mystery that is both terrifying and fascinating at the same time) (Jung, 1938, p. 6). It has also been described as a sacred, subjective experience (Vaughan, 1991) and as the immeasurable realm of human potential seeking to conceive ultimate purposes with higher entities, with God, with love, with compassion, with purpose (Tart, 1983).

Due to the rise in secularism during this century, religion has been somewhat distinguished from spirituality. Prior to now, spirituality may have been described as subjective religion. It was not until the past 25 years that spirituality began to be of interest to researchers (Roof, 1993). During this time, there has been a decline in church membership beginning in the late 1940’s with a significant increase during the 1960s and 1970s, especially among the “Baby
Boomers”. With this decline in organized religious affiliation came an increase in the popularity of new forms of faith under the auspices of “spirituality” (Zinnbauer, Pargament, & Scott, 1999).

Spirituality has had a great deal of attention in recent years, as it has been the focus of books, conferences and journal articles. In the 1980s and 1990s, there was an attachment of the term spirituality to numerous political, religious and social movements (Zinnbauer et al., 1999). Religious institutions have been viewed as a hindrance to experiencing the sacred, therefore the current culture has sought to find elements that are more “spiritual” rather than “religious” (Zinnbauer et al., 1997).

In a study by Roof (1993), where he examined 1,599 baby boomers, he found a defection of baby boomers who have left organized religion in the 1960s and 1970s and an increase in spiritually-based religion or new religion. This cohort was labeled as highly active seekers and was characterized as being “more educated, more individualist, more likely to engage in mystical religion which may contain various New Age beliefs and practices, less likely to hold a theist belief about God, more likely to view their faith as a spiritual journey or a quest and more likely to come from homes of infrequent attendance by their parents” (Zinnbauer et al., 1997).

Although there seems to be a distinction between religion and spirituality, there are still many overlapping concepts. Several studies have shown that there are some common threads that weave between them. A common phrase and finding is often the generalized classification/comparison of spirituality and religion, suggesting that spirituality is a broader concept than religion and includes religion (Hyman, 2006). This may be due to the fact that common definitions of spirituality and religion do not differ in regards to the sacred. The
common references to God, Christ and the Church are often incorporated in both types of definitions, suggesting that they are not fully independent. In a study by Zinnbauer and colleagues (1997), interestingly, they identified a group who is classified as spiritual, not religious who are closely linked to the highly active seekers in the Baby Boomer generation. This idea of being spiritual but not religious is likely to stem from the negative connotation associated with religion among the baby boomer culture. As a result of this ideology, many Americans are trying to experience the sacred without using religion as a vehicle.

For research purposes, it is necessary to identify the characteristics that may help to distinguish each concept. Some notable characteristics for religion may include being focused on the community through service and outreach. These behaviors are often observable and measurable outward practices. In comparison, spiritual characteristics are more individualistic and often involve a more emotional orientation. These include practices that are directed inward and often involve no other person. Religion is organized, formal, and orthodox where spirituality is less organized, less formal and less systematic. Religion is typically founded in doctrine pertaining to good and evil, whereas, spirituality does not have a consistent doctrine or specified boundaries. Religion is often more behaviorally authoritarian and seeks to encourage conformity by its adherents. Spirituality is more liberal, with little accountability to any other person, and encourages unity through personal distinction (Koenig et al., 2001).

A well-recognized set of characteristics that varies greatly between religion and spirituality involves the concept of good and evil. Religion has a doctrine which separates the two concepts; spirituality is more unified and has no doctrine. The most distinguishable characteristics, for the purposes of research, are that religion is measurable, observable and
objective whereas spirituality is much less visible and measurable and subjective (Koenig et al., 2001). Taking these characteristics into account, the definitions which shall be used for the purposes of research are found in the Handbook of Religion and Health (2001, p. 18) and are as follows:

Religion is an organized system of beliefs, practices, rituals, and symbols designed (a) to facilitate closeness to the sacred or transcendent (God, higher power, or ultimate truth/reality) and (b) to foster an understanding of one’s relationship and responsibility to others in living together in a community.

Spirituality is the personal quest for understanding answers to ultimate questions about life, about meaning, and about relationship to the sacred or transcendent, which may (or may not) lead to or arise from the development of religious rituals and the formation of community.

Much of the research that has been conducting with religion, spirituality and health, has been conducted in the United States. The majors religious groups found in the United States include Christian, Jewish, Muslim, Buddhist, and Hindu. Worldwide membership within these religions is approximately 2.1 million (Christianity); 14 million (Jewish/Judaism); 1.5 million (Muslim); 376 million (Buddhist); 900 million (Hindu) (Adherents, 2000). In the United States, these numbers are approximately 151,000,000 (Christian); 3,100,000 (Jewish); 527,000 (Muslim); 400,000 (Buddhist); 227,000 (Hindu) (Koenig et al., 2001).

Religion/religiosity may be operationally examined by the use of specific dimensions. These dimensions allow researchers to examine or measure a particular area of religion by using
the components within the dimension to formulate specific questions. It is important to note that within the literature, the dimensions have been used synonymously with the term ‘religiosity’ and the number of dimensions being examined varied between studies. For the purposes of this research, traditional dimensions of Judeo-Christian religion was discussed and examined. They include Religions belief; Religious affiliation or denomination; Organizational religiosity; Non-organizational religiosity; Subjective religiosity; Religious commitment/motivation; Religious experience; Religious well-being; Religious coping; Religious knowledge; Religious consequences (see Table 1) (Koenig et al., 2001).

Table 1

Dimensions of Religiosity

<table>
<thead>
<tr>
<th>Religious Belief</th>
<th>Religious Knowledge</th>
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<tr>
<td>Religious Affiliation/ Denomination</td>
<td>Religious Quest</td>
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<tr>
<td>Organizational Religiosity</td>
<td>Religious Experience/ Conversion</td>
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<tr>
<td>Non-organizational Religiosity</td>
<td>Religious Well-being</td>
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<tr>
<td>Subjective Religiosity</td>
<td>Religious Coping</td>
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<tr>
<td>Religious Commitment/ Motivation</td>
<td>Religious consequences</td>
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The most basic level of religiosity is religious belief. This is typically discussed in terms of whether or not an individual believes in God and to what extent the individual conforms to the early ecumenical creeds and confessions of the early church. Identification with a particular religious group is the next dimension. This affiliation is often classified as a denomination, even though the two terms are not synonymous. Affiliation has more to do with the religious practice; denomination is classification within the Protestant Christianity. For example, Judeo-Christian religious affiliation would be classified as Protestant, Catholic, or Jewish. Within the Protestant affiliation, there are many denominations including Baptist, Methodists and Presbyterians (this list is not exhaustive).

The next dimension, organizational religiosity, examines the social dimension. This involves not only membership but also participation in the organizations activities. This includes attendance to religious services, social activities, and participation in Bible or scripture studies, holding church office, participation in rituals or sacraments, or financial giving.

Non-organizational religiosity is defined by prayer. Prayer is unique to each individual; however, theologian Michael Novak describes it as a way for Christians and Jews to have a conversation with the Creator (1999). There are at least six types of prayer that are based on an intended outcome: petitionary prayer, intercessory prayer, prayer of adoration, prayer of confession, contemplative prayer and meditative prayer. Petitionary prayer involves making your specific requests known to God. Intercessory prayer involves praying for others and is directed to specific divine beings for a particular outcome. A prayer of adoration involves giving praise and thanksgiving, showing love and honor to God or divine beings. The admitting of one’s mistakes or sin to God is known as a prayer of confession. For some religions this may
involve a ritual of penance or other activity that aims to correct the mistake or sin.

Contemplative and Meditative Prayer are similar, yet may differ among religious groups. They have less specific direction than the previous prayer types. For Christians, contemplative prayer may involve sitting quietly and listening to God. This may be in reference to a particular scripture or for no specific reason. For other groups, they may sit quietly and clear the mind of any specific thoughts. Meditation is very similar to the latter. It is a common practice among Buddhist and involves clearing the mind and focusing on a specific word or phrase. It is important to note that meditation is practiced by the non-religious, as it does not always relate to the transcendent (Koenig et al., 2001).

Religious experience is a dimension of religion that has long been studied by social scientists. In the early 1900s, psychologists William James used the bizarre and often spectacular religious experiences of patients and famous people in history as the means for his classic book *Varieties of Religious Experience* (1902). These religious experiences are described as religious conversion (gradual or sudden types of life events that transform beliefs and change the individual’s life), born-again experience (personal experience where Jesus Christ saved the individual from his or her current life of sin and eternal damnation), mystical experiences (“becoming one” with the universe, God or some other phenomena), physical or emotional healing (that which takes place after conversion and often becomes part of the individual’s “testimony”), or other individual experiences that related to God, the transcendent or the ultimate reality (feeling close to God, reverence resulting from spiritual experiences, feeling negative emotions such as fear or terror) (Koenig et al., 2001).
The religious well-being dimension was derived from the *Spiritual Well-Being* (SWB) scale by researchers Paloutzian and Ellison (1982). This scale measures religious well-being and existential well-being. The questions regarding religious well-being examine the individual’s relationship with God from a personal, fulfilling and satisfying perspective, whereas existential elements seek to examine general well-being and life satisfaction.

Religious coping examines ways in which individuals adapt to change and cope with stressful situations. Although this may seem similar to extrinsic religiosity, it is not. This involves the individual’s religious behaviors and cognitions. Commons strategies include prayer to God for emotional strength or for a situation to change, reading inspirational scripture for comfort, seeking the guidance of a minister, making decisions to trust God, or other religious thoughts or behaviors. This concept was discussed more in depth in the book by Kenneth L. Pargament, *The Psychology of Religion and Coping* (1997).

The amount of information or knowledge a person has regarding his or her religion is known as religious knowledge. This includes the doctrines, major tenets and history of the religious faith.

The last religious dimension examines religious consequences. This is based on the tenets of religious tradition. For example, for Christians and other religious faiths, religious consequences may include giving money and time (service) to support the church or the needy. It may also include altruistic acts (helping someone in need) or volunteering one’s time for a worthy cause.
The Health Benefits Associated with Religion and Spirituality

Religion (formal and informal religious practice, both public and private) and spirituality (individual’s relationship to something sacred; meaning and values of one’s purpose) are regarded as having extensive influence on individual’s cognitions, emotions and behaviors (Koenig et al., 2001; Neff, 2006). Much of previous research, however, has focused on how and why religion influences mental health outcomes. For example, well-being has consistently been related to religious beliefs and practices. Additional findings of this relationship suggest greater life satisfaction, happiness, positive affect and morale. In a meta-analysis by Koenig (2001) and colleagues, 100 studies were uncovered that statistically examined the association between well-being and religion. Seventy nine percent of those studies reported at least one positive correlation between religious involvement and life satisfaction, morale, greater happiness or positive affect (Koenig et al., 2001).

Additional significant correlations between religion and mental health outcomes have been found with hope and optimism (Sethi & Seligman, 1993); purpose and meaning; self-esteem; adaptation to bereavement (Idler, 2003); social support (Idler, 2003); loneliness; depression (Ellison, 1995); suicide (van Tubergen, te Grotenhuis, & Utler, 2005); anxiety (Glas, 2007); schizophrenia and psychoses (Koenig et al., 2001); alcohol and drug abuse (Michalak, Troki, & Bond, 2007); delinquency and crime (Wallace & Forman, 1998); marital stability (Brimhall & Butler, 2007). Significant evidence exists through the studies where religion has been shown to reduce the onset of depression (Koenig et al., 1992) and hasten the recovery for those already suffering from it (Koenig, George, & Peterson, 1998).
In examining religiosity’s relationship with physical health outcomes, substantial evidence supports its usefulness as a protective factor (Aten & Shenck, 2007; Fraser, 1999; Kim & Sobal, 2004; Koenig et al., 2001; Michalak et al., 2007; Townsend, Kladder, & Mulligan, 2002; Wallace & Forman, 1998). One such mechanism involves a direct physiological pathway for major and minor stressors. This involves the neuroendocrine messengers catecholamine, serotonin, and cortisol, which have been associated with suppressed immune response, myocardial ischemia, increased platelet aggregation, arrhythmias, and elevated ambulatory blood pressure (Idler, 2003). Certain practices associated with religiosity, such as prayer and meditation, have been shown to counter the stress response by eliciting a relaxation response. This is accomplished by reduced activity in the autonomic nervous system; a lower oxygenation, heart rate, and blood pressure; reduced activity in the adreno-cortical axis/anterior-pituitary; and alterations in activity and function of brain waves (Idler, 2003). Therefore, this mind-body-spirit relationship can serve to create cognitive cues for managing stress and minimize the associated health risks and adverse physical effects.

Cardiovascular diseases (CVD), such as heart disease, hypertension, peripheral vascular disease and stroke, continue to reign as the most common cause of death in the United States (American Heart Association, 2008). According to the American Heart Association (2008), 80.7 million adults, or 1 out of 3, have one or more of these diseases and as a result, approximately 2,400 people die each day. That equates to the combined number of deaths that result from cancer, chronic lower respiratory diseases, accidents and diabetes mellitus (AHA, 2008). Risk factors that are most commonly associated with CVD include smoking cigarettes, high cholesterol, and inadequate levels of physical activity, overweight/obesity, and alcohol abuse (Koenig et al., 2001). Studies have examined the relationship between religiosity and each of the
aforementioned risk factors and revealed significant findings between the protective factor of religion and positive health outcomes regarding these risk factors (Enstrom, 1989; Gupta & Camm, 1997; Idler, 2003; Lyon, Wetzler, Gardner, Klauber, & Williams, 1978; Phillips, Kuzma, Beeson, & Lotz, 1980; Phillips, Lemon, Beeson, & Kuzma, 1978).

Several studies have supported the notion of a positive association between religious involvement and physical activity (Bassett, Schneider, & Huntington, 2004; Kim & Sobal, 2004), healthy eating (Hart, Tinker, Bowen, Satia-Abouta, & McLerran, 2004; Kim & Sobal, 2004; Kim et al., 2003; Oleckno & Blacconeire, 1991), tobacco use (Adelekan, Abiodun, Imouoklhome-Obayan, Oni, & Ogunremi, 1993; Kim et al., 2003; Oleckno & Blacconeire, 1991; WHO, 2004;), safe driving and risk-taking (Hoffman, 2000; Miller & Hoffman, 1995; Oleckno & Blacconeire, 1991). An influencing factor may include the social aspect of religion, which can serve as an impetus for better health. In a study by Johnson and associates (2008), 516 college students were surveyed and found an inverse relationship with religious involvement and alcohol consumption through social influences and negative beliefs about alcohol; social influences had the greatest effect. Wallace and colleagues (2003) found that among white and black adolescents, those who reported being more highly religious were more likely to abstain from alcohol, tobacco and marijuana. Oleckno and Blacconiere (1991) surveyed 1,077 college students at Northern Illinois University and found that college students who reported being more religious were more likely to exercise, less likely to smoke, and more likely to use a seat belt.

According to experts, if individuals are more attentive to lifestyle when they are younger, many expensive chronic diseases may be prevented (Koenig et al., 2001). Additionally, if
greater attention is paid to diet, smoking and exercise patterns, at any age, rates of the most widespread illnesses could be drastically reduced (Ornish et al., 1990).

Although research in the area of religion and dietary behaviors is relatively new, there have been some interesting associations with diet and religion. Blix portrays an interesting perspective about religion’s influence on diet in the essay, ‘Religion, spirituality and a vegetarian dietary’, (Sabate', 2004; Blix, 2001):

“Since the dawn of civilization, there has been an inexorable intertwining of food and religion. The earliest of recorded history is rife with the interconnections. The plethora of cultures with their divergent practices and behaviors still share this one commonality, for humans seem incapable of separating nourishment of the body from sustenance for the soul.” (Sabate', 2004, p. 508).

National studies conducted by Ferraro (1998) and Lapane et al. (1997) found that church members were more likely to be at least 20 percent overweight, with obesity being associated with higher levels of religious practice. These rates were highest among Pietistic and Fundamentalist Protestants and lowest among Jews and non-Christians. Interestingly, the highest rates of obesity were positively associated with the percentage of Baptists in the state. Seventh-Day Adventists and Mormons seem to have the most proscribed diets, as they are encouraged to abstain from alcohol, tobacco, caffeinated beverages and refined or processed foods. Additionally, Seventh-Day Adventists’ tend to avoid biblically proscribed meats, such as pork, and many are complete vegetarians. Their dietary practices are thought to contribute significantly to the low rates of death from coronary artery disease experienced by Seventh-Day Adventists and Mormons (Koenig et al., 2001).
The relationship between religion and physical activity has also received recent attention among researchers. Oleckno and Blacconiere found that among college students at a large public university, regular exercise was positively associated with being highly religious (1991). In a study by Kim and Sobal (2004), adult community members were surveyed and findings suggested a significant relationship between greater religious commitment (giving money to religion) and moderate and vigorous physical activity among women. For men, prayer was related to increased moderate physical activity. These findings were more common among Catholics than Protestants. In contrast, McIntosh and Spilka found an inverse relationship between intrinsic religiosity and physical activity. Among study participants, those who reported being more intrinsically religious (motivation for religiosity stems from internal processes rather than external processes) also reported lower levels of physical activity (1990). This finding suggests that more intrinsically motivated people will exercise less often than those who are more extrinsically motivated (Koenig et al., 2001).

Data exist from numerous studies, as seen above, to support that those who are more religious tend to have healthier lifestyles, overall (Koenig et al., 2001). This often involves less use of tobacco, marijuana, and alcohol and more frequent utilization of seat belts and less risk-taking. Additionally, those who are more religious tend to have a greater social network which often leads to higher levels of physical activity, and for some religious groups, a healthier diet.

As mentioned before, chronic disease continues to increase, as does its negative association with physical activity and dietary behaviors. However, there has been very little distinction between the college population and the general population prior to now. Additional limitations in previous research include the lack in distinction between religiosity and spirituality. Terms have since been distinguished and instrumentation continues to improve,
therefore more current studies are needed that utilize the objective measures and distinct concepts. Additionally, the majority of previous studies have targeted older adults or broad-range, mixed populations. There are very few studies, comparably, that directly target college students. More specifically, the number of studies that address religion, physical activity and dietary behaviors within the college population are almost void.

The Benefits Associated with Physical Activity and Reduced Fat Intake in the College Population

“Generally speaking, all parts of the body which have a function, if used in moderation and exercised in labors to which each is accustomed, become healthy and well developed, and age slowly, but if unused and left to idle, they become liable to disease, defective in growth, and age quickly.” – Hippocrates (n.d.)

Physical activity is associated with many health benefits among all population groups. These include reduced incidence of hypertension and diabetes, improved cardiorespiratory performance, increased muscle and bone strength, improved physical appearance and mental well-being (Brown et al., 2003). In addition to these facts, physical activity decreases the risk of developing other diseases such as breast and colon cancer, high density blood lipids (HDL), heart disease and associated death among all age groups (DHHS, 1999d). Among children and adolescents, engaging in physical activity is beneficial for normal skeletal development, increased aerobic fitness, decreased body fat, increased HDL and improved self-perception, therefore, having benefits for current and future health (Sallis & Owen, 1999; DHHS, 2000). Among adolescents and young adults, physical activity is beneficial for building and maintaining healthy bones, muscles, and joints. Additionally, it aids in weight control, builds lean muscle, and reduces body fat. Concerning chronic disease prevention, these benefits assist with
preventing or delaying the development of high blood pressure and may reduce blood pressure in some adolescents with hypertension (DHHS, 1999d).

Guidelines for the optimal level of physical activity have been revised and expanded to be more comprehensive for decades. This evolution of national recommendations for physical activity health benefits began in the early since the 1960s and 1970s with the President’s Council on Physical Fitness in 1965 and the American College of Sports Medicine (ACSM) position statement in 1978 entitled “The Recommended Quantity and Quality of Exercise for Developing and Maintaining Fitness in Healthy Adults” (DHHS, 1999a). Initially, public health recommendations emphasized the importance of vigorous activity for cardiorespiratory fitness and body composition. Later, standards set forth by the U.S. Department of Health and Human Services that were outlined in the first Surgeon General’s Report to address physical activity and health, *Physical Activity and Health: A Report of the Surgeon General* (1999), recommended participation in moderate and vigorous physical activity at least 3 to 5 times per week for about 30 minutes each time, recognizing numerous health benefits and not just cardiorespiratory benefits. These guidelines were consistent with the American College of Sports Medicine recommendations for participation in physical activity three to five days per week for 20 to 60 minutes daily at an intensity that increases one’s breathing rate or causes sweating.

More recently, Healthy People 2010 recommended regular engagement in moderate physical activity for at least 30 minutes five or more days per week or at least 15-20 minutes of vigorous physical activity three or more days per week. Additionally, experts have advised that previously sedentary individuals begin with short durations of moderate-intensity activity and gradually increase the duration or intensity until the desired goal was reached. According to the
Surgeon’s General’s Report on Physical Activity and Health (1999), these recommendations have been extended to include the recommendation that “people of all ages over the age of 2 years should accumulate a minimum of 30 minutes of physical activity of moderate-intensity on most, if not all, days of the week” (DHHS, 1999d). It was also acknowledged that most people could obtain greater health benefits by engaging in more vigorous intensity physical activity or by engaging in physical activity for a longer duration (DHHS, 1999d).

According to the 2008 Physical Activity Guidelines for Americans, there are two levels of aerobic physical activity recommended for achieving health benefits, as mentioned above. The first type of physical activity, moderate-intensity aerobic activity, involves working intensely enough to raise the heart rate and cause perspiration. For example, a participant would be able to talk without being too winded but not able to sing. Examples of activities that require moderate effort include fast walking, water aerobics, doubles tennis, and bicycling on level or moderate terrain. The second type, vigorous-intensity aerobic activity, involves more labored breathing and an increased heart rate. Examples of these activities include jogging, bike riding, or playing basketball (DHHS, 1999d).

The Surgeon General’s Report on Physical Activity and Health for Adolescents and Young Adults reported that approximately half of American youths aged 12-21 are not regularly vigorously active and 14 percent have had no recent physical activity (DHHS, 1999d). According to the 2008 National College Health Assessment, of the 80,121 college students from 106 institutions of higher education surveyed, more than 50 percent of them did not meet the recommendations for physically activity. Among those students, 21.9 percent of were
considered overweight and 10 percent obese, based on Body Mass Index (BMI) from self-reported height and weight (ACHA, 2009).

Other researchers have reported that over 50 percent of college students did not meet the American College of Sports Medicine’s recommendations for adequate amounts of moderate or vigorous physical activity (Keating, Guan, Pinero, & Bridges, 2005; Dinger, 1999). The Surgeon General’s Report identified females as being more likely to be less active – 14 percent compared to 7 percent – and black females almost twice as likely to be inactive compared to white females – 21 percent compared to 12 percent (DHHS, 1999d). The 2005 BRFSS data reported the physical activity participation prevalence as 60.5 percent for males and 50.8 percent for females between the ages of 18 and 24 years (Physical Activity Guidelines Advisory Committee (PAGAC), 2008).

These reported rates of physical activity are very low among a population of traditionally active individuals. However, they are consistent with reported trends indicating a continuous decline in physical activity levels between 18 and 29 years of age (Caspersen, Pereira, & Curran, 2000). Unless these issues are properly addressed, the associated outcomes will likely be an unhealthy future (PAGAC, 2008; DHHS, 1999d). These data support the need for health education and promotion assessment and intervention for effecting positive change in physical activity among college students, reducing the incidence of overweight, and improving the health of the nation (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005).

Patterns of physical activity begin to decline as early as 12 years of age. Caspersen, Pereira, & Curran (2000) examined data from the National Health Interview Survey-Youth Risk
Behavior Survey (10,645 male and female respondents ages 12-21 years) and the National Health Interview Survey-Health Promotion/Disease Prevention supplement (43,732 men and women aged ≥18 years) and found a consistent decline in “regular, vigorous activity” and strengthening patterns among 12-21 year olds. The prevalence for respondents aged 12 to 17 reporting regular, sustained activity dropped from 40 percent to 24 percent for males and from 30 percent to 20 percent for females, a decline of 16 and 10 percentage points, respectively.

Physical inactivity increased from about 6 percent for 14 year old male and female respondents to about 24 percent for the 20 year old respondents. Among the adult respondents, females had a significantly higher prevalence of inactivity than men (27 percent compared to 21 percent). With age, both groups reported greater physical inactivity. According to Caspersen and associates (2000), the findings from this study suggest that the greatest decline in physical activity occurs between the ages of 15 to 18 years. These findings followed by slower, yet continuous decreases in physical activity in young adulthood have contributed substantially to the obesity epidemic in the United States (Caspersen, Pereira, & Curran, 2000).

In efforts to determine what influences or determines physical activity behavior among young people, Sallis, Prochaska, and Taylor (1999), conducted a comprehensive review of correlates of physical activity. 108 studies were evaluated and 48 variables were examined for adolescents aged 13-18. The variables that were identified as having a consistent association with the adolescent’s physical activity behavior were sex (males being more likely than females to regularly engage in physical activity), ethnicity (whites having higher physical activity rates), age (younger adolescents more frequently engaged than older adolescents), perceived activity competence, intentions, previous physical activity, community sports, sensation seeking,
depression (inverse relationship), sedentary after school and on weekends (inverse relationship),
parent support, support from others, sibling physical activity, direct help from parents, and
opportunities to exercise. By identifying and gaining a better understanding of these factors that
influence or determine physical activity among young people, effective physical activity
interventions can be developed that can target potential mediators of physical activity behavior
(Sallis, Prochaska, & Taylor, 1999).

A more recent study by Blanchard (2008) found a similar correlation between ethnicity
and physical activity among college students, which suggested that Caucasian students were
more likely than African American students to voluntarily engage in physical activity in efforts
to improve one’s physical health. These patterns appear to have remained consistent over the
last decade, as Fennell (1997) found that over one-third of African American students attending
historically black colleges and universities were not involved in any sports activity. Additional
studies of minorities have identified low to very low levels of physical activity among 50 – 70
percent of minority women and 40-50 percent of minority men (Ainsworth, Berry, Schnyder, &

In a population-based survey that included college-aged students, Kim and Sobal (2004)
surveyed 546 adults, aged 17-91 years, and found a significant relationship between greater
religion and moderate and vigorous physical activity in women, and increased moderate physical
activity in men.

Based on the aforementioned statistics, it is evident that there is a need to accurately
identify determinants of these behaviors and factors that influence these determinants in order to
develop effective health promotion strategies for increasing physical activity and healthy dietary
practices. Institutions of higher education may serve as an environment conducive to such
efforts (Keating, Guan, Pinero, & Bridges, 2005).

Recent research has indicated that good nutrition practices can help to lower risk for
many chronic diseases such as cardiovascular disease, stroke, cancers, diabetes, and
osteoporosis. However, it has been estimated only about one-fourth of U.S. adults are consuming
the National Cancer Institute’s (NCI) recommended five or more servings of fruits and
vegetables each day (DHHS, 2007d; Rozmus et al., 2005). Although significant increases in
caloric intake have been identified, these increases were not found to be the result of increased
fruit and vegetable consumption as these numbers have remained relatively constant since 1994.
These respective proportions consist of 20 percent of men and 29 percent of women consuming
the recommended 5 servings per day. These findings appear to be consistent in all
socioeconomic strata, in both sexes, and regardless of individual risk factors (Adams & Colner,
2008).

Although there are a limited number of studies available for the nutrient intake of United
States college students, the college-aged population does not appear to vary much from the
aforementioned norms (ACHA, 2009; Adams & Colner, 2008; Racette et al., 2005).
Comparably, the proportion of 18- to 24-year-olds who regularly met the recommendations falls
approximately 3 percentage points below that of the overall population (Adams & Colner, 2008).
According to data from the Behavioral Risk Factor Surveillance System (BRFSS) and the only
published national college health risk behavioral survey, the National College Health Risk
Behavior Survey, the recommended fruit and vegetable consumption has been met in only about
25 percent of 18- to 24-year old students (Adams & Colner, 2008; Racette et al., 2005; Serdula et al., 2004). In a study by Grunbaum and colleagues (2002), female students reported consuming less fruits and vegetables each day than male students, as males were significantly more likely to have eaten more than five servings of fruits and vegetables each day.

There is a paucity of research examining the relationship between religion and dietary fat intake and a near void in those targeting college students. Because of this gap in the literature, the majority of the information in this section will come from studies that involved a general population group or a college-aged population groups.

Among the few existing studies whose primary focus has been religion and body weight, the findings tend to vary. However, many of the study findings have suggested a negative correlation between the two variables (Baecke, Burema, Frijter, Hautvast, & van der Wiel-Wetzel, 1983; Ferraro, 1998; Kim & Sobal, 2001; Kim, Sobal, & Wethington, 2003; Lapane, Lasater, Allan, & Carleton, 1997). According to a study by Lapane and colleagues (1997) that examined data from the Pawtucket Heart Health Program surveys from 1981-82 and 1983-84, church members were more likely to be greater than 20 percent overweight compared to non-church members and appeared to have more adverse cardiovascular risk factor profiles.

Using a national sample of adults 25 years and older and state-level ecological data, Ferraro (1998) found that among states with higher proportions of religious affiliation, particularly higher proportions of Baptists, these states also had higher rates of obesity. Through an analysis of individual-level data, he found a positive association between religious practice and BMI, independent of socio-economic status. Kim, Sobal, & Wethington (2003) found that
Among men who were self-identified as being part of a conservative Protestant denomination, they were more likely to have a higher body weight than those with other religious affiliations. These findings were not consistent among women. As they examined other dimensions of religion, they found a relationship between higher BMI and religious attendance, commitment, social support, and identity.

Among the young adult population, Baeke and associates (1983) conducted a study that examined the contribution of socio-demographic variables to relative weight for young adults living in an urban-rural Dutch community. The study participants were divided into three age groups, 19-21, 24-26, and 29-31. The median BMI for males (n=1765) was 23.1 kilograms/meters squared and 21.8 kilograms/meters squared for females (n=2092). A stronger relationship was identified between age and BMI among males, which suggested that young male participants (aged 19-21) had a greater increase in body weight than did female participants. Regarding the relationship between religion and body weight, participants were categorized according to religious affiliation into one of four groups: Protestant (subdivided into Lutheran or Calvinist), Roman Catholic, other religions and no religion. Higher BMI’s were reported for both male and female participants who identified as being Lutheran compared to the non-Lutheran males and females (0.5 and 0.4 kilograms/meters squared, respectively). However, males who reported attending church more often than once a month had slightly but significantly lower BMI’s than other males (0.3 kilograms/meter squared), regardless of religion.

In a study by Mahoney and colleagues (2005), they discussed the relationship between religion and health among college students from the perspective of sanctification, suggesting that the notion of sanctification “extends the psychological power of religion and spirituality to many
aspects of life, including many seemingly secular objectives”. They discussed how students can sanctify objects in theistic or nontheistic ways. Nontheistic sanctification process could involve ascribing divine significance and character to the human body and viewing it as something that is holy, blessed or sacred (Mahoney, Carels, Pargament, Wachholtz, Leeper, Kaplar et al., 2005). Theistic sanctification could involve the more traditional ascription of viewing the body as a temple of God or as being a gift from God. Both types of sanctification facilitate health-promoting behaviors, which were supported by their findings. Associations were noted between greater beliefs in God being in the body or the body being characterized by sacred or transcendent qualities and a broad range of health-protective beliefs and behaviors including eating sensibly and body shape acceptance. Associations were also found between both types of sanctification and higher rates of vigorous and mild to moderate exercise. For college students, sanctification could serve as a spiritual frame of reference to encourage regular engagement in physical activity (Mahoney et al., 2005).

The Epidemiology of Religion and Spirituality and Physical Activity and Dietary Fat Intake in the College Population

According to the recent American College Health Association-National College Health Assessment (26,685 student participants) (2008), over 44 percent of college students did not meet the recommendations for physical activity, 20.4 percent of who were classified as overweight and 10.9 percent were obese (ACHA, 2009). Additionally, 94.9 percent did not meet the daily recommendation for fruit and vegetable consumption, with 6.4 percent reporting that they do not eat fruits and vegetables.
Research in the area of religion and spirituality has indicated that ninety-five percent of adolescents believe in God and eighty-five to ninety-five percent report that religion is important in their life (Cotton, Zebracki, Rosenthal, Tsevat, & Drotar, 2006). The Higher Education Research Institute’s study of spirituality in higher education found that approximately 79 percent of college students believe in God, 66 percent pray, and 40 percent think that it is very important to follow religion every day (Astin, Astin, Lindhom, Bryant, Calderone, & Szelenyi, 2007; Myers & Kyle, 2008).

To better understand the relationship between religion and spirituality and physical activity and fat intake, each variable will be organized and examined through the following categories: (1) demographic characteristics, (2) knowledge and experience, (3) health status, (4) psychological and social factors, (5) environmental factors, and (6) religion, spirituality, physical activity and dietary fat intake characteristics.

College is a very transitional time for students. Due to the change in lifestyle structure and environment, students are exposed to new things and encouraged to expand their horizons. In 2005, approximately 17.5 million students were enrolled in degree-granting institutions (U.S. Department of Education, 2008). These numbers represent a 23 percent increase from 1995. The number of females enrolled increased by 27 percent (10,032,000) while male enrollment increased by 18 percent (7,456,000). Among these enrolled, approximately 39 percent were between the ages of 18- and 24-years, which is an increase from 34 percent in 1995. Interestingly, the number of 18-24-year olds also increased from 25.5 million to 29.3 million from 1995-2005 (U.S. Department of Education, 2008).
There are several distinct demographic characteristics associated with religion, spirituality, physical activity and dietary fat intake in the college population, including race, gender, age, classification, and income. According to research, females tend to exhibit higher levels of religiousness, higher levels of spirituality, less physical activity, and higher daily intakes of dietary fat (Cline & Ferraro, 2006; Kim & Sobal, 2004; Kim et al., 2001; Ferraro, 1998). This gender discrepancy has appeared continuous across age. There has also been evidence of ethnic and socioeconomic differences in these health areas, particularly among African Americans and Mexican Americans (Adams & Colner, 2008; Cline & Ferraro, 2006; Ferraro, 1998). Both groups tend to have lower levels of regular physical activity and higher levels of regular dietary fat intake (Adams & Colner, 2008; Koenig et al., 2001; Sallis & Owen, 1999).

College provides students with an opportunity for increased control over lifestyle behaviors. Evidence from epidemiological studies suggests a rapid reduction in physical activity occurs between the ages of 18 and 24 (Dinger, 1999). College is often the first time that students live in a location apart from their parents, which has shown to affect students’ food choices, nutrient intake, and participation in physical activity (Dinger, 1999).

The greatest increase in overweight and obesity has been observed between the ages of 18-29 years. This is the typical age range of more than 10 million full-time college students in the United States (Dinger, 1999). Although this age range is usually regarded as relatively healthy, it is a time of change and exploration when new health behaviors are being established and practiced, ultimately resulting in enduring lifestyle behaviors (Rovniak, Anderson, Winett, & Stephens, 2002).
There have been numerous psychological and social factors that have been examined in hopes of better understanding the relationship between religion and spirituality and physical activity and dietary behaviors. Several of these factors have consistently shown promising relationships with physical activity and encouraging relationships with intake of dietary fat, depending on the religious group.

Social support is a significant factor associated with physical activity, dietary behaviors and religion/spirituality in the college population. Research has shown that the role of social support is significant in helping people undertake and maintain healthy dietary changes (Kim & Sobal, 2004). It is also a critical component to successful long-term weight loss (Kim et al., 2003). Perceived social support is also important, as it has been shown to relate to the intake of fats, salt and sugar, fiber and fruit, and vitamins and minerals (Kim & Sobal, 2004). Religious social support has been shown to enable participants to practice positive health behaviors.

The role of religion, in relation to social support, has been an area in interest for researchers. Results have suggested positive relationships among members of religious groups and health outcomes. One study found that among African-Americans, church-based hypertension intervention programs were shown to reduce systolic and diastolic blood pressures (Livingston, 1991). Interestingly, women have been shown to have a stronger relationship between religion and health. In a longitudinal study of 28 years that focused on mortality rates and frequent church attendance, women who reported attending church most frequently also had the lowest mortality rates (McCullough et al., 2000; Strawbridge, 1997).
There are factors that have been revealed throughout the literature as having significant associations with health and lifestyle behaviors among college students specific to the college environment. For many students, college is a setting where independence is experienced for the first time (Dinger, 1999). As they progress through the developmental changes associated with autonomy and assuming personal responsibility from family, they are also faced with academic, financial, and social pressures that are unlike those experienced in high school (Rozmus et al., 2005). Consequently, they are establishing new ideas, attitudes, beliefs and subsequent behaviors (Arnett, 2000; Hu, & Khu, 2003; Lau, Quadrel, & Hartman, 1990).

Some even suggest that it is during this period of life that the foundation for adulthood is established (Arnett, 2000; Erikson, 1968). For many, matters of life and love are being explored while worldviews are being expanded. Some students may clearly articulate their philosophy of life at this point, while others feel a need to figure out who they are, or identify their true self (Erikson, 1968; Rozmus et al., 2005). Although some student may arrive at college with grounded religious and spiritual beliefs, many do not. Just the same, some may arrive with certain patterns of physical activity and eating healthy foods. Nonetheless, these behaviors often become interrupted and/or influenced by the effects of college (Rovniak et al., 2002).

Since the beliefs and values held by peers often vary from parental values, college students tend to question individual beliefs, values and goals (Rozmus et al., 2005). These psychosocial factors are thought to be intertwined with the process of faith development. The period of faith transition between early adolescence and young adulthood was described by Westerhof (1976) as a progress from Affiliative Faith (based on the need to belong to a community) to a Search Faith (based on the doubt, experimentation and involvement in various groups and causes) to Owned Faith (based on personal commitment to a life of faith “in both
However, all students do not necessarily progress through each of these stages in the same way; there is significant evidence that suggests variability exists among the religious beliefs, practices and attitudes of college students (Pargament et al., 1984). An interesting parallel was discovered during a national study by the Higher Education and Research Institute (2003) which reported that college students expect that universities will help them to develop spiritually. These findings reflect the mental and emotional processes involved, as well as the spiritual expectations students have during this phase of life.

This time of exploration, coupled with new social, academic, financial and personal stresses, often influences the lifestyle and health behaviors of students. According to Rozmus and colleagues (2005), “at this vulnerable period for students, understanding why they engage in health behaviors is an important factor in helping them to reduce risk behaviors and consequently enhance their quality of life”. Spiritual health offers a sense of meaning and purpose to life and provides students with an ethical pathway to personal fulfillment (Taliaferro et al., 2009). Students may reduce risk behaviors and maintain stability, according to their own moral compass by incorporating health-promoting behaviors into their daily life such as physical activity and healthy dietary practices.

The most effective health education and promotion efforts involve an approach that is developmentally comprehensive and integrated. Conceptually, health is comprised of several components, including physical, mental, emotional, environmental, social and spiritual. These components of health have been referred to as specific dimensions containing unique components, specific to that particular dimension; however, they are still involved in an intimate
relationship with each other (Eberst, 1984). Therefore, each dimension of health is distinctive, yet has the ability to function synergetically with other dimensions.

Just as there are multiple dimensions of health that need to be considered when developing health education interventions, there are also multiple levels by which these interventions may be implemented that improve the likelihood for effectiveness (Eberst, 1984; Koenig et al., 2001). This approach should consider not only the multi-faceted, intrinsic aspects of an individual’s health but also the affect of potential environmental and socio-cultural influences. Therefore, it is important to consider not only personal factors but also social and environmental factors (Sallis, Owen, & Fisher, 2008). As mentioned before, the unique function of each dimension is that it can be studied individually in its own nature or integrated with other dimensions. This study will seek to examine the relationship between the spiritual dimension of health (religiosity and spirituality), individual factors (intentions, attitudes, and beliefs) and social and environmental factors (religious involvement & social support).

Religiosity can be examined from multiple perspectives. In particular, it encompasses social organizations, norms, values and experiences. These facets are often used as things that define or identify members to a larger social group. Health behaviors are included as identifiers for particular religious groups. For example, Mormons (members of the Church of Jesus Christ of Latter-day Saints) have prescribed diets of balance and moderate meat intake, Seventh-Day Adventists encourage lacto-ovo vegetarian diets, Judaism regulates foods that are considered to be kosher and Halal food guidelines are required by Islams (Fraser, 1999; Shatenstein, 1998). They have proven to be beneficial in health behavior change in general and to dietary and physical activity change (Bowen, 2004; Koenig et al., 2001; McLeroy, 1988). Although there
has been limited research among college students in the area of religion, spirituality, and health, findings from related studies have suggested positive correlations between health-promoting behaviors and religion and spirituality (Adams & Colner, 2008; Nagel, 2007; Oleckno & Blacconiere, 1991).

Physical activity is a life-sustaining behavior performed by everyone (Sallis & Owen, 1999). Although everyone engages in some level of physical activity, the amount of engagement is subject to personal choice and often varies from person to person. The desired outcome of physical activity is caloric expenditure. The measurement of expended energy (energy required to accomplish an activity) occurs through a measure of heat, known as kilocalories (kcal), per unit of time. This expenditure is a continuous variable ranging from low to high and is determined by the intensity, duration, and frequency of muscular contractions (Caspersen, Powell, & Christenson, 1985).

A recent suggestion of The Physical Activity Guidelines Advisory Committee (PAGAC) (2007) was that in order to be able to draw strong conclusions from research, uniform data collection is needed with respect to the type and characteristics (e.g., intensity, duration, frequency) of physical activity being performed. Therefore, in efforts to strengthen the outcomes of this study, physical activity will be measured by examining the frequency, intensity, and duration of participation through a seven (7)-day recall item from the National College Health Assessment-American College Health Association (2008). Intensity will be “meaningfully partitioned into mutually exclusive categories” of moderate and vigorous activity (Caspersen et al., 1985); Duration will be assessed by asking if participants have engaged in moderate intensity physical activity “…for at least 30 minutes” and vigorous intensity physical activity “…for at
least 20 minutes”; Frequency will be assessed by asking if participants have engaged in moderate intensity physical activity “…on five or more days” and vigorous intensity physical activity “…on three or more days” as the unit of time for measurement. As part of the original study design (Kim & Sobal, 2001), a past-year recall will also be used to measure physical activity.

Healthy People 2010 established the objective to increase the proportion of people who consume 5 or more servings of fruits and vegetables each day. According to these national objectives, fruits and vegetables should be consumed more frequently and dietary fat consumption should decrease (DHHS, 2000). Although recent research suggests that there has been an increase in caloric intake, this increase is not attributable to increased consumption of fruits and vegetables (Adams, 2008).

Review of Current Theoretical Influences for Religiosity, Physical Activity, and Dietary Fat Intake Interventions in the College Population

Several theoretical constructs are consistently associated with religiosity, physical activity and dietary fat intake, yet very few studies and interventions have used them for guidance. Despite the acknowledged effectiveness of incorporating theoretically based behavioral and cognitive strategies into research studies, the omission remains an issue. For those studies that have included them, they often are not measured to assess change or fail to measure mediation of behavior change. Authors consistently conclude that future research and interventions should focus on systematic application of theoretical and conceptual models and within the models, examine possible mediation relationships (Adams & Colner, 2008; Ellison & Levin, 1998; Racette et al., 2008, Sallis & Owens, 1999; Thoresen & Harris, 2002). Given the recommendations for including theoretically-based components and conceptual models, the
remainder of this chapter will review the current literature addressing theoretically-based research in physical activity, dietary fat intake, and religiosity and spirituality among the college population.

Evidence shows that negative changes in several health behaviors can occur during college (Adams & Colner, 2008). Several studies that have examined the relationships between dietary behaviors, physical activity behaviors and college students have suggested negative correlations between the variables, independently and collectively (Adams & Colner, 2008; Brevard, 1996; Keating et al., 2005; Lowry et al., 2000; Racette et al., 2008; Racette et al., 2005). The determinants of these correlations likely vary and a better understanding of demographic and behavioral characteristics of college students who are more likely to make poor nutrition choices or fail to engage in regular physical activity could facilitate better program interventions (Adams & Colner, 2008; Sallis & Owen, 1999).

Social influences, such as peers and parents, and perceptions of physical activity and healthy eating, often affect one’s attitude toward his/her personal diet and level of physical activity (Kim & Sobal, 2004). Possible associated confounders include cultural and religious beliefs such as attitudes toward certain foods or physical activity; one’s perceived ability to perform certain exercise behaviors or adhere to particular dietary behaviors; peer and social norms (Armitage, 1999; Aten, 2007; Fraser, 1999; Hart, 2004; Kim & Sobal, 2004; Kim et al., 2001; Koenig et al., 2001; Lyon, 1978; Nagel, 2007).

Religiosity and spirituality are multidimensional constructs. Because of the complex nature of each construct, it is necessary to specify the exact dimension(s) being measured and provide a theoretical rationale (Thoresen & Harris, 2002). These constructs have been broadly examined throughout the literature and have most often used a single indicator, such as
frequency of religious attendance or religious commitment/financial giving, as the measure of religiosity (Ellison & Levin, 1998). More descriptive approaches to examining these constructs have been presented as the “distal and proximal domains” (Pargament, Koenig & Tarakeshwar, 2000; Cotton et al., 2006) and categorized into three components: behavioral, subjective, and functional (Cotton et al., 2006; Ellison & Levin, 1998; Kim & Sobal, 2004; Thoresen & Harris, 2002). These approaches purposed to categorize dimensions of religiosity and spirituality into subscales of measurement, thereby providing theoretical distinction and understanding of the mechanisms through which health is influenced.

The distal/proximal framework of religion/spirituality, described by Pargament et al., (2000), consists of distal domains (individual behaviors) and proximal domains (functions of religion/spirituality for the individual). The distal domain includes measures of service attendance, frequency of prayer/meditation, and self-rated religiousness and is often referred to as “religiosity”; the proximal domain includes spiritual meaning and peace, positive or negative religious coping, positive and negative spiritual support and is often referred to as “spirituality” (Cotton et al., 2006). Similarly, the three broad components, described in a study by Kim & Sobal (2004), categorize the behavioral aspect subscale as being comprised of the dimensions of religious denomination, attendance, and religious application; the subjective aspect includes religious identity and commitment; the functional aspect includes the dimensions of religious coping and religious social support. Among the adult population, it has been suggested that much of the effect between distal or behavioral measures of religiosity, spirituality, and well-being can be accounted for by the proximal domains, and may also prove true for adolescents (Cotton et al., 2006).
Much of the previous empirically-based research to date, have not been designed to comprehensively measure the religiosity and spirituality constructs (Thoresen & Harris, 2002). For one, they have not distinguished between religiosity and spirituality, but rather lumped the two terms and subsequent outcomes together (Ellison & Levin, 1998). Consequently, there is very little well controlled data on spirituality and health, independent of religion (Thoresen & Harris, 2002).

Secondly, the studies have most commonly focused on behavioral aspects of religious involvement such as rituals and frequency of church attendance and have failed to examine the function served in people’s lives by religious involvement. Very few studies have assessed the meaningfulness or importance of religion or religious beliefs to the individual and the majority of the assessments have been limited to a few questionnaire items (Ellison & Levin, 1998; Thoresen & Harris, 2002). There has also been little, if any, theoretical application of the measures examined within the current literature.

Lastly, researchers have recognized that religiosity is an area of human life that is complex, in that it is characterized by individual attitudes, beliefs, values, experiences, and behaviors, and it should be capitalized on by researchers (Ellison & Levin, 1998). These practices have been consistent across populations, particularly among adolescents where very little research has been conducted.

When conducting research that investigates the religion-health relationship, it is essential to thoughtfully design and carefully execute the research process (Koenig et al., 2001). According to Koenig et al. (2001, p. 480), “the primary hypothesis or research question should
be grounded in scientific theory and based on prior work done in the field”. When applied as a complete theory or individual constructs, theory serve as foundational pieces that aid researchers in program planning, identifying why a problem exists, explaining behavior change or guiding interventions. Theories help to guide studies by identifying modifiable factors such as attitudes, knowledge, social support, self-efficacy, lack of resources, or any other factor that may seem plausible to the research (Montano & Kasprzyk, 2002). Additionally, they illustrate the relationships between variables which enable them to explain or predict behavior change. Therefore, it is necessary to identify constructs that best fit the purpose and level of intervention of the research and develop a combined theoretical basis for the study (Rimer, 2008).

Theories that have been proposed to explain health-related behaviors since the early 1970s include the social cognitive theory [SCT] (Bandura, 2004), theory of reasoned action/planned behavior [TRA/TPB] (Montano & Kasprzyk, 2002), transtheoretical model [TTM] (Prochaska, Redding, & Evers, 2002), health belief model [HBM] (Janz, Champion, & Strecher, 2002), social ecological model [SEM] (McElroy, Bibeau, Steckler & Glanz, 1988), and protection motivation theory (Rogers, 1983). Each consists of core constructs designed to both predict health behaviors and be the focus for interventions (Stewart, Rakowski, & Pasick, 2009). In the proposed study, the variables of interest include individual attitudes, beliefs and behaviors toward religiosity and spirituality, as well as recent physical activity and intake of dietary fat. Religious and individual social support will also be examined. Based on the assumption that it is not possible for a single theory to account for all that is involved in behavior change, and the unconventional nature of the proposed study, behavioral constructs will be discussed from the SEM, TPB, TTM, and SCT (Prochaska et al., 2008).
A fundamental tenet of most all the world’s major religions encourages help and support of others. Religion encompasses not only individual characteristics, but also social characteristics. Religion as a social institution provides opportunities for social interaction among people of like values and interests (Koenig et al., 2001). Theoretically, the social ecological approach involves recognizing that behavior affects and is affected by the social environment through various levels of influence. According to the social ecological model, a religious institution could influence health behaviors at an organizational/institutional level because religious involvement affords religious adherents the opportunity to develop greater social networks and establish social relationships within their institutions (McElroy et al., 1988).

In a meta-analysis by Koenig, McCullough, & Larson (2001), they identified 20 studies that quantitatively examined the religion and social support relationship. They found that within 19 of the studies, at least one relationship between a religious variable and greater social support was found to be statistically significant. In the remaining study, the findings were mixed with 50 percent of the older African American study sample reporting that their family members were their closest and most important friends and 40 percent reported that the members of their church were their most important and closest friends. These findings support the belief that religious involvement facilitates social contacts and social integration, reducing alienation and anomie.

The social affiliation within religious communities helps to bind the community together by providing shared experiences, beliefs and values (Koenig et al., 2001). Among adolescents, research has suggested that in addition to exposing them to more conventional beliefs and values, religion may encourage more prosocial behaviors and connect them to the broader community (Bernat & Resnick, 2009). Through mechanisms such as social support, religion affects
attitudes, beliefs, and behaviors (Regnerus, 2003). In a study by Good & Willoughby (2006), they found that regardless of adolescent’s belief in a higher power, church attendance was associated with more positive outcomes. This finding supports the view that through church attendance, individuals are exposed to conventional beliefs, opportunities and connections with others which may facilitate religiosity’s role as an overall protective factor (Bernat & Resnick, 2009).

According to research, an important function of social relationships is the provision of social support (Heaney & Israel, 2008, p. 190). This concept refers to both the structure and function of an individual’s social life, including group memberships, familial ties, and emotional support. Its psychological and behavioral pathways often facilitate healthy behaviors such as healthy eating and exercise, thereby establishing it as a health-promoting concept (Uchino, 2006).

Among religious group membership, the social context may serve to encourage a tendency toward positive affiliative behaviors beyond the basic need for meaning and belonging (Bernat & Resnick, 2009, p. 378). In a study by Kirkpatrick, Shillito, & Kellas (1999), religion was related to greater emotional support and better perceived support among college students. Because it may reduce an individual’s susceptibility to harmful effects of stress, it is considered to be a psychosocial protective factor for health. However, social support’s role in the etiology of disease is unclear and therefore, may influence the incidence and prevalence of many health outcomes (Heaney & Israel, 2008, p. 193). Even so, social institutions may influence the development and maintenance of healthy dietary practices and physical activity through the concept of social support.
The Theory of Planned Behavior (TPB) (Ajzen, 1991) was developed to predict health behaviors by including additional measures to the TRA, specifically, perceived behavioral control (PBC) (Ajzen, 1991). Ajzen’s (1991) rationale behind adding PBC was to allow predictions of behaviors that were less straightforward and not under volitional control (Armitage, 2001). The addition of the PBC was responsible for providing information about potential constraints or barriers to action, as perceived by the individual. According the TPB, behavior depends upon salient beliefs for its function. Behavioral beliefs are essential to attitudes and normative beliefs are essential to subjective norm (Wall, 1998). The normative aspect of beliefs tends to function through TPB’s subjective norms component. It relates to perceptions of general social pressure while the underlying normative beliefs are concerned with the approval or disapproval by specific individuals or groups with whom the individual is motivated to comply (National Cancer Institute, 2005).

Religion as a social institution provides opportunities for social interaction among people of like values and interests (Koenig et al., 2001). Additionally, religious involvement affords religious adherents the opportunity to develop greater social networks and establish social relationships within their institutions (McElroy et al.1988). Through mechanisms such as social relationships and support, religion affects attitudes, beliefs, and behaviors (Regnerus, 2003). If in theory, intentions to perform a behavior are directly influenced by subjective norms and attitudes, then it is possible that expectations for daily fat intake and physical activity by religious adherents may serve to reinforce member’s participation in those behaviors, depending on his or her willingness to adhere to the expectations of other members (Stewart, Rakowski, & Pasick, 2009).
Considerable research has focused on applications of the TPB to exercise and suggest that it is a framework that is often used to predict exercise intentions and behaviors (Barr, 2007). Reviews have generally concluded that attitude is the best predictor of intention to exercise, while subjective norm rarely contributes or shows valid significance (Blue, 1995; Godin, 1993; Hausenblas, 1997). Less research has focused on healthy dietary behaviors, perhaps because of the difficulties involved in the measurement and definition of the variable (Povey, 1998). This research has generally found that, as with exercise, attitude is the best predictor of intention and subjective norm rarely contributes. This includes intention to consume wholegrain bread and biscuits (Sparks, 1992), reduce red meat consumption (Sparks, 1997), eat a low-fat diet (Armitage & Connor, 1999; Povey, 2000), reduce fat intake (Paisley, 1998), and eat healthier foods (Oygard, 1996). Based on these findings, the TPB may be an effective method for assessing and predicting college student’s attitudes and intentions toward religion, physical activity and dietary fat intake, as well as, the relationship of subjective norms.

The Transtheoretical Model integrates processes and principles of change across major theories of intervention using stages of change. The model is comprised of ten processes of change that describe techniques and strategies individuals use to progress through the six stages of change. These covert and overt processes are used by individuals to modify thoughts, feelings, and behavior and provide guides for intervention programs (Marshall & Biddle, 2001). The processes are characterized as being either experiential or behavioral, with each of them being likened to an independent variable for progressing from stage to stage (Marshall & Biddle, 2001; Prochaska et al., 2008).
For this study, the behavioral process of change known as *helping relationships* would be useful in examining the social support variable. It combines characteristics of caring, trust, openness, and acceptance with support for creating health behavior change (Prochaska et al., 2008). According to research, an important function of social relationships is the provision of social support (Heaney & Israel, 2008). This concept refers to both the structure and function of an individual’s social life, including group memberships, familial ties, and emotional support. Its psychological and behavioral pathways often facilitate healthy behaviors through channels such as supportive behaviors, emotional support, appraisal support, informational support, instrumental support, and social capital (DeBarr, 2004; Uchino, 2006). Among religious group membership, the social context may serve to encourage a tendency toward positive affiliative behaviors beyond the basic need for meaning and belonging (Bernat & Resnick, 2009).

The Social Cognitive Theory (SCT) is focused on learning mechanisms, specifically, modeled behavior and vicarious reinforcement. It emphasizes cognition’s role in constructing reality, self-regulation, encoding information, and performing behaviors (DeBarr, 2004). SCT contains a concept known as reciprocal determinism, which is a dynamic process that involves the influence and interaction of a triadic, reciprocal model involving an individual’s (a) personal factors such as cognitions, affect and biological characteristics, (b) behavior, and (c) environmental influences where the behavior is performed (Burke, Joseph, Pasick, & Barker, 2009; DeBarr, 2004). Essentially, human behavior is the result of a dynamic interaction between personal, behavioral, and environmental influences (McAlister, Perry, & Parcel, 2008). This concept is based on the notion that people learn by observing the actions of others and the benefits of those actions, and not merely from their own experiences (McAlister et al., 2008).
Therefore, social environments are important factors in health behavior change because they provide models for and influences on behavior (Burke et al., 2009).

The social aspect of religion may serve as an impetus for better health. In a study by Johnson and associates (2008), 516 college students were surveyed and found an inverse relationship with religious involvement and alcohol consumption through social influences and negative beliefs about alcohol, with social influences having the greatest effect. Reciprocal determinism is an approach to systematically examine the relationships and interactions between (a) personal factors - religion as a cognitive component of influence (religious beliefs, attitudes, & practices) (behavioral, subjective, & functional religiosity); (b) an individual’s behavior – physical activity & intake of dietary fat; and (c) environmental factors – college.

Conclusion

The percentage of adults who engage in regular physical activity is decreasing while intakes of dietary fat are increasing. These behaviors are causing an increase in risk for many long-term, serious health issues, specifically, chronic diseases. Research indicates that individuals who are more physically active during adolescence and young adulthood are more likely to remain active throughout his or her lifespan. The same positive influence has been suggested for healthy dietary practices begun in adolescence. Both of these behaviors are critically important during the college years, not only for immediate health outcomes but also for long-term health benefits.

The number of individuals entering the college or university setting has continued to increase over the past decade, with no significant declines projected for the future. Institutions of higher education are supportive of comprehensive health education programs addressing these
issues, because of the known benefits of participating in physical activity and healthy eating among college students. Some of these benefits may include: higher grades, less stress, better adjustment and higher persistence to graduation. Therefore, there is a need to better understand and utilize the factors that influence health behaviors such as physical activity and dietary fat intakes among college students.
Chapter III

METHODS

Introduction

This study was designed to provide a better understanding of religion, spirituality, and social support in relationship to physical activity and fat intake among college students. Health behaviors are developed and maintained through various methods, making it difficult to identify causal relationships when studying these variables. In effort to better understand the origin and function of health behaviors, this study examined associations between these variables by using a classroom-based survey to collect responses from a convenience sample of college students at a major, southeastern university in the United States. The assessment instrument included questions related to demographics including age, gender, height, weight, and year in school, ethnicity, marital status, residence (on or off campus), affiliation with a social fraternity/sorority, and involvement with a religious student organization. Additionally, students completed measures related to their personal religious and spiritual beliefs and behaviors, as well as their previous participation in moderate and vigorous physical activity and intakes of dietary fat.

Purpose

The purpose of this study was to examine the association between religion, spirituality, and social support in relation to physical activity and intakes of dietary fat among college students. Specifically, if greater religiosity or spirituality resulted in increased levels of physical activity and/or decreased intakes of dietary fat. Social support was examined independently, as a
potential confounding variable between religion, spirituality and the health behaviors. Religion and spirituality may serve to shape physical activity and fat intake through specific beliefs and teachings, as well as through the influence of social support, social networks and social control (Kim & Sobal, 2004). In accordance with The University of Alabama policies, the study was submitted to the Institutional Review Board and approved for research with human subjects and approved for a waiver of consent prior to implementation (see Appendix B).

Research Questions

In order to examine the association between religion, spirituality, and social support in relationship to physical activity and intakes of dietary fat among college students, this study examined the following research questions:

The research questions were:

1. Were greater levels of religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
2. Were greater levels of spirituality associated with higher levels of physical activity and lower intakes of dietary fat among college students?
3. Were greater levels of social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?
4. Were greater levels of religiosity and spirituality and social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?
5. Were greater levels of behavioral religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
6. Were greater levels of subjective religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
7. Were greater levels of functional religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
Participants

Data of interest were collected via a classroom-based assessment battery from a convenience sample of college students enrolled at The University of Alabama. The assessment battery contained questions related to religiosity, spirituality, physical activity, and intakes of dietary fat (see Appendix A).

The inclusionary and exclusionary criteria for this study are described below:

Inclusion:
1. College students who are at least 19 years of age and currently enrolled at The University of Alabama.
2. College students who agree to complete the survey.

Exclusion:
1. College students who are not at least 19 years of age.
2. College students who are not currently enrolled at The University of Alabama.
3. College students who do not agree to complete the survey.

Assessment Battery

No appropriate instrument existed for assessing religiosity, spirituality, physical activity, and intakes of dietary fat among college students. The assessment instrument that was used for this study was an adaptation of an existing survey that was developed and used by Kim & Sobal (2004) in a similar study among a religious sample of the general population, which is shown in the Appendices (see Appendix A). Demographic and physical activity measures were added from the American College Health Association-National College Health Assessment II (ACHA-NCHA II) survey in order to better capture the intended information from the college population. Permissions were secured to use some or all of the items from the Kim & Sobal (2004) survey instrument and the ACHA-NCHA instrument.
Demographics

The ACHA-NCHA II is a nationally recognized research survey that includes items about college students’ health habits, behaviors and perceptions (American College Health Association, 2009). The original survey, ACHA-NCHA, was initiated in 2000 and was used nationwide through spring 2008. The ACHA-NCHA II was developed following a thorough pilot testing process and incorporates several revised questions from the previous version (American College Health Association, 2008). The ACHA-NCHA II was first used in fall 2008 and the results provide the largest known comprehensive data set on health of college students. In fall 2008, forty institutions participated in data collection, where 26,685 students responded via paper and web-based collection methods (American College Health Association, 2009). This study used nine questions from the Demographic Characteristics section of the assessment and two additional demographic questions relevant to the proposed study. Questions included age, gender, self-reported height and weight, year in school, ethnicity, marital status, on/off campus residence, affiliation with a social fraternity/sorority, affiliation with a religious student organization and original residence state. The ACHA-NCHA II is a public domain scale.

Religiosity

To measure religiosity, the assessment instrument included 35 items, divided into seven subscales/dimensions and conceptualized as three broad components: Behavioral, Subjective and Functional. The seven subscales/dimensions include religious denomination, religious commitment, religious identity, religious attendance, religious application, religious ‘Divine’ social support prayer scale, and religious coping.
The behavioral component of religiosity will be comprised of three subscales/dimensions: religious denomination, religious attendance, and religious application. Religious denomination included the following items: ‘yes’ (1) or ‘no’ (0), do you have a religious preference/denomination? If yes, what is your religious preference/denomination? (Open-ended). Religious denominations was grouped into five categories (Steensland, 2000): ‘Christian’ (0); Catholic’ (1); ‘Protestant’ (2); ‘Jewish’ (3); ‘Other’ (4); and ‘Non-religious’ (5). Possible scores for religious denomination will range from 0 to 5, with a higher score indicating a stronger religious preference. Self-reported religious preference/denomination was used as a label.

Religious attendance was assessed through a single-item measure: how often do you usually attend religious/spiritual services? Response options included: never (0); less than once a month (1); about once a month (2); two or three times a month (3); about once a week (4); several times a week (5). Possible scores for religious attendance ranged from 0 to 5, with a higher score indicating a higher level of religious attendance. Religious application was assessed through a single-item measure, “I try hard to carry my religious beliefs over into all my other dealings in life” with possible response options of ‘strongly disagree’ (0); ‘disagree’ (1); ‘agree’ (2); ‘strongly agree’ (3). Scores ranged from 0 to 3 with higher scores indicating a higher level of religious attendance.

The subjective component included two subscales/dimensions of religiosity: religious identity and religious commitment. Religious identity (α=0.80) included the following four items with response options of ‘not at all’ (0); not very’(1); ‘somewhat’(2); ‘very’(3); “how important is it for you – or would it be if you had children now – to send your children for religious or spiritual services or instruction?”…“how closely do you identify with being a
member of a/your religious group? (IF YOU ARE NOT PART OF A RELIGIOUS GROUP, MARK ‘not at all’)… “how much do you prefer to be with other people who have the same religious beliefs as you?”… “how important do you think it is for people of your religion to marry other people who are the same religion?” Scores were summed to yield a scale ranging from zero to twelve, with higher scores indicating higher levels of religious identity. Religious commitment (α=0.87) included the following four items with response options of ‘not at all’ (0); not very’ (1); ‘somewhat’ (2); ‘very’ (3): “how religious are you?”… “how important is religion in your life?”… “how spiritual are you?”… “how important is spirituality in your life?” Scores were summed to yield a scale ranging from zero to twelve, with higher scores indicating higher levels of religious identity.

The functional component included the two subscales/dimensions of religiosity: religious coping and religious social support. Religious coping was assessed through the Brief RCOPE short form, a 7-item scale that assesses positive religious coping (α=0.94) and negative religious coping (α=0.81) and a summary evaluation of the degree to which religion/spirituality is involved in an individual’s coping (Idler, Musick, Ellison, George, Krause, Ory, et al., 2003). Respondents were asked to think of a recent negative event in their life and asked to what extent they used a series of coping mechanisms. Responses included ‘not at all’ (0); sometimes(1); ‘moderate’ (2); ‘a great deal’ (3), with possible sum scores ranging from zero to 28 and higher scores indicating higher levels of religious coping. Religious social support will be measured by assessing divine social support. The items in this scale included a single item and a continuous scale about prayer. The single item asked participants to describe ‘how close their relationship is with God’ on a scale from one to seven, with 1 being ‘very distant’ and 7 being ‘very close’. The
prayer scale ($\alpha=0.87$) was constructed by collapsing five questions on prayer that were scaled according to degrees of intimacy with the divine.

**Spirituality**

To measure spirituality, the following two items with response options of ‘not at all’ (0); ‘not very’ (1); ‘somewhat’ (2); ‘very’ (3) were summed to yield a scale ranging from zero to six, with higher scores indicating higher levels of spirituality. The items were part of the religious commitment scale and included “how spiritual are you?” and “how important is spirituality in your life?”

**Social Support**

Social support was assessed using the same scales as in the Kim & Sobal (2004) study: summing the seven-item perceived social support scale from the Piedmont Health Survey ($\alpha=0.82$) and two social interaction items from the National Survey of Midlife Development in the United States. The two social interaction items assessed frequency of contact with family and friends and possible responses included: ‘never or hardly ever’ (0); ‘less than once a month’ (1); ‘about once a month’ (2); ‘two or three times a month’ (3); ‘about once a week’ (4); ‘several times a week’ (5); ‘about once a day’ (6); ‘several times a day’ (7). The seven-item scale which assessed perceived social support included the following possible responses with higher sum scores indicating higher levels of perceived social support: ‘hardly ever’ (0); ‘some of the time’ (1); ‘most of the time’ (2).
Health Behaviors: Dietary Fat Intake and Physical Activity

*Dietary Fat Intake*

Measures for fat intake were adopted from the National Cancer Institute’s Quick Food Scan by Kim & Sobal (2001) for use in the study instrument. These measures assessed the percentage of energy from fat consumed based on the intake frequency of 16 foods with possible responses including: ‘never’ (0); ‘less than once per month’ (1); ‘1-3 times per month’ (2); ‘1-2 times per week’ (3); ‘3-4 times per week’ (4); ‘5-6 times per week’ (5); ‘1 time per day’ (6); ‘2 or more times per day’ (7). In order to determine negative or unhealthy intakes of fat, 12 of the items were summed and used in the dietary fat intake analyses. Sum scores ranged from zero to 84, with higher scores yielding higher intakes of fat.

*Physical Activity*

Physical activity was assessed using two scales: two items from a past year recall for moderate and vigorous physical activity that were adopted from National Survey of Midlife Development in the United States (α = 0.83) (MIDUS) (1996) in the original study by Kim & Sobal (2004) and the 7-day recall for moderate and vigorous physical activity that were adopted from the 2009 ACHA-NCHA II survey (α = 0.87). The past-year recall items asked participants how often they engage in moderate or vigorous physical activity long enough to work up a sweat during the past year. Possible responses included: ‘never’ (0); ‘less than once a month’ (1); ‘about once a month’ (2); ‘two or three times a month’ (3); ‘about once a week’ (4); ‘several times a week’ (5); ‘about once a day’ (6). The ACHA-NCHA II physical activity assessment scale was added to the final instrument in efforts to improve the accuracy of the participants’ responses. The measurement included a single-item scale for moderate and vigorous physical activity...
activity during the past 7 days for at least 30 minutes. Scores for each of the items ranged from zero to seven. Possible responses for each of these items (moderate & vigorous) included ‘0 days’; ‘1 day’; ‘2 days’; ‘3 days’; ‘4 days’; ‘5 days’; ‘6 days’; ‘7 days’. Possible scores for moderate and vigorous physical activity ranged from zero to seven, with higher scores indicating higher levels of physical activity. Upon examining the scales and responses, it was determined that no significant advantages were identified between the two scales. Thus, in keeping with recent research in this area (Kim & Sobal, 2004), this study used the past year recall for moderate and vigorous physical activity.

**Study Design**

The purpose of this study was to determine if a relationship existed between the independent and dependent variables and examine the variability between the variables. Health behavior theory was examined in order to guide the development, analysis and interpretation of the data, and provide a distinguishing element to the study. This is an essential process in health education research, as it allows researchers to choose an appropriate set of constructs that help to systematically explain observations made within a study.

A one-time class-room based survey was utilized to collect data from college students enrolled at the University of Alabama. Students (n = 914) were derived from general education classes housed within the Colleges of Human Environmental Sciences, Education, Communication, New College, and Arts and Sciences; which included the following courses: HHE 270 Personal Health, HHE 273 Community Health, HHE 440 Understanding Stress Management, CSM 441 Consumer Communications, NHM 101 Introduction to Human Nutrition, NUR 102 Introduction to Nursing, ATR 257 Introduction to Athletic Training, ATR
Participants and Recruitment

A convenience sample of 914 students enrolled in general education classes from the University of Alabama were asked to complete the classroom-based survey. Students were informed that they would not be penalized for choosing not to participate in answering the survey and would be instructed to remain quiet while the other students completed the survey. Participation was anonymous and no identifiers were collected. A waiver of informed consent was granted by the Institutional Review Board since this research could not have been carried out without the waiver of consent. A waiver of written documentations of informed consent for those participants who are at least 19 years of age was also granted (See Appendix B). Each participant received a participant information sheet when the assessment was distributed (See Appendix A) that explained that their information was anonymous and would be used solely for research purposes.

The survey used for this research was the product of merging existing instruments with established reliability and validity. An existing assessment instrument (Kim & Sobal, 2004)
containing measures of religiosity, spirituality, social support, physical activity, and dietary fat intake was used to collect responses from the students. Select questions from the following instruments were used: American College Health Association-National College Health Assessment II (ACHA-NCHA II) Demographics; Religious Denomination, Religious Attendance, Religious Application, Religious Identity, Religious Commitment, and Religious Social Support questions as in the Kim & Sobal, 2004 study; Brief RCOPE Short Form as in the Kim & Sobal, 2004 study developed by Pargament, Smith, Koenig, & Perez, 1998; Quick Food Scan as in the Kim & Sobal, 2004 developed by the National Cancer Institute; Past-Year and 7-day recall measures of Physical Activity items as in the Kim & Sobal, 2004 study and the ACHA-NCHA II; Piedmont Health Survey & National Survey of Midlife Development in the US as in the Kim & Sobal, 2004 study developed by Brim, Baltes, Bumpass, Cleary, Featherman, Hazzard, et al., 1996; Landerman, George, Campbell, & Blazer, 1989.

Table 2 summarizes the development of the Religiosity, Spirituality & Health Behaviors Instrument.
Table 2

*Development of the Assessment Instrument*

<table>
<thead>
<tr>
<th>Reference</th>
<th>Scale</th>
<th>Constructs</th>
<th>Validity/Reliability</th>
<th># of Items</th>
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<td>Brief RCOPE – Short Form</td>
<td>Functional Religiosity – Religious Coping</td>
<td>α=0.94 (positive coping) and α=0.81 (negative coping)</td>
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<td>Kim &amp; Sobal, 2004; Brim, Baltes, Bumpass, Cleary, Featherman, Hazzard, et al., 1996; Landerman, George, Campbell, Blazer, 1989</td>
<td>Piedmont Health Survey National Survey of Midlife Development in the US</td>
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<td>Total Questionnaire</td>
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**Statistical Analyses**

SPSS v.17 was used for all statistical analyses. The statistical methods employed in this study were based on those from a similar study of religiosity, physical activity and fat intake among the general population (Kim & Sobal, 2001). Analyses conducted included descriptive analyses, bivariate correlations, t-tests, analysis of variance (ANOVA), and regression models. Initial analyses were conducted in order to screen data for relationships. Demographic control variables were examined in relation to the outcome variables (physical activity and dietary fat intake) and again in relation to the independent variables (religiosity and spirituality). Those that were found to be significant were added into the regression models as control variables in answering the following research questions. In order to more clearly examine relationships among the variables and to avoid multicollinearity problems, each variable was examined independently.

**Research Question 1**

In order to determine if greater levels of religiosity were associated with higher levels of physical activity and lower intakes of dietary fat among college students, sum scores for each
variable (religiosity, physical activity and dietary fat intake) were examined using Pearson correlations to determine independent bivariate associations. As in a similar study by Kim & Sobal (2004), multivariate regression analyses will be conducted to examine religiosity’s relationship with physical activity and intakes of dietary fat. The analyses included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differed among these subcategories in relation to religiosity. The regression model for this question was entered as follows: Religiosity + Demographics versus Physical Activity + Fat Intakes

Research Question 2

In order to determine if greater levels of spirituality were associated with higher levels of physical activity and lower intakes of dietary fat among college students, sum scores for each variable (spirituality, physical activity and dietary fat intake) were examined using Pearson correlations to determine independent bivariate associations. As in research question 1, multivariate regression analyses were conducted to examine spirituality’s relationship with physical activity and intakes of dietary fat. The analyses included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differed among these subcategories in relation to spirituality. The regression model for this question was entered as follows: Spirituality + Demographics versus Physical Activity + Fat Intakes
Research Question 3

In order to determine if greater levels of social support were associated with higher levels of physical activity and lower intakes of dietary fat among college students, sum scores for each variable (social support, physical activity and dietary fat intake) were examined using Pearson correlations to determine independent bivariate associations. As in the previous research questions, multivariate regression analyses were conducted to examine social support’s relationship with physical activity and intakes of dietary fat. The analyses included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differed among these subcategories in relation to social support. The regression model for this question will be entered as follows: Social Support + Demographics versus Physical Activity + Fat Intakes

Research Question 4

In order to determine if greater levels of religiosity, spirituality, and social support were associated with higher levels of physical activity and lower intakes of dietary fat among college students, multivariate regression analyses were conducted to examine their relationship with physical activity and intakes of dietary fat. The regression model included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differed among these subcategories when examined in relation to all of the independent variables (religiosity, spirituality, and social support). The regression model for this question was entered as follows: Religiosity + Spirituality + Social Support + Demographics versus Physical Activity + Fat Intakes
**Research Question 5**

In order to determine if greater levels of behavioral religiosity were associated with higher levels of physical activity and lower intakes of dietary fat among college students, sum scores for each scale (religious denomination, attendance, and religious application, physical activity, and dietary fat intake) were examined using Pearson correlations to determine independent bivariate associations. As in the previous research questions, multivariate regression analyses were conducted to examine behavioral religiosity’s relationship with physical activity and intakes of dietary fat. The analyses included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differed among these subcategories. The regression model for this question was entered as follows: Behavioral Religiosity + Demographics versus Physical Activity + Fat Intakes

**Research Question 6**

In order to determine if greater levels of subjective religiosity were associated with higher levels of physical activity and lower intakes of dietary fat among college students, sum scores for each scale (religious identity and commitment, physical activity, and dietary fat intake) were examined using Pearson correlations to determine independent bivariate associations. As in the previous research questions, multivariate regression analyses were conducted to examine subjective religiosity’s relationship with physical activity and intakes of dietary fat. The analyses included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differ among these subcategories.
The regression model for this question was entered as follows: Subjective Religiosity + Demographics versus Physical Activity + Fat Intakes

Research Question 7

In order to determine if greater levels of functional religiosity were associated with higher levels of physical activity and lower intakes of dietary fat among college students, sum scores for each scale (religious coping and religious social support through divine support, physical activity, and dietary fat intake) were examined using Pearson correlations to determine independent bivariate associations. As in the previous research questions, multivariate regression analyses were conducted to examine functional religiosity’s relationship with physical activity and intakes of dietary fat. The analyses included the significant demographic control variables from the initial analyses, to examine whether fat intake and physical activity differ among these subcategories. The regression model for this question was entered as follows: Functional Religiosity + Demographics versus Physical Activity + Fat Intakes.
CHAPTER 4

RESULTS

Introduction

The purpose of this study was to examine the association between religion, spirituality, and social support in relation to physical activity and intakes of dietary fat among college students. Specifically, if greater religiosity or spirituality resulted in increased levels of physical activity and/or decreased intakes of dietary fat. Social support was examined independently, as a potential confounding variable between religion, spirituality and the health behaviors. This study investigated the relationships between religiosity, spirituality, and health behaviors among a sample of college students \( n = 914 \) from a large, public university in the southeastern United States. Data of interest were collected via a classroom-based assessment battery. The assessment battery contained questions related to religiosity, spirituality, physical activity, and intakes of dietary fat.

Research Questions

In order to examine religiosity, spirituality and health behaviors among college students, the following research questions were examined:

1. Were greater levels of religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
2. Were greater levels of spirituality associated with higher levels of physical activity and lower intakes of dietary fat among college students?

3. Were greater levels of social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

4. Were greater levels of religiosity and spirituality and social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

5. Were greater levels of behavioral religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

6. Were greater levels of subjective religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

7. Were greater levels of functional religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Descriptive Statistics

The sample consisted of 914 undergraduate students enrolled in classes during the spring 2010 at a large, public university in the southeastern United States (see Table 3). The majority of the sample was female (n = 638; 70.2%). With regard to ethnicity, the sample was predominantly White (n = 701; 78.1%) or Black (n = 150; 16.7%). The mean (M) age was 20.58 with a standard deviation (SD) =2.89. Just over a third of the sample reported being in their first year (n = 295; 32.9%), 23.5% in their second year (n = 211), 18.2% in their third year (n = 163) and 24.2% reported being in their fourth or fifth year. The majority (n = 528; 58.8%) reported that they were
not affiliated with a Greek (fraternity or sorority) organization. The average weight reported by the sample was 152.1 pounds ($SD = 38.3$) and height was 66.8 inches ($SD = 4.11$). By gender, the average weight reported among females was 136.8 pounds ($SD = 25.6$) and among males, 188.1 pounds ($SD = 39.0$).

Table 3

Demographics and Religiosity, Spirituality, and Health Behaviors of a Sample of College Students*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>%</th>
<th>M</th>
<th>SD</th>
</tr>
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<td>Gender</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>271</td>
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</tr>
<tr>
<td>Female</td>
<td>638</td>
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</tr>
<tr>
<td>Age</td>
<td></td>
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<td>2.89</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>First Year</td>
<td>295</td>
<td>32.9</td>
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<tr>
<td>Second Year</td>
<td>211</td>
<td>23.5</td>
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<tr>
<td>Third Year</td>
<td>163</td>
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<tr>
<td>Fourth Year</td>
<td>147</td>
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<td>Fifth Year or more</td>
<td>70</td>
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<td>1.0</td>
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<td></td>
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<tr>
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<td>Hispanic/Latino</td>
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<td>American Indian/Alaskan Native/ Native Hawaiian</td>
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Marital Status

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<td>Married/Partnered</td>
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<td>Other</td>
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<td>.4</td>
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Residence

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<td>Fraternity or Sorority House</td>
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<tr>
<td>Other College/University Housing</td>
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<tr>
<td>Parent/Guardian’s Home</td>
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<td>47.6</td>
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<td>Other Off-Campus Housing</td>
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<th>Greek Affiliation</th>
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<th>Percent</th>
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<td>41.2</td>
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<tr>
<td>No</td>
<td>528</td>
<td>58.8</td>
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Religious Student Organization Involvement

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<th>Involvement</th>
<th>Count</th>
<th>Percent</th>
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<td>25.3</td>
</tr>
<tr>
<td>No</td>
<td>671</td>
<td>74.7</td>
</tr>
</tbody>
</table>

Note. *n = 913; n = sample size; % = sample percent; M = mean; SD = standard deviation.

Religiosity

To measure religiosity, the assessment instrument included 35 items, divided into seven subscales/dimensions and conceptualized as three broad components: Behavioral, Subjective and Functional. The Behavioral Religiosity construct included the dimensions/subscales of religious denomination (α = NA), religious attendance (α = NA), religious application (α = NA). The Subjective Religiosity construct included the dimensions/subscales of religious commitment (α = 0.76), religious identity (α = 0.76). The Functional Religiosity construct included the
dimensions/subscales of religious ‘divine’ social support prayer scale ($\alpha = 0.88$), and religious coping ($\alpha = 0.53$). The dimensions with $\alpha$-levels of “NA” were single-item measures.

Respondents were asked their religious denomination and based on previous research (Kim & Sobal, 2004), religious denomination was grouped into 6 categories and results were as follows: Christian ($n = 202$; 24.3%), Catholic ($n = 136$; 16.3%), Protestant ($n = 468$; 56.3%), Jewish ($n = 8$; 1.0 %), Other ($n = 9$; 1.0 %), and Non-Religious ($n = 9$; 1.0 %). Scores for religious commitment ranged 0 – 15, with a mean ($M$) of 10.73 ($SD = 3.09$) (High). Scores for religious identity ranged from 0 – 12, with a mean ($M$) of 8.05 ($SD = 3.09$) (Moderate). Scores for religious attendance ranged from 0 – 2, with a mean ($M$) of 0.88 ($SD = 0.87$) (Low). Scores for religious application ranged from 0 – 3, with a mean ($M$) of 2.06 ($SD = 0.73$) (High).

For the coping scales, positive coping scores ranged from 0 – 8, with a mean ($M$) of 5.16 ($SD = 2.14$) (Moderate) and the negative coping scores ranged from 0 – 7, with a mean ($M$) of 1.54 ($SD = 1.43$) (Low). Scores for the prayer scale ranged from 0 – 15, with a mean ($M$) of 9.51 ($SD = 3.63$) (Moderate). The scores for divine social support ranged from 0 – 8, with a ($M$) of 5.86 ($SD = 1.55$) (High).

The scores for the broad categories of religion included a behavioral component, a subjective component and a functional component. The behavioral component was comprised of three subscales/dimensions: religious denomination, religious attendance, and religious application ($\alpha = 0.58$). Scores for this component ranged from 0 – 6, with a mean ($M$) of 3.52 ($SD = 1.23$) (Moderate). The subjective component included two subscales/dimensions of religiosity: religious identity and religious commitment ($\alpha = 0.84$). Scores for this component
ranged from 0 – 27, with a mean ($M$) of 16.75 ($SD = 6.70$) (Moderate). The functional component included the two subscales/dimensions of religiosity: religious coping and religious social support through divine support ($\alpha = 0.84$). Scores for this component ranged from 0 – 23, with a mean ($M$) of 14.81 ($SD = 5.32$) (Moderate).

**Spirituality**

To measure spirituality ($\alpha = 0.81$), two items, which were also part of the religious commitment scale, included “how spiritual are you?” and “how important is spirituality in your life?” Two items were asked to assess spirituality. Scores for spirituality ranged from 0 – 6, with a mean ($M$) of 4.66 ($SD = 1.38$) (High).

**Social Support**

Social support ($\alpha = 0.75$) was assessed using the same scales as in the Kim & Sobal (2004) study: summing the seven-item perceived social support scale from the *Piedmont Health Survey* ($\alpha = 0.86$) and two social interaction items from the *National Survey of Midlife Development in the United States* ($\alpha = 0.58$). The two social interaction items assessed frequency of contact with family and friends and a seven-item scale which assessed perceived social support. Scores for the social interaction scale ranged from 0 – 14, with a mean ($M$) of 12.26 ($SD = 2.07$) (High). The scores for the perceived social support ranged from 0 – 14, with a mean ($M$) of 12.72 ($SD = 2.19$) (High). The new social support scale ranged from 2 – 28, with a mean ($M$) of 24.08 ($SD = 5.05$) (High).

**Physical Activity**

Physical activity was assessed using two scales: two items from a past year recall for moderate and vigorous physical activity that were adopted from *National Survey of Midlife*
Development in the United States ($\alpha = 0.83$) (MIDUS) (1996) in the original study by Kim & Sobal (2004) and the 7-day recall for moderate and vigorous physical activity that were adopted from the 2009 ACHA-NCHA II survey ($\alpha = 0.87$). Consistent with recent research in this area (Kim & Sobal, 2004), this study used the past year recall for moderate and vigorous physical activity. Scores for the moderate physical activity past year recall ranged from 0 – 6, with a mean ($M$) of 4.73 ($SD = 1.26$) (High). Scores for the vigorous physical activity past year recall ranged from 0 – 6, with a mean ($M$) of 4.13 ($SD = 1.51$) (Moderate).

Dietary Fat Intake

Measures for fat intake were adopted from the National Cancer Institute’s Quick Food Scan ($\alpha = 0.73$). Dietary fat intake was subdivided into two categories: negative fat intake ($\alpha = 0.78$) and positive fat intake ($\alpha = 0.55$). These measures assessed the percentage of energy from fat consumed based on the intake frequency of 16 foods. For the purposes of this study and based on previous research (Kim & Sobal, 2004), negative fat intake scores were analyzed for 12 foods that indicated unhealthy fat intake, with higher scores yielding higher intakes of fat. These scores ranged from 0 – 66, with a mean ($M$) of 28.87 ($SD = 9.38$) (Moderate).

Research Question 1

1. Were greater levels of religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Pearson correlations were computed for the entire sample in regard to study constructs of religiosity, behavioral religiosity, subjective religiosity, functional religiosity, spirituality, social support, physical activity, and intakes of negative dietary fat (see Table 4). All of the religiosity and spirituality scales were significantly correlated ($p < 0.001$) with each other. In relation to the
dependent variables, negative fat intake, and moderate and vigorous physical activity, the following observations were made: no significant correlations were observed for negative fat intake; for the physical activity variables, one significant correlation was observed for moderate physical activity and social support \((r = .191, p < 0.001)\) and one significant correlation for vigorous physical activity and social support \((r = .172, p < 0.001)\). Reported as a continuous variable, age was significantly correlated with moderate physical activity \((r = -.099, p = 0.003)\) and vigorous physical activity \((r = -.154, p < 0.001)\).
Table 4

Pearson Correlation Coefficients of Religiosity, Spirituality, Physical Activity, and Dietary Fat Intake of a Sample of College Students

<table>
<thead>
<tr>
<th>RC</th>
<th>Spirit</th>
<th>R Id</th>
<th>R At</th>
<th>R Ap</th>
<th>Pray</th>
<th>Cope</th>
<th>SS</th>
<th>Fat</th>
<th>PA</th>
<th>BR</th>
<th>SR</th>
<th>FR</th>
<th>Rel</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC</td>
<td>.894**</td>
<td>.721**</td>
<td>.549**</td>
<td>.714**</td>
<td>.786**</td>
<td>.668**</td>
<td>.136**</td>
<td>.014</td>
<td>.027</td>
<td>.586**</td>
<td>.807**</td>
<td>.754**</td>
<td>.861**</td>
</tr>
<tr>
<td>Spirit</td>
<td>-</td>
<td>.567**</td>
<td>.356**</td>
<td>.580**</td>
<td>.668**</td>
<td>.546**</td>
<td>.073**</td>
<td>.014</td>
<td>.017</td>
<td>.407**</td>
<td>.660**</td>
<td>.622**</td>
<td>.721**</td>
</tr>
<tr>
<td>R Id</td>
<td>-</td>
<td>.537**</td>
<td>.595**</td>
<td>.623**</td>
<td>.557**</td>
<td>.162**</td>
<td>-.007</td>
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<td>.518**</td>
<td>.833**</td>
<td>.589**</td>
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<td>.441**</td>
<td>.336**</td>
<td>.119**</td>
<td>.065</td>
<td>.029</td>
<td>.830**</td>
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<td>.420**</td>
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</table>

*Note. n = 913; RC = Religious Commitment; Spirit = Spirituality; R Id = Religious Identity; R At = Religious Attendance; R Ap = Religious Application; Pray = Prayer; Cope = Coping; SS = Social Support; Fat = Negative Fat Intake; PA = Physical Activity; BR = Behavioral Religiosity; SR = Subjective Religiosity; FR = Functional Religiosity; Rel = Religiosity.*

**p value < 0.01. *p value < 0.05.
One Way ANOVAs: Moderate Physical Activity and Demographics

One way ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity. In this college sample, males ($M = 4.90; SD = 1.27$) had significantly higher moderate physical activity scores ($F = 6.83; p = .009$) than female students ($M = 4.66; SD = 1.25$). For ethnicity, the results indicated a significant difference for moderate physical activity scores ($F = 9.79; p < .001$). Post-hoc Tukey’s Honestly Significantly Different (HSD) tests indicated that the moderate physical activity scores for White students were significantly higher than those for Black students ($p < .001$). Mean moderate physical activity scores for the six ethnicity categories were 4.88 for White students ($SD = 1.06$), 4.07 for Black students ($SD = 1.71$), 3.75 for Hispanic/Latino students ($SD = 1.49$), 4.83 for Asian/Pacific Islander students ($SD = 1.47$), 3.75 for American Indian/Alaskan Native/Native Hawaiian ($SD = 1.25$), 4.70 for biracial and multicultural students ($SD = 1.25$), and 5.50 for students selecting the “other” category ($SD = 0.70$). The results for marital status showed a significant difference in moderate physical activity scores ($F = 3.79; p = .01$). Post-hoc Tukey’s HSD tests did not indicate a significant difference in the moderate physical activity scores for marital status. Mean moderate physical activity scores for the four categories were 4.76 for single students ($SD = 1.22$), 4.19 for married students ($SD = 1.83$), 3.00 for separated students ($SD = .00$), and 5.00 for divorced students ($SD = 1.15$). Students with a Greek affiliation ($M = 4.84; SD = 1.12$) had significantly higher moderate physical activity scores ($F = 4.37; p = .037$) than those reporting no Greek affiliation ($M = 4.66; SD = 1.32$). Finally, students involved with a religious student organization ($M = 4.88; SD = 1.32$).
1.08) had significantly higher levels of moderate physical activity scores ($F = 3.84; p = .05$) than the students reporting no religious student organization involvement ($M = 4.69; SD = 1.29$).

There was not a significant difference in moderate physical activity scores ($F = 1.91, p = .065$) and year in school ($M = 2.47; SD = 1.38$); first year ($M = 4.81; SD = 1.19$), second year ($M = 4.66; SD = 1.26$), third year ($M = 4.70; SD = 1.31$), fourth year ($M = 4.89; SD = 1.10$), and fifth year ($M = 4.34; SD = 1.51$) and graduate ($M = 5.00; SD = 0.71$), not seeking a degree ($M = 6.00; SD = not reported$), and other ($M = 5.67; SD = 0.58$). There was not a significant difference in moderate physical activity scores ($F = 1.37, p = .234$) for students who lived on-campus ($M = 4.76; SD = 1.24$) and those who lived off-campus ($M = 4.72; SD = 1.25$).

**One Way ANOVAs: Vigorous Physical Activity and Demographics**

One way ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity. In this college sample, males ($M = 4.51; SD = 1.43$) had significantly higher vigorous physical activity scores ($F = 25.39; p < .001$) than female students ($M = 3.97; SD = 1.51$). For ethnicity, the results indicated a significant difference for vigorous physical activity scores ($F = 7.74; p < .001$). Post-hoc Tukey’s HSD tests indicated that the vigorous physical activity scores for White students were significantly higher than Black students ($p < .001$). Mean vigorous physical activity scores for the six ethnicity categories were 4.27 for White students ($SD = 1.32$), 3.41 for Black students ($SD = 1.97$), 4.38 for Hispanic/Latino students ($SD = 1.84$), 4.35 for Asian/Pacific Islander students ($SD = 1.70$), 3.25 for American Indian/Alaskan Native/Native Hawaiian ($SD = 0.96$), 4.30 for biracial or multicultural students ($SD = 1.64$), and 5.50 for students selecting the “other” category ($SD = 0.71$). There was a
significant difference in vigorous physical activity scores ($F = 2.11, p = .041$) and year in school ($M = 2.47; SD = 1.38$); first year ($M = 4.21; SD = 1.40$), second year ($M = 4.11; SD = 1.43$), third year ($M = 4.04; SD = 1.66$), fourth year ($M = 4.27; SD = 1.32$), and fifth year ($M = 3.63; SD = 1.98$) and graduate ($M = 4.56; SD = 0.72$), not seeking a degree ($M = 6.00; SD = \text{not reported}$), and other ($M = 5.50; SD = 0.71$). There was not a significant difference in vigorous physical activity scores ($F = 1.37; p = .234$) for students who lived on-campus ($M = 4.76; SD = 1.24$) and those who lived off-campus ($M = 4.72; SD = 1.25$).

The results for marital status showed a significant difference in vigorous physical activity scores ($F = 7.38; p < .001$). Post-hoc Tukey’s HSD tests showed that the vigorous physical activity scores for single students were significantly higher than married students ($p = 0.001$) and that the scores for divorced students were higher than the separated students ($p = 0.041$). Mean vigorous physical activity scores for the four categories were 4.17 for single students ($SD = 1.47$), 3.04 for married students ($SD = 1.97$), 2.00 for separated students ($SD = 1.73$), and 5.00 for divorced students ($SD = 1.15$). Vigorous physical activity scores were significantly higher ($F = 2.50; p = .029$) for students who lived in ‘other college/university housing’ ($M = 4.50, SD = 1.37$) than those who lived in ‘parents/guardian’s home’ ($M = 3.49, SD = 1.77$). Finally, students involved with a religious student organization ($M = 4.07; SD = 1.56$) had significantly higher levels of vigorous physical activity scores ($F = 4.09; p = .043$) than the students reporting no religious student organization involvement ($M = 4.30; SD = 1.29$).

Students with a Greek affiliation ($M = 4.09; SD = 1.59$) did not have significantly higher vigorous physical activity scores ($F = 2.39; p = .303$) than those reporting no Greek affiliation ($M = 4.19; SD = 1.36$).
One Way ANOVAs: Fat Intake and Demographics

One way ANOVAs indicated that gender and ethnicity were significantly associated with dietary fat intake. In this college sample, males ($M = 30.44; SD = 10.19$) had significantly higher dietary fat intake scores ($F = 10.71; p = .001$) than female students ($M = 28.22; SD = 8.95$). For ethnicity, the results indicated a significant difference for dietary fat intake scores ($F = 3.82; p = .001$). Post-hoc Tukey’s HSD tests indicated that the dietary fat intake scores for White students were significantly lower than scores for Black students ($p = .001$). Mean dietary fat intake scores for the six ethnicity categories were 28.31 for White students ($SD = 8.99$), 31.80 for Black students ($SD = 10.56$), 23.00 for Hispanic/Latino students ($SD = 13.38$), 28.22 for Asian/Pacific Islander students ($SD = 9.24$), 25.50 for American Indian/Alaskan Native/Native Hawaiian ($SD = 5.26$), 32.50 for biracial or multicultural students ($SD = 9.86$), and 33.00 for students selecting the “other” category ($SD = 12.73$).

There was not a significant difference in dietary fat intake scores ($F = 1.40, p = .201$) and year in school ($M = 2.47; SD = 1.38$); first year ($M = 28.94; SD = 9.38$), second year ($M = 29.11; SD = 9.68$), third year ($M = 28.77; SD = 10.03$), fourth year ($M = 28.44; SD = 8.21$), and fifth year ($M = 30.23; SD = 9.46$) and graduate ($M = 21.11; SD = 9.05$), not seeking a degree ($M = 18.00; SD = not reported$), and other ($M = 33.00; SD = 7.07$). There was not a significant difference in dietary fat intake scores ($F = 2.32, p = 0.074$) for marital status; however, Tukey’s HSD tests showed that single students have higher intakes of dietary fat than separated students ($p = .043$). Mean scores for the four categories were 28.95 for single students ($SD = 9.38$), 28.50 for married students ($SD = 9.47$), 14.67 for separated students ($SD = 12.86$), and 28.50 for divorced students ($SD = 9.29$). There was not a significant difference in dietary fat intake scores
\(F = 0.90, p = .409\) for students who lived on-campus \((M = 29.16; SD = 9.54)\) and those who lived off-campus \((M = 28.64; SD = 9.29)\). Students with a Greek affiliation \((M = 29.48; SD = 8.93)\) did not have significantly higher vigorous physical activity scores \((F = 2.48; p = .115)\) than those reporting no Greek affiliation \((M = 28.47; SD = 8.93)\). Finally, scores for students involved with a religious student organization \((M = 28.39; SD = 8.91)\) were not significantly different than the students reporting no religious student organization involvement \((M = 29.06; SD = 9.57)\).

A multiple linear regression analysis was conducted to determine the association between moderate physical activity and religiosity (see Table 5), vigorous physical activity and religiosity (see Table 6), and dietary fat intake and religiosity (see Table 7).

**Multiple Linear Regression: Moderate Physical Activity and Religiosity**

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model (Table 5) examining moderate physical activity included the religiosity scale and the significant demographic variables. The religiosity scale \((p = .692)\) was not significantly related to moderate physical activity in the model. The model was statistically significant \((p < 0.001)\) and explained 2.6% of the variance in moderate physical activity among the sample of college students. In general, results from this multiple regression
analysis suggest that there was no significant association between greater levels of religiosity and higher levels of moderate physical activity.

Table 5

*Multiple Regression Model Examining Moderate Physical Activity and Religiosity among a Sample of College Students (n = 912)*

<table>
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<td>Greek</td>
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<td>Religiosity</td>
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</table>

Note. R² = 0.026 (p < 0.001). β = unstandardized beta weight; SE = standard error, Relig Stud Org = Religious student organization involvement; Greek = Greek involvement.

*Multiple Linear Regression: Vigorous Physical Activity and Religiosity*

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.
The multiple linear regression model examining vigorous physical activity included the religiosity scale and the significant demographic variables (Table 6). The religiosity scale ($p = .350$) was not significantly related to moderate physical activity in the model. The model was statistically significant ($p < 0.001$) and explained 4.1% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there is no significant association between greater levels of religiosity and higher levels of vigorous physical activity.

Table 6

*Multiple Regression Model Examining Vigorous Physical Activity and Religiosity among a Sample of College Students (n = 912)*

<table>
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<td>Religiosity</td>
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<td>.004</td>
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<td>.350</td>
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</table>

Note. $R^2 = 0.041$ (p < 0.001). $\beta$ = unstandardized beta weight; $SE$ = standard error; Stud Org = religious student organization involvement.
Multiple Linear Regression: Dietary Fat Intake and Religiosity

For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining dietary fat intake included the religiosity scale and the significant demographic variables (Table 7). The religiosity scale ($p = .106$) was not significantly related to intakes of negative dietary fat in the model. The model was statistically significant ($p < 0.001$) and explained 1.5% of the variance in negative dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of religiosity and lower intakes of dietary fat.

Table 7

<table>
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<tr>
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<td>Ethnicity</td>
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<td>Religiosity</td>
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<td>.026</td>
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</table>

Note. $R^2 = 0.015$ ($p = 0.001$). $\beta =$ unstandardized beta weight.
Research Question 2

2. Were greater levels of spirituality associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Pearson correlations were computed for the entire sample in regard to study constructs religiosity, behavioral religiosity, subjective religiosity, functional religiosity, spirituality, social support, physical activity, and intakes of negative dietary fat (see Table 4). There were no significant correlations identified for spirituality and moderate physical activity ($r^2 = .022, p = .51$); spirituality and vigorous physical activity ($r^2 = .010, p = .76$); or spirituality and negative dietary fat intake ($r^2 = .014, p = .68$).

A multiple linear regression analysis was conducted to determine the association between moderate physical activity and spirituality (see Table 8), vigorous physical activity and spirituality (see Table 9), and dietary fat intake and spirituality (see Table 10).

*Multiple Linear Regression: Moderate Physical Activity and Spirituality*

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining moderate physical activity included the spirituality scale and the significant demographic variables (Table 8).
.554) was not significantly related to moderate physical activity in the model. The model was statistically significant ($p < 0.001$) and explained 2.6% of the variance in moderate physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of spirituality and higher levels of moderate physical activity.

Table 8

**Multiple Regression Model Examining Moderate Physical Activity and Spirituality among a Sample of College Students (n = 912)**

<table>
<thead>
<tr>
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<td>Relig Stud Org</td>
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<td>Greek</td>
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<td>Spirituality</td>
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<td>.554</td>
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Note. $R^2 = 0.026$ ($p < 0.001$). $\beta =$ unstandardized beta weight; SE = standard error; Relig Stud Org = Religious student organization involvement; Greek = Greek involvement.

**Multiple Linear Regression: Vigorous Physical Activity and Spirituality**

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity.
activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining vigorous physical activity included the spirituality scale and the significant demographic variables (Table 9). The spirituality scale \( (p = 0.941) \) was not significantly related to moderate physical activity in the model. The model was statistically significant \( (p < 0.001) \) and explained 4.0% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of spirituality and higher levels of vigorous physical activity.
Table 9

Multiple Regression Model Examining Vigorous Physical Activity and Spirituality among a Sample of College Students (n = 912)

<table>
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<td>Relig Stud Org</td>
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<td>Year in School</td>
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Note. R² = 0.040 (p < 0.001). β = unstandardized beta weight; SE = standard error; Relig Stud Org = religious student organization involvement.

Multiple Linear Regression: Dietary Fat Intake and Spirituality

For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining dietary fat intake included the spirituality scale and the significant demographic variables (Table 10). The spirituality scale (p = .624) was not significantly related to intakes of negative dietary fat in the model. The model...
was statistically significant \((p = 0.003)\) and explained 1.3% of the variance in negative dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there is no significant association between greater levels of spirituality and lower intakes of dietary fat.

Table 10

*Multiple Regression Model Examining Dietary Fat Intake and Spirituality among a Sample of College Students \((n = 912)\)*

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<td>Ethnicity</td>
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<td>Spirituality</td>
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<td>.624</td>
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</table>

Note. \(R^2 = 0.013\) \((p = 0.003)\). \(\beta\) = unstandardized beta weight; \(SE\) = standard error.

Research Question 3

3. Were greater levels of social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Pearson correlations were computed for the entire sample in regard to study constructs religiosity, behavioral religiosity, subjective religiosity, functional religiosity, spirituality, social support, physical activity, and intakes of negative dietary fat (see Table 4). There were significant correlations identified for social support and moderate physical activity \((r^2 = .191, p < 0.001)\) and social support and vigorous physical activity \((r^2 = .172, p < 0.001)\).
A multiple linear regression analysis was conducted to determine the association between moderate physical activity and social support (see Table 11), vigorous physical activity and social support (see Table 12), and dietary fat intake and social support (see Table 13).

**Multiple Linear Regression: Moderate Physical Activity and Social Support**

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining moderate physical activity included the social support scale and the significant demographic variables (Table 11). The social support scale \((p < .001)\) was significantly related to moderate physical activity in the model. The model was statistically significant \((p < 0.001)\) and explained 5.3% of the variance in moderate physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was a significant association between greater levels of social support and higher levels of moderate physical activity.
Table 11

*Multiple Regression Model Examining Moderate Physical Activity and Social Support among a Sample of College Students (n = 908)*

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Note. $R^2 = 0.053$ ($p < 0.001$). $\beta =$ unstandardized beta weight; SE = standard error; Relig Stud Org = Religious student organization involvement; Greek = Greek involvement.

Multiple Linear Regression: Vigorous Physical Activity and Social Support

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining vigorous physical activity included the social support scale and the significant demographic variables (Table 12). The social support scale ($p < .001$) was significantly related to vigorous physical activity in the model. The model
was statistically significant \((p < 0.001)\) and explained 6.9\% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was a significant association between greater levels of social support and higher levels of vigorous physical activity.

Table 12

*Multiple Regression Model Examining Vigorous Physical Activity and Social Support among a Sample of College Students \((n = 908)\)*

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<td>4.189</td>
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<td>Gender</td>
<td>-.713</td>
<td>.110</td>
<td>-6.482</td>
<td>.000</td>
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<tr>
<td>Ethnicity</td>
<td>-.066</td>
<td>.057</td>
<td>-1.161</td>
<td>.246</td>
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<td>Marital Status</td>
<td>-.249</td>
<td>.180</td>
<td>-1.386</td>
<td>.166</td>
</tr>
<tr>
<td>Relig Stud Org</td>
<td>.205</td>
<td>.114</td>
<td>1.798</td>
<td>.072</td>
</tr>
<tr>
<td>Year in School</td>
<td>-.041</td>
<td>.047</td>
<td>-.880</td>
<td>.379</td>
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<tr>
<td>Living Location</td>
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<td>.033</td>
<td>.387</td>
<td>.699</td>
</tr>
<tr>
<td>Social Support</td>
<td>.055</td>
<td>.010</td>
<td>5.402</td>
<td>.000</td>
</tr>
</tbody>
</table>

Note. \(R^2 = 0.69\) \((p < 0.001)\). \(\beta\) = unstandardized beta weight; \(SE\) = standard error; Relig Stud Org = religious student organization involvement.

*Multiple Linear Regression: Dietary Fat Intake and Social Support*

For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of
negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining dietary fat intake included the social support scale and the significant demographic variables (Table 13). The social support scale \( (p = .173) \) was not significantly related to intakes of negative dietary fat in the model. The model was statistically significant \( (p = 0.001) \) and explained 1.5% of the variance in negative dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of social support and lower intakes of dietary fat.

Table 13

*Multiple Regression Model Examining Dietary Fat Intake and Social Support among a Sample of College Students (n = 908)*

<table>
<thead>
<tr>
<th></th>
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<th>( SE )</th>
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<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
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<td>1.953</td>
<td>15.366</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>-2.461</td>
<td>.703</td>
<td>-3.501</td>
<td>.000</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.706</td>
<td>.366</td>
<td>1.927</td>
<td>.054</td>
</tr>
<tr>
<td>Social Support</td>
<td>.089</td>
<td>.065</td>
<td>1.365</td>
<td>.173</td>
</tr>
</tbody>
</table>

Note. \( R^2 = 0.015 \) (\( p < 0.001 \)). \( \beta \) = unstandardized beta weight; \( SE \) = standard error.

Research Question 4

4. Were greater levels of religiosity and spirituality and social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?
Pearson correlations were computed for the entire sample in regard to study constructs religiosity, behavioral religiosity, subjective religiosity, functional religiosity, spirituality, social support, physical activity, and intakes of negative dietary fat (see Table 4). There were significant correlations identified for social support and moderate physical activity ($r^2 = .191, p < .001$) and social support and vigorous physical activity ($r^2 = .172, p < .001$).

A multiple linear regression analysis was conducted to determine the association between moderate physical activity and religiosity + spirituality + social support (see Table 14), vigorous physical activity and religiosity + spirituality + social support (see Table 15), and dietary fat intake and religiosity + spirituality + social support (see Table 16).

**Multiple Linear Regression: Moderate Physical Activity and Religiosity and Spirituality and Social Support**

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining moderate physical activity included the religiosity scale, the spirituality scale, and the social support scale and the significant demographic variables (Table 14). The religiosity scale ($p < .706$), and the spirituality scale ($p < .545$) were not significantly related to moderate physical activity. The social support scale ($p < .001$) was significantly related to moderate physical activity in the model. The model was statistically significant ($p < 0.001$) and explained 6.0% of the variance in moderate physical activity.
activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was a significant association between greater levels of social support and higher levels of moderate physical activity. They also suggest that social support does not necessarily have a confounding effect on the independent associations between religiosity and moderate physical activity ($r^2 = .026, p = .692$) or spirituality and moderate physical activity ($r^2 = .026, p = .554$).

Table 14

*Multiple Regression Model Examining Moderate Physical Activity and Religiosity, Spirituality, and Social Support among a Sample of College Students (n = 912)*

<table>
<thead>
<tr>
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<tbody>
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<td>12.453</td>
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<td>Gender</td>
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<td>.000</td>
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<tr>
<td>Ethnicity</td>
<td>-.101</td>
<td>.049</td>
<td>-2.082</td>
<td>.038</td>
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<tr>
<td>Marital Status</td>
<td>-.144</td>
<td>.146</td>
<td>-.987</td>
<td>.324</td>
</tr>
<tr>
<td>Greek</td>
<td>.159</td>
<td>.088</td>
<td>1.795</td>
<td>.073</td>
</tr>
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<td>Relig Stud Org</td>
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<td>.102</td>
<td>1.103</td>
<td>.270</td>
</tr>
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<td>Religiosity</td>
<td>-.002</td>
<td>.005</td>
<td>-.377</td>
<td>.706</td>
</tr>
<tr>
<td>Spirituality</td>
<td>.026</td>
<td>.043</td>
<td>.605</td>
<td>.545</td>
</tr>
<tr>
<td>Social Support</td>
<td>.044</td>
<td>.008</td>
<td>5.139</td>
<td>.000</td>
</tr>
</tbody>
</table>

Note. $R^2 = 0.060$ ($p < 0.001$). $\beta =$ unstandardized beta weight; SE = standard error; Greek = Greek involvement; Relig Stud Org = religious student organization involvement.
Multiple Linear Regression: Vigorous Physical Activity and Religiosity and Spirituality and Social Support

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining vigorous physical activity included the religiosity scale, the spirituality scale, and the social support scale and the significant demographic variables (Table 15). The religiosity scale ($p < .082$), and the spirituality scale ($p < .251$) were not significantly related to vigorous physical activity. The social support scale ($p < .001$) was significantly related to vigorous physical activity in the model. The model was statistically significant ($p < 0.001$) and explained 7.0% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was a significant association between greater levels of social support and higher levels of vigorous physical activity. They also suggest that social support does not necessarily have a confounding effect on the independent associations between religiosity and vigorous physical activity ($r^2 = .041, p = .350$) or spirituality and vigorous physical activity ($r^2 = .040, p = .941$).
Table 15

Multiple Regression Model Examining Vigorous Physical Activity and Religiosity, Spirituality, and Social Support among a Sample of College Students (n = 908)

<table>
<thead>
<tr>
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<tbody>
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<td>(Constant)</td>
<td>4.239</td>
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<td>10.526</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>-.699</td>
<td>.110</td>
<td>-6.328</td>
<td>.000</td>
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<tr>
<td>Ethnicity</td>
<td>-.068</td>
<td>.057</td>
<td>-1.198</td>
<td>.231</td>
</tr>
<tr>
<td>Marital Status</td>
<td>-.250</td>
<td>.180</td>
<td>-1.390</td>
<td>.165</td>
</tr>
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<td>Relig Stud Org</td>
<td>.242</td>
<td>.123</td>
<td>1.967</td>
<td>.049</td>
</tr>
<tr>
<td>Year in School</td>
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<td>.047</td>
<td>-0.998</td>
<td>.318</td>
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<tr>
<td>Living Location</td>
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<td>.033</td>
<td>.473</td>
<td>.637</td>
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<td>Religiosity</td>
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<td>.006</td>
<td>-1.740</td>
<td>.082</td>
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<tr>
<td>Spirituality</td>
<td>.059</td>
<td>.051</td>
<td>1.148</td>
<td>.251</td>
</tr>
<tr>
<td>Social Support</td>
<td>.056</td>
<td>.010</td>
<td>5.514</td>
<td>.000</td>
</tr>
</tbody>
</table>

Note. $R^2 = 0.070$ (p < 0.001). $\beta$ = unstandardized beta weight; SE = standard error; Relig Stud Org = religious student organization involvement.

Multiple Linear Regression: Dietary Fat Intake and Religiosity and Spirituality and Social Support

For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.
The multiple linear regression model examining intakes of dietary fat included the religiosity scale, the spirituality scale, and the social support scale and the significant demographic variables (Table 16). The religiosity scale ($p < .101$), the spirituality scale ($p < .436$), and the social support scale ($p < .229$) were not significantly related to dietary fat intake. The model was statistically significant ($p = 0.002$) and explained 1.6% of the variance in dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of religiosity, spirituality, or social support and lower intakes of dietary fat. They also suggest that social support does not necessarily have a confounding effect on the independent associations between religiosity and dietary fat intake ($r^2 = .015$, $p = .106$) or spirituality and dietary fat intake ($r^2 = .013$, $p = .624$).
Table 16

*Multiple Regression Model Examining Dietary Fat Intake and Religiosity, Spirituality, and Social Support among a Sample of College Students (n =908)*

<table>
<thead>
<tr>
<th></th>
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<td>(Constant)</td>
<td>29.155</td>
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<td>13.389</td>
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</tr>
<tr>
<td>Gender</td>
<td>-2.599</td>
<td>.708</td>
<td>-3.670</td>
<td>.000</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td>1.988</td>
<td>.047</td>
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<td>Religiosity</td>
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<td>.037</td>
<td>1.644</td>
<td>.101</td>
</tr>
<tr>
<td>Spirituality</td>
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<td>.329</td>
<td>- .779</td>
<td>.436</td>
</tr>
<tr>
<td>Social Support</td>
<td>.079</td>
<td>.065</td>
<td>1.204</td>
<td>.229</td>
</tr>
</tbody>
</table>

Note. $R^2 = 0.016$ ($p = 0.002$). $\beta = $ unstandardized beta weight; $SE = $ standard error.

Research Question 5

5. Were greater levels of behavioral religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

*Multiple Linear Regression: Moderate Physical Activity and Behavioral Religiosity*

A multiple linear regression analysis was conducted to determine the association between moderate physical activity and behavioral religiosity (see Table 17), vigorous physical activity and behavioral religiosity (see Table 18), and dietary fat intake and behavioral religiosity (see Table 19).

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious
student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining moderate physical activity included the behavioral religiosity scale and the significant demographic variables (Table 17). The behavioral religiosity scale \( (p = .668) \) was not significantly related to moderate physical activity in the model. The model was statistically significant \( (p < 0.001) \) and explained 2.6\% of the variance in moderate physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of behavioral religiosity and higher levels of moderate physical activity.
Table 17

Multiple Regression Model Examining Moderate Physical Activity and Behavioral Religiosity among a Sample of College Students (n = 912)

<table>
<thead>
<tr>
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<th>SE</th>
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<tr>
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<td>-3.549</td>
<td>.000</td>
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<td>Ethnicity</td>
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<td>-2.562</td>
<td>.011</td>
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<tr>
<td>Marital Status</td>
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<td>.146</td>
<td>-1.590</td>
<td>.112</td>
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<tr>
<td>Greek</td>
<td>.181</td>
<td>.089</td>
<td>2.032</td>
<td>.042</td>
</tr>
<tr>
<td>Relig Stud Org</td>
<td>.160</td>
<td>.097</td>
<td>1.660</td>
<td>.097</td>
</tr>
<tr>
<td>Behavioral Religiosity</td>
<td>.015</td>
<td>.034</td>
<td>.429</td>
<td>.668</td>
</tr>
</tbody>
</table>

Note. $R^2 = 0.026$ (p < 0.001). $\beta = \text{unstandardized beta weight; SE = standard error; Greek =}$ Greek involvement; Relig Stud Org = religious student organization involvement.

Multiple Linear Regression: Vigorous Physical Activity and Behavioral Religiosity

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining vigorous physical activity included the behavioral religiosity scale and the significant demographic variables (Table 18). The behavioral
religiosity scale \( (p = .508) \) was not significantly related to vigorous physical activity in the model. The model was statistically significant \( (p < 0.001) \) and explained 4.1\% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of behavioral religiosity and higher levels of vigorous physical activity.

Table 18

*Multiple Regression Model Examining Vigorous Physical Activity and Behavioral Religiosity among a Sample of College Students (n = 912)*

<table>
<thead>
<tr>
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<th>( SE )</th>
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<th>( p ) value</th>
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</thead>
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<td>.000</td>
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<td>.111</td>
<td>-5.657</td>
<td>.000</td>
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<td>Ethnicity</td>
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<td>.058</td>
<td>-1.782</td>
<td>.075</td>
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<td>.181</td>
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<td>.051</td>
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<td>Relig Stud Org</td>
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<td>.028</td>
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<td>.047</td>
<td>-.995</td>
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<td>Living Location</td>
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<td>.521</td>
<td>.603</td>
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<td>Behavioral</td>
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<td>.041</td>
<td>.662</td>
<td>.508</td>
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</table>

Note. \( R^2 = 0.041 \) (\( p < 0.001 \)). \( \beta \) = unstandardized beta weight; \( SE \) = standard error; Relig Stud Org = religious student organization involvement.

*Multiple Linear Regression: Dietary Fat Intake and Behavioral Religiosity*
For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining dietary fat intake included the behavioral religiosity scale and the significant demographic variables (Table 19). The behavioral religiosity scale ($p = .033$) was significantly related to intakes of negative dietary fat in the model. The model was statistically significant ($p < 0.001$) and explained 1.7% of the variance in negative dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there was a significant association between greater levels of behavioral religiosity and higher intakes of dietary fat.

Table 19

*Multiple Regression Model Examining Dietary Fat Intake and Behavioral Religiosity among a Sample of College Students (n = 912)*

<table>
<thead>
<tr>
<th></th>
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<td>19.740</td>
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<td>.697</td>
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<td>.000</td>
</tr>
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<td>Ethnicity</td>
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<td>1.924</td>
<td>.055</td>
</tr>
<tr>
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<td>.257</td>
<td>2.133</td>
<td>.033</td>
</tr>
</tbody>
</table>

Note. $R^2 = 0.017$ ($p < 0.001$). $\beta =$ unstandardized beta weight, $SE =$ standard error.
Research Question 6

6. Were greater levels of subjective religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Multiple Linear Regression: Moderate Physical Activity and Subjective Religiosity

A multiple linear regression analysis was conducted to determine the association between moderate physical activity and subjective religiosity (see Table 20), vigorous physical activity and subjective religiosity (see Table 21), and dietary fat intake and subjective religiosity (see Table 22).

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining moderate physical activity included the subjective religiosity scale and the significant demographic variables (Table 20). The subjective religiosity scale ($p = .463$) was not significantly related to moderate physical activity in the model. The model was statistically significant ($p < 0.001$) and explained 2.6% of the variance in moderate physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of subjective religiosity and higher levels of moderate physical activity.
### Table 20

**Multiple Regression Model Examining Moderate Physical Activity and Subjective Religiosity among a Sample of College Students (n = 899)**

<table>
<thead>
<tr>
<th></th>
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</tr>
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</tr>
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<td>.096</td>
<td>-3.534</td>
<td>.000</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td>-2.550</td>
<td>.011</td>
</tr>
<tr>
<td>Marital Status</td>
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<td>.147</td>
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<td>.115</td>
</tr>
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<td>Greek</td>
<td>.192</td>
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<td>.034</td>
</tr>
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<td>Relig Stud Org</td>
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<td>.217</td>
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<td>Subjective Religiosity</td>
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<td>.735</td>
<td>.463</td>
</tr>
</tbody>
</table>

Note. \( R^2 = 0.026 \) (p < 0.001). \( \beta \) = unstandardized beta weight; SE = standard error; Greek = Greek involvement; Relig Stud Org = religious student organization involvement.

**Multiple Linear Regression: Vigorous Physical Activity and Subjective Religiosity**

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining vigorous physical activity included the subjective religiosity scale and the significant demographic variables (Table 21). The subjective
religiosity scale \( (p = .841) \) was not significantly related to vigorous physical activity in the model. The model was statistically significant \( (p < 0.001) \) and explained 4.0% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of subjective religiosity and higher levels of vigorous physical activity.

Table 21

*Multiple Regression Model Examining Vigorous Physical Activity and Subjective Religiosity among a Sample of College Students (n = 899)*

<table>
<thead>
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</tr>
</thead>
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<td>.111</td>
<td>-5.549</td>
<td>.000</td>
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<td>Ethnicity</td>
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<td>.059</td>
<td>-1.911</td>
<td>.056</td>
</tr>
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<td>Marital Status</td>
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<td>.181</td>
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<td>.059</td>
</tr>
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<td>.126</td>
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<td>.041</td>
</tr>
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<td>Year in School</td>
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<td>.267</td>
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<td>.618</td>
<td>.537</td>
</tr>
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<td>.200</td>
<td>.841</td>
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</tbody>
</table>

Note. \( R^2 = 0.041 \) \( (p < 0.001) \). \( \beta \) = unstandardized beta weight; SE = standard error; Relig Stud Org = religious student organization involvement.
Multiple Linear Regression: Dietary Fat Intake and Subjective Religiosity

For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining dietary fat intake included the subjective religiosity scale and the significant demographic variables (Table 22). The subjective religiosity scale \((p = .888)\) was not significantly related to intakes of negative dietary fat in the model. The model was statistically significant \((p < 0.001)\) and explained 1.2% of the variance in negative dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there is not a significant association between greater levels of subjective religiosity and higher intakes of dietary fat.

Table 22

Multiple Regression Model Examining Dietary Fat Intake and Subjective Religiosity among a Sample of College Students \((n = 899)\)

<table>
<thead>
<tr>
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<tr>
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<tr>
<td>Gender</td>
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<td>.704</td>
<td>-3.176</td>
<td>.002</td>
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<td>Ethnicity</td>
<td>.636</td>
<td>.370</td>
<td>1.720</td>
<td>.086</td>
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<td>Subjective Religiosity</td>
<td>.007</td>
<td>.048</td>
<td>.141</td>
<td>.888</td>
</tr>
</tbody>
</table>

Note. \(R^2 = 0.012\) \((p < 0.001)\). \(\beta\) = unstandardized beta weight, \(SE\) = standard error.
Research Question 7

7. Were greater levels of functional religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

Multiple Linear Regression: Moderate Physical Activity and Functional Religiosity

A multiple linear regression analysis was conducted to determine the association between moderate physical activity and functional religiosity (see Table 23), vigorous physical activity and functional religiosity (see Table 24), and dietary fat intake and functional religiosity (see Table 25).

For this analysis, moderate physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, marital status, Greek affiliation, and religious student organization involvement were significantly associated with moderate physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining moderate physical activity included the functional religiosity scale and the significant demographic variables (Table 23). The functional religiosity scale ($p = .503$) was not significantly related to moderate physical activity in the model. The model was statistically significant ($p < 0.001$) and explained $2.6\%$ of the variance in moderate physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was no significant association between greater levels of functional religiosity and higher levels of moderate physical activity.
Table 23

Multiple Regression Model Examining Moderate Physical Activity and Functional Religiosity among a Sample of College Students (n = 912)

<table>
<thead>
<tr>
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<td>.010</td>
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<tr>
<td>Marital Status</td>
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<td>.112</td>
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<tr>
<td>Greek</td>
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<td>.089</td>
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<td>.038</td>
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<td>Rel Stud Org</td>
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<td>.099</td>
<td>1.497</td>
<td>.135</td>
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<td>Functional Religiosity</td>
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<td>.007</td>
<td>.670</td>
<td>.503</td>
</tr>
</tbody>
</table>

Note. R² = 0.026 (p < 0.001). β = unstandardized beta weight; SE = standard error; Rel Stud Org = religious student organization involvement.

Multiple Linear Regression: Vigorous Physical Activity and Functional Religiosity

For this analysis, vigorous physical activity was the dependent variable. Results from the ANOVAs indicated that gender, ethnicity, year in school, living location, marital status, and religious student organization involvement were significantly associated with vigorous physical activity and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining vigorous physical activity included the functional religiosity scale and the significant demographic variables (Table 24). The functional religiosity scale (p = .203) was not significantly related to vigorous physical activity in the
The model was statistically significant \((p < 0.001)\) and explained 4.2% of the variance in vigorous physical activity among the sample of college students. In general, results from this multiple regression analysis suggest that there was not a significant association between greater levels of subjective religiosity and higher levels of vigorous physical activity.

Table 24

*Multiple Regression Model Examining Vigorous Physical Activity and Functional Religiosity among a Sample of College Students \((n = 912)\)*

<table>
<thead>
<tr>
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<th>(B)</th>
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<tr>
<td>Gender</td>
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<td>-5.495</td>
<td>.000</td>
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<tr>
<td>Ethnicity</td>
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<td>Marital Status</td>
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<td>Relig Stud Org</td>
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<td>.011</td>
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<td>Year in School</td>
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<td>.047</td>
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<td>Living Location</td>
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<td>.034</td>
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<td>.545</td>
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<tr>
<td>Functional Religiosity</td>
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<td>.008</td>
<td>-1.274</td>
<td>.203</td>
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</table>

Note. \(R^2 = 0.042\) \((p < 0.001)\). \(\beta\) = unstandardized beta weight; \(SE\) = standard error; Relig Stud Org = religious student organization involvement.

*Multiple Linear Regression: Dietary Fat Intake and Functional Religiosity*

For this analysis, dietary fat intake was the dependent variable. Results from the ANOVAs indicated that gender and ethnicity were significantly associated with intakes of
negative dietary fat and therefore, were included in the multiple linear regression analysis as potential confounding variables.

The multiple linear regression model examining dietary fat intake included the functional religiosity scale and the significant demographic variables (Table 25). The functional religiosity scale ($p = .031$) was significantly related to intakes of negative dietary fat in the model. The model was statistically significant ($p < 0.001$) and explained 1.7% of the variance in negative dietary fat intake among the sample of college students. In general, results from this multiple regression analysis suggest that there was a significant association between greater levels of functional religiosity and higher intakes of dietary fat.

Table 25

<table>
<thead>
<tr>
<th></th>
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<td>.001</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td>1.821</td>
<td>.069</td>
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<tr>
<td>Functional Religiosity</td>
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<td>.050</td>
<td>2.161</td>
<td>.031</td>
</tr>
</tbody>
</table>

Note. $R^2 = 0.017$ ($p < 0.001$). $\beta =$ unstandardized beta weight; $SE =$ standard error.
CHAPTER 5
DISCUSSION

Introduction

The purpose of this study was to examine the association between religion, spirituality, and social support in relation to physical activity and intakes of dietary fat among college students. Specifically, the objective was to determine if greater religiosity or spirituality resulted in increased levels of physical activity and/or decreased intakes of dietary fat. Social support was examined independently, as a potential confounding variable between religion, spirituality and the outcome behaviors. This study included a sample of college students (n = 913) from a large, public university in the southeastern United States. Data of interest were collected via a classroom-based assessment battery, with a completion rate of 99 percent. The assessment battery contained questions related to religiosity, spirituality, physical activity, and intakes of dietary fat.

Seventy percent of the sample was female (n = 638). With regard to ethnicity, almost eighty percent of the sample was White (n = 701) and approximately 17% was Black (n = 150). The mean (M) age was 21 years. Just over a third of the sample reported being in their first year (n = 295), 24% were in their second year (n = 211), 18% were in their third year (n = 163) and 24% reported being in their fourth or fifth year. Almost 60% (n = 528) reported that they were not affiliated with a Greek (fraternity or sorority) organization. By gender, the average weight reported among females was 137 pounds and among males, 188 pounds.
Fifty six percent reported being Protestant, 24% reported being Christian, 16% stated they were Catholic, 1% reported being Jewish, other, and non-religious. Student scores indicated a high level of reported spirituality.

In relation to physical activity, males had significantly higher moderate and vigorous physical activity scores than females. These findings for gender are consistent with other general physical activity research that has reported higher levels of moderate and vigorous physical activity among males than females (American College Health Association, 2009; Blanchard et al., 2008; Caspersen, Pereira, & Curran, 2000). Results of the current study are inconsistent with the Kim & Sobal study (2004), as they found no significant differences between males and females related to physical activity.

For ethnicity, results of the present study indicated significant differences for moderate and vigorous physical activity scores. For both intensity levels, significant differences were observed between White and Black students. These ethnic differences are supported by recent BRFSS data, which reveal that 51.8% of White students engaged in physical activity on 5 or more days of the week compared to 41.3% of Black students (CDCa, 2008). According to health disparity research, Blacks are more likely to develop hypertension and chronic diseases than other ethnic groups (Koenig et al., 2001). Although the reason for these differences is unclear, differences in cultural attitudes about desirable healthy body weight may influence physical activity behavior and other determinants of health (Crespo, Smith, Carter-Pokras, & Anderson, 2001).

The results for marital status showed a significant difference in moderate and vigorous physical activity scores. Post-hoc tests did not indicate a significant difference in the moderate
physical activity scores for marital status but did indicate that the vigorous physical activity scores for single students were significantly higher than for married students. Also the vigorous activity scores for divorced students were higher than those of the separated students.

In the present study, students with a Greek affiliation had significantly higher moderate physical activity scores than those reporting no Greek affiliation. (No significant associations were identified for Greek affiliation and vigorous physical activity.) More activity among those in sororities or fraternities does not support findings of previous research, which found no difference in physical activity behaviors between students who were and were not affiliated with Greek organizations (Scott-Sheldon, Carey, & Carey, 2008).

There was not a significant difference in moderate physical activity scores and year in school. However, there was a significant difference in vigorous physical activity scores and year in school. Upper classmen engaged more regularly in vigorous physical activity than underclassmen. Since upper classmen have been in school longer than under classmen, they have had more time to develop personal relationships that might be supported through physical activity engagement (Okun, Karoly, & Lutz, 2002). Another possible explanation could be that as students progress through college, they are exposed to more health-promoting information. More specifically, they are exposed to health information that increases awareness and knowledge of the importance of physical activity in relation to health risks and consequences (Rozmus et al., 2005).

There was not a significant difference in moderate or vigorous physical activity scores for students who lived on-campus and those who lived off-campus. Vigorous physical activity scores were significantly higher for students who lived in ‘other college/university housing’ than
those who lived in ‘parents/guardian’s home’. In addition to the previously mentioned social influence effect, it is possible that the autonomy and freedom experienced through campus and residential life could serve to perpetuate more campus involvement in vigorous physical activity behaviors such as campus recreation and intramural sports (Rozmus et al., 2005).

Gender and ethnicity were significantly associated with dietary fat intake. In this sample, males had significantly higher dietary fat intake scores than females. This finding was consistent with previous research in this area for the general population (Kim & Sobal, 2004; USDA, 2008). For ethnicity, the results indicated a significant difference for dietary fat intake. Dietary fat intake of White students was significantly lower than Black students, which is consistent with previous population research examining nutrient intakes by race/ethnicity (USDA, 2008).

In the current study, students involved with a religious student organization had significantly higher levels of moderate and vigorous physical activity scores than the students reporting no religious student organization involvement. Social relationships and social support are key elements of the social environment in which individuals operate (Heaney & Israel, 2008). The sense of connectedness to others and to key institutions has been shown to be protective against an array of health risk behaviors as well as produce better mental health outcomes among adolescents (Bernat & Resnick, 1996). Additionally, social relationships have been reported to have a profound influence on health behaviors and health status and are important to consider when examining health-related variables.

Several studies have addressed the positive influence of social relationships on health (Antonucci, 1990; Goldberg & King, 2007; House, Umberson & Landis, 1988a; Kahn et al., 2002; Quick, Nelson, Matuszek, Whittington & Quick, 1996; Turner & Marino, 1994). The
reviews conducted have also provided consistent evidence that social relationships may strongly influence health behavior choices (Heaney & Israel, 2008). Health behaviors are often influenced by the social context in which someone lives, whether that context is pro-social or antisocial (Bernat & Resnick, 2009). It is often referred to, theoretically, as social conformity, or taking on the norms and behaviors of one’s environment while seeking a sense of connection with others. It is through this experience that individuals tend to acquire identity and meaning and that they internalize norms, beliefs, values, and behaviors reflective of their standards or relationships (Bernat & Resnick, 2009). Therefore, it is useful to consider factors at many levels of influence including Greek affiliation and/or religiosity and spirituality, as well as the possible influence of its propensity towards social support and social involvement.

In order to better examine the religiosity & spirituality constructs, religiosity and spirituality were conceptualized and assessed through the use of three broad scales. These scales included the Behavioral Religiosity scale, which included the dimensions of religious denomination, religious attendance, and religious application; the Subjective Religiosity scale, which included the dimensions of religious identity and religious commitment; and the Functional Religiosity scale, which included the dimensions of religious coping and religious social support. Many studies have examined religiosity through the behavioral religious indicators alone, and have found significant relationships with health (Ellison & Levin, 1998). The behavioral aspect of religion can be useful in identifying the main effects religion may have on particular health outcomes; however, the identified effects may be indirect or erroneous (Ellison & Levin, 1998). It has been recommended that researchers specify the features being measured and include more than one indicator of religion in order to better understand the
mechanisms through which health is influenced (Ellison & Levin, 1998; Thoresen & Harris, 2002). Table 27 lists all the significant associations found in the current study.

Research Questions

In order to examine religiosity, spirituality and health behaviors among college students, the following research questions were examined:

1. Were greater levels of religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

2. Were greater levels of spirituality associated with higher levels of physical activity and lower intakes of dietary fat among college students?

3. Were greater levels of social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

4. Were greater levels of religiosity and spirituality and social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

5. Were greater levels of behavioral religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

6. Were greater levels of subjective religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

7. Were greater levels of functional religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?
Discussion

Research Question 1: Were greater levels of religiosity associated with higher levels of physical activity and lower intakes of dietary fat among college students?

In relation to the dependent variables, fat intake and moderate and vigorous physical activity, there were no significant correlations observed. The multiple linear regression models predicting moderate and vigorous physical activity and intakes of dietary fat using religiosity indicated no significant relationships when demographics were controlled. Although it was hypothesized that higher levels of religiosity would predict higher levels of physical activity and lower intakes of dietary fat, these were not the outcomes among this sample of college students.

Findings of the current study are consistent with the Kim & Sobal (2004) study, where there was no direct significant relationship identified between the religion variables (religiosity) and physical activity (moderate and vigorous) or the religion variables (religiosity) and dietary fat intake. Their study indicated a few significant relationships once the variables were analyzed by gender and by individual religiosity scales/dimensions. However, the intention of this current research question was to examine religiosity as a broad, inclusive concept in relation to the physical activity and dietary fat intake health behaviors of the college sample.

Research Question 2: Were greater levels of spirituality associated with higher levels of physical activity and lower intakes of dietary fat among college students?

The multiple linear regression models predicting moderate and vigorous physical activity and intakes of dietary fat using spirituality indicated no significant relationships when controlling for demographics. Although it was hypothesized that higher levels of spirituality would predict higher levels of physical activity and lower intakes of dietary fat, these association were not
identified among this sample of college students. In the Kim & Sobal (2004) study, there was no direct significant relationship reported for the spirituality variables and physical activity (moderate and vigorous) or the spirituality variables (religiosity) and dietary fat intake. It was examined as part of the religious commitment scale. However, when the scale was examined by item, they found that ‘giving more money to religion’ was related to greater moderate and vigorous physical activity in women (Kim & Sobal, 2004) but nothing for the direct measures of spirituality. Although the present study did not identify significant relationships between spirituality and physical activity or dietary fat intake, other studies have found positive associations between these measures (Taliaferro et al., 2009).

Research Question 3: Were greater levels of social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

The multiple linear regression models predicting intakes of dietary fat using social support indicated no significant association when controlling for demographics. The model predicting moderate physical activity using the social support scale found a significant association, as did the model predicting vigorous physical activity using the social support scale. For moderate physical activity, approximately 5.3% of the variance could be explained by social support. For vigorous physical activity, the variance increased slightly to 6.9% suggesting a slightly stronger relationship between vigorous physical activity and social support. The current study indicated that greater levels of social support resulted in higher levels of moderate and vigorous physical activity.

This finding for physical activity is consistent with other research (ACHA, 2008; Koenig et al., 2001). However, it is unclear why there was no significant association with dietary fat
intake and social support. Social support is a significant factor associated with physical activity, dietary behaviors and religion/spirituality in the college population. Research has shown that the role of social support is significant in helping people undertake and maintain healthy dietary changes (Kim & Sobal, 2004). It is also a critical component to successful long-term weight loss (Kim, Sobal, & Wethington, 2003; Silverman, Hecht, & McMillin, 2002). Perceived social support is also important, as it has been shown to relate to the intake of fats, salt and sugar, fiber and fruit, and vitamins and minerals (Murphy et al., 2001; Silverman, Hecht, & McMillin, 2002). Although there was no significant association identified between social support and dietary fat intake for the present study, previous similar research also indicated that there were no significant associations for social support variables and dietary fat intake among a predominantly religious sample (Kim & Sobal, 2004).

Consistent with the present study, other studies that have examined the relationship between social support and physical activity have found a strong positive association. Cross-sectional and prospective studies have consistently reported these relationships among a broad range of population groups (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Leslie, Owen, Salmon, Bauman, Sallis, & Kai Lo, 1999; Stahl et al., 2001; Sallis, Hovell, & Hofstetter, 1992; Steptoe et al., 1997; Sternfield, Ainsworth, & Quesenberry, 1999). For example, in an international study of determinants of physical activity by Stahl and associates (2001), perceived social support from the personal environment was identified as the strongest predictor of physical activity. Those reporting low social support were more than twice as likely to be sedentary compared to those who reported high levels of perceived social support.
In another study examining the relationship between physical activity and actual social support among Australian college students, Leslie and colleagues (1999) found that those reporting low levels of social support from either family or friends were 23-55% more likely to be inadequately active for health benefits than were those reporting high levels of support. According to the findings from the current study and previously-conducted research, there is compelling evidence for this notion that increased social support can be health-promoting.

Research Question 4: Were greater levels of religiosity and spirituality and social support associated with higher levels of physical activity and lower intakes of dietary fat among college students?

The multiple linear regression models predicting intakes of dietary fat using the religiosity scale, the spirituality scale, and social support indicated no significant associations when controlling for demographics. For the models predicting moderate and vigorous physical activity using the religiosity scale, the spirituality scale, and the social support scale and the significant demographic variables, a significant association was identified for social support. The model was statistically significant and social support explained 6.0% of the variance in moderate physical activity. For vigorous physical activity, social support explained 7.0% of the variance. In general, these results suggest that greater levels of social support may have a significant association with higher levels of moderate and vigorous physical activity.

Research Question 5: Were greater levels of behavioral religiosity associated with regularly engaging in physical activity and lower intakes of dietary fat among college students?

The multiple linear regression model predicting moderate physical activity using the behavioral religiosity scale and the significant demographic variables was not significant. There
was also no significant association identified for the multiple linear regression model predicting vigorous physical activity using the behavioral religiosity scale and the significant demographic variables. In general, these results suggest that greater levels of behavioral religiosity were not associated with higher levels of moderate or vigorous physical activity.

The multiple linear regression model predicting dietary fat intakes using the behavioral religiosity scale and the significant demographic variables indicated a weak significant relationship. The behavioral religiosity model was statistically significant but explained only 1.7% of the variance in dietary fat intake among the sample of college students. In general, results from this analysis suggest that there was a significant association between greater levels of behavioral religiosity and higher intakes of dietary fat; however, the relationship is not strong. These findings are similar to those in the Kim & Sobal (2004) study, where a significant association was observed between religious denomination among females and higher intakes of fat. These differences are consistent with other research, particularly when denomination has been examined independently (Shatenstein & Ghadirian, 1998).

Research Question 6: Were greater levels of subjective religiosity associated with regularly engaging in physical activity and lower intakes of dietary fat among college students?

The multiple linear regression models predicting moderate and vigorous physical activity using subjective religiosity indicated no significant relationships when controlling for demographics. Additionally, the multiple linear regression model predicting dietary fat intakes using the subjective religiosity scale and the significant demographic variables indicated no significant relationship. In general, results from these multiple regression analyses suggest that
there is not a significant association between greater levels of subjective religiosity and higher levels of physical activity or lower intakes of dietary fat.

Results from the current study are inconsistent with those in the Kim & Sobal (2004) study; they identified a significant association between religious commitment (giving money to religion) and higher intakes of fat and higher levels of both moderate and vigorous physical activity among females. These findings are consistent with other research examining religion and physical activity (Wallace & Forman, 1998).

Research Question 7: Were greater levels of functional religiosity associated with regularly engaging in physical activity and consuming lower intakes of dietary fat among college students?

The multiple linear regression models examining moderate physical activity and vigorous physical activity using the functional religiosity scale and the significant demographic variables were not significant.

The multiple linear regression model predicting intakes of dietary fat using the functional religiosity scale and the significant demographic variables indicated a weak significant relationship. The model was statistically significant but explained only 1.7% of the variance in dietary fat intake. These results suggest that there is a significant association between greater levels of functional religiosity and higher intakes of dietary fat; however, the relationship is not very strong. The Kim & Sobal (2004) study did not identify the same significant association for functional religiosity and dietary fat intake among their predominantly religious sample.
Table 26

Statistically Significant Findings

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<th>Multivariate Analyses</th>
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<td>• Religious student organization</td>
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<tr>
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</tr>
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<td>Functional Religiosity &amp; Dietary Fat Intake</td>
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</table>
Implications

This research has several implications for researchers and other college health professionals, with an interest in promoting chronic disease prevention through physical activity and dietary behaviors. In general, the results from these research questions suggest that additional research in this area is necessary to better understand religiosity and spirituality as a potential determinant of health behaviors. Religiosity and spirituality, as inclusive measures, did not reveal any significant associations with moderate and/or vigorous physical activity or intakes of dietary fat. When examined conceptually, significant associations were identified for intakes of dietary fat for all three categories – behavioral religiosity, subjective religiosity, and functional religiosity. It is unclear why there were significant associations with dietary fat intake for each of the three broad categories of religiosity, yet not for religiosity or spirituality alone. Future studies in this area may want to examine possible relationships of religiosity with health behaviors by exploring the individual dimensions of religiosity and including a query for gender within the research question.

Health promotion specialists have recognized the need for continued research in the area of spiritual health and its interaction with and relationship to other dimensions of health (Hawks, 1994). Since spirituality is regarded as a more subjective area than religiosity, it may be necessary to use a greater variety of study designs and assessment strategies to obtain a more accurate insight (Koenig et al., 2001). Recommendations include the use of qualitative and quantitative methods such as surveys and focus groups or in-depth interviews to more accurately assess spirituality. This could aid in directing research methods toward identified problems and questions, rather than research methods seeking questions and problems (Thoresen & Harris,
2002). It has also been recommended that better distinctions be made between spiritual factors and religious factors to clarify understanding and improve research (Koenig et al., 2001; Thoresen & Harris, 2002).

In addition to the religiosity variables, significant associations were identified for social support and moderate and vigorous physical activity. These relationships remained significant even after social support was examined in conjunction with religiosity and spirituality. Most studies that have examined the relationship between social support and physical activity have found a strong positive association. Cross-sectional and prospective studies have consistently reported these relationships among a broad range of population groups (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Leslie, Owen, Salmon, Bauman, Sallis, & Kai Lo, 1999; Sallis, Hovell, & Hofstetter, 1992; Stahl, Ruttenb, Nutbeam, Baumand, Kannasa, Abele et al., 2001; Steptoe, Andrew, Wardle, Fuller, Holte, Justo et al., 1997; Sternfield, Ainsworth, & Quesenberry, 1999). Among college students, the relationship between physical activity and social support appears to remain strong. Leslie and colleagues (1999) found that among Australian college students, those reporting low levels of social support from either family or friends were 23-55% more likely to be inadequately active for health benefits than were those reporting high levels of support. However, lack of social support from family and friends has been associated with lower levels of physical activity among all groups (Stahl et al., 2001). Since physical activity is known to be beneficial for most areas of health, particularly the areas pertaining to physical and mental health, and aids in reducing chronic disease, identifying strong associations or significant relationships may aid in developing and maintaining this health behavior.
This study was unique in that it examined the relationship between the religiosity and spirituality and health among a sample of college students in a non-religious institution. To date, a study on physical activity and intakes of dietary fat among college students using broad-based and conceptual measures of religiosity and spirituality has not been conducted. It is important to note that the Kim & Sobal (2004) study sample primarily involved a broad range of individuals (aged 21 – 65 years) from various religious congregations who reported to be very religious. A recommendation from that study for better examining the relationships between religion, fat intake, and physical activity was to use a sample that is not predominantly religious (Kim & Sobal, 2004). Although the notion of reducing the restricted range of religiosity was valid, it did not prove to be significant in this study. It is also worth mentioning that individual differences exist among any social, cultural, or ethnic group and these differences may moderate the relationship of religiosity and health (Thoresen & Harris, 2002).

Through progressive research efforts, terminology and instrumentation has improved and more recent studies are needed that utilize the objective measures and distinct concepts. Additionally, the majority of previous studies targeted older adults or broad-range, mixed populations. There are very few studies that directly target college-aged students. More specifically, the number of studies that address religion, physical activity and fat intake within the college population are almost void. Religiosity is strongly associated with positive health outcomes for all population groups and merits further investigation in efforts to continue to advance the field of study and for the development of health education interventions.

The findings from this research suggest that it may be beneficial to tailor some educational and promotional efforts for physical activity and healthy dietary practices to college
students from a religious perspective. There was a statistical difference among gender for moderate physical activity scores. This information may be useful to campus ministry associations, as well as local church-based college groups, in their strategies to increase student involvement activities that promote physical activity (i.e. church leagues sports and intramural team sports). Knowing that females are less likely to participate in regular moderate and vigorous physical activity may help them to direct their efforts to encourage more female participation.

Distinct differences appear to exist between the concepts within religiosity and between religiosity and spirituality, particularly in the area of dietary fat intake. By further examining these concepts of religiosity and spirituality in relation to physical activity and dietary fat intake, practitioners could then target the specific dimension of religiosity and tailor promotional or educational materials to address these findings and encourage healthier behaviors.

Many studies have examined religiosity through the behavioral religious indicators alone, and have found significant relationships with health (Ellison & Levin, 1998). The behavioral aspect of religion can be useful in identifying the main effects religion may have on particular health outcomes; however, the identified effects may be indirect or erroneous (Ellison & Levin, 1998). It has been recommended that researchers specify the features being measured and include more than one indicator of religion in order to better understand the mechanisms through which health is influenced (Ellison & Levin, 1998; Thoresen & Harris, 2002).

More specifically, practitioners or college professionals could use the finding that functional religiosity was associated with higher intakes of dietary fat to develop intervention strategies that specifically address the aspects of religious coping and religious social support
through prayer in relation to healthy eating. Since functional religiosity involves the possible functional roles religion may have in one’s life, through its examination, it may be possible to better understand the mechanisms through which health is influenced. This may include the existential framework of life meaning and purpose, strategies for coping, and/or support for specific health behaviors (Thoresen & Harris, 2002). In the area of college health, these findings could be useful to religious student organizations that wish to lead healthy initiatives for their members. Since social support was found to be significantly associated with increased physical activity, a program that combined both elements - increased physical activity through social support and improved eating behaviors through the functional aspect of religiosity- could serve as a beneficial comprehensive weight management strategy.

Health practitioners could structure healthy eating programs that address mindful eating when in social situations or discuss the significance of healthy practices such as fasting and meditation before, during, and after prayer. From the concept of behavioral religiosity, it might be that specific denominations are more likely to engage in certain dietary practices than others or that those who attend services more regularly, have greater opportunities to engage in certain eating behaviors with members of their religious group. Religious application may serve to encourage or hinder negative dietary practices, and thus, could serve as a fundamental precept for an educational program. This setting could offer a useful opportunity to educate members of the importance of healthy food preparation and selection at home or during church socials.

For the association of subjective religiosity with higher intakes of dietary fat, intervention strategies might utilize the concept of religious identity to encourage healthy eating from the angle of being a member and representative of a larger community. From the concept of
relational commitment, messages and materials could be developed that emphasize the
significance of one’s personal values and beliefs in making healthy dietary choices and staying
healthy. A broader approach might be to create a campaign such as “Eating with Purpose” and
encourage other college students to participate in sharing recipes and dining experiences.
Utilizing technology and social networking sites, the group could plan, post, and share
information about meetings, experiences, or opportunities to eat together.

Chronic diseases are a major public health concern for the United States. They are the
leading cause of disparity and death, accounting for limitations in daily living of approximately
25 million Americans and approximately 1.7 million deaths annually. They are the most
prevalent, costly and preventable of all diseases and result in extensive pain and suffering for
their victims, thus, decreasing their quality of life. The influence of religion and spirituality on
factors relating to an individual’s psychosocial behaviors is regarded as having extensive
influence on individual’s cognitions, emotions and behaviors and merit further investigation
among various population groups (Kim & Sobal, 2004; Neff, 2006).

As discussed in Chapter 2, health behaviors are developed and maintained through
various methods, making it difficult to identify causal relationships when studying these
variables. A suggestion for better understanding this process has been that they be
conceptualized through a social context (Heaney & Israel, 2008; Kim & Sobal, 2004).
Accordingly, their association with social institutions may provide a more useful context for
examining proximate risk factors for health such as physical activity and dietary practices. For
this study, the under-investigated social institution that has provided insights about health
behaviors was religion. This is an important and unique approach, as research in this area
typically has not focused on this aspect of dietary fat intake and physical activity among this target population. Rather, the focus has been on their relationship to health as proximate causes of disease (Link & Phelan, 1995).

Social relationships and social support are key elements of the social environment that influence health behaviors and health status. Several reviews have addressed the positive influence of social relationships on health (Lansford, Sherman, & Antonucci, 1998; Turner & Marino, 1994). Although there are some inconsistencies in the findings and conclusions of the reviews, Heaney and Israel (1996) concluded that social support together with social networks have an important causal effect on health, exposure to stress and the relationship between stress and health. The reviews conducted also provide consistent evidence that social relationships influence health behavior choices (Heaney & Israel, 2008).

Religion as a social institution provides opportunities for social interaction among people of like values and interests. Institutions of higher learning may also do the same (Rozmus et al., 2005). Therefore, religious adherents and/or college students have the opportunity to develop greater social networks and establish social relationships within their institutions. According to research, an important function of social relationships is the provision of social support (Heaney & Israel, 2008). This concept refers to both the structure and function of an individual’s social life, including group memberships, familial ties, and emotional support. Its psychological and behavioral pathways often facilitate healthy behaviors such as healthy eating and exercise, thereby establishing it as a health-promoting concept (Uchino, 2006). According to the findings from this study, social support appears to have a greater association with moderate and vigorous physical activity than does religiosity or spirituality. Since social contexts are purported to play
an important role in shaping health behaviors, this finding is not completed unexpected (Kim & Sobal, 2001).

Limitations

There were limitations of this research that warrant further discussion. First, this study relied on self-report. This method required respondents to honestly recall and report their moderate and vigorous physical activity behaviors and intakes of dietary fat over the past year, as well as provide responses to questions addressing their religious and spiritual beliefs and practices. Self-report data has limitations, such as sensitivity of specific information and level of privacy associated with the method of collection. This can affect the reporting of sensitive, stigmatized, or illicit behaviors, particularly among the adolescent population. However, they provide a less threatening means of reporting and are viewed as providing more privacy than other methods (Sieving & Shrier, 2009, p. 475). Therefore, it is a widely accepted data collection method for social science research (Colton & Covert, 2007, p. 321).

Another limitation was the selection bias and the lack of generalizability with the use of the convenience sample. This study used a convenience sample of college students from various classes at one university located in the southeastern United States. This may limit the ability of the results to be generalized to other college student samples or to other age groups. This research attempted to minimize selection bias by utilizing various general education classes from several colleges and majors within the university; hence, the sample should be relatively generalizable to other college students (Kraft, 2009). This study sample of college students had a disproportionately higher number of females (70.2%) and Greek affiliated students (41.2%) compared to the overall university student population in 2009, where there were 12,426 (52.3%)
female students and 6,399 (27%) Greek students. Additionally, this sample had a slightly different ethnic composition than that of the current enrollment at the institution with a lower percentage of White students (78.1% compared to 82.9%) and a higher percentage of Black students (16.7% compared to 11.8%) (Kraft, 2009).

Additionally, this study was limited by an exploratory cross-sectional design. Although longitudinal studies are more likely to identify cause-effect relationships, cross-sectional studies are known to be useful for preliminary or early stages of studies (Kim & Sobal, 2004; Rew & Wong, 2006; Thoresen & Harris, 2002). There is a need to employ a greater variety of study designs in order to accurately test theoretical propositions concerning underlying mechanisms of religion and to better develop effective interventions (Thoresen & Harris, 2002). This is especially true when examining these behaviors in the college population since college is a time of exploration, identity development, and change. In order to more effectively validate the utility of religiosity, a prospective study may be advantageous.

The concepts of religiosity and spirituality need to be more distinguishable in order to accurately assess the influence on an outcome variable (Thoresen & Harris, 2002). Future studies may also benefit from tapping into specific doctrinal beliefs to uncovered more potent religious variation (Kim & Sobal, 2004).

The measures of physical activity and dietary fat intake were brief assessments and involved a past-year recall. This may have limited the accuracy of the responses, as well as, the sensitivity in examining the relationships between religiosity and physical activity and intakes of dietary fat. More comprehensive measures of nutrition might be useful in examining relationships beyond fat intake. This study included two measures of physical activity: two
items from a past year recall for moderate and vigorous physical activity that were adopted from the National Survey of Midlife Development in the United States ($\alpha = 0.83$) (MIDUS) (1996) in the original study by Kim & Sobal (2004) and the 7-day recall for moderate and vigorous physical activity that were adopted from the 2009 ACHA-NCHA II survey ($\alpha = 0.87$). Upon examining the scales and responses, it was determined that no significant advantages were identified between the two scales. Thus, in keeping with recent research in this area (Kim & Sobal, 2004), this study used the past year recall for moderate and vigorous physical activity. However, using the two scales helped to strengthen the validity of the measurement of physical activity for this study.

Future Research

This research added to the literature in that it examined possible relationships between religiosity, spirituality, and physical activity and dietary fat intake among college students. At this time, there has been no known research published that has used these variables and examined possible relationships among them in a college student sample. The findings from this research support further investigation of religiosity and spirituality as a theoretical assertion to explain, predict, and potentially increase levels of physical activity and lower intakes of dietary fat. Although there were not direct remarkable findings in relation to religiosity or physical activity, employing different research methods and designs may yield more significant outcomes. Additionally, several significant relationships were identified for dietary fat intake, which suggests that future research may help expose the mechanisms by which religion and spirituality are related to this outcome. Dietary practices contribute to disease development and disease prevention. This is evident by the fact that diets that are high in fats and low in fruit, vegetable,
and grain consumption are considered to be unhealthy and put individual consumers at increased risk for developing chronic diseases such as cardiovascular disease, strokes, obesity, diabetes, and some cancers (CDC, 2008c; CDC, 2008d; Koenig et al., 2001; Kristal et al., 1995; Racette et al., 2005). As mentioned in Chapter 2, recent college health data revealed that college student patterns of physical activity and dietary practices do not meet the recommendations of health professionals (Racette et al., 2008). Based on these assumptions, college health research and programming should focus on issues related to physical activity and overweight and obesity, with particular attention given to influential areas of health, such as religion and spirituality. Researchers should ensure that the measures for assessing physical activity and dietary factors are reliable and well constructed. Additionally, it could be advantageous to use simplified scales of measurement for physical activity behavior in order to more clearly capture the intended outcome. These techniques may lead to better research efforts, thus, to a greater sustained impact on health outcomes such as chronic disease prevention and to the development of healthy lifestyle practices while in college.

As mentioned in the previous section, it could be useful to examine physical activity behavior and intakes of dietary fat among college students using the tenets of religiosity and spirituality by employing a prospective or longitudinal study design. This could serve to provide a more thorough examination of the relationships among these variables within this population, and to investigate the possibility for temporal changes in their influence. In addition, using a more overt theoretical framework for religiosity in relation to meeting national recommendations for physical activity and dietary fat intake would be beneficial from a public health perspective,
for health educators, and other college health professionals who are interested in acknowledging religion as a possible mediator in preventing chronic disease.

Future studies may consider examining different aspects of religion beyond religious support, coping, and similar constructs in order to more thoroughly examine religion’s relationship with dietary fat and physical activity. These studies may find that tapping into specific doctrinal beliefs or proscribed behaviors may reveal more compelling variations between the health outcomes. It is important to be mindful of the social aspects of religion and its consequential effects for adherents. Because of cultural norms associated with food and fellowship and with college, it will be important to consider the social contexts in which religion may serve to shape health behaviors, in order to better understand the influence of each aspect for the social context.

Conclusions

There have been numerous psychological and social factors that have been examined in hopes of better understanding the relationship between religion and spirituality and physical activity and dietary behaviors. Several of these factors have consistently shown promising relationships with physical activity and encouraging relationships with dietary fat intakes, depending on the religious group, among college students.

In the current study, students involved with a religious student organization had significantly higher levels of moderate and vigorous physical activity scores than the students reporting no religious student organization involvement. Social relationships and social support are key elements of the social environment in which individuals operate (Heaney & Israel, 2008). The sense of connectedness to others and to key institutions has been shown to be protective
against an array of health risk behaviors, as well as, produce better mental health outcomes among adolescents (Bernat & Resnick, 1996). Additionally, social relationships have been reported to have a profound influence on health behaviors and health status and are important to consider when examining health-related variables.

In general, the results of this research indicate the utility of the religiosity construct in examining intakes of dietary fat among college students. Additionally, this study supports the inclusion of conceptual religiosity (behavioral, subjective, and functional) and social support as independent constructs in examining physical activity and dietary fat intake. This notion was supported by the significant positive relationships for the behavioral and functional concepts of religiosity and intakes of dietary fat among the college student sample.

This study, along with several reviews, has addressed the positive influence of social relationships on health behaviors such as physical activity and dietary fat intake (Goldberg & King, 2007; Kahn et al., 2002; Lansford, Sherman, & Antonucci, 1998; Turner & Marino, 1994) and concluded that social support together with social factors have an important causal effect on health (Heaney and Israel, 1996). The current study indicated that greater levels of social support resulted in higher levels of moderate and vigorous physical activity. For studies involving religiosity and spirituality, it is important to better understand the influence of the specific context in order to promote healthy behaviors (Kim & Sobal, 2004).

Despite the limitations of self-reporting and selection bias, the results of this study support the development and implementation of educational and promotional materials that target lowering intakes of dietary fat and increasing physical activity among college students.
Additionally, this research provides a better understanding of the religious and spiritual landscape, as well as, physical activity behaviors and intakes of dietary fat of college students.
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APPENDIX A

ASSESSMENT BATTERY
Relationships between Religiosity, Spirituality, & Health Behaviors among College Students

Michelle S. Harcrow, M.S.
Dissertation Research Assessment Instrument
Department of Health Science, The University of Alabama
Please answer (Circle) the following questions based on where you feel you are today in relation to the question.

1. Do you have a religious preference/denomination? Yes No
2. If yes, what is your religious preference/denomination?

The following questions (3-10) are about your religious attitudes. Please CIRCLE the answer that best describes you.

3. How religious are you? Not at all Not very Somewhat Very
4. How important is religion in your life? Not at all Not very Somewhat Very
5. How spiritual are you? Not at all Not very Somewhat Very
6. How important is spirituality in your life? Not at all Not very Somewhat Very
7. How important is it for you – or would it be if you had children now- to send your children for religious or spiritual services or instruction? Not at all Not very Somewhat Very
8. How closely do you identify with being a member of a/your religious group? (If you are not a part of a religious group, circle 'N/A' for Not Applicable) Not at all Not very Somewhat Very N/A
9. How much do you prefer to be with other people who have same religious beliefs as you? Not at all Not very Somewhat Very
10. How important do you think it is for people of your religion to marry other people who are the same religion? Not at all Not very Somewhat Very
11. How often do you usually attend religiously/spiritual services? (Circle one)
   a. Never
   b. Less than once a month
   c. About once a month
   d. Two or three times a month
   e. About once a week
   f. Several times a week
12. I try hard to carry my religious beliefs over into all my other dealings in life.
    Strongly Disagree Disagree Agree
    Strongly Agree
13. During the last year, I contributed a substantial amount of money to my congregation or to religious causes.
    Strongly Disagree Disagree Agree
    Strongly Agree
14. How would you describe your relationship with God on a scale of 1 to 7, with 1 begin very distant and 7 being very close? (Circle ONE number) 1 (very distant) – 2 – 3 – 4 – 5 – 6 – 7 (very close)
15. Do you ever pray to God?  
1. Yes…continue to question 16  
2. No…skip to question 21

The questions below (17-21) are about some experiences that you might have had during prayer. How often have you experienced the following? (Circle an answer for each statement)

16. Experienced a deep sense of peace and well-being.  
   Never  Once/Twice  Occasionally  Regularly

17. Felt the strong presence of God.  
   Never  Once/Twice  Occasionally  Regularly

18. Received what you regarded as a definite answer to a specific prayer request.  
   Never  Once/Twice  Occasionally  Regularly

19. Received what you believed to be a deeper insight into a spiritual or biblical truth.  
   Never  Once/Twice  Occasionally  Regularly

20. Felt divinely inspired or ‘led by God’ to perform some specific action.  
   Never  Once/Twice  Occasionally  Regularly

The following questions are about how you may have coped with recent events in your life. Think about how you try to understand and deal with major problems in your life. To what extent is each involved in the way you cope? During that time, how much did you use the following coping strategies?

21. I think about how my life is part of a larger spiritual force.  
   Not at all  Somewhat  Quite a bit  A great deal

22. I work together with God as partners to get through hard times.  
   Not at all  Somewhat  Quite a bit  A great deal

23. I look to God for strength, support, and guidance in crisis.  
   Not at all  Somewhat  Quite a bit  A great deal

24. I feel that stressful situations are God’s way of punishing me for my sins or lack of spirituality.  
   Not at all  Somewhat  Quite a bit  A great deal

25. I wonder whether God has abandoned me.  
   Not at all  Somewhat  Quite a bit  A great deal

26. I try to make sense of the situation and decide what to do without relying on God.  
   Not at all  Somewhat  Quite a bit  A great deal
27. To what extent is your religion involved in understanding or dealing with stressful situations in any way?  

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<thead>
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<th>Not involved at all</th>
<th>Not very involved</th>
<th>Somewhat involved</th>
<th>Very involved</th>
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The following questions are about how you relate to family and friends. Please CIRCLE your answer.

28. How often are you in contact with any member of your family – that is, any of your brothers, sisters, parents, or children who do not live with you – including visits, phone calls, letters, or electronic messages?

   a. Never or hardly ever  
   b. Less than once a month  
   c. About once a month  
   d. Two or three times a month  
   e. About once a week  
   f. Several times a week  
   g. About once a day  
   h. Several times a day

29. How often are you in contact with any of your friends – including visits, phone calls, letters, or electronic messages?

   a. Never or hardly ever  
   b. Less than once a month  
   c. About once a month  
   d. Two or three times a month  
   e. About once a week  
   f. Several times a week  
   g. About once a day  
   h. Several times a day

30. Do family and friends understand you?  
    Hardly ever  Some of the time  Most of the time

31. Do you feel useful to family and friends?  
    Hardly ever  Some of the time  Most of the time

32. Do you know what’s happening with family and friends?  
    Hardly ever  Some of the time  Most of the time

33. Do you feel listened to by family and friends?  
    Hardly ever  Some of the time  Most of the time

34. Do you feel you have a definite role in family and among friends?  
    Hardly ever  Some of the time  Most of the time

35. Can you talk about your deepest problems with family and friends?  
    Hardly ever  Some of the time  Most of the time
36. How satisfied are you with relationships with family and friends?

Hardly ever  Some of the time  Most of the time

*Moderate-Intensity physical activity is characterized as an individual being able to talk but not sing during the activity**Vigorous-Intensity physical activity, the individual cannot say more than a few words without pausing for a breath.

37. During the past year, how often do you engage in *moderate physical activity (for example, brisk walking, hiking, softball/baseball) long enough to work up a sweat? (Circle one)

   a. Never
   b. Less than once a month
   c. About once a month
   d. Two or three times a month
   e. About once a week
   f. Several times a week
   g. About once a day

38. During the past year, how often do you engage in **vigorous physical activity (for example, running, tennis, basketball, etc.) long enough to work up a sweat? (Circle one)

   a. Never
   b. Less than once a month
   c. About once a month
   d. Two or three times a month
   e. About once a week
   f. Several times a week
   g. About once a day

39. On how many of the past 7 days (or in a typical week) did you:

   a. Do moderate-intensity cardio or aerobic exercise (caused a noticeable increase in heart rate, such as a brisk walk) for at least 30 minutes? 0 days – 1 day – 2 days – 3 days – 4 days – 5 days – 6 days – 7 days
   b. Do vigorous-intensity cardio or aerobic exercise (caused large increases in breathing or heart rate, such as jogging) for at least 20 minutes? 0 days – 1 day – 2 days – 3 days – 4 days – 5 days – 6 days – 7 days
Think about your eating habits over the past 12 months. About how often did you eat or drink each of the following foods? Remember breakfast, lunch, dinner, snacks, and eating out. Mark the appropriate box for your answer.

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<th>Type of Food</th>
<th>Never</th>
<th>Less than once per month</th>
<th>1-3 times per month</th>
<th>1-2 times per week</th>
<th>3-4 times per week</th>
<th>5-6 times per week</th>
<th>1 time per day</th>
<th>2 or more times per day</th>
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<td>Cold Cereal</td>
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<td>Eggs, fried or scrambled in margarine, butter or oil</td>
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<td>Sausage or bacon, regular fat</td>
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<td>Margarine or butter on bread, rolls, pancakes</td>
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<td>Orange juice or grapefruit juice</td>
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<td>Beef or pork hot dogs, regular-fat</td>
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<td>Cheese or cheese spread, regular-fat</td>
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<td>French fries, home fries, or hash brown potatoes</td>
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<td>Margarine or butter on vegetables, including potatoes</td>
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<td>Mayonnaise, regular-fat</td>
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<td>Salad dressings, regular-fat</td>
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<td>Margarine, butter, or oil on rice or pasta</td>
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56. How old are you (in years) ____________?
57. What is your gender? (Circle one) Male Female
58. What is your height in feet and inches? ____________
59. What is your weight in pounds? ____________
60. What is your year in school? (Circle one)
   a. 1st year undergraduate
   b. 2nd year undergraduate
   c. 3rd year undergraduate
   d. 4th year undergraduate
   e. 5th year or more undergraduate
   f. Graduate or professional
   g. Not seeking a degree
   h. Other ____________________
61. How do you usually describe yourself? (Circle one)
   a. White, non-Hispanic
   b. Black, non-Hispanic
   c. Hispanic or Latino/a
   d. Asian or Pacific Islander
   e. American Indian, Alaskan Native, or Native Hawaiian
   f. Biracial or Multicultural
   g. Other ____________________

62. What is your marital status? (Circle one)
   a. Single
   b. Married
   c. Separated
   d. Divorced
   e. Other ____________________

63. Where do you currently live? (Circle one)
   a. Campus Residence Hall
   b. Fraternity/Sorority House
   c. Other college/university housing
   d. Parent/guardian’s home
   e. Other off-campus housing
   f. Other ____________________

64. Are you a member of a social fraternity or sorority? (e.g. National Interfraternity Conference, National Panhellenic Conference, National Pan-Hellenic Council, National Association of Latino Fraternal Organizations) (Circle one)
   No   Yes

65. Are you a member of a religious student organization? (Circle one)
   No   Yes

66. What state do you consider yourself to be from? ________________

Thank you.
July 8, 2009

Lori W. Turner, PhD, RD
Professor and Chair of Health Science
PO Box 870311
The University of Alabama
Tuscaloosa, AL 35487-0311

Dear Dr. Turner,

Thank you for your interest in my work in religion, health behaviors, and health. Enclosed is a copy of the survey I used for the Kim et al. article published in 2004, which I have also included.

Best of luck on your work. If I can be of any assistance, do not hesitate to contact me.

Sincerely,

Karen H. Kim Yenry, Ph.D.
APPENDIX B

REQUEST FOR THE APPROVAL OF RESEARCH

INVOLVING HUMAN SUBJECTS
Research Project Title:

Relationships between Religiosity, Spirituality, and Health Behaviors among College Students

Project Components:

This study consists of a survey instrument to examine physical activity behavior, dietary fat intake, religiosity, and spirituality among college students. Students from the University of Alabama will be asked to complete self-report survey items in order to obtain descriptive information regarding their engagement in physical activity, intakes of dietary fat, attitudes, beliefs and practices related to religiosity and spirituality, and measures of potential covariates.

Background:

The influence of religion and spirituality on factors relating to an individual’s psychosocial behaviors has emerged as an area of interest for researchers, in recent years. Despite the skepticism of earlier researchers, religiosity (formal and informal religious practice, both public and private) and spirituality (individual’s relationship to something sacred; meaning and values of one’s purpose) are regarded as having extensive influence on individual’s cognitions, emotions and behaviors (Neff, 2006). In recent studies, religion and spirituality has been proven to reduce risky behaviors such as alcohol use, unsafe sexual practices, and seatbelt noncompliance among adolescents (Wallace et al., 2003; Poulson et al., 1998; Johnson, Sheets, & Kristeller, 2008; Koenig, McCullough, & Larson, 2001). Additional findings include those studies of religion and spirituality in relation to coping. These studies suggested lower rates of depression and improved mental health among those who consider themselves to be religious or spiritual (Glas, 2007; Kim & Sobal, 2004; Ellison, 1995). Similar findings exist in the area of religion and social support. Among children, adolescents, adults and elderly groups, studies have found positive associations for religion and healthy behaviors such as increased physical activity and diet (Koenig et al., 2001). An interesting correlation between religion and general health found that on average, people who attended church on a regular basis have an average life expectancy of eight years longer compared to those who never attend church, even when adjustments were made for initial health status and behavioral and social risk factors (Idler et al., 2003; Hummer et al., 1999). In a more recent study that examined the effects of religion and spirituality among young, healthy college students in a small liberal arts college in California, small positive correlations were identified between religious measures and positive health promoting behaviors (i.e. exercise) (Koenig et al., 2001). A more recent study found an interesting correlation between ethnicity and physical activity, suggesting that Caucasian students are more likely than African American students to voluntarily engage in physical activity in efforts to improve one’s physical health (Blanchard, 2008).
Procedures:

Purpose:

The purpose of this study is to examine the relationship between physical activity levels, intakes of dietary fat, and how factors of religiosity and spirituality influence these behaviors among college students. Social support will be included in the study as a control variable to test for potential mediation. This research will target physical activity behavior, dietary fat intake, religiosity, and spirituality of college students, which will provide information for practitioners to help tailor marketing and educational strategies to encourage healthier lifestyle choices and chronic disease prevention among college students.

Design:

The proposed study will incorporate a one-time classroom survey that will be completed in late spring of 2010.

A class-room based survey will be utilized to collect data from college students enrolled in at the University of Alabama. Students (N=1000) will be derived from general education classes housed within the Colleges of Human Environmental Sciences, Education, Communication, New College, and Arts and Sciences; which specifically could include the following courses: HHE 270 Personal Health, CSM 204 Introduction to Personal Financial Planning, NHM 101 introduction to Human Nutrition, HHE 273 Community Health, HHE 440 Understanding Stress management, HAT 257 Introduction to Athletic Training, HAT 272 First- Aid, Safety and CPR AAST 395 Special Topics, BCE 101 Freshman Compass Course, COM 123 Public Speaking, NEW 237 Conflict and Cooperation, SOC 315 Race and Ethnicity, CJ 303 Minorities, Criminality and Social Justice, KIN 199 Ecological Approach to Health and Fitness, NEW 222 Academic Potential, HHE 370 Principles/Foundation Health Promotion, HHE 378 Drug Awareness Education, HHE 468 Practical Application of Health Communication/Promotion and HD 382 Parent and Family Development. In order to increase participant enrollment and in efforts to obtain a diverse, culturally representative sample of college students, I would like to add these sites: academic buildings, libraries, dining facilities, and residence halls, Student Health Center, University Recreation Center, UA Quad, and Ferguson Center. Colleges of Arts and Science, Commerce & Business Administration, Communication and Information Sciences, Community Health Sciences, Education, Engineering, Honors, Human Environmental Sciences, Nursing and Social Work. Additionally, these recruitment efforts will be made among student social groups, honor societies and undergraduate and graduate student organizations and associations. Participants will be asked to complete an assessment battery consisting of 66 questions. The assessment battery will take approximately 15 minutes to complete.
Participants and Recruitment:

A convenience sample of approximately 700 students enrolled in general education classes from the University of Alabama will be asked to complete the classroom-based survey. Students will be informed that they will not be penalized for choosing not to participate in answering the survey and will be instructed to remain quiet while the other students complete the survey. Participation will be anonymous and no identifiers will be collected. We are requesting a waiver of informed consent since this research could not be carried out without the waiver of consent. *We are also requesting a waiver of written documentations of informed consent for those participants who are at least 19 years of age.* Each participant will receive an information sheet when the assessment is distributed (See Appendix A). The information sheet will explain that their information is *anonymous* and will be used solely for research purposes.

Measures (See Appendix A):

The survey to be used for this research is the product of merging existing instruments with established reliability and validity. An existing assessment instrument (Kim & Sobal, 2004) containing measures of religiosity, spirituality, social support, physical activity, and dietary fat intake will be used to collect responses from the students. Select questions from the following instruments will be used: American College Health Association-National College Health Assessment II (ACHA-NCHA II); Religious Denomination, Religious Attendance, Religious Application, Religious Identity, Religious Commitment, and Religious Social Support questions as in the Kim & Sobal, 2004 study; Brief RCOPE Short Form as in the Kim & Sobal, 2004 study developed by Pargament, Smith, Koenig, & Perez, 1998; Quick Food Scan as in the Kim & Sobal, 2004 developed by the National Cancer Institute; Past-Year and 7-day recall measures of Physical Activity items as in the Kim & Sobal, 2004 study and the ACHA-NCHA II; Piedmont Health Survey & National Survey of Midlife Development in the US as in the Kim & Sobal, 2004 study developed by Brim, Baltes, Bumpass, Cleary, Featherman, Hazzard, et al., 1996; Landerman, George, Campbell, Blazer, 1989.

Demographics

The ACHA-NCHA II is a nationally recognized research survey that includes items about college students’ health habits, behaviors and perceptions (American College Health Association, 2009). The original survey, ACHA-NCHA, was initiated in 2000 and was used nationwide through spring 2008. The ACHA-NCHA II was developed following a thorough pilot testing process and incorporates several revised questions from the previous version (American College Health Association, 2008). The ACHA-NCHA II was first used in fall 2008 and the results provide the largest known comprehensive data set on health of college students. In fall 2008, forty institutions participated in data collection, where 26,685 students responded via paper and web-based collection methods (American College Health Association, 2009). The proposed research will use nine questions from the Demographic Characteristics section of the
assessment and two additional demographic questions relevant to the proposed study. Questions included age, gender, self-reported height and weight, year in school, ethnicity, marital status, on/off campus residence, affiliation with a social fraternity/sorority, affiliation with a religious student organization and original residence state. The ACHA-NCHA II is a public domain scale.

Measures of Religiosity, Spirituality, Social Support, Physical Activity, and Dietary Fat Intake

Religiosity

To measure religiosity, the assessment instrument will include 35 items, divided into seven subscales/dimensions and conceptualized as three broad components: Behavioral, Subjective and Functional. The seven subscales/dimensions include religious denomination, religious commitment, religious identity, religious attendance, religious application, religious ‘Divine’ social support prayer scale, and religious coping.

The behavioral component of religiosity will be comprised of three subscales/dimensions: religious denomination, religious attendance, and religious application. Religious denomination will include the following items: ‘yes’ (1) or ‘no’ (0), do you have a religious preference/denomination? If yes, what is your religious preference/denomination? (open-ended). Religious denominations will be grouped into five categories, as in the Kim & Sobal (2004) study: ‘Catholic’ (1); ‘Conservative Protestant’ (2); ‘Mainline Protestant’ (3); ‘Other’ (4); and ‘Non-religious’ (5). Possible scores for religious denomination will range from 0 to 1, with a higher score indicating a stronger religious preference. Self-reported religious preference/denomination will be used as a label and analyzed as a demographic. Religious attendance will be assessed through a single-item measure: how often do you usually attend religious/spiritual services? Response options will include: never (0); less than once a month (1); about once a month (2); two or three times a month (3); about once a week (4); several times a week (5). Possible scores for religious attendance will range from 0 to 5, with a higher score indicating a higher level of religious attendance. Religious application will be assessed through a single-item measure, “I try hard to carry my religious beliefs over into all my other dealings in life” with possible response options of ‘strongly disagree’ (0); ‘disagree’ (1); ‘agree’ (2); ‘strongly agree’ (3). Scores will range from 0 to 3 with higher scores indicating a higher level of religious attendance.

The subjective component will include two subscales/dimensions of religiosity: religious identity and religious commitment. Religious identity (α=0.80) will include the following four items with response options of ‘not at all’ (0); not very’(1); ‘somewhat’(2); ‘very’(3): “how important is it for you – or would it be if you had children now – to send your children for religious or spiritual services or instruction?”…“how closely do you identify with being a member of a/your religious group? (IF YOU ARE NOT PART OF A RELIGIOUS GROUP, MARK ‘not at all’)”… “how much do you prefer to be with other people who have the same
religious beliefs as you?”... “how important do you think it is for people of your religion to marry other people who are the same religion?” Scores will be summed to yield a scale ranging from zero to twelve, with higher scores indicating higher levels of religious identity. Religious commitment (α=0.87) will include the following four items with response options of ‘not at all’ (0); ‘not very’ (1); ‘somewhat’ (2); ‘very’ (3): “how religious are you?”... “how important is religion in your life?”... “how spiritual are you?”... “how important is spirituality in your life?” Scores will be summed to yield a scale ranging from zero to twelve, with higher scores indicating higher levels of religious identity.

The functional component will include the two subscales/dimensions of religiosity: religious coping and religious social support. Religious coping will be assessed through the Brief RCOPE short form, a 7-item scale that assesses positive religious coping (α=0.94) and negative religious coping (α=0.81) and a summary evaluation of the degree to which religion/spirituality is involved in an individual’s coping (Idler, Musick, Ellison, George, Krause, Ory, et al., 2003). Respondents will be asked to think of a recent negative event in their life and asked to what extent they used a series of coping mechanisms. Responses will include ‘not at all’ (0); sometimes (1); ‘moderate’ (2); ‘a great deal’ (3), with possible sum scores ranging from zero to 28 and higher scores indicating higher levels of religious coping. Religious social support will be measured by assessing divine social support. The items in this scale will include a single item and a continuous scale about prayer. The single item will ask participants to describe ‘how close their relationship is with God’ on a scale from one to seven, with 1 being ‘very distant’ and 7 being ‘very close’. The prayer scale (α=0.87) will be constructed by collapsing five questions on prayer that will be scaled according to degrees of intimacy with the divine.

Spirituality

To measure spirituality, the following two items with response options of ‘not at all’ (0); ‘not very’ (1); ‘somewhat’ (2); ‘very’ (3) will be summed to yield a scale ranging from zero to six, with higher scores indicating higher levels of spirituality. The items are part of the religious commitment scale and include “how spiritual are you?” and “how important is spirituality in your life?”

Social Support

Social support will be assessed using the same scales as in the Kim & Sobal (2004) study: summing the seven-item perceived social support scale from the Piedmont Health Survey (α=0.82) and two social interaction items from the National Survey of Midlife Development in the United States. The two social interaction items assess frequency of contact with family and friends and possible responses include: ‘never or hardly ever’ (0); ‘less than once a month’ (1); ‘about once a month’ (2); ‘two or three times a month’ (3); ‘about once a week’ (4); ‘several
times a week’ (5); ‘about once a day’ (6); ‘several times a day’ (7). The seven-item scale which assesses perceived social support will include the following possible responses with higher sum scores indicating higher levels of perceived social support: ‘hardly ever’ (0); ‘some of the time’ (1); ‘most of the time’ (2).

Health Behaviors: Dietary Fat Intake and Physical Activity

Dietary Fat Intake

Measures for fat intake were adopted from the National Cancer Institute’s Quick Food Scan by Kim & Sobal (2001) for use in the study instrument. These measures assess the percentage of energy from fat consumed based on the intake frequency of 16 foods with possible responses including: ‘never’ (0); ‘less than once per month’ (1); ‘1-3 times per month’ (2); ‘1-2 times per week’ (3); ‘3-4 times per week’ (4); ‘5-6 times per week’ (5); ‘1 time per day’ (6); ‘2 or more times per day’ (7). Sum scores will range from zero to 112, with higher scores yielding higher intakes of fat.

Physical Activity

Physical activity will be assessed using two scales: two items from a past year recall for moderate and vigorous physical activity that were adopted from National Survey of Midlife Development in the United States (MIDUS) (1996) in the original study by Kim & Sobal (2004) and the 7-day from the 2009 ACHA-NCHA II survey. The past-year recall items ask participants how often they engage in moderate or vigorous physical activity long enough to work up a sweat during the past year. Possible responses include: ‘never’ (0); ‘less than once a month’ (1); ‘two or three times a month’ (2); ‘about once a week’ (3); ‘several times a week’ (5); ‘about once a day’ (6). The ACHA-NCHA II physical activity assessment scale will be added to the final instrument in efforts to improve the accuracy of the participants’ responses. The scale will include a single-item measurement of both moderate and vigorous physical activity during the past 7 days for at least 30 minutes. Scores for each item will range from zero to seven; the physical activity scale will be the result of summing responses to both the moderate and vigorous items. Possible responses for each of these items (moderate & vigorous) will include ‘0 days’; ‘1 day’; ‘2 days’; ‘3 days’; ‘4 days’; ‘5 days’; ‘6 days’; ‘7 days’. Possible scores for physical activity will range from zero to 14, with higher scores indicating higher levels of physical activity.

Site of Data Collection:

The University of Alabama, Tuscaloosa, AL

Dr. Lori W. Turner will serve as the faculty Principle Investigator with research interests focusing on the promotion of health and quality of life through osteoporosis prevention and
spirituality. She is a Registered Dietitian and author of 19 published instructor manuals for college-level nutrition textbooks, 12 published student study guides, 76 published articles and 90 presentations at conferences.

Michelle Senter Harcrow will serve as the Doctoral student Principle Investigator with specific research interests and expertise in the areas of psychosocial determinants of health behavior (religiosity/spirituality) and physical activity.
Informed Consent:

Nine Basic Elements of Informed Consent (*Quotes taken directly from informed consent forms)

1. **A statement that the study involves research**

   “You are being asked to participate in a research study using an in-class survey assessment designed to examine the relationships between religiosity, spirituality, physical activity behaviors and dietary fat intakes of students at the University of Alabama.”

2. **An explanation of the purposes of the research**

   “The purpose of this study is to examine the relationship between physical activity levels, intakes of dietary fat, and how factors of religiosity and spirituality influence these behaviors among college students.”

3. **The expected duration of the subject's participation**

   “If you choose to take part in this study, you will be asked to complete survey that will take about 15 minutes.”

4. **A description of the procedures to be followed**

   “For this study, participants will be asked to complete an in-class survey about religiosity, spirituality, and health behaviors.”

5. **A description of any reasonably foreseeable risks or discomforts to the subject**

   “One risk may be that you might not like to answer questions about what your attitudes, beliefs, and/or practices of religiosity and spirituality, your physical activity behaviors, and/or your usual intakes of dietary fat.”

6. **A description of any benefits to the subject or to others that may reasonably be expected from the research**

   “As a participant, you will benefit by learning more about your religious and spiritual attitudes, beliefs and practices and your physical activity and dietary health behaviors. Society will benefit by having a better understanding of college students religious and spiritual attitudes, beliefs and practices and physical activity and dietary health behaviors that can lead to innovative education, promotion and interventions.”

7. **A statement describing the extent, if any, to which confidentiality of records identifying the subject will be maintained**
“The information you provide will remain secret and private. Information obtained through this study will only be used by the research staff. All data will be stored in using locked computers with a password and/or locked filing cabinets.

The University of Alabama Institutional Review Board (a group that looks out for the fair and just treatment of people in research studies) will review study records from time to time. This is to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.”

8. An explanation of whom to contact for answers to pertinent questions about the research and research subjects' rights, and whom to contact in the event of a research-related injury to the subject

“For more information concerning this research, you should contact Dr. Lori W. Turner at (205) 348-1292. If you have any questions about your rights as a research participant, you may contact The University of Alabama Research Compliance Officer at (205) 348-5152.”

9. A statement that participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled and the subject may discontinue participation at any time without penalty or loss of benefits to which the subject is otherwise entitled

“Please know that your participation is voluntary, if you choose not to take part in the survey, there will not be a penalty. You may quit the study at any time. If you choose not to participate, the information that has been told to us will be kept secret and private. Your choice to take part in this study (or to not help) will not reflect on you as a student of the University of Alabama.”

Letter of consent

**Risks and Benefits:**

Potential Risks:

Risks for participation in this study are minimal. Participants could potentially feel uncomfortable answering questions regarding their attitudes, beliefs, and/or practices of religiosity and spirituality, physical activity behaviors, and/or usual intakes of dietary fat, especially if they are not comfortable with their current activity levels and dietary fat intake.

Risk Minimization:

Each participant will be given the opportunity to withdraw from the study at any time and participation in the study is entirely voluntary.
Benefits:

*Participant:* Participants will benefit from this study by having a better understanding of their religious and spiritual attitudes, beliefs and practices and physical activity and dietary health behaviors. Participants could also benefit by simply knowing that their participation in this study contributes to the enhancement of scientific understanding and knowledge.

*Researchers, Health Professionals, Community Planners:* Findings from this research have several implications for researchers, campus recreation professionals and other health educators. First, this research will provide a better understanding of factors that influence current university student physical activity and dietary behaviors. Second, the information gleaned from this study will provide valuable information that will help with the design of a future intervention to increase physical activity and decrease dietary fat consumption among students. Third, the information obtained from this study could also be used by other universities interested in identifying factors that influence the participation in physical activity and intakes of dietary fat among students.

Risk/Benefit Ratio:

Though there are some mild psychological risks to participants (annoyance, reflection on current religious and spiritual attitudes, beliefs, and practices, and health behaviors); however, the benefits of this proposed research to the participants and society at-large outweigh the risks.

*Participants Confidentiality:*

The information that is being collected with this research will be basic demographic information and the completion of a knowledge based questionnaire. Only the principle investigator and research staff will have access to the data. There will be no identifying information collected. We are requesting a waiver of informed consent since this research could not be carried out without the waiver of consent. Each participant will receive an information sheet when the assessment is distributed. The information sheet will explain that their information is anonymous and will be used solely for research purposes.

At the end of the participant information sheet we have included the following statement indicating that completing this survey is of a voluntary nature:

Thank you very much for participating in this questionnaire today.

By completing this questionnaire you are agreeing to participate in this research study. Please know that your participation is entirely voluntary and in no way will impact you standing as a student at The University of Alabama.
Incentives to Participate:

There will not be any direct incentives for participation in this study. We will explain to participants that their contribution will provide researchers with valuable information on religiosity, spirituality, and health behaviors.
Participant Information Sheet
Religiosity, Spirituality, and Health Behaviors Survey

Title of Research: Relationships between Religiosity, Spirituality, and Health Behaviors among College Students
Principal Investigators: Lori W. Turner, Ph.D. and Michelle Senter Harcrow, M.S.

Explanation of Procedures

You are being asked to complete this questionnaire voluntarily as part of a research study to gain a better understanding of the relationships between religiosity, spirituality, physical activity behaviors and dietary fat intakes of students at the University of Alabama. This questionnaire will contain questions about your religious and spiritual attitudes, beliefs, and practices, your physical activity behaviors and your usual intakes of dietary fat. This questionnaire will take approximately 15 minutes to complete. Findings from this questionnaire will be used to assist with the development of health promotion messages which will attempt to increase the proportion of students engaging in regular physical activity and healthy dietary practices.

Risks and Discomforts

There are no physical risks or discomforts in this study. Mild psychological discomfort might be involved in answering questions about your leisure time physical activity behaviors, but this should be minimal.

Benefits

There are no direct benefits to you for your participation in this study.

Confidentiality

Your information gathered during this study will be anonymous, so the information you provide cannot be linked to you. Your information will be entered into a database whose files will be indexed with a unique identification number for this study. Data will be stored in secure computers with password protection accessible only to the principal investigators. The results of the study may be published for scientific purposes; however, there will be no way to identify you in the results.
Withdrawal without Prejudice

You are free to withdraw your consent and to discontinue participation in this project at any time without prejudice or any negative consequences.

Costs to Subject from Participation in the Research

There will be no cost to you from participation in this research.

Questions

For more information concerning this research you should contact Dr. Lori W. Turner at (205) 348-1292. If you have any questions about your rights as a research participant you may contact Ms. Tanta Myles, the University of Alabama Research Compliance Officer, at 205-348-5152.

Legal Rights

You are not waiving any of your legal rights by reading this information sheet and participating in this research study.

Thank you very much for participating in this questionnaire today. By completing this questionnaire you are agreeing to participate in this research study. Please know that your participation is entirely voluntary and in no way will impact your standing as a student at The University of Alabama.
Michelle S. Harcrow, MS
Department of Health Science
College of Human Environmental Sciences
The University of Alabama

Re: IRB # 10-OR-111 “Relationships between Religiosity, Spirituality, and Health Behaviors among College Students”

Dear Ms. Harcrow:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your protocol has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of informed consent. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on April 7, 2011. If your research will continue beyond this date, complete the relevant portions of Continuing Review and Closure Form. If you wish to modify the application, complete the Modification of an Approved Protocol Form. When the study closes, complete the appropriate portions of FORM: Continuing Review and Closure.

Please provide participants with a copy of the attached participant information sheet.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,

Carpaytato T. Myles, MSM, CJM
Director & Research Compliance Officer
Office for Research Compliance
The University of Alabama
FORM: MODIFICATION OF AN APPROVED PROTOCOL

Investigator: Michelle S. Harcrow, MS

Study Title: Relationships between Religiosity, Spirituality, & Health Behaviors among College Students

IRB #10-OR-111 Approval Date 4/8/2010 OSP #

1. What change(s) do you wish to make? Check all that apply.

_____ Add or delete instruments

_____ Change (substitute) instruments

_____ Add or delete variable(s)

_____ Add or delete a category of participant (e.g. eliminate diabetics, add Hispanics, add students from other courses or student research pools). Please identify courses or subject pools.

___________________________________________________

_____ Change inclusion or exclusion criteria

_____ Add a vulnerable population

_____ Change sample size

_____ Add or change recruitment sites

_____ Change recruitment strategies, e.g., recruitment media

_____ Change content of recruitment materials

_____ Change compensation plan

_____ Change incentive plan

_____ Change wording of consent document

_____ Change method of obtaining or documenting consent
_____Change in investigator
_____Change in project staff (GRA, data collectors, etc.)
_____Obtain protected health information
_____Change strategies for protecting confidentiality or privacy
_____Change plan for data storage or dissemination
_____Address new Conflict of Interest issue
_____OTHER:

2. What is the stimulus for this/these change/s? 
_____Unanticipated or adverse events have arisen
_____Prospects’ questions suggest ways to improve study explanation and consent form
_____Participants’ responses suggest that data collection instruments or procedures should be changed.
_____Recruitment is going very slowly
_____New information has arisen that suggests an additional population or category of participant should be included or deleted.
_____New information has arisen that prospective or current participants should know.
_____Reduce participant burden
_____Changes in funding require adjustments in study
_____Requirement of sponsor
_____COI issue requires change in procedure or disclosure to participants
_____OTHER:

3. Please explain rationale or circumstances in detail.

In order to increase participant enrollment and in efforts to obtain a diverse, culturally representative sample of college students, I would like to add these sites: academic buildings, libraries, dining facilities, and residence halls, Student Health Center, University Recreation Center, UA Quad, and Ferguson Center. Colleges of Arts and Science, Commerce & Business Administration, Communication and Information Sciences, Community Health Sciences,
Education, Engineering, Honors, Human Environmental Sciences, Nursing and Social Work. Additionally, these recruitment efforts will be made among student social groups, honor societies and undergraduate and graduate student organizations and associations.

4. Describe what exactly will be added to or deleted from your currently approved protocol and what change(s) will be made to your protocol.

The following sites and recruitment strategies will be added to my original protocol: UA academic buildings, libraries, dining facilities, and residence halls, Student Health Center, University Recreation Center, UA Quad, and Ferguson Center. Additionally, these recruitment efforts will be made among student social groups, honor societies and undergraduate and graduate student organizations and associations.

5. What is the effect of the requested change(s) on participant burden?

   ___x___None
   _____Increases ---Please explain
   _____Decreases--- Please explain

6. Will the proposed change(s) affect the risk-benefit ratio for participants?

   ___x___No           _____Yes

   If YES, What is your specific appraisal of the new risk-benefit ratio?

   _____Minimal risk (Potential harm/discomfort not greater than those encountered in everyday life or during routine physical or psychological examinations)

   _____Greater than minimal risk but has potential direct benefit

   _____Greater than minimal risk and no direct benefit but with potential to yield generalizeable knowledge about the subjects’ disorder or condition.

   _____If risk is greater than minimal, are the risks reasonable in relation to the potential benefits? Please explain.

Please supply (1) a new clean copy of the protocol with all changes incorporated and identified by boldface, underlining, or italics and (2) a copy of the currently approved protocol.

If you are adding or changing a vulnerable population, please complete and attach the supplementary form appropriate to that population.
May 17, 2010

Michelle S. Harcrow, MS
Department of Health Science
College of Human Environmental Sciences
The University of Alabama

Re: IRB #10-OR-111 (Revision) “Relationships between Religiosity, Spirituality, and Health Behaviors among College Students”

Dear Ms. Harcrow:

The University of Alabama Institutional Review Board has reviewed the revision to your previously approved expedited protocol. The board has approved the change in your protocol.

Please remember that your approval period expires one year from the date of your original approval, April 7, 2011, not the date of this revision approval.

Should you need to submit any further correspondence regarding this proposal, please include the assigned IRB application number.

Good luck with your research.

Sincerely,

Carpentier T. Myles, MSM, CRM
Director & Research Compliance Officer
Office for Research Compliance
The University of Alabama
APPENDIX C

WAIVERS OF INFORMED CONSENT
THE UNIVERSITY OF ALABAMA
HUMAN RESEARCH PROTECTIONS PROGRAM

FORM: Request for Waiver of Written Documentation of Informed Consent

Title of Research: Relationships between Religiosity, Spirituality, and Health Behaviors among College Students
Principal Investigators: Lori W. Turner, Ph.D. and Michelle Senter Harcrow, M.S.

Directions: Address the criteria listed below and attach this form to your application. Also, state in your application that you are requesting a waiver of written documentation of informed consent and describe what you will do to obtain consent in the procedure section of your application. The IRB often requires investigators to provide participants with a written information statement about the research when written documentation is waived; you may wish to include one in your initial application.

NOTE that the UA IRB does not allow passive consent and that waivers may not be granted for FDA-regulated research.

You are welcome to call Research Compliance staff at 205-348-5152 to discuss your need for a waiver in advance of application submission.

(1) The only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality; or

If the participants sign the consent form that would be the only item that would include participant names. There is no identifying information collected in the assessment battery.

(2) The research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

There is no more than minimal risk to the participants and since we are requesting a waiver of consent for those participants under the age of 19 it is not realistic to have only a small group of students sign the informed consent form. There is an Information Sheet that will be attached to the survey indicating that participation is voluntary and that by completing the survey the participant is agreeing to participate in the study.
Title of Research: Relationships between Religiosity, Spirituality, and Health Behaviors among College Students

Principal Investigators: Lori W. Turner, Ph.D. and Michelle Senter Harcrow, M.S.

Directions: Complete this form and attach it to your application if you desire a waiver or alteration of informed consent (includes studies seeking no consent, studies involving deception/concealment, and studies using a short form informed consent document.) ALL conditions must be met for a waiver/alteration to be granted. Also state in your application that you are requesting a waiver of informed consent and describe what you will do in the procedure section of your application. The IRB often requires investigators to provide participants with a written information statement about the research when informed consent is waived; you may wish to include one in your initial application.

NOTE that the IRB does not allow passive consent and that waivers may not be granted for FDA-regulated research. You are welcome to call Research Compliance staff at 205-348-5152 to discuss your need for a waiver in advance of application submission.

This request is made to waive consent from parents of students less than 19 years of age. We will recruit students from a variety of academic classes at the University of Alabama. This research presents minimal risk and the justification for this request is as follows.

1. Describe exactly what you wish to waive: For this study we wish to waive parental consent from UA students less than 19 years of age. Since some of the participants will be under 19 we also wish to waive consent from those participants aged 19 and older.

2. Describe why the research involves no more than minimal risk to the subjects: There are no foreseen risks to participating in this study. Mild psychological discomfort might be involved in answering questions about your leisure time physical activity behaviors, but this should be minimal.

Participants will not be placed in any situation that may be physically or psychologically stressful. This survey is completely voluntary and anonymous and their participation will in no way will impact their standing as a student at the University of Alabama.

3. Describe why the waiver or alteration will not adversely affect the rights and welfare of the subjects: Participants will take full responsibility in deciding whether or not to participate in this study. A paragraph explaining the study will be included on the information sheet so that the participants may make a fully informed decision to
participate. Participants’ willingness to participate is therefore the participants’ consent. The waiver of consent will not produce any danger to the participants’ welfare or rights.

4. Describe why the research could not practicably be carried out without the waiver or alteration of informed consent. The ultimate purpose of this research study is to examine the relationship between physical activity levels, intakes of dietary fat, and how factors of religiosity and spirituality influence these behaviors among college students. Targeting academic classes to distribute surveys will result in having students under the age of 19 and it is not realistic to obtain parental consent from the parents of those UA students. Furthermore, many students are from out of town which would make it impossible for a parent to be present to give permission in a timely manner.

5. Will subjects be provided with additional pertinent information after or during the research? If yes, describe how information will be provided to participants: No, this survey is voluntary and anonymous and there is no follow-up with the students.