THE RELATIONSHIP OF PERSONALITY PREFERENCES AND TYPE TO HEALTH-PROMOTING BEHAVIORS, ALCOHOL USE, AND CIGARETTE SMOKING

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THE RELATIONSHIP OF PERSONALITY PREFERENCES AND TYPE TO HEALTH-PROMOTING BEHAVIORS, ALCOHOL USE, AND CIGARETTE SMOKING

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Education in the College of Education at the University of Kentucky

By
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Lexington, Kentucky

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Lexington, Kentucky

2011

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An individual’s personality traits and characteristics have been found to have an important relationship with health behaviors. However, there has been minimal research conducted with personality types. The purpose of the study was to examine the predictive relationship among MBTI® personality preferences and types and both selected health-promoting and selected risk-taking behaviors among residential college students. Furthermore, several potential mediating demographic variables were added to the study to determine their predictive relationship and if they should be entered into a model for the selected health behaviors.

The study used a cross-sectional design with two self-report instruments and demographic questionnaire. The two self-report instruments were the MBTI® and the HPLP II. A systematic random sample was employed to obtain the sample of full-time residential college students. A total of 406 subjects voluntarily completed the instruments. The subjects ranged in age from 18 to 28 with 98.3% reporting traditional college age. Descriptive and inferential statistics with an alpha level of .05 were used for data analysis.

The results revealed that models incorporating MBTI® personality preferences and types had a significant predictive relationship with nutrition, interpersonal relations, spiritual growth, physical activity, aggregate health-promoting lifestyle, alcohol use, binge drinking, and heavy drinking. However, the variance explained by the models for each behavior was consistently low with the one exception of interpersonal relations. Health-responsibility, stress management, and cigarette smoking could not be predicted by models integrating MBTI® personality preferences and types. Nonetheless, specific personality preferences and types did have a significant relationship with health-responsibility, stress management, and cigarette smoking.

In conclusion, MBTI® personality preferences and types provided valuable insight into explaining several of the selected health behaviors. The results revealed personality
preferences and type can be useful in health research. Given the popularity of the MBTI®, future research incorporating the MBTI® and various health behaviors may offer valuable information used by health professionals and counselors to modify health behaviors.

KEYWORDS: Myers-Briggs Type Indicator (MBTI), Health-Promoting Lifestyle Profile II (HPLP II), personality type, personality preference, health behavior

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CHAPTER 1:
STATEMENT OF THE PROBLEM

Background

The health of adults in the United States is an area of national concern. This is particularly true when examining Kentucky’s health statistics. In 2008, 67% of Kentuckian’s classified themselves as overweight or obese (Centers for Disease Control [CDC], 2008b). Additionally, 56% reported they did not get 30 minutes of physical activity on five or more days per week and 78% reported they did not get 20 or more minutes of vigorous activity three or more days per week (CDC, 2009d). Kentucky has the second highest state adult smoking rate at 25.2% (CDC, 2010c). Astonishingly, 80% of Kentuckians reported they were in good to excellent health (CDC, 2008a). Add Kentucky’s other chronic disease indicators, low fruit and vegetable consumption and high alcohol use, and there is a clear disconnect for these adults between perception and reality.

The question is when do these unhealthy habits begin? While there is not a time on which everyone agrees, much research points to the transition from adolescence to early adulthood. The CDC (2008a) states that priority health risk behaviors, those contributing to the leading causes of morbidity and mortality among adults, are often established during adolescence, extend through adulthood, and are preventable. This is also when many individuals transition from high school to college. The National Center for Education Statistics (2009) approximates that 18.2 million college students were enrolled in fall 2008, and this population makes up approximately 31% of 18 to 24 year olds.
Attending a college or university is an exciting yet vulnerable time for many young men and women. For most, it is the first time they have lived away from parents and are solely responsible for their choices. Students gain freedom and independence while often experiencing self-doubt and apprehension in their new environment. Adjusting to this new phase of life can cause significant increases in stress as students adapt to more rigorous academic workloads, build new social networks and learn effective time management strategies (Brissette, Carver, & Scheier, 2002; Friedlander, Reid, Shupak, & Cribbie, 2007; Singh & Upadhyay, 2008).

Additionally, college students are entering a dynamic environment where they have greater control over their lifestyles, making this an opportune time to establish lifelong healthy habits (Von Ah, Ebert, Ngamviroj, & Kang, 2004). Ottenritter (2004) suggested this is a time when health habits are being adopted and solidified. These years appear to offer great opportunities for effective health education programs and messages.

Unfortunately, research has demonstrated the college years are globally a time for risky health behaviors such as increased sexual behavior, increased alcohol consumption and binge drinking, recreational drug use, and smoking (Steptoe et al. 2002; Wechsler et al., 2002; Ratliff-Crain, Donald & Dalton, 1999; American College Health Association [ACHA], 2008). Becker, McMahan, Etnier, and Nelson (2002) found much of the health education programming and literature offered to college students is directed toward these disease prevention behaviors and focuses on the negative aspects of health. Although these disease prevention behaviors are important for short- and long-term health, health-promoting behaviors such as physical activity, fruit and vegetable consumption, and stress management are equally important. Unfortunately, health-promoting behaviors are
less of a focus on college campuses by health promotion and education professionals (Becker et al., 2002).

As one example, the Department of Student Health Promotion and Education at a mid-sized, mid-western university offered 137 programs during the 2009 academic year and of those programs, only five were dedicated to health-promoting behaviors (Martin, 2009). Becker et al. (2002) determined college students prefer health-promoting programs and messages to disease prevention programs and messages. Furthermore, college students are considered a low involvement audience; positive messages and programs have become a useful tool in getting the attention of such audiences (Monahan, 1995). Unfortunately, college students often believe health problems are for older adults and do not believe they are susceptible. If health promotion and education professionals expect college students to listen and, thus, have the potential to change behavior, these professionals must offer health-promoting messages and programs.

Since there are numerous health-promoting behaviors challenging college students, it would be implausible to address all of those behaviors in one study. The current study addressed the health-promoting behaviors measured by Health Promoting Lifestyle Profile II (HPLP II) discussed in more detail in Chapter 3. The HPLP II measures physical activity, stress management, nutrition, spiritual growth, interpersonal relations and health responsibility (Pender, Murdaugh, & Parson, 2006). In addition, the HPLP II offers an aggregate health-promoting lifestyle score based on the aforementioned six selected health-promoting behaviors. The HPLP II was derived from Pender’s Health Promotion Model (HPM). The HPM is discussed in detail in Chapter 2.
In addition to the selected health-promoting behaviors, two prominent risk-taking behaviors were included in the study: alcohol use and cigarette smoking. Alcohol use, and specifically binge drinking, is prevalent among college students (ACHA, 2009). The highest national rate of alcohol consumption is observed in the 18-24 age cohort at 35.6% with college students aged 18-24 consuming the highest rate at 60% (CDC, 2009c; ACHA, 2009). Binge drinking is at its highest among college students aged 18-24 years with nearly 42% of students binge drinking in the last 30 days (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009). Binge drinking and heavy alcohol consumption have dire consequences to the drinker and the people whom he/she comes into contact (Wechsler, Lee, Nelson, & Kuo, 2002; Zeigler et al., 2005; Powell, Faden, Wing, & Office of the Surgeon General, 2007). Johnston, L., O'Malley, P., Bachman, J., Schulenberg, J., & National Institute on Drug Abuse (2009) declared alcohol is the most widely used substance of abuse among America’s youth. There is little doubt alcohol consumption among college students is a public health concern. In the USDHHS Surgeon General’s *Call to Action to Prevent and Reduce Underage Drinking* (2007), goal four states the necessity to conduct additional research on alcohol use. Studying the relationship between both personality preferences and types and alcohol use behaviors could provide results that could be used to build more effective and enduring interventions.

Tobacco use is a prominent risk-taking behavior in the U.S. with numerous negative health consequences (CDC, 2010b). This is particularly true with Kentuckians. Currently, the national adult smoking rate among adults is 17.9%, but the adult smoking rate for Kentucky is 25.2% (CDC, 2010c). Kentucky has the second highest state
smoking rate and is the leading producer of tobacco along with North Carolina in the U.S. (CDC, 2010b; CDC 2010c). Furthermore, the most problematic statistic for Kentucky college health professionals is Kentuckians in the 18-24 age cohort are daily smokers at nearly double the national rate for 18-24 year olds: 28.2% to 14.4% (CDC 2009e). Research is revealing a new trend over the last decade in student smoking toward social smoking (Moran, Wechsler, & Riggoti, 2004; Waters, Harris, Hall, Nazir, & Waigandt, 2006). Social smoking has brought a new set of challenges to health professionals as social smokers do not consider themselves smokers, do not want to quit smoking, and do not believe they are at risk of harm from smoking (Waters, Harris, Hall, Nazir, & Waigandt, 2006). This new trend in smoking beliefs could lead to more smoking as the college environment is full of opportunities for socialization. Researching personality and its connection to tobacco use may provide insights into college smoking allowing for the development of more effective cessation programs.

From 1980 – 2007, the three leading causes of death in the United States (in rank order) were heart disease, cancer, and stroke (Xu, Kochanek, & Tejada-Vera, 2009). Health-promoting behaviors such as physical activity, consumption of fruits and vegetables, stress reduction, interpersonal relationships, and spirituality have been linked to reduced rates in these leading health indicators (CDC, 2009b; ACHA, 2008; USDHHS, 2000; Nagel & Sgoutas-Emch, 2007). In addition, alcohol and tobacco use have causal links to heart disease, cancer, and stroke (USDHHS, 2007). Since the foremost goal of Healthy People 2010 is “increasing the quality and healthy years of life”; health-promoting and risk-taking behaviors will ultimately have a profound effect on an individual’s quality-adjusted life years.
Genetic predisposition, health beliefs, and decision-making are three factors that determine whether an individual will participate in health-promoting or risky health behaviors. (Hong & Paunonen, 2009). Another factor believed to influence health related behaviors is personality, which constitutes a significant group of exploratory variables. Before discussing personality, a distinction must be made between personality “traits” and personality “types”. These terms have at times been inappropriately used interchangeably.

Personality traits are genetic characteristics measured along a continuum. An individual can have a small amount of a trait, a large amount of a trait, or anything in-between. The promoters of traits focus on the fact that researchers can measure variation in a characteristic (Vollrath & Torgersen, 2006). Personality types are innate characteristics that are discontinuous with an absolute midpoint. An individual will be placed into a dichotomous category, usually consisting of opposing characteristics such as introversion or extraversion. Supporters of personality types believe they cannot describe an individual when only single traits are studied (Vollrath & Torgersen, 2006). Personality type theory posits that personality is a compilation of the interactions of several characteristics making a whole personality type.

There is disagreement between which of these personality constructs, traits or types, is more valuable within research. The general accepted “rule of thumb” is researchers favor trait theories and practitioners favor type theories (Vollrath & Torgersen, 2006). This helps explain why the overwhelming majority of research is based on personality traits.
Extensive research on the relationship between personality traits and disease prevention has well established that certain personality traits are correlated with health outcomes (Friedman, 2000; Vollrath & Torgersen, 2002; Hong & Paunonen, 2009; Friedman, Hawley, & Tucker, 1994). Friedman (2000) declared personality can lead to health outcomes through its influence on processes such as health-related behaviors and social environmental variables. There is, however, minimal research on personality traits and health-promoting behaviors. According to Vollrath and Torgersen (2006), research has just begun to discuss the potential of personality type and risky health behaviors. The researcher was unable to find studies related to personality preferences and types and health-promoting behaviors and alcohol use.

**Purpose and Significance of Study**

The purpose of the study was to examine the relationship between MBTI® personality preferences and types and both selected health-promoting and selected risk-taking behaviors among residential college students. Addressing this gap in the research could provide critical information about how innate personality preferences are related to health behaviors. Research results could be used to advance health programs, initiatives and messages ultimately having a more profound impact on the long-term health of college students. The American College Health Association (ACHA) Standards of Practice of Health Promotion in Higher Education (2007) state health professionals should strive to reduce risk for individual illness and to enhance health as a strategy to support student learning. This study supports the mission of the ACHA and could provide numerous insights into the relationship between personality type and health-promoting and risk-taking behaviors.
The benefits of determining the relationship between personality type preferences and the selected health-promoting behaviors and risk-taking behaviors are many. Nelson et al. (2006) concluded that developing effective health strategies has become a necessity in promoting long-term health and active lifestyles. Understanding the role of personality type preferences in behavior change would help experts plan more strategically for future workshops, programs, messages and counseling sessions specific to health-promoting and risk-taking behaviors.

College and university based departments that provide programming focused on student health could develop more successful programs and workshops by implementing approaches focused on personality preferences and types which influence the health behavior of interest. Training peer health educators in individual differences in personality preferences and types could benefit the delivery of information on selected health topics related to certain personality preferences. In addition, with the rise in web and computer delivered health interventions, designing software programs with personality preferences and types that impact the health issue would provide improved opportunities for success of participants.

The benefits for university counselors and psychologists are significant. College students are beginning college with more psychological health problems. Burris, Brechting, Salsman, and Carlson (2009) highlighted the need to research variables that influence psychological health, specifically personality, to help determine the influence on mental health and to guide treatment planning and increase effectiveness. University counseling centers routinely create programs focusing on health-promoting and risk-taking behaviors such as stress management, nutrition, physical activity, and alcohol use.
in an effort to impact mental health. Discovering the relationship between personality preferences and types of college students is necessary to develop more effective interventions for this population (Burris et al., 2009).

University housing develops numerous programs each year consisting of everything from general information on health topics to specific behavior change initiatives. Research has demonstrated programming offered by university housing can affect life-long health habits (Brower, Golde, & Allen, 2003; Longerbeam, Inkelas, & Brower, 2007). Furthermore, the recent additions of living learning communities to university housing allow students with similar interests, such as health or wellness, to live in the same location. Training university housing staff, particularly resident hall coordinators and resident assistants, on the importance of personality preferences and types would allow for more effective health messages and programs.

An additional benefit to the research literature is determining the mediating effect of sex. Research has established there are sex differences in the selected health-promoting and risk-taking behaviors. Males are more likely to participate in exercise and report higher levels of physical activity (Buckworth & Nigg, 2004; Huang et al., 2003). Racette, Deusinger, Strube, Highstein, and Deusinger (2005) found females eat more fatty foods than males. Females are more likely to report being stressed and to report more physical symptoms from stress (Hudd et al., 2000; American Psychological Association [APA], 2010; Singh & Upadhyay, 2008). Males binge drink, consume alcohol, and smoke cigarettes at a higher rate than females (Wechsler et al., 2002; Pattersen et al, 2004).
Understanding the mediating role of sex in the relationship between personality type preferences and both selected health-promoting and risk-taking behaviors may provide a unique opportunity to develop programs specific to sex. Health education and promotion professionals would be able to build more effective sex-based programs and messages that would have a more profound effect on short and long-term health behavior. Several possible mediating variables such as age, ethnicity, academic classification, and social position were factored into the study. Although a brief overview of the literature does not support nor disprove these variables impact on the selected health-promoting and risk-taking behaviors, it is important to determine the extent these variables interact with the health-promoting and risk-taking behaviors.

**Research Questions and Hypotheses**

The following research questions were used for this study.

1. Can health-promoting behaviors measured by the Health-promoting Lifestyle Profile II be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?

2. Can cigarette smoking be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?

3. Can alcohol use behaviors be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality
preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?

The study focused on the hypotheses listed below:

1. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality preferences will have a significant predictive relationship with both the six health-promoting behaviors and aggregate health-promoting lifestyle.

2. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, MBTI® personality types will have a significant predictive relationship with both the six health-promoting behaviors and aggregate health-promoting lifestyle.

3. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality preferences will have a significant predictive relationship with cigarette smoking.

4. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, MBTI® personality types will have a significant predictive relationship with cigarette smoking.

5. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, MBTI® personality preferences will have a significant predictive relationship with alcohol use behaviors.

6. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, MBTI® personality types will have a significant predictive relationship with alcohol use behaviors.
Definition of Terms

The following is a list of key terms used throughout the study:

**Health-promoting Lifestyle Profile II** (HPLP II) – A 52-item instrument composed of a total scale and six subscales to measure behaviors in the theorized dimensions of health-promoting lifestyle listed below.

**Health Responsibility** – An active sense of accountability for one’s own well-being. It includes paying attention to one’s own health, educating oneself about health, and exercising informed consumerism when seeking professional assistance (Walker and Hill-Polerecky, 1996).

**Interpersonal Relations** – Utilizing communication to achieve a sense of intimacy and closeness with meaningful, rather than more casual, relationships with others. Communication involves the sharing of thoughts and feeling through verbal and nonverbal messages (Walker and Hill-Polerecky, 1996).

**Nutrition** – Involves knowledgeable selection and consumption of foods essential for sustenance, health, and well-being (Walker and Hill-Polerecky, 1996).

**Physical Activity** – Regular participation in light, moderate, and/or vigorous activity. It may occur within a planned and monitored program for the sake of fitness and health or incidentally as a part of daily life or leisure activities (Walker and Hill-Polerecky, 1996).

**Spiritual Growth** – Focuses on the development of inner resources and is achieved through transcending, connecting, and developing. Transcending puts us in touch with our most balanced selves; it provides us with inner peace and opens us to the possibilities of creating new options for becoming something more
by going beyond who and what we are. Connecting is the feeling of harmony, wholeness, and connection with the universe. Developing involves maximizing human potential for wellness through searching for meaning finding a sense of purpose, and working toward goals in life (Walker and Hill-Polerecky, 1996).

**Stress Management** – The identification and mobilization of psychological and physical resources to effectively control or reduce tension (Walker & Hill-Polerecky, 1996).

**Myers-Briggs Type Indicator® (MBTI®)** – A personality inventory based on C.G. Jung’s theory of psychological type to identify the basic personality preferences on each of the four dichotomies specified or implicit. The four dichotomous preferences are introversion or extroversion, sensing or intuiting, thinking or feeling, and judging or perceiving. Personality types result from the combination of these four dichotomies (Myers, McCaulley, Quenk, & Hammer, 1998).

- **Introversion** (I) – An attitude or orientation of energy. Drawing energy from the environment and focusing inward (Myers et al, 1998).
- **Extraversion** (E) - An attitude or orientation of energy. Directing energy mainly toward the outer world of people and objects (Myers et al, 1998).
- **Sensing** (S) – Functions or processes of perception. Focusing mainly on what can be perceived by the five senses (Myers et al, 1998).
- **Intuition** (N) - Functions or processes of perception. Focusing mainly on perceiving patterns and interrelationships (Myers et al, 1998).
- **Thinking** (T) – Functions and processes of judging. Basing conclusions on logical analysis with a focus on objectivity and detachment (Myers et al, 1998).
Feeling (F) - Functions and processes of judging. Basing conclusions on personal and social values with a focus on understanding and harmony (Myers et al, 1998).

Judging (J) – Attitudes or orientations toward dealing with the outside world. Preferring the decisiveness and closure that result from dealing with the outer world using one of the judging processes (Myers et al, 1998).

Perceiving (P) - Attitudes or orientations toward dealing with the outside world. Preferring the flexibility and spontaneity that results from dealing with the outer world using one of the perceiving processes (Myers et al, 1998).

Personality Preference – One of each pair of the four basic mental functions and attitudes that in type theory structure an individual’s personality (Myers et al, 1998).

Personality Trait – A set of genetic characteristics measuring variation along a continuum.

Personality Type – A set of innate characteristics that are discontinuous with an absolute midpoint.
CHAPTER 2:  
LITERATURE REVIEW

Introduction

The purpose of the study was to examine the relationship between MBTI® personality preferences and types and both selected health-promoting and selected risk-taking behaviors among residential college students. The chapter will discuss the theoretical framework behind the Myers-Briggs Type Indicator® (MBTI®) and Health-promoting Lifestyle Profile II (HPLP II). The various health-promoting behaviors measured by the HPLP II will be presented. A review of the relevant research on each of the dimensions of health-promoting lifestyle will be discussed. Personality and its association with health behaviors are conveyed. The need for future research is addressed.

Personality Type Theory

The basic premise behind the theory of psychological types, commonly labeled type theory, is that seemingly random variation in behavior is actually quite orderly and consistent when viewed as a collection of innate preferences. The central concepts of type theory indicate people differ in the ways they prefer to focus their mental energy (internally or externally), receive information (sensing and intuiting), make decisions (thinking and feeling), and orient to the external world (perceiving and judging) (Myers, 2003). These preferences, when considered together, constitute an individual’s personality type.

Type theory maintains several key assumptions: 1) each of the scales is independent from each other; 2) each subscale is non-mutually exclusive, meaning an individual can exhibit behaviors from either side of a preference continuum; 3) type is
universal, thus, people from a variety of cultural backgrounds all share common mental processes and applications of cognitive energies; 4) one type, or preference, is not superior to another; and 5) while a person’s type is relatively stable, over time, type may develop depending on long-term environmental demands (Myers, et al. 1998). Types are not pigeonholes and each pattern is a self-balancing system, meaning an individual will shift processes if necessary to reflect a certain situation. An individual’s preference may be toward introversion, but he/she may be able to shift processes and demonstrate extraversion as needed. The individual will then shift back to his/her preference of introversion as soon as possible.

Swiss psychiatrist Carl G. Jung developed type theory based on his clinical practice and years of observing people, and first published *Psychological Types* in 1923. He attempted to explain differences in human behavior by coming to the conclusion there are two types of people, which he identified as introverts and extraverts. He describes introverts as people whose energies were directed toward thoughts, reflections and experiences with their inner environment. Conversely, extraverts directed their energies toward objects in the external environment. Objects were explained as people, events or any external stimuli. Jung classified introversion and extraversion as attitudes. Attitude defined by Jung is “a readiness of the psyche to act or react in a certain way” (Jung, 1971, p.414). Both extraversion and introversion are seen as complementary attitudes or orientations of energy (Myers et al., 1998). These attitudes translate into vastly different approaches toward life.

People who use the introverted attitude will draw energy from the environment and focus inward. Introverts learn best through introspection and tend to be energized by
inner resources and internal experiences. Their communication is usually reserved and they have a tendency to reflect before they act. Their interests have depth and they work best through internal reflection. People who use the extraverted attitude will gain energy from interacting with the environment. Extraverts are energized by other people and external experiences. Their communication is open and will usually take initiative in developing new relationships. They have numerous interests, work best through external action, and tend to act before reflecting (Myers et al., 1998).

Jung continued to observe people and realized extraversion and introversion did not provide a complete representation of human behavior. After ten years of observation, he noted there were two ways of perceiving and judging (see Table 2.1). Perceiving and judging arose from the existence of two distinct and sharply contrasting ways of coming to conclusions. He proposed two pairs of opposite mental functions. Jung defined a function as “a particular form of psychic activity that remains the same in principle under varying conditions” (Jung, 1971, p. 436). The first pair of functions was opposite perceiving functions known by Myers and Briggs as sensing (or sensation) and intuiting (or intuition). The second pair of functions was the opposite judging functions of thinking and perceiving. Perceiving refers to the way people become aware of things and take in information. Judging refers to the way people come to conclusions about what people perceive. Jung concluded, “I distinguish these functions from one another because they cannot be related or reduced to one another” (Jung, 1971, p. 437). These four functions are essential for everyday living and relate to consciousness (Myers et al., 1998). The functions allow people to collect, interpret and analyze a wide range of stimulus information.
Table 2.1. Positions of MBTI® Preferences

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>Perceiving Functions</th>
<th>Judging Functions</th>
<th>Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-I</td>
<td>S-N</td>
<td>T-F</td>
<td>J-P</td>
</tr>
<tr>
<td>Extraversion or Introversion</td>
<td>Sensing or Intuition</td>
<td>Thinking or Feeling</td>
<td>Judging or Perceiving</td>
</tr>
</tbody>
</table>

Note. Created by the author.

In order to fully understand the four mental functions one must comprehend the respective uses of perception and judgment. Perception represents all the ways of becoming aware of objects, people, events and ideas. Perception includes gathering information, sensation seeking, searching for inspiration, and the selection of sensation and inspiration. Judgment represents all the ways of coming to conclusions about what is perceived. Judging includes assessment, choice, decision-making, and the selection of a response after perceiving a stimulus.

Jung (1971) classified the two types of perception as sensing and intuiting. Sensing refers to acquiring information through the five senses by what is real, present and actual. Sensing people prefer practicality, factual information, and concrete examples (Myers, 2003). They tend to focus on the present moment or compare the present with the past. Their preference is for parts then the whole, meaning they construct a meaningful whole by adding up the sum of the parts. In contrast, people who prefer intuition tend to focus on the future and to identify patterns, concepts, meanings and options (Myers, 2003). Intuiting people prefer using their imaginations, and generating possibilities and theories and may be seen as inspiring and visionary. The differences in the perceiving function can be illustrated by the clarification of diet. An individual using the sensing function to perceive a diet would use words such as: small
portions, bad taste, or hungry. The individual’s focus is on the sensory aspects. When
the intuiting function is used to perceive the same diet, a person may say bikini,
supermodel, or “The Biggest Loser”. Here the focus is on the associations and possible
meanings stimulated by the person’s perception of diet.

According to Jung (1971), people differ in how they evaluate information, make
decisions, and come to closure. He classified these two opposing types of judging
functions as thinking and feeling. People who prefer the thinking function tend to
approach decisions with an impersonal logic and analytical frame of reference and value
precision, rules, and reasonableness. People exhibiting the thinking preference tend to
question, critique, and focus on consequences (Myers, 2003). These people prefer truth
over tact, and people preferring the feeling function tend to focus on harmony and
personal relationships when making decisions (Myers, 2003). They value inclusive
processes and are inclined to accommodate. People exhibiting the feeling preference
tend to be accepting, empathetic, focus on people, and prefer tact over truth. Across the
type preferences, men and women differ significantly on measures of thinking and
feeling (Myers et al., 1998).

The final attitude of type theory was the result of an expansion of Jung’s original
work by Katherine Briggs. Briggs identified a pair of concepts, which were incomplete
and implicit in Jung’s Psychological Types, through several decades of observation of
different behavioral patterns (Myers et al., 1998). These behavioral patterns were the
manner by which individuals oriented themselves to the outer world. She later called
these behavioral patterns the judging and perceiving attitudes. The judging-perceiving
dichotomy describes the way individuals orient themselves to the extraverted world (Myers, 2003).

As people orient to the outside world, they prefer to use either the judging or perceiving attitudes. People with a judging attitude are concerned with making decisions, seeking closure and organizing the outside world (Myers, 2003). Judging individuals are task-focused, systematic and organized. They are at their best when order and structure are in place, and they enjoy following a plan. People with a perceiving attitude are attuned to incoming information. Perceiving individuals’ lifestyles tend to be flexible, adaptable, spontaneous, prefer an open-ended environment, and starting a project just in time is exhilarating (Myers, 2003).

The judging-perceiving (J-P) dichotomy works directly with the mental process for which it is linked. Since the J-P dichotomy identifies how an individual orients to the outside world, an individual having a judging attitude will extravert the judgment function (thinking-feeling dichotomy). Individuals with a perceiving attitude will extravert the perception function (sensing-intuition dichotomy). In any new activity, an individual will use the perceiving function (sensing or intuiting) to first observe or take in information; then the person will use the judging function (thinking or feeling) to decide the appropriate actions. Perceiving types of people would stay longer in the observing attitude because it is more comfortable and natural. Judging types of people would move quickly through the observing attitude (perception) and make a decision to obtain closure, as this is more comfortable and natural (Myer et al., 1998).
The study used the MBTI® to determine personality preferences and types. The MBTI® was developed to make Jung’s theory useful to groups and individuals and is discussed in the instruments section of chapter three.

**Health Promotion Model**

The theoretical framework employed is this study is the Health Promotion Model (HPM) (Pender, Murdaugh, & Parsons, 2006). The initial version of the HPM was developed in 1982 to provide a framework for exploration of the complex biopsychosocial processes that motivate individuals to engage in behaviors directed toward the enhancement of health (Pender, Murdaugh, & Parsons, 2006). The foundation of the model was developed from constructs in the Social Cognitive Theory (Bandura, 1985) and Expectancy-Value Theory (Feather, 1982).

The HPM resembles the Health Belief Model (Rosenstock, 1966). The major difference between the Health Belief Model (HBM) and HPM is the HPM is a competence-oriented model unlike the HBM which is an avoidance-oriented model. The HPM does not include the constructs of fear or threat as a source of motivation. Although fear and threat can motivate people to act in the immediate future, people may not be motivated to act if that fear or threat is in the distant future. Pender, Murdaugh, and Parsons (2002, p. 61) state “The HPM is applicable to any health behavior in which threat is not proposed as a major source of motivation for the behavior”. Using the HPM in research with college students has an apparent strength as studies have shown college students believe they are not susceptible to illness (Pender, Murdaugh, & Parsons, 2006).

The original HPM had seven cognitive-perceptual factors and five modifying factors to explain and predict a person’s health behaviors. The cognitive-perceptual
factors of the model included the importance of health, perceived control of health, definition of health, perceived health status, perceived self-efficacy, perceived benefits, and perceived barriers. The modifying factors in the model were demographic and biologic characteristics, interpersonal influences, situational influences, and behavioral factors (Pender et al., 2006).

After numerous studies were conducted on the cognitive-perceptual factors and modifying factors in the original HPM, the variables supported by research were retained and a revised version of the HPM was developed in 1996 (see Figure 2.1). The revised HPM was reconfigured and numerous variables were removed and three new variables were added. The importance of health, perceived control of health, definition of health and perceived health status factors were removed from the revised HPM. The new variables added to the revised model were activity related affect, commitment to a plan of action, and immediate competing demands and preferences. In addition, the cognitive-perceptual factors and modifying factors were changed to the factors of individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes. Each of the three factors is comprised of numerous variables, including the three added variables, and will be discussed in detail.

The first factor in Pender’s revised HPM is individual characteristics and experiences, which includes prior related behavior and personal factors such as biological, psychological, and sociocultural. Prior related behaviors have a direct and indirect effect on engaging in health-promoting behaviors. The direct effect can be observed through habit formation, which allows individuals to engage in health-promoting behaviors automatically. The indirect effect of prior related behavior is
similar to the SCT in that it influences behavior through perceptions of self-efficacy, benefits, barriers, and activity-related affect. Personal factors include biological factors such as age, strength, and body mass index. Psychological factors are included as personal factors and consist of self-esteem, self-motivation, and perceived health status. Lastly, personal factors include sociocultural factors comprised of peoples’ race, ethnicity, education, and socioeconomic status. Personal factors should be limited to relevant theoretical constructs to explain or predict a person’s given target behavior.

The second factor in Pender’s revised HPM is behavior-specific cognitions and affect. Behavioral-specific cognitions and affect are factors that can be modified and have major motivational significance. Measuring changes in these variables are critical to determine if changes to the intervention influenced changes in peoples’ commitment or in the occurrence of their health-promoting behaviors.

There are several behavioral specific cognition and affect factors. The first factor is peoples’ perceived benefits of action. Perceived benefits of action are proposed to directly and indirectly motivate their behavior through determining the extent of commitment to a plan of action to engage in behaviors from which the anticipated benefits will result. Anticipated benefits are referred to as mental representations people have of positive or reinforcing consequences of a behavior. Individuals are more likely to invest their time and resources in activities that have a high likelihood of producing positive outcomes. This can be accomplished with intrinsic and extrinsic benefits. The next factor is perceived barriers to action. Perceived barriers to action may consist of perceptions people have concerning the unavailability, inconvenience, expense, difficulty, or time-consuming nature of a particular action. Perceived barriers can be real
or imagined and have been found to have significant influence on peoples’ intention to engage in a behavior and to execute the behavior. Perceived self-efficacy is a factor referring to peoples’ judgment of personal competence to organize and carry out a particular course of action. Research has demonstrated the perception of skill or competence in a domain motivates individuals to engage in behaviors in which they excel. Perceived self-efficacy is based on four types of information: 1) performance attainments from engaging in the behavior and evaluating feedback from others or self-standard; 2) vicarious experiences of observing others and their self-evaluation and feedback; 3) verbal persuasion from others regarding if people possess the ability to carry out a particular action or behavior; and 4) physiological states from which individuals judge competencies on a particular activity or behavior (Bandura, 1977). In the HPM, self-efficacy is proposed to influence activity-related affect. Self-efficacy motivates health-promoting behavior through efficacy expectations and by influencing perceived barriers, level of commitment, and persistence in pursuing a plan of action.

Another behavioral specific cognition and affect factor is activity-related affect. Activity-related affect refers to the subjective feeling states that occur prior to, during, and after the activity. This factor consists of three components: emotional arousal to the act itself, self-acting, and the environment in which the action takes place. Activity-related affect on a given action can be positive or negative or both. The resulting feeling state will likely affect whether an individual will repeat the activity or behavior again.

The next two behavioral specific cognition and affect factors are interpersonal influences and situational influences. Interpersonal influences are cognitions concerning the behaviors, beliefs, or attitudes of others. The influences may not correspond with
reality. The primary sources of interpersonal influences on health-promoting behaviors are family, peers, and health care providers. Norms, social supports, and modeling are interpersonal influences that affect the individual’s propensity to engage in health-promoting behaviors. In the HPM, interpersonal interaction influences health-promoting behaviors through social pressures or encouragement to commit to a plan of action. For these influences to be significant the individual must place value on the behaviors, wishes and inputs of others; comprehend them; and assimilate them into cognitive representations. Situational influences are personal perceptions and cognitions that facilitate or impede behavior. Situational influences on health-promoting behaviors include person’s perceptions of the options available, demand characteristics, and visual features of the environment in which a given behavior is taking place. These three factors directly and indirectly influence health behavior in the HPM.

The third factor in Pender’s revised HPM is behavioral outcomes, which consists of commitment to a plan of action and immediate competing demands and preferences. A person’s commitment to a plan of action is needed for him/her to initiate a behavior experience. Individuals will commit to action unless a competing demand cannot be avoided or competing preference that cannot be resisted occurs. In the HPM, a person’s commitment to a plan of action is a cognitive process consisting of a commitment to carry out a certain action at a given time and place, regardless of competing demands and the identification of strategies for obtaining, carrying out, and reinforcing the behavior. Immediate competing demands and preferences refer to alternative behaviors that present themselves immediately prior to the person’s initiating the planned health-promoting behavior. Competing demands are usually out of the individual’s control (e.g. work,
family) and can have a profound effect on engaging in health-promoting behaviors.

Competing preferences are alternative behaviors (e.g. choosing high-fat foods over lower fat options) in which the individual has a high level of control.

Pender et al. (2002, p. 63) provided the following theoretical propositions derived from the HPM:

“1. Prior behavior and inherited and acquired characteristics influence beliefs, affect, and enactment of health-promoting behavior.

2. Persons commit to engaging in behaviors from which they anticipate deriving personally valued benefits.

3. Perceived barriers can constrain commitment to action, a mediator of behavior as well as actual behavior.

4. Perceived competence or self-efficacy to execute a given behavior increases the likelihood of commitment to action and actual performance of the behavior.

5. Greater perceived self-efficacy results in fewer perceived barriers to a specific health behavior.

6. Positive affect toward a behavior results in greater perceived self-efficacy, which can in turn, result in increased positive affect.

7. When positive emotions or affect are associated with a behavior, the probability of commitment and action is increased.

8. Persons are more likely to commit to and engage in health-promoting behaviors when significant others model the behavior, expect the behavior to occur, and provide assistance and support to enable the behavior.
9. Families, peers, and health care providers are important sources of interpersonal influence that can increase or decrease commitment to and engagement in health-promoting behavior.

10. Situational influences in the external environment can increase or decrease commitment to or participation in health-promoting behavior.

11. The greater the commitment to a specific plan of action, the more likely health-promoting behaviors are to be maintained over time.

12. Commitment to a plan of action is less likely to result in the desired behavior when competing demands over which persons have little control require immediate attention.

13. Commitment to a plan of action is less likely to result in the desired behavior when other actions are more attractive and thus preferred over the target behavior.

14. Persons can modify cognitions, affect, and the interpersonal and physical environment to create incentives for health actions.”

Health-promoting behaviors are the end point of the HPM and are ultimately directed toward a person attaining positive health outcomes. Individuals integrating health-promoting behaviors into a healthy lifestyle that filters into all aspects of living will experience improved health, enhanced functioning, and better quality of life in all stages of development (Pender et al., 2006).

The majority of the research using the HPM has been based on four health-promoting behaviors: physical activity, nutrition, stress management, and social support (Pender, Murdaugh, & Parsons, 2006). The four behaviors, as well as spirituality and health responsibility, will be addressed. These behaviors are of particular interest as they
are measured in the Health-promoting Lifestyle Profile II (HPLP II). The HPLP II was developed based on the HPM to measure the frequency of health-promoting behaviors. The HPLP II was used in the study and is discussed in the instruments section of chapter three.

**Figure 2.1.** Pender’s Health Promotion Model

*Figure X.* Adapted from Health Promotion in Nursing Practice (p. 50) by N. J. Pender, C. L. Murdaugh and M. A. Parsons, 2006 New Jersey: Pearson Prentice Hall. Copyright 2006 by Pearson Education, Inc. Reprinted with permission (see Appendix H).
Determinates of Health-Promoting Lifestyle

Historically, risky health behaviors have been the focus of the majority of research (Larouche, 1998). Even a more recent review of the literature demonstrates modest research involving health-promoting behaviors. Health-promoting behaviors are closely associated with the six dimensions of wellness developed by Hettler in 1976. Hettler (1984, p. 117) referred to wellness “as an active process through which individuals become aware of and make choices toward a more successful existence”. The very definition of wellness goes beyond the prevention of disease and health-protection behaviors. Wellness is a combination of positive lifestyle behaviors that lead to optimal health. In the original wellness model presented by Hettler, there were six wellness components: spiritual, social, occupational, physical, intellectual, and emotional.

A health-promoting lifestyle is defined as “a multidimensional pattern of self-initiated actions and perceptions that serve or enhance the level of wellness, self-actualization, and fulfillment of the individual” (Walker, Sechrist, & Pender, 1987, p. 77). This definition aligns closely with wellness, and researchers sometimes, although incorrectly, use the terms interchangeably. The health-promoting behaviors presented by Walker, Sechrist, and Pender (1996) were physical activity, nutrition, interpersonal relations, spiritual growth, stress management and health responsibility. Again, these behaviors are similar to Hettler’s wellness model and are predicted to lead to a health-promoting lifestyle and better quality of life (Walker, Sechrist, & Pender, 1996).

The determinants of health-promoting lifestyles are personal influences, those specific to the individual, and contextual influences, those in the individual’s environment. These personal and contextual influences work in tandem with health-promoting behaviors to provide a health-promoting lifestyle and quality-adjusted life
years. However, the foremost concern is that these behaviors are not a priority by administrators and health educators on college campuses (Gieck & Olsen, 2007). Since risky health behaviors such as binge drinking, low condom use, and drug use have an immediate impact on college students, prevention strategies have been moved to the forefront by campus health professionals.

While messages, programs, and interventions on risky health behaviors are imperative to college students, health educators must not forget about health-promoting behaviors. Larouche (1998) declared little is known about the health-promoting lifestyles of college students. Health-promoting behaviors have an impact on short- and long-term health. Physical activity has the short-term impact of better sleep, increased short-term memory, and reducing or maintaining weight (CDC, 2009d). The long-term impact of physical activity is reduced morbidity, increased functioning, and more quality-adjusted life years (CDC, 2009d). Nutrition offers similar short and long-term opportunities. Yet, the NCHA results have established over the last decade that students are severely deficient in these health-promoting behaviors (ACHA, 2005; ACHA, 2009).

A study conducted by Oleckno and Blacconiere (1990) was concerned with determining the wellness level of college students. The study sample had 1077 students, and used the original Health Promoting Lifestyle Profile (HPLP) to assess wellness level. The results revealed an average level of wellness, with females scoring higher in every health-promoting dimension than males: exercise, stress management, interpersonal support, spirituality, health responsibility, and nutrition. The students scored lowest on the dimension of health responsibility. Nutrition and exercise were both below average for the sample. The researchers concluded there was significant room for improvement.
and college students could benefit from a greater emphasis on health promotion programming.

Larouche (1998) studied determinants of college students’ health-promoting lifestyle. The participants were 151 students with a mean age of 21. The sample was 54% male and 66% Caucasian. The Health Promoting Lifestyle Profile II was used to measure health-promoting behaviors and health-promoting lifestyle. The highest health-promoting behavior scores were spiritual growth and interpersonal relationships while the lowest scores were stress management and health responsibility. An ANOVA showed perceived health status and sex were predictive of health-promoting lifestyle. The overall health promoting lifestyle score was 2.58, which was slightly above the mean of 2.5. This result was consistent with the Oleckno and Blacconiere (1990) study that had an overall health promoting lifestyle score of 2.57. As with the aforementioned study, women scored higher on the health-promoting behaviors than men. Larouche stated it was necessary to provide programs and interventions to improve students stress management behaviors. Also, health professionals should target health-responsibility, nutrition, and interpersonal relationships in the male population. The study validates the need for interventions on various directed health-promoting behaviors in the college population.

Health-promoting behaviors are essential to address on college campuses, and they provide health professionals the opportunity to conduct health promotion programs. The American College Health Association (ACHA, 2009) states “health promotion serves the core mission of higher education by supporting students and creating healthy learning environments.” Health education is imperative during this time of maturation to
emphasize and encourage health-promoting skills that will affect students the remainder of their lives.

**Physical Activity and College Students**

The benefits of physical activity and exercise have been supported by research for decades (American Heart Association [AHA], 2010; CDC, 2010a). However, there is a national trend toward reductions in physical activity as we age. The greatest rate of decline in physical activity occurs between 18 and 24 years of age (USDHHS, 2000). This has become such a national concern that the Office of the Surgeon General wrote a report in 1996 regarding *Physical Activity and Health* in an attempt to stimulate the U.S. into action. Today, research has demonstrated physical activity helps maintain weight, reduce high blood pressure, reduce arthritis pain, reduce the risk of type 2 diabetes, reduce the risk of certain cancers (e.g. colon cancer), reduce the risk of heart attacks, strokes and osteoporosis, reduce the symptoms of depression and anxiety and improve mood state (CDC, 2009). Even with these significant benefits, the ACHA-NCHA (2008) revealed only 44.5% of college students participated in vigorous exercise for at least 20 minutes or moderate exercise for at least 30 minutes on at least three of the past seven days. With evidence indicating regular physical activity patterns established during childhood and adolescence have a positive influence on the quality of one’s life in later years; it is imperative the collegiate years be used to create healthier lifestyles (Herman, Hopman, & Craig, 2010; Parker, Martin, Martinez, Marsh, & Jackson, 2010).

Physical activity as a health-promoting behavior is undeniable. Research on physical activity and its benefits provides convincing reasons to adopt and maintain active lifestyles. With nearly 55% of college men and women not meeting the guidelines
for physical activity and nearly 70% of adults inactive, the sedentary lifestyles that begin in mid- to late adolescence are a disturbing trend (CDC, 2009d; Neumark-Stzainer, Hannan, Sirard, & Story 2006).

A study conducted by Buckworth and Nigg (2004) examining the relationship between physical activity, exercise, and sedentary behavior in a sample of college students. Buckworth and Nigg found students engaged in 30 hours a week of sedentary behaviors. Significant differences were reported between men and women on sedentary activities with men reporting more hours spent watching television and videos and using the computer. Regarding age, older students spent more time using the computer. The researchers also found 30.6% of students reported engagement in moderate activity \( \leq 5 \) of the previous 7 days and 53.2% of students reported engagement in vigorous activity \( \leq 3 \) of the previous 7 days. They concluded, although still low, the percentages were higher than reported in the NCHA and NCHRBS surveys because students who had elected to register for a conditioning course were more likely to be active previously. Men reported significantly higher levels of exercise compared with women. Buckworth and Nigg (2004) concluded college health educators should target sedentary activities by designing interventions that make physical activity and exercise more accessible and rewarding. Increasing the accessibility and adding reinforcement can have immediate and long-term health benefits for college students.

In another study, Nelson et al. (2006) assessed the longitudinal trends in physical activity and sedentary behavior during adolescence. The research was conducted over five years with 1710 participants. Results demonstrated during this five year period that a substantial decrease occurred in moderated- to vigorous physical activity (MVPA) and
an increase in leisure time computer use. During the transition from mid- to late
adolescence females showed the most significant increase in computer use. Males had
the greatest decline in MVPA from mid- to late adolescence. Overall, the findings
indicate a substantial decrease in MVPA in adolescents making the transition into
adulthood. The researchers suggest using the trend in more leisure time computer use to
the benefit of health promotion and education. Health professionals can use computer
generated positive health messages, and opportunities in online health education
programs to help motivate and build self-efficacy. Offering these options could be the
start to possibly changing a student from the precontemplation stage to contemplation
stage for physical activity participation (Nelson et al., 2006).

With the structure provided by high school and living at home, coupled with the
reduction in physical activity as a person ages, it is important to address the transition
from high school to college. Bray and Born (2004) investigated the changes in vigorous
physical activity during the transition from high school to college. The study’s major
purpose was to assess the difference in vigorous physical activity during transition, and
the secondary purpose was to determine the association between psychological well-
being and vigorous physical activity during the conversion. The researchers also
controlled for extraneous variables such as transfer students and students living at home.
All participants lived on campus and had graduated from high school the same year as
attending college.

Results of the study revealed a significant decrease in vigorous physical activity
during the transition from high school (66.2% active) to college (44.1% active), p < .001.
The results are similar to the ACHA-NCHA (2008) survey with 44.5% of students met
the recommendations for physical activity. The college students who were active reported lower levels of tension and fatigue and higher levels of vigor. Overall, active students had more positive mood states.

The results have significance for health educators. Understanding incoming students will have reductions in physical activity provides incentives to focus interventions on physical activity and exercise. As mentioned in the introduction, the mid-sized university where the study was conducted offers few health-promoting programs, and there were none focusing on physical activity or exercise.

Huang et al. (2003) conducted a study investigating overweight, obesity, diet and physical activity in college students. The results of the study in regard to physical activity revealed students engaged in aerobic activity an average of 2.8 days in the previous seven days. Male students were more likely to participate in aerobic activity, and more days per week. Students aged \( \leq 19 \) were more likely to participate in aerobic activity than students aged \( \geq 20 \) years (p < .01). Students reported engaging in strength training an average of 2.2 days in the last seven days. Again, students aged \( \leq 19 \) were more likely to participate in strength training than students aged \( \geq 20 \) years (p < .02). Students reported participation in a physical education class on average of .9 days the last seven days. Overall, 16.1% of students reported no physical activity in the previous seven days (Huang et al., 2003).

These results continue to show a decline in physical activity and exercise during the collegiate years. The researchers express the need for interventions on physical activity focusing on students aged \( \geq 20 \). The results further the need for health education programs and workshops focusing on increased opportunities for participation in physical activity.
activity. Health educators need to assess possible barriers for participation and use positive messages about perceived benefits.

Studies addressing cognitive variables, such as self-efficacy, have been successful in identifying factors that influence participation in health behaviors (Nickel & Spink, 2010; Maglione & Hayman, 2009; Sniehotta, Scholz, & Schwarzer, 2005; Butler, Black, Blue, & Gretebeck, 2004). Perceived benefits and perceived barriers are among the cognitive variables in the literature that have been linked to activity levels. A study conducted by Brown (2005) with a college sample assessed the cognitive variables of perceived benefits and perceived barriers for physical activity. The instrument used to assess the perceived benefits and perceived barriers was the Exercise Benefits/Barriers Scale (EBBS).

There was not a significant difference between men and women for perceived benefits or barriers on physical activity. The relationships between benefits and barriers were negatively correlated with one another. The results illustrate a significant difference between sex, with males expending more kilocalories per body weight. The study revealed a significant relationship between physical activity and perceived benefits ($r = .20$), but not with perceived barriers ($r = -.11$). The findings are interesting because it is one of few studies that used a standardized instrument for perceived benefits and perceived barriers. This may have led to the surprising conclusion that perceived barriers are not related to physical activity. However, the results do point to a trend in the literature which focuses on positive health-promoting programs and messages to motivate students.
Since there is ample research showing the decline in the physical activity of college students, it is critical to understand how campus health educators can change these behaviors (Racette et al., 2005; Nelson et al., 2006; CDC, 2009f). Research conducted by Ince (2008) used a physical activity intervention based on the Social Cognitive Theory to determine the effect on the health-promoting behaviors of college students. A pretest and posttest experimental design without a control group was used with 62 undergraduate students. The mean age of the participants was 22.2 years. The structure of the 12-week intervention included a proposed set of determinants on health promotion and disease prevention with the learning environment of physical activity. Sample activities included self-regulatory skills such as goal setting; increasing social support such as participating in physical activity with friends; and experiencing enjoyment of physical activity such as participating in positive, fun activities. Each week, two hours were spent discussing personal experiences and two hours were spent in the gymnasium. The first six weeks featured instruction on the health related fitness components and the second six weeks included both discussion and practice of the methods by which each fitness component can be improved. A week before and a week after the intervention the students completed the Adolescent Health Promotion Scale, based on the HPLP II, and the International Physical Activity Questionnaire.

The results showed a significant increase in health responsibility, stress management, social support, exercise behavior, and overall health promotion after the intervention. In addition, the intervention significantly increased the subjects’ moderate physical activity (p < .01), vigorous physical activity (p < .001), and total physical activity levels (p < .001) posttest than at baseline. The results are significant for
university health education. Changing the health behaviors of college students is the primary goal, and Ince’s study illustrates interventions based on cognitive variables can be an effective tool for altering behavior. The focus on health-promoting behaviors demonstrates students are receptive to changing these behaviors.

As revealed in the previously cited studies on exercise and physical activity, it is apparent these behaviors are important health-promoting behaviors to address with college students. The research indicates a significant decrease in physical activity as student’s transition from high school to college. Physical activity continues to decline throughout students’ college career. However, positive interventions, programs, and workshops based on cognitive variables have been successful in modifying physical activity and exercise behavior. Researchers concluded continued study in this area is necessary to build more effective strategies for health promotion and education. With the emphasis on cognitive variables, such as personality type, programs and interventions could be more efficient and successful. With over 1.7 million deaths attributed to physical inactivity it is crucial to determine more effective strategies for promoting physical activity (WHO, 2004).

**Nutrition, Weight and College Students**

Nutrition has a profound impact on the short- and long-term health of college students (Adams & Colner, 2008; Racette et al., 2005; U.S. Department of Education, 2009). However, NCHA (2008) found only 8.5% of college students reported consuming five or more fruits and vegetables a day. Additionally, the Behavioral Risk Factor Surveillance System (BRFSS) survey (2007) data shows 81.6% of adult Kentuckians do not meet the USDA guidelines of five fruits and vegetables per day. Research
demonstrates college is a time of increased saturated fat intake and weight gain (Kasparek, Corwin, Valois, Sargent, & Morris, 2008).

Adams and Colner (2008) conducted a study regarding the association of risk factors with fruits and vegetable intake among college students. The study was a retrospective study using data from items on the NCHA, which was completed by 40,209 college students. The majority of the subjects were Caucasian (77.2%), in their first year of college (29.5%), female (65%), and attending college full-time (96.8%). The mean age of the sample was 20.3 years of age. Results of the study revealed that full-time students ate more fruits and vegetables than part-time students. Students who lived on-campus resident halls ate more fruits and vegetables than students living off-campus or with parents. The study found a positive association between increased fruit and vegetable intake and vigorous or moderate physical activity, better perceived health, and more hours of sleep. Strength training was positively associated with fruit and vegetable intake among women. Greater fruit and vegetable intake was associated with a smaller amount of depression. In addition, a higher intake of fruits and vegetables was associated with better grades.

The researchers suggest health professionals consider the association between fruit and vegetable intake and relevant collegiate health behaviors when building programs and constructing messages. Combining fruit and vegetable intake with physical activity, sleep, and mental health programs may provide better results and add efficiency.

A study conducted by Kasparek et al. (2008) addressed behaviors influencing college weight gain. The participants included 193 freshmen between 17 and 19 years of age who completed an online survey the third week of fall classes and late spring the
same academic year. The results indicated 57% of respondents reported a weight gain, 23.8% reported weight loss, and 19.2% reported no weight gain. The total sample experienced a statistically significant increase in mean weight of 2.5 lbs. The individuals in the desirable category (BMI < 25) who gained weight had gained an average of 6.21 lbs. The mean weight gain for the individuals in the overweight categories (BMI ≥ 25) had a weight gain of 10.96 lbs. Overall, there was a significant decrease in fruit and vegetable consumption. The author surmised the decrease in fruit and vegetable intake was linked with the overall increase in weight of the sample. Students may be replacing the fruits and vegetables with higher fat foods. Kasparek et al. declared the need for further research on nutrition and its link to healthy weight for the college-aged population.

A similar study implemented by Racette et al. (2005) focused on weight changes and dietary patterns during the freshman and sophomore years of college. Results of the study showed a statistically significant inverse relationship between fruit and vegetable consumption and both high-fat fast food and fried food intake. There was a positive significant relationship between high-fat fast food and fried food. Women reported higher consumption of fatty foods. Body weight increased in 70% of the 290 students, and the 70% who gained weight averaged a 9 lb. increase. BMI increased in 69% of students in the follow-up assessment with more women increasing than men. Consumption of fruits, vegetables and high-fat fast food did not change and fried food consumption declined slightly. Overall, 30% of students met the dietary guidelines for fruits and vegetable consumption and over half the students had eaten three servings of high-fat fried or fast food the previous week. In addition, 55% of the students were in the
precontemplation stage for fruit and vegetable consumption during their freshmen year and at the end of their sophomore year.

The results of the Racette et al. (2005) study reveals college students appear to have unhealthy habits such as unhealthy eating patterns resulting in weight gain. These behaviors can have a lasting impact as students continue into adulthood. The researchers suggested further research into the behavioral patterns of students is needed to promote healthy eating on college campuses. The study also relates well with the Kasparek et al. (2008) study which reported an increase in weight gain during college and decrease in fruit and vegetable intake. The researcher could reasonably deduce the decrease in fruit and vegetable consumption is being replaced by high fat foods.

Dinger (1999) studied dietary intake among college students. A cluster stratified sampling design was used and stratified by sex and class division. The sample included 743 students, 50% of which were female, the majority were Caucasian, and 91% of which were between the ages of 18 and 22 years. The surveys were built using items from the National College Health Risk Behavior Survey (NCHRBS) for physical activity and dietary intake.

The results of the study reported the average number of combined fruit, juice and vegetable servings was 2.90 per day. This is well below the five a day promoted by the CDC and USDHHS, but comparable to the NCHA results (CDC, 2007; USDHHS, 2000; ACHA, 2009). The average number of high-fat food servings per day was 2.41. Males consumed more high-fat foods than females. Students who were members of the campus wellness center consumed more fruit, juice and vegetables. The average student did not meet the current physical activity guidelines or the dietary intake recommendations.
Dinger’s (1999) research suggests a relationship between physical activity and dietary intake. These results are similar to Adams and Colner (2008) who concluded physical activity messages and programs should add dietary components for improved results and efficiency. In addition, Dinger (1999) called for more research into the variables affecting fruit, juice and vegetable consumptions with high-fat intake in addition to sex.

The dietary intake of college students is a reason for concern. Research has demonstrated habits formed in late adolescence can proceed through adulthood if not altered (Wengreen & Moncur, 2009; Niemeier, Raynor, Lloyd-Richardson, Rogers, & Wing, 2006). Consistently, college students are not meeting the fruit and vegetable recommendations and eating high-fat foods. It is no coincidence students are gaining weight at an alarming rate. Racette et al. (2005) found students who gained weight increased by 9 lbs in one year. Levitsky, Halbmaier, and Mrdjenovic (2004) study reported the average weight gain of freshmen was 4.2 lbs. and when accounting for initial weight, consumption of junk foods, meal frequency and number of snacks accounted for 47% of the variance.

Worldwide, 2.7 million deaths can be attributed to low fruits and vegetable intake (WHO, 2004). The U.S. Surgeon General reported 300,000 deaths were attributed to being overweight with a direct and indirect cost of 117 billion in the year 2000 (USDHHS, 2009). With the increase in obesity, coupled with the dietary patterns of the U.S., health professionals could infer these statistics will have increased significantly when the CDC releases the new health data. Obesity is a nationwide epidemic and would appear college plays a role in exacerbating it (Niemeier et al., 2006; CDC 2008b; Adams
Research is imperative to study variables that may positively affect the development of messages, programs and interventions on nutrition. Furthermore, personality preferences and types may offer insight into why individuals choose unhealthy food options over healthy ones.

**Stress and Health**

Stress has been an area of concern for health educators and college students for decades (Burris, Brechting, Salsman, & Carlson, 2009; Economos, Hildebrandt, & Hyatt, 2008; Larouche, 1998). The transition from high school to college, increased academic demands, new social networks, and developing time management skills all produce stressors that can affect health (Hicks & Miller, 2007; Dusselier, Dunn, Yonyi, Sheeley, & Whalen, 2005; Friedman, Hawley, & Tucker, 2000). Ultimately, the prominence of stress during the college years has served as the catalyst for countless studies.

Understanding the stress of the nation is important to understanding the stress of incoming students. *Stress in America* (American Psychological Association [APA], 2010) reported numerous significant findings after completing a nationwide survey to examine the state of stress across America. The age of participants was 18 and up, which would included college students as well as parents and other family members. As with other health habits, stress and stress management techniques can be learned from parents, relatives, and peers. The APA report sheds light on an epidemic controlling the nation. Forty-five percent indicated their stress has increased over the last five years and 24% reported having experienced extreme levels of stress in the previous month. Additionally, 29% of obese adults reported extreme stress compared to 20% of normal weight adults.
The APA (2010) report in regards to health found 45% of respondents reported stress had a negative impact on their emotional well-being and physical health. Forty-five percent experienced psychological symptoms during the last month such as irritability or anger (45%), lack of energy (38%), feeling nervous (36%), and feeling depressed (34%). Forty-two percent experienced physical symptoms during the last month such as fatigue (41%), headaches (36%), upset stomach (26%), muscle tension (23%), and change in appetite (21%). Furthermore, 40% of adults lay awake at night and reported losing an average of 21 hours of sleep per month because of stress.

The APA (2007) report cited stress played a critical role in intensifying certain unhealthy behaviors. For instance, 66% of smokers reported smoking more when stressed. Seventeen percent of people who drank reported drinking too much the previous week to help manage stress. Forty-three percent of respondents overate or ate unhealthy foods and 36% skipped a meal because of stress during the last month. When asked what they ate on days they ate too much or ate unhealthy foods because of stress, 65% reported candy/chocolate, 56% reported ice cream, 53% reported potato chips, 49% reported cake/cookies, and 46% reported fast food. Only 14% reported overeating fruits and 8% reported overeating vegetables.

Findings from the APA (2010) report suggest stress affects sex differently. Women reported experiencing extreme stress more often, were more concerned about their levels of stress, and were more likely to report their stress levels had increased the last five years. In addition, women reported experiencing more physical symptoms of stress in the last month. Women were more likely to report sleep problems, overeat, skip meals and use prescriptions medication to manage stress.
Adults between the ages of 18 – 31 years experienced numerous negative consequences of stress. This age group reported unhealthy stress management behaviors, such as overeating/eating unhealthy (44%), skipping meals (42%), and losing sleep (52%). In addition, 48% cited personal health concerns as a cause of stress and 20% reported consuming alcohol to manage stress (APA, 2010).

The apparent theme of the APA’s reports is stress is a serious problem with Americans. Seventy-nine percent of adults stated stress is a way of life. The most unfortunate aspect is 82% of Americans believe they manage their stress well. Couple this statistic with the reported 69% who recognized mental health professionals could aid in their stress management and the menial 7% who actually sought professional support, and it becomes abundantly clear there is a significant problem (APA, 2007).

Research in the college setting has demonstrated the need for stress management programs and counseling. Ross, Niebling, and Heckert (1999) studied the sources of stress among college students. A convenience sample of 100 undergraduate students was utilized. The demographic breakdown was 80% female and 20% male. The Student Stress Survey (SSS) was used to determine sources of stress. The instrument consisted of 40 potential stressors that made up four scales: interpersonal, intrapersonal, academic, and environmental sources of stress. Examples of interpersonal stressors were interaction with other people, such as parents, friends or significant other. Intrapersonal stressors were internal sources, such as eating and sleeping habits. Academic stressors were school related activities, such as increased class workload. Environmental stressors were outside of academics, such as car problems, traffic, and living arrangements. Within each of these four categories were stressors identified as either daily hassles or major life
events. Examples of daily hassles were financial difficulties, unfamiliar situations and increased work load. Major life events were death of friend or family member, drug use, and severe injury.

Results of the Ross, Niebling, and Heckert (1999) study revealed 38% of the stressors were intrapersonal, 28% environmental, 19% interpersonal and 15% academic. Overall, 81.1% of stressors were classified as daily hassles. The most frequently reported stressors were sleeping habits (89%), change in eating habits (74%), new responsibilities (73%), increased class workload (73%), financial difficulties (71%), and change in social activities (71%). The least reported stressors were death of a friend (6%), severe injury (5%), engagement/marriage (2%), and divorce of parents (1%). The study was designed to determine student stressors so health promotion and education professionals could target the most prominent stressors and develop stress management programs. The results show the first and second leading stressors are intrapersonal. These findings would suggest college students cannot manage their stress as intrapersonal stressors are stressors under a person’s volitional control. Effective stress management programs focused on intrapersonal stressors would be beneficial to college students.

A study conducted by Hudd, et al. (2000) addressed stress at college, specifically the effect on health habits, health status, and self-esteem. The research focused on three questions: 1) Are students in certain demographic groups prone to higher levels of stress? 2) Is there a relationship between stress and other health behaviors? 3) Do stressed students posses lower self-esteem or perceive themselves as less healthy? The research by Hudd, et al. (2000) provided various results. Overall, 85.2% of students indicated they were either in excellent, very good, or good health. The students indicated high
levels of stress (52.1%) during the course of a “typical” semester. Females reported feeling stressed 27.5% more than males. One-third of the sample reported never eating breakfast. Students who did not exercise indicated higher levels of stress. The group with higher stress levels consumed more junk food, were less likely to exercise, and less likely to consume fruits and vegetables. The group with lower stress was more likely to classify themselves in excellent to very good health. Higher stressed students were significantly less satisfied with their weight and fitness level. The results demonstrate the effect stress can have on health and health related behaviors. Hudd, et al. (2000) discussed the need for stress management programs targeting certain health behaviors and the need to continue research to make the programs more effective.

Singh and Upadhyay (2008) completed a study regarding age and sex differences on academic stress. A total of 400 undergraduate students aged 18 to 22 years participated; with 200 male and female first year students and 200 male and female third year students. The results of the study demonstrate first year students have more academic stress than third year students for both men and women. Women scored significantly higher than men in stress both the first and three years. These results provide further evidence women have more stress than men. However, some research has suggested males are better at hiding stress or choosing to ignore it (APA, 2007). Additionally, first year students have higher stress. The obvious reason could be the change in environment and academic demands from high school to college. The research reveals health educators should focus attention on freshmen when developing stress management programs and interventions. The research also points to the need for specific programs targeting female students.
Although stress is a major side effect of college life, there are ways to reduce it other than specific stress management programs and interventions. Nguyen-Michel, Unger, Hamilton, and Spruijt-Metz (2006) conducted research with college students on the association between physical activity and perceived stress and hassles. The results of the study demonstrate a relationship between daily hassles and leisure physical activity. There was a relationship, although not significant ($p = .12$), between leisure physical activity and stress. The researchers believe this could have been because leisure physical activity may have less of an influence on stress than overall physical activity. There was an inverse relationship between both stress and hassles and age. The finding would suggest stress management be targeted toward younger students. The inverse relationship between age and stress is similar to Singh and Upadhyay (2008) research, which found first year students have higher stress than third year students. Nguyen-Michel et al. (2006) concluded the need for further research on the variance in perceived stress to reduce the distress in college students.

The aforementioned cited research demonstrates the significance of stress on college students and the need for ways to reduce it. Nguyen-Michel et al. (2006) indicated the need to develop more effective stress management programs. Katz, Davis, and Findlay (2002) conducted a need assessment ultimately revealing students want to receive information on stress management. Students reported the number one health impediment to academic performance was stress (ACHA, 2008). Stress can lead to deficits in learning through declines in short-term memory (Matthews & Campbell, 2010). Stress can trigger reductions in sleep, increases in smoking, unhealthy eating practices, and decreased satisfaction with interpersonal relationships (Trockel, Barnes, &
Egget, 2000; Economos, Hildebrandt, & Hyatt, 2008; Dusselier, Dunn, Yongyi, Shelley, & Whalen, 2005). Couple the affects of stress with the desire of students to receive stress management information, and the need for more effective strategies in stress reduction becomes apparent.

One idea to build more effective stress management programs or interventions would be to determine the relationship between personality preferences and types and stress. Given certain personality preferences and types are more susceptible to stressors than others, it seems reasonable personality would relate to perceived stress. Completing a study focusing on the relationship between personality preferences and types and stress management could provide unique information into development of stress reduction strategies.

**Social Support and Health**

Research has demonstrated the impact of psychosocial influences on health (Friedlander et al., 2007; Hale, Hannum, & Espelage, 2005; Mahon, Yarcheski, & Yarcheski 1998). Stress was discussed in the previous section, but the impact of social support is an equally important psychosocial influence. With students transitioning from high school to college, the need to create new social networks is necessary as well as stressful. Pender et al. (2006, p. 226) defined social support as “a network of interpersonal relationships that provide companionship, assistance, and emotional nourishment”. There are four broad categories of social support: emotional, instrumental, informational, and appraisal (Pender et al., 2006). Emotional support is the expression of caring, empathy, loyalty, and love. Instrumental support is best understood as tangible support or actions such as goods and services. Examples of instrumental support would
include meals, transportation to doctor’s appointments, and financial help. Informational support consists of advice and personal information or suggestions. An example of informational support would be advice about how to get involved with a peer group of particular interest to the individual. Appraisal support is the condition of affirmation or constructive feedback that is useful for self-evaluation. The social support available at any given time may vary depending on the nature of the situation.

There are several social support systems linked to health. The most prominent are natural support systems (families), peer support systems, organized religious support systems, and organized self-help support groups. College encourages these support systems through family networks (natural support system); peer health educators, student wellness organizations, multicultural centers (peer support systems); Baptist Student Unions, Catholic Centers, Campus Outreach (organized religious support systems); and weight management groups and student wellness groups (organized self-help support groups). The primary functions of these social support systems are to enhance the personal strengths of members and promote achievement of their life goals.

There are four ways to conceptualize the functions of support groups in promoting health. Social support groups can encourage health by 1) creating a growth-promoting environment that supports health-promoting behaviors; 2) decrease the likelihood of stressful life events; 3) provide feedback or confirmation that actions are leading to anticipated or socially desirable results; and 4) buffering events or mediating the negative effects of stressful event, thus decreasing the illness producing potential (Pender et al., 2006).
In college, peer support has consistently shown to have powerful stress buffering effects and health-promoting influences. Friedlander et al. (2007) conducted a study addressing social support, self-esteem, and stress as predictors of adjustment to college among first-year undergraduates. The main purpose was to examine the longitudinal relation among stress, specific and global self-esteem, and social support. There were 115 participants who were 81.7% female, with a mean age of 19 years.

The assessments were given in November of the student’s freshman year and again ten weeks later. The results of the study were noteworthy. Overall, social support was an important protective factor in assisting students in the transition to college. Students who perceived their social support had increased had improved adjustment. Interestingly, the change in social support from friends, as opposed to family, was a more consistent predictor of changes in adjustment. Although 97% of students in this study had spoken to family once a week, it was the perceived availability of a friend that was an important resource in successfully adjusting to college and reductions in stress. These results are important for counselors and health professionals because it demonstrates the importance of social support from the college community in the reduction of stress and in the adjustment of first year college students. Research has consistently shown student involvement aids in retention. Engaging students in health-promoting groups as a way to get them involved would help aid retention while increasing their short- and long-term health (Friedlander et al., 2007).

Social support is a multifaceted construct. There are various studies focusing on the constructs of social support and college students’ health. Hale, Hannum, and Espelage (2005) completed a study on several social support domains and their
relationship with student health. The support domains examined were tangible support (instrumental support), belonging (connection to a group of others), disclosure (availability of other to share intimate details), and social intimacy (closeness, caring). The dependent variables were health perceptions and physical symptoms. The main purpose of the study was to highlight the critical support facet or facets responsible for the connection to physical health in college students. The results of the study revealed women reported more physical symptoms than men. Belonging was the only support facet correlated to health perceptions. Higher belonging was correlated with higher health perceptions. Disclosure was correlated with health perceptions meaning that participants who reported higher levels of disclosure reported higher levels of health perceptions. Belonging was the only facet to correlate with physical symptoms. When regression analysis was used to predict health perceptions with tangible support, belonging, disclosure, and social intimacy simultaneously, the overall model was significant for women but not for men. Women reported greater levels of social intimacy. The most significant finding of the study was having a network of interpersonal relationships resulted in better health.

In an additional study addressing constructs of social support, Mahon, Yarcheski, and Yarcheski (1998) studied the effect of social support on positive health practices in young adults. The participants in the study were part of a convenience sample of mostly undergraduate juniors and seniors with a mean age of 24 years. Of the 70 young adults who participated, 60% were male, and 64% were Caucasian.

The study revealed a statistically significant relationship between perceived social support and positive health practices (r = .47, p < .001). Additionally, an inverse
A statistically significant relationship was found between perceived social support and loneliness ($r = -.65, p < .001$). Lastly, there was a statistically inverse correlation between positive health practices and loneliness ($r = -.54, p < .001$). The results indicated the importance of social support to positive health practices. Mahon et al. (1998) concluded it was critical to continue research on alternative factors that influence the development of social support and its relationship to positive health practices.

The research presented provides evidence of the relationship between social support and health. Although there has been an abundant amount of research, there is little known about the role personality plays in developing social support or its various components. The majority of the studies suggest new research is needed to encourage the development of social support because of its positive relationship to positive health outcomes. Furthermore, Pender et al. (2006) suggested further research is needed to better understand the pathway by which social supports affect mental and physical health that is critical to use in the design of programs to promote mental, social, and physical well-being. Studying personality may provide pertinent information to improve social constructs for health programming.

**Spirituality and Health**

Spirituality has received much attention in the last decade, especially researchers’ efforts to determine an operational definition of spirituality for research purposes. Even though an operational definition has not yet been identified, research has continued. Researchers do agree spirituality and religion are different constructs that overlap as the majority of “religious” people consider themselves to be spiritual (Kane & Jacobs, 2010).
In any case, spirituality appears to have a significant relationship with health and health outcomes.

Edmondson et al. (2005) investigated the roles of spirituality and religiosity in self-reported physical health in a female college population. The sample was 52 female students, predominantly Caucasian (78.8%) with a mean age of 21.24 years. The research is particularly interesting because it used the Spirituality Well-Being Scale, which measures both religiosity and spirituality. The results show a significant relationship with high spirituality and high religiosity scores correlated with low perceived stress and greater life satisfaction. A regression analysis showed spirituality predicted stress, medication use, and physical symptoms. The researchers concluded, based on results, spirituality plays a more prominent role in health and subjective well-being than religiosity in a young adult population. This supports the importance of studying spirituality in college students. According to Edmonson et al. religiosity may play a role in health behaviors, but it is of lesser significance in a college population.

The relationship among spirituality, health beliefs, and health behaviors in a college population was studied by Nagel and Sgoutas-Emch (2007). The researchers wanted to determine the effect of sex and ethnicity on spirituality, health beliefs, and health behaviors. The results demonstrate high spirituality scores were positively correlated to being more physically active and to frequent exercise. On the other hand, low spirituality scores were correlated with alcohol and caffeine use. The study did not discover a link between spirituality and smoking or illicit drug use, but stated there were low rates of both in the sample which may have contributed to this finding. One sex difference was noted; males were more likely to report fate influences their health.
Whereas females were more likely to report spirituality influences their health. No ethnic
differences in spirituality, health beliefs, and health behaviors were reported.

The findings from Nagel and Sgoutas-Emch are similar to other studies. Nelms,
Hutchins, Hutchins, and Pursley (2007) determined college students who scored higher
on the spirituality scale reported more positive current health status, p < .02. However,
Nelms et al. (2007) found individuals who had never used tobacco had a higher self-
reported level of spirituality than individuals who used tobacco. The same was reported
for alcohol consumption. Zullig, Ward, and Horn (2006) indicated students who
described themselves as spiritual were more likely to report greater self-reported
perceived health.

Edmondson et al. (2005) concluded the need for future studies to address the
positive health practices and spiritual development in college-aged students.
Determining the relationship between spirituality and personality would be interesting as
personality preferences and type could represent influential constructs in spiritual growth.
Finding such influential variables in spiritual development could have a tremendous
influence on improving health-promoting behaviors and reducing risk-taking behaviors.

**Alcohol Use and Health**

Each year in the U. S., the 3rd leading lifestyle-related cause of death is excessive
alcohol use, which results in approximately 79,000 deaths (Kanny, Liu, & Brewer, 2010).
Furthermore, binge drinking accounts for over 50% of the 79,000 alcohol related deaths.
Alcohol use during the collegiate years has and continues to be a public health concern.
Research has shown the 18- to 24-year age cohort is in an important development time
when key decisions are made regarding education, occupation, and social realms (Tapert,
Caldwell, & Burke, 2004). The National Institute on Alcohol Abuse and Alcoholism ([NIAAA] 2007) “What colleges need to know now” painted a bleak picture of the magnitude of college drinking and the problems associated. Hingson, Zha, and Weitzman (2005) reported drinking by college students aged 18 to 24 contributes to an estimated 1,825 student deaths, 599,000 injuries, and 97,000 cases of sexual assault or date rape each year. Couple the previous statistics with the knowledge binge drinking (five or more drinks for men and four or more drinks for women [Wechsler et al., 2002]) steadily increases through late adolescents, peaks at 21 years of age, and declines steadily into the late twenties and you have a significant problem at college and universities filled with 18 to 22 year old students (Maggs & Schulenberg, 2005).

The most recent National College Health Assessment (2009) revealed nearly 60% of students consumed alcohol within the last 30 days and over 25% consumed alcohol six or more days within the last 30 days. In addition, a greater percentage of 18 to 24 year old college students binge drink than their 18 to 24 year old counterparts (Hingson & Zha, 2009). A closer look at binge drinking concludes it is on the rise. The National Survey on Drug Use and Health conducted by SAMHSA (2009) revealed 18 to 24 year old college students who reported binge drinking during the last 30 days increased from 41.7 percent to 45.2 percent from 1999 to 2005. Chen, Dufour, and Yi (2002) found 20 percent of college students engaged in frequent episodic heavy consumption (binge drinking three or more times in the last two weeks). Consistently, males drink more heavily than females, and Caucasians drink more than other ethnicities (Weschler et al, 2002; Vaisman-Tzachor & Lai, 2008; Tremblay et al., 2010). These findings are troubling for many college and university health professionals and have spawned
numerous studies on effective interventions and policies (Mitchell, Toomey, & Erickson, 2005; Saltz, 2007; Saltz, Welker, Paschall, Feeney, & Fabiano, 2009).

Research continually demonstrates the harmful effects of alcohol use. The immediate effects of alcohol consumption are blackouts, alcohol poisoning, memory loss, and impairment of functional brain activity (Zeigler et al., 2005). Alcohol consumption plays a significant role in risky sexual behavior, such as unprotected sexual activity and unplanned sexual intercourse (Wechsler & Nelson, 2008; Cooper & Orcutt, 1997). Alcohol consumption has also been associated with academic failure, illicit drug use, and tobacco use (Eaton et al., 2004; Shiffman & Balabanis, 1996). The secondary effects of binge drinking create numerous harms to the people whom the alcohol users come into contact. Wechsler et al. (2002) found property damage, assaults, unwanted sexual advances, and sleep disturbances were among the most prevalent secondary effects from binge drinking. Powell et al. (2007) had similar findings and added unintentional injuries as a consequence of binge drinking. There is clear evidence alcohol consumption can have dire consequences to the user and the people around them.

The long-term effects of alcohol consumption have equally dire consequences. The negative behaviors that can begin in early adolescents can greatly impact the health of the individual as he/she ages. Consuming alcohol as an adolescent has been linked to higher dependence later in life (Powell et al., 2007). Long-term alcohol consumption has been associated with brain lesions, ventricular enlargement, and cerebellar degeneration (Zeigler et al., 2005). In addition, cancers of the oral cavity, larynx, pharynx and esophagus; liver cirrhosis; pancreatitis; and hemorrhagic stroke have been linked to heavy alcohol use (Powell et al., 2007). Overall, 31 percent of college students met
criteria for a diagnosis of alcohol abuse and six percent for a diagnosis of alcohol
dependence in the past 12 months (Knight et al., 2002). The effects of heavy alcohol use
and binge drinking provide a compelling case to build more effective and efficacious
alcohol interventions and workshops for the college population.

What motivates college students to drink more than their peers? Cooper (1994)
identified four key motives for alcohol consumption, which were drinking for coping
reasons, drinking for social reasons, drinking for enhancement reasons, and drinking for
conformity reasons. College can present significant increases in stress as students move
away from home, build new social networks, and adapt to more rigorous academic
workloads (Brissette, Carver, & Scheier, 2002). O’Conner and Colder (2005) studied
reasons for drinking based on Cooper’s four key motives and determined social reasons
for drinking are external motives based on positive reinforcement; drinking for mood
enhancement was an internal motive based on positive reinforcement; and drinking for
coping reasons are an internal motive based on negative reinforcement. Carey and
Correia (1997) established both positive and negative reinforcement motives were
correlated with problematic alcohol consumption. Given the previous information,
attending a college or university provides the environment to significantly influence
alcohol consumption over their peers.

LaBrie, Hummer, and Pedersen (2007) studied various motives for consuming
alcohol in college in an effort to find the motive that most significantly influences alcohol
consumption. The subjects were a convenience sample who was majority Caucasian and
majority freshman. The results of the study found social camaraderie was the most
endorsed reason for consuming alcohol. Social camaraderie as a social motivator was
associated with alcohol consumption levels more strongly than enhancement and coping motives. Furthermore, social motives were a significant predictor of alcohol-related consequences.

Vaisman-Tzachor and Lai (2008) studied the effects of college tenure, sex and alcohol drinking and alcoholism. The study was conducted with 168 subjects that were majority Caucasian. Sex and academic classification mirrored the overall college population. Results indicated the greater the social involvement the greater the alcohol consumption. Alcohol indicators (e.g. having reasons to drink, engaging in alcohol consumption, and exhibiting alcoholism tendencies) were predicted by social involvement. Being male was also a predictor of reasons to drink and consuming alcohol. Although the study did not find college tenure was predictive of alcohol consumption and alcohol indicators; the study did find college tenure was predictive of alcoholism tendencies (drinking during morning hours, drinking while alone, and suffering more hangovers). Ethnicity and socioeconomic status were not predictors of reasons to drink, consuming alcohol, or exhibiting alcoholism tendencies.

A study conducted by Smith and Berger (2010) addressed the motives and ways female college students consumed alcohol. The study was qualitative with ten female subjects who were Caucasian and ranged from 18 to 22 years of age. The results revealed women drank alcohol for mood management, social engagement, and to deal with their emotions. An alternative motive was to meet men. These results are consistent with the previous reported studies and demonstrate females drink for similar reasons as males. Labrie, Hummer, and Pedersen (2007) reported women consumed alcohol for social motives more than men. In addition, Smith and Berger (2010) revealed women
with high-risk alcohol consumption skipped more classes, got in more frequent arguments, were more emotional, had more regrettable sexual contacts, and had more frequent physical problems such as hangovers, blackouts, and vomiting. Wechsler et al. (2002) reported the gap between male and female binge drinking and heavy alcohol consumption is narrowing.

Alcohol consumption is clearly a significant area in need of improvement on college and university campuses with nearly 60% of college students consuming alcohol in the last 30 days, the gap between alcohol consumption of men and women narrowing, and an environment that encourages social involvement (NCHA, 2009; Wechsler et al., 2002; LaBrie, Hummer, & Pedersen, 2007). The U.S. Surgeon General established a Healthy People 2010 goal to reduce binge drinking by 50% by the year 2010 (USDHHS, 2000). Given the data showing binge drinking increased from 1999-2005 and remained steady from 2005-2009, the U.S. Surgeon General is far from achieving this goal (SAMHSA, 2009; NCHA, 2009). Although there are numerous interventions and programs that have proven to be effective, colleges and universities are not seeing changes in alcohol consumption patterns. This could be because focusing on interventions and programs does not change the overall culture of a college or university. Studies have demonstrated colleges and universities with stricter alcohol policies have lower rates of alcohol consumption (Saltz, Welker, Paschall, Feeney, & Fabiano, 2009). Policies are an effective idea, but additional resources are needed. A better understanding of the role of personality on alcohol consumption could possibly lead to effective changes in the culture of colleges and universities along with more effective interventions and programs.
**Tobacco Use and Health**

Tobacco use is the leading preventable cause of disease, disability, and death in the U.S. (CDC, 2010b). The USDHHS (2004) provides a very compelling argument for continued research into more effective tobacco programs and interventions with the copious amount of literature provided; approximately 650,000 publications and videos in 2009. For instance, cigarette smoking accounts for an estimated 443,000 deaths each year with an additional 8.6 million people having a serious illness caused by cigarette smoking. Tobacco use is such a public health epidemic that there are 21 national objectives in *Health People 2010* pertaining to tobacco use. The necessity for health professionals to focus on tobacco use and its correlates’ is evident.

The effects of cigarette smoking have disastrous consequences on people’s health. Cigarette smoking causes 90% of lung cancers in men, 80% of lung cancers in women, acute myeloid leukemia, bladder cancer, cancer of the cervix, cancer of the esophagus, kidney cancer, cancer of the larynx, cancer of the oral cavity, cancer of the pharynx, stomach cancer, cancer of the uterus, peripheral vascular disease, lung diseases (e.g. bronchitis, emphysema) and abdominal aortic aneurysm (CDC 2008c). Furthermore, smoking cigarettes is estimated to increase the risk of coronary heart disease by 2 to 4 times and stroke by 2 to 4 times (CDC, 2008c). Smoking has also been associated with infertility, stillbirth, and sudden infant death syndrome (USDHHS, 2001). The direct impact of cigarette smoking on health is unmistakable and yet 21.6% of adults continue to smoke (CDC, 2008c).

The indirect, or secondhand, effects of smoking pose serious health consequences. Secondhand smoke releases 250 toxic chemicals, including 50 that can cause cancer.
The USDHHS (2006) estimates 88 million nonsmokers were exposed to secondhand smoke in 2008, and the individuals exposed to secondhand smoke can increase their risk of lung cancer by 25-30% and heart disease by 25-30%. Secondhand smoke causes 3,400 lung cancer deaths and 46,000 heart disease deaths annually. Research has determined there is no safe level of exposure to secondhand smoke. If the negative health consequences were not enough, the economic burden of tobacco use is astounding. Nearly 96 billion per year in medical expenditures and another 97 billion per year in lost productivity are correlated to cigarette smoking (CDC, 2010b).

With research so clearly proving cigarette smoking damages the health of the smoker and the nonsmoker in close proximity, why do nearly one-sixth of the college and university students continue to smoke? Numerous findings suggest students do not feel they are at risk. A study conducted by Moran, Wechsler, and Riggoti (2004) addressed the impact of smoking among college students. The sample included 10,904 students enrolled at 119 colleges. The subjects were 64% female, 74% white, and 89% were within the 18 to 24 age range. The results of the study were revealing. Fifty-one percent of students who had smoked in the last 30 days classified themselves as social smokers (smokers who smoked more often with others than alone). Social smoking was inversely associated with frequency and intensity of tobacco consumption. Social smoking was significantly more common with smokers who spent more time socializing and were binge drinkers. Social smokers were also less likely to be nicotine dependent. Interestingly, social smokers did not want to change his/her smoking pattern and thus, were less likely to have made a quit attempt. Moran, Wechsler, and Riggoti concluded
students may believe they are not at risk of a smoking-related disease because social smokers do not see themselves as smokers.

In a similar study, Murphy-Hoefer, Alder, and Higbee (2004) assessed perception and risk of cigarette smoking in a college population. The sample included 1,020 students that were 60% female, 80.6% white and ranged between 18 to 24 years. Descriptive analysis from the study revealed 71% of the sample had tried smoking and 33% had smoked in the last 30 days. Nearly 75% of current smokers stated they wanted to quit, 69% stated they had tried to quit in the past 12 months, and remarkably only 7% thought he/she would be smoking five years from now. This is similar to Van Volkom’s (2008) research that found 70% of current smokers had tried to quit in the last 12 months. The more interesting finding from Murphy-Hoefer, Alder, and Higbee’s research was only 32% of smokers thought smoking on the weekend or a couple of days a week was harmful. These findings led the researchers to conclude smokers undervalue the health consequences associated with cigarette smoking and health professionals need to communicate that each cigarette is damaging to his/her health.

Even though the majority of smokers do not believe they are at risk, there are addition reasons why students continue to smoke. Van Volkolm (2008) studied attitudes toward cigarette smoking and found 52% of smokers cited smoking to reduce stress and 23% cited it was a pleasurable experience. Patterson et al. (2004) examined the smoking practices of college students. The results revealed students smoked to manage depression, reduce academic stress, and increase life satisfaction. In addition, males thought smoking made them more masculine and females felt smoking helped manage their weight. With the ideas that occasional smoking poses minimal risk, and there are
numerous benefits of smoking (e.g. weight control, stress management, managing depression), it is no wonder cigarette smoking is a health epidemic.

In the majority of the research presented the one constant was the concept of “social smoking”. Although there is not an operational definition of social smoking, the majority of research delineates social smoking as a situational event involving others. Recent research reveals social smokers represent the majority of college and university smokers. A study conducted by Waters et al. (2006) focused on the characteristics of social smoking. The results revealed 70% of college smokers viewed themselves as social smokers and nearly 50% of social smokers did not classify themselves as smokers. Higher social support was predictive of smoking among social smokers. Additionally, social smokers were only moderately motivated to quit. This finding could be the result of the nearly 50% who did not classify themselves as smokers and thus would not need to quit something they do not believe they are doing. As found with Moran, Wechsler, and Riggoti (2004), the majority of the subjects in the Waters et al. (2006) study did not believe they were at risk of harm from cigarette smoking. The social smokers smoked fewer days and smoked fewer cigarettes than other smokers. Social smokers believed they could quit smoking when and if they wanted. This is contrary to the finding by the USDHHS (1994), which stated between 33-50% of individuals who try smoking cigarettes become regular users. Furthermore, Wetter et al. (2004) concluded 50% of occasional college smokers were still smoking after four years.

Alcohol use is deemed one of the most influential cues for social smokers. Krukowski, Solomon, and Naud (2005) determined lighter smokers consumed a significantly greater proportion of cigarettes when drinking alcohol. Shiffman et al.
(2002) reported alcohol consumption was the strongest environmental correlate of cigarette smoking. Jackson, Colby, and Sher (2010) studied the daily patterns of smoking and drinking in college students. The sample consisted of 115 subjects who were 57% female and 96% Caucasian. Results revealed subjects reported greater amounts of smoking on drinking days and greater amounts of drinking on smoking days. On days the subjects drank, they smoked 85% of the cigarettes smoked that day while drinking. Social smokers exhibited stronger correlations between smoking and drinking than did heavy/regular smokers. The researchers concluded social context is an important factor that may account for a greater proportion of the association between the alcohol and smoking. A possible explanation for this association is lighter smokers are more influence by external social cues, in contrast to heavier smokers who may be influenced predominantly by internal cues (Krukowski, Solomon, and Naud, 2005).

Socializing is a part of the college lifestyle. College and university administrators have long understood the relationship between student retention and social networks (Dunphy, 1987). The more a student is “connected” the more likely the student will be retained. University administrators, especially student life professionals, work hard to create an environment filled with social events in an effort to connect students and aid in retention. These “events”, such as sorority and fraternity recruitment, could be encouraging social smoking and alcohol use. Moreover, social smokers do not see themselves as smokers, believe they are not susceptible to harm from smoking, and often drink while smoking. This combination of increased social offerings by colleges and universities along with students’ social smoking beliefs could lead to an increase in smoking. The CDC (2010b) has concluded there is no safe number of cigarettes an
individual can smoke and there is no safe exposure to secondhand smoke. The previously cited studies all stated the need for more effective interventions and programs. Fitzgerald et al. (2007, p.14) declared “university students are the single largest group of young adults who can be reached by anti-tobacco programs by a single class of institutions.” Identifying the possible predictive relationship between personality and tobacco use may provide an important element in developing more effective interventions and programs.

**Personality and Health**

Personality traits and types offer an important group of explanatory variables pertaining to health behaviors. The risky health behaviors of college students have provided health professionals with a tremendous amount of opportunities for behavior change. Interestingly, not all individuals are equally prone to participating in risky health behaviors. What is the deciding factor for individuals who ultimately choose to participate in negative health behaviors as opposed to positive behaviors? Research could determine if an individual’s personality preferences or types influences whether he/she engages in a particular health behavior.

Vollrath and Torgersen (2002) suggest personality is one of the major risk factors influencing an individual’s participation in risky health behaviors. Furthermore, health behaviors tend to manifest themselves within individuals, thus it is critical to examine the extent to which personality influences these negative health behaviors (Raynor & Levine, 2009)

Before discussing the research on personality and health behaviors it is important to recognize the following: the researcher was unable to find any published research
using the MBTI® and health-promoting behaviors; the majority of research has used personality trait instruments; the research that has used a personality type instrument has taken a personality trait instrument, determined a meaningful mid-point, and changed the personality trait instrument into a personality type instruments (e.g. Eysenck's three factor model, commonly referred to as the Big Three) (Eysenck & Eysenck, 1991); and the majority of the research uses the personality trait instrument named the Neuroticism-Extroversion-Openness Personality Inventory (NEO-PI, commonly referred to as the Big Five or Five-Factor Model) (Costa & McCrae, 1989).

If personality were a factor influencing certain behaviors, a question to consider would be does it change over time? Although trait and type theories propose personality is genetic or innate, there are researchers who believe while an individual is gaining maturity their personality changes. College attendance is viewed as a transitional time when students are especially susceptible to change and could promote the development of personality. A study completed by Robbins, Fraley, Roberts, and Trzesniewski (2001) concentrated on the collegiate years and personality change as measured by the NEO-PI. The NEO-PI is made up of five scales: Agreeableness (cooperation and friendliness), Openness (culture and intellect), Conscientiousness (need for achievement and dependability), Extraversion (positive emotionality), and Neuroticism (lack of emotional stability, anxiety, and negative emotionality). Two hundred, seventy students were administered the NEO-PI during their freshman year and again during their senior year. Their findings suggest personality traits are considerably consistent over time. Although college is a time of considerable identity construction, it does not seem to change the structure of personality traits. The findings are extremely important for developing
interventions, programs, and messages in the college population. If personality traits or types were developing during the collegiate years, it would be arbitrary to build these behavior change initiatives using personality as an effective strategy.

Copious research on risky health behaviors and personality traits in college students exists. The results have consistently shown a relationship between personality traits and various risky health behaviors. Raynor and Levine (2009) conducted a study focusing on associations between the NEO-PI and health behaviors among college students. The sample consisted of 583 students who were predominantly female (76%) and Caucasian (89%). The questions on health behaviors were taken from the ACHA-NCHA web survey and were on six topic areas: health, health education and safety; alcohol, tobacco and drugs; sex behavior and contraception; weight, nutrition, and exercise; mental and physical health; and impediments to academic performance.

The results of the Raynor and Levine (2009) study revealed numerous associations with risky health behaviors. High conscientiousness was linked to reduced alcohol use, \( p = .001 \); inverse association to binge drinking in the last two weeks, \( p = .001 \); and inverse association to cigarette use, \( p = .001 \). High extraversion was positively associated to cigarette use, \( p = .001 \); linked to alcohol use, \( p = .001 \); increased binge drinking, \( p = .001 \); decreased condom use, \( p = .001 \); and increased number of sexual partners, \( p = .001 \). High agreeableness was inversely associated to binge drinking in the last two weeks, \( p = .002 \); and with reduced alcohol behaviors, \( p = .005 \). Low agreeableness was linked to increased sexual partners, \( p = .001 \).

The Raynor and Levine (2009) study is one of the few to address health-promoting behaviors and personality traits. The results brought to light numerous
associations. High conscientiousness was related to increased moderate/vigorous exercise, \( p = .001 \); increased likelihood of getting enough sleep and feeling rested, \( p = .001 \); and increase consumption of fruits and vegetables per day, \( p = .001 \). High extraversion was positively associated with strengthening exercise, \( p = .004 \); the decreased likelihood of getting restful sleep, \( p = .001 \); and decreased harm reduction behaviors, \( p = .001 \). High openness was associated with increased consumption of fruits and vegetables per day, \( p = .001 \).

Malouff, Thorsteinsson, Rooke, and Schutte (2007) conducted a meta-analysis on alcohol involvement and the NEO-PI. The researchers collected information on 20 studies with 7,886 subjects. In regard to the characteristics of the study, eight studies assessed quantity of alcohol intake, seven studies assessed individuals in treatment for an alcohol disorder, four studies assessed alcohol related problems, and one study assessed whether a child ever drank alcohol. Malouff et al. (2007) reported the alcohol-related problems data rather than alcohol intake data as the researchers believed alcohol-related problems were more clinically important. After reviewing the studies there were several consistent findings. Alcohol involvement was significantly associated with low conscientiousness, low agreeableness, high extraversion, and high neuroticism. These findings mirror research on smoking and the NEO-PI (Malouff, Thorsteinsson, & Schutte, 2006). Low agreeableness did not predict future alcohol consumption but did correlate with current alcohol use. The researchers concluded alcohol treatment professionals should keep in mind these personality tendencies when providing treatment.

The studies by Raynor and Levine (2009) and Malouff et al. (2007) demonstrate the effect personality traits have on risky health behaviors and health-promoting
behaviors. The Raynor and Leving (2009) study replicates and extends previous research by adding a health-promoting behavior. Other studies have established the relationship between personality and health behaviors. For example, individuals with low conscientiousness are more likely to engage in tobacco, alcohol and drug consumption (Elkins, King, McGue, & Iacono, 2006; Terracciano & Costa, 2004; Walton and Roberts, 2004; Hong & Paunonen, 2009), and risky sexual behaviors (Schmitt, 2004). High extraversion is linked to alcohol and tobacco use (Hampson, Goldberg, Vogt, & Dubanoski, 2006; Luhtanen & Crocker, 2005; Vollrath & Torgersen, 2002). Low agreeable individuals are more likely to have negative health attitudes, engage in substance use, and risky sexual behaviors (Booth-Kewley & Vickers, 1994; Markey, Markey, & Tinsley, 2003; Miller et al., 2004; Hong & Paunonen, 2009). Personality traits play a significant role in risky health outcomes. The findings have been impressive, but there has been modest use of the results in the development of interventions, programs, and messages. One may conclude the result of using traits, instead of types, is less useful to health professionals and practitioners.

As discussed earlier, the NEO-PI has been the most researched personality trait instrument in the last decade. However, there is reason to believe the MBTI® may yield similar results when examining health behaviors. In a study conducted by McCrae and Costa (1989), the researchers discuss the popularity of the MBTI® in relation to the NEO personality inventory. McCrae and Costa developed the NEO inventory in 1983 and wanted to increase its use. However, the researchers agreed the MBTI® was substantially more popular because of its value to I/O psychologists and the individuals themselves. In order to help validate their instrument they compared the MBTI®
dichotomies to the NEO-PI traits. As a reminder, the NEO-PI measures five distinct traits: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. The results of the study concluded the NEO-PI Extraversion trait correlated to the MBTI® E-I dichotomy (p<.001), the NEO-PI Openness trait correlated to the MBTI® S-N dichotomy (p<.001), the NEO-PI Agreeableness trait correlated with the MBTI® T-F dichotomy (p<.001), and the NEO-PI Conscientiousness trait correlated with the MBTI® J-P dichotomy (p<.001). The NEO-PI Neuroticism trait was not correlated with any of the MBTI® preferences. The study concluded since the MBTI® and NEO-PI were similar, the NEO-PI was more comprehensive and valuable because it measured the added construct of neuroticism and personality traits (McCrae & Costa, 1989). The McCrae and Costa study was replicated by MacDonald, Anderson, Tsagarakis, and Halland (1994) and the researchers found similar significant correlations.

However, some researchers in the last decade have begun to recognize the importance of personality types. Torgersen (2000) used the NEO-PI to develop eight typologies using the Neuroticism, Extraversion, and Conscientiousness traits. The typology was constructed by using the means of the three scales and developing dichotomies. Torgersen believed typology represented a useful approach to addressing the question of how individuals with different combinations of traits experience and manage health behaviors.

Vollrath and Torgersen (2002) conducted a study to determine if relationships exist between health risks and the eight personality types of the NEO. The health risks were smoking, consumption of alcohol and drugs, and risky sexual behavior. A sample of 683 college students was utilized. The results demonstrated individuals with low
conscientiousness and high extraversion were more likely to engage in multiple risky health behaviors. Conversely, high conscientiousness and low extraversion abstained from risky health behaviors. Vollrath and Torgersen (2002, p. 195) concluded types constitute a “source of inspiration” for research and typology represents a useful approach to predicting risky health behaviors.

In a more recent study by Vollrath and Torgersen (2008), NEO personality types and risky health behaviors were examined. A sample of 606 university students participated in the study and the subjects had a mean age of 22.3 years. The study focused on smoking, risky alcohol consumption, drug consumption, and risky sexual behavior. The results illustrated high extraversion and low conscientiousness were associated with increased smoking, binge drinking, marijuana use, and unsafe sexual practices. The researchers contended future research should move from a variable-centered approach, focusing on traits, to a person-centered approach, focusing of types.

The movement toward personality type research has just recently gained momentum. However, the limited research available on the MBTI® and health topics was conducted decades ago. Thorne, Fyfe, and Carskadon (1987) attempted to find a relationship between coronary heart disease (CHD) and the MBTI® personality types using Form G. Ninety-three CHD patients who were 79% male with a mean age of 62 years filled out the MBTI® inventory. A control group of 801 males and 179 females was used. The results of the experiment revealed CHD patients were significantly more likely than the control group to prefer sensing, p < .001; and feeling, p < .05. This study demonstrates the MBTI® can be used to address health areas and provide useful results.
Goldman (1993) attempted to find a link between psychological type and drug choice. The study utilized 76 participants in a residential drug treatment programs. The sample consisted of 47 men and 29 women with drug use involving heroin, amphetamines, and cocaine. Using stepwise multiple linear regressions a significant relationship was found between ISFJ and heroin use, $p < .0001$. There was a relationship between sensing and feeling with drug use. The researcher suggested ideas, specifically communication techniques, incorporating behaviors exhibited by Introvert/Sensing/Feeling/Judging (ISFJ’s) in building programs for heroin users. The results of the Goldman study show support for the use of the MBTI® and risky health behavior. Furthermore, the study demonstrates the ability to use the results to build more effective interventions.

In a more recent study, O’Toole and Torabi (2001) investigated the relationship of personality type and tobacco use among college students. The sample included 1,029 college students, aged 18 to 24 years from eight pre-selected Georgia colleges and universities. The subjects of the study were 52% female and the majority of the subjects were Caucasian (82.9%). The Tobacco Use Inventory and the MBTI® Form G were used to collect data. The results displayed a relationship between the sensing preference and tobacco use. In regards to personality type, the study found there was an overrepresentation of INTP’s (introvert, intuiting, thinking, and perceiving) by smokers. In addition, the personality types of ISTJ’s (introvert, sensing, thinking, and judging) and ENTP’s (extravert, intuiting, thinking, and perceiving) were underrepresented by smokers. O’Toole and Torabi (2001) called for further research on the potential impact
of personality types and health behaviors and for future research to investigate the intervening variable of sex.

The review of the literature on the effect of personality on health behaviors is profound. Personality traits and types have demonstrated numerous correlations with health behaviors. Although the majority of research has focused on personality traits and risky health behaviors, research is beginning to see the benefits of using personality types with health-promoting and risky health behaviors. The current study would be, to the researcher’s best knowledge, the first to investigate the relationship between MBTI® types and preferences and the selected health-promoting and alcohol use behaviors.

**Summary**

Based upon the review of the literature, it is evident health-promoting behaviors provide considerable resources for the growth of health initiatives on college campuses. Although wellness and positive health initiatives have been available for many years, they have been overlooked on college campuses because of the immediate impact of risky health behaviors. Only in recent years has the focus of research shifted to health-promoting behaviors and lifestyles in the collegiate population. The learning environment of college provides an excellent opportunity to affect the health of students and teach life-long skills to decrease morbidity and increase quality-adjusted life years. Research has revealed students are more susceptible to positive health programs and messages, which make health-promoting behaviors of high importance.

The literature also revealed sex differences with both the selected health-promoting and selected risk-taking behaviors and personality. Male college students consistently reported higher levels of physical activity, binge drinking, and cigarette
smoking. Female college students consistently reported better nutritional habits, higher social support, and higher spiritual growth. However, female college students reported more stress, and more physical symptoms from stress. In regards to personality, the T-F preference type on the MBTI® shows a significant difference by sex. The review of the literature demonstrates sex may be an important intervening variable in the study.

Personality types offer an energizing approach to developing and implementing strategies in health promotion. Gieck and Olsen (2007, p. 29) stated “there has been limited use and discussion of how to build programs that promote a lifestyle approach to health behavior with existing theories of health promotion.” Using the HPLP II, designed from the HPM, with personality type theory could offer a unique perspective on developing health-promoting interventions, program, and messages.

The literature revealed personality traits and health behaviors have been studied for over 30 years, but little has been used to develop more effective health education interventions and programs from the studies even though they have revealed relationships between personality traits and risky health behaviors. The reasoning for this is unknown, but a simple explanation could be the difference between personality traits and personality types. The majority of researchers prefer using personality traits because they provide numeric values to assess variation, but practitioners prefer using personality types because they provide valuable information for the professional and the client. Given the non-use of past personality trait research, it is reasonable to believe results from research with personality preferences and types on health behaviors would be more useful to health professionals, practitioners, and the end users. This would allow the findings to be more easily integrated into health interventions, programs, and message.
The study will add to the literature because it is the first, to the researcher’s best knowledge, to focus on the relationship between personality type theory and health-promoting behaviors.
CHAPTER 3:
METHODOLOGY

Introduction

The chapter describes the specific methods and procedures implemented in the study, and includes research questions and hypotheses, design, sample selection, and procedures. In addition, there is a discussion of psychometric properties of the measures, methods of data collection, and analysis.

Study Design

The purpose of the study was to examine the relationship between MBTI® personality preferences and types and both selected health-promoting and selected risk-taking behaviors among residential college students. Three research questions and six hypotheses guided the study:

Research Questions

1. Can health-promoting behaviors measured by the Health-promoting Lifestyle Profile II be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality types and/or personality preferences as measured by the Myers-Briggs Type Indicator®?

2. Can cigarette smoking be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality type preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?

3. Can alcohol use behaviors be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality
type preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?

Hypotheses

1. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality preferences will have a significant predictive relationship with both the six health-promoting behaviors and aggregate health-promoting lifestyle.

2. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality types will have a significant predictive relationship with both the six health-promoting behaviors and aggregate health-promoting lifestyle.

3. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality preferences will have a significant predictive relationship with cigarette smoking.

4. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality types will have a significant predictive relationship with cigarette smoking.

5. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality preferences will have a significant predictive relationship with alcohol use behaviors.

6. Taken together, sex, age, ethnicity, academic classification, mean family income, parental social position, and MBTI® personality types will have a significant predictive relationship with alcohol use behaviors.
This research utilized the MBTI® and the HPLP II. The MBTI® used by industrial organizational psychologists, human resources, and career and mental health counselors for over 50 years determines personality type preferences. The HPLP II is used to assess health-promoting behaviors of college students. Originally known as the HPLP, the instrument was developed in 1987 to measure theorized dimensions of health-promoting lifestyle. The instrument was revised in 1996 at which time it was renamed the HPLP II. The instrument is based on the Health Promotion Model which was derived from the Social Cognitive Theory and Expectancy-Value Theory. The HPLP II has proven to be successful in measuring the selected health-promoting behaviors. The MBTI® and the HPLP II are both established, standardized survey instruments.

To measure cigarette smoking, two items were selected from the American College Health Association’s - National Collegiate Health Assessment (ACHA-NCHA, 2009). Those were “During the last 30 days, on how many days did you smoke?” and “During the last days, on the days you smoked, how many cigarettes did you smoke per day?”

To measure alcohol use, four items were selected from the Substance Abuse and Mental Health Services Administration’s (SAMHSA) National Drug and used to measure alcohol consumption were “During the last 30 days, how many times did you engage in the following: 1) Had at least one drink of alcohol?; 2) Had five or more drinks of alcohol during one sitting?; 3) Drank enough to get drunk—unsteady, dizzy, or sick to your stomach, or passed out or blacked out?; 4) Drank rapidly: shooting beer, funneling, 4+ shots an hour?” (SAMSHA, 2010, p. 49). Each of the items selected required the selection of a categorical answers ranging from 0 to all 30 days (see Appendix C).
Population and Sampling

Participants were recruited from the residence halls at a mid-sized university in the Southeastern part of the United States. Research has demonstrated this population is at a critical point for either adopting positive health behaviors or participating in risking health behaviors (Von Ah et al., 2004; Ottenritter, 2004). The collegiate environment provides a platform to change health behaviors that are detrimental to short- and long-term health (Brissette et al., 2002). In addition, college provides an ideal venue for research on health-promoting and risk-taking behaviors given the vulnerable nature of health in late adolescence and the educational opportunities to change these behaviors. The sample was only of resident hall students to facilitate data collection. In addition, those students have similar living arrangements and easy access to university services and facilities.

The housing demographics for Fall 2009 Semester are shown in Table 3.1. There are currently 4079 students living in the residence halls. The sample needed for statistical significance at the 95% confidence level with a population of 4500 is 354 participants (Zoomerang, 2010). The investigator attempted to obtain between 400 and 500 participants in the study. In order to accomplish this, 585 resident hall students were asked to voluntarily participate. There were no incentives for participation. The study utilized systematic random sampling because of its simplicity and the assurance the population would be evenly sampled. Administration of the research packets took place on every n’th floor subsequent to a randomly chosen starting floor. To begin the process of selecting the participating floors, each hall was listed alphabetically with the number of corresponding floors (e.g. Burnam 1, 2, 3, followed by Case 1, 2, 3 until all halls and floors were listed). Resident hall demographics are provided in Table 3.2. There were a
A random number generator was used to select the starting floor. Sixty-three was chosen to begin the sampling (Martin 1st floor) and every seventh floor after the starting floor was selected to attain the sample. Every seventh floor was chosen because it provided an appropriate sample size and allowed for residence halls that varied by sex to be alternately selected (i.e. resident halls that varied male, female, male, female, and so on). If an even number were chosen only male or female floors in a resident hall would have been chosen. Given fall ’09 residential numbers, the random selection would allow for a sample size of 670 resident students. Permission was granted by the Director of University Housing (see Appendix G) to gain access to the population. The time frame for survey administration was August 18th to August 23rd during the selected floors mandatory floor meeting.

**Table 3.1. University Housing Demographics**

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<th>Academic Classification</th>
<th>#</th>
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<th>#</th>
<th>Ethnicity</th>
<th>#</th>
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<td></td>
</tr>
<tr>
<td>Total Residents</td>
<td>4079</td>
<td></td>
<td></td>
<td>Other</td>
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</tr>
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</tbody>
</table>

Note. Created by the author.
Table 3.2. Resident Hall Demographics

<table>
<thead>
<tr>
<th>Residence Hall</th>
<th>Male/Female/ Coeducational</th>
<th># of Students</th>
<th># of Floors</th>
<th># of Resident Assistants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnam</td>
<td>Female</td>
<td>234</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Case</td>
<td>Coeducational</td>
<td>137</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
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<td>Coeducational</td>
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<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Combs</td>
<td>Coeducational</td>
<td>187</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Commonwealth</td>
<td>Coeducational</td>
<td>447</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Dupree</td>
<td>Male</td>
<td>254</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Keene</td>
<td>Coeducational</td>
<td>502</td>
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<td>14</td>
</tr>
<tr>
<td>Martin</td>
<td>Coeducational</td>
<td>367</td>
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<td>8</td>
</tr>
<tr>
<td>McGregor</td>
<td>Coeducational</td>
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<tr>
<td>Palmer</td>
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<td>Sullivan</td>
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<td>Telford</td>
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<tr>
<td>Todd</td>
<td>Female</td>
<td>262</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Walters</td>
<td>Coeducational</td>
<td>303</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

*Note.* Created by the author.

**Procedures**

Subjects were recruited through University Housing’s Department of Residential Life. Campus Recreation employees, hereafter referred to as survey administrators, were used to distribute the research packets. Survey administrators were recruited by the investigator to participate in an hour long training to distribute the standard research packets and to complete the limited CITI Human Subjects Protocol training. The survey administrators were given a research packet, and the investigator reviewed each form (instructions for distribution, participation letter, MBTI®, HPLP II, and demographic
questionnaire) in the packet. The survey administrators were asked to follow the instructions provided in the packet (see Appendix G). The investigator addressed potential questions from participants, and allowed the survey administrators to ask any questions about the study or implementation. After discussing the research packets, the survey administrators logged into the CITI website and completed the limited CITI Human Subjects Protocol.

The first week of the fall semester every residential student is required to attend a floor meeting. Resident assistants go over housing rules and regulations for the semester during these meetings. At the beginning of the floor meeting, residential students from the selected floors were asked to voluntarily participate in the study. A participation letter (see Appendix F) was distributed describing the study, confidentiality, and use of results. Those students who agreed to participate were given the MBTI®, HPLP II, and demographic questionnaire. Completion of the MBTI®, HPLP II, and demographic questionnaire were regarded as consent to participate. Upon completing the survey, the resident students placed the stapled packets back in the filing envelope provided to survey administrators. The survey administrators returned the filing envelopes to the investigator in his office after completion of survey administration. Each inventory was scored by the administrator to determine the four type preferences and the HPLP II mean scores. The filing envelopes were kept in a locked file cabinet in the investigators office until the data were put into the computer for analysis. After the data were entered, the instruments were shredded. There was no identifiable information on the instruments, and the probability of harm or discomfort anticipated in the research was not greater than
those encountered in daily life or during the performance of routine psychological examination.

Discussion of Instruments

Demographic Questionnaire

Based on the review of the literature, a demographic questionnaire (see Appendix C) was designed for the study to provide information on a student’s sex, academic year classification, age, ethnicity, parental education, and parental job status. The variables on the demographic questionnaire were used in the study. Parental education and parental job status were used to determine social position, which is described in detail in the data coding section. The demographic variables of age, sex, academic year classification, and ethnicity were used to describe how well the sample represented the residential population.

Myers-Briggs Type Inventory®

The MBTI® is the most popular personality instrument in the world with over two million administered each year in the United States and over one million administered around the world (Myers et al., 1998). The MBTI® was developed to operationalize Carl Jung’s Theory of Personality Type reviewed in chapter two. The instrument may be used for psychologically healthy individuals 14 years of age and older with a seventh grade reading ability. The first form (Form C) of the instrument was published in 1956, has been revised 11 times, and features alternate methods of administering and scoring.

For the purpose of this study, the most current paper MBTI® Form M, developed in 1998, was used to determine personality type preferences. Form M consists of 93 self-report items divided into three parts. Part I contains 26 word phrases in which the subject
was asked to select an answer from two forced choice response options. An example word phrase was “Do you tend to spend a lot of time (A) by yourself or (B) with others?” Part II contains 47 pairs of words. An example of word pairs was “(A) reserved or (B) talkative”. Part III includes 20 word phrases. An example of a word phrase item was “At parties do you (A) do much of the talking or (B) let others do most of the talking”.

The aim of the MBTI® was to make the insights of personality type theory accessible to individuals and groups. The MBTI® was designed to accurately identify which of the two opposite constructs were preferred on each of the four dichotomies. The items on the instrument require forced choice between each pole of the dichotomy. The key assumptions in the construction of the MBTI® were 1) true preferences actually exist, 2) type is innate and preferences are developed, 3) the instrument indicates preference, not skills, 4) individuals can give an indication or their preferences on a self-report instrument, 5) preferences are dichotomized, and 6) the two poles of the preference are equally valuable (Myers et al., 1998). The four dichotomous preferences were introversion (I) or extraversion (E), sensing (S) or intuition (N), thinking (T) or feeling (F), and judging (J) or perceiving (P). The combination of the four dichotomous preferences compose a “whole” type (e.g. ISTP). The study addressed the four dichotomous preferences and whole types.

There were rare instances when the preference clarity scores to determine dichotomous poles were tied (e.g. a tie between extraversion and introversion). In this event, one point was given to the preferences I, N, and P. Introversion, intuiting, and perceiving preferences were less frequent types and research has shown individuals taking the MBTI® were more likely to choose culturally acceptable answers. Thus, any
ties were broken by this method, and in the example above a tie on the E-I scale would result in an “I”. A tie between the T-F preference scale was determined similar to the other scales, but has sex specific outcomes. For males, a point was added to the F scale and for females a point was given to the T scale. The rationale is comparable to the E-I, S-N, and J-P preference scales. The T scale was more culturally acceptable for males and the F scale was more culturally acceptable for females. Thus, a tie was decided by adding a point to the less culturally desirable scale.

Reliability of the MBTI® was established using several methods. Estimates of internal consistency were completed using split-half reliability and examining internal consistencies based on coefficient alpha. Split-half reliability of Form M was performed by pairing items using the follow considerations “item format (word pairs verse phrase questions); item-to-total correlations; average value of difficulty parameter defined by the item response theory (IRT); maximum amount of item information; and subscale coverage” (Myers et al., 1998, p. 160). Additionally, the inventory was divided into half, where the first set of consecutive items represented the first half and the last set of consecutive items represented the second half (Myers et al., 2006). Using the Spearman-Brown formula to examine Form M, the logical split-half reliabilities were high ranging from .90 to .92 on the continuous scores (Myers et al., 1998). The national sample (n=3,036, see Appendix C) was identified as a stratified random sampling procedure to collect data, which would be representative of the U.S. population. The sample varies from U.S. census data by containing an under representation of African American males, non-representation of American Indian, Asian/Pacific Islander, or Eskimo, and an over representation of Caucasian females. Thus, the sample was weighted on sex and ethnicity.
to approximate the U.S. census data (Myers et al., 1998). The coefficients alpha for the
E-I scale ranged from .90 to .91; the S-N scale ranged from .91 to .95; the T-F scale
ranged from .88 to .91; and the J-P scale ranged from .92 to .93. The T-F scale had the
lowest coefficient alphas of the four scales.

Myers et al. (1998) determined test-retest reliability estimates for Form M from
research completed on three samples: Virginia Commonwealth University students
(n=116), Public Utilities Company (n=258), and Consulting Psychologists Press (n=50).
Form M was given one month after original implementation for each of the three
samples. The research addressed the continuous scores and percentage agreement of
dichotomies between administrations. The test-retest product-moment correlation
coefficients of continuous scores for the three samples ranged from .83 to .97: E-I ranged
from .93 to .95, S-N ranged from .89 to .97, T-F ranged from .83 to .94, and J-P ranges
from .90 to .95. The test-retest percentage agreement of dichotomies for the three
samples ranged from .84 to .96: E-I ranged from .87 to .96, S-N ranged from .87 to .96,
T-F ranged from .84 to .92, and J-P ranges from .88 to .96. The lowest scales on both
measurements of test-retest reliability were found in the T-F dichotomy. Overall, sixty-
five percent of the samples had the same type preferences on all four constructs. Myers
et al. (1998) states that test-retest agreement is not ever expected to reach 100% since the
scales measure a complex and multifaceted psychological constructs. Furthermore, the
whole type is measured by individual scales which increase the chance of measurement
error of self-report. There is evidence the test-retest reliabilities of the MBTI® show
consistency over time. If a person has a change in type, it is usually on one preference
and on a scale that initially was near the mid-point between the dichotomies.
Research on the validity of the MBTI® has focused on two broad categories. First, the instrument in fact measures separate and distinct preferences composing the indicator. This was completed using factor analysis, correlations from the MBTI® scores to the scores of other instruments, analysis designed to uncover dichotomies, and categorical analysis of behaviors believed to be associated with people of different preferences. Second, to assure the instrument measures preferences having theoretical importance. This was examined using comparison of MBTI® reported type with best-fit type, analysis of type distributions, observations of independent raters, and comparison of factor scores derived from other instruments.

Exploratory and confirmatory factor analysis was conducted to determine content validity. A large study (n=2143) conducted by Tischler (1994) found there was strong evidence of a good item-to-scale structure. Tischler (1994, p. 29) concluded the MBTI® is almost “factorially pure”, its structure appears to be valid, and its items appear to measure its scales. Harvey, Murray, and Markham (1995) conducted a study using item response theory to determine the viability of the four factor model of the MBTI®. The researchers found their results were virtually identical to the hypothesized factor structure of the MBTI®. Using confirmatory factor analysis, Johnson and Saunders (1990) analyzed the subscales of the MBTI® using 529 college students and concluded the inventory does measure the expected factor structure.

Comparisons with other instrument factors/constructs that measure personality and instruments measuring the underlying theory were conducted to determine criterion and construct validity. McCrae and Costa (1989) compared the MBTI® dichotomies to the NEO-PI traits. The NEO-PI, often called the Big Five Model of Personality,
measures five distinct traits: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. The NEO-PI is a well-respected instrument measuring personality traits and has strong validity and reliability. The results of the study concluded the extraversion trait correlated to the MBTI® E-I dichotomy (p<.001), the Openness trait correlated to the MBTI® S-N dichotomy (p<.001), the Agreeableness trait correlated with the MBTI® T-F dichotomy (p<.001), and the Conscientiousness trait correlated with the MBTI® J-P dichotomy (p<.001). MacDonald et al., (1994) replicated the study using college students and found statistically significant (p<.001) correlations that mirrored McCrae and Costa’s findings. Neither study found a significant correlation between the Neuroticism trait and any MBTI® dichotomy.

A study conducted by Karesh, Pieper, and Holland (1994) focused on the relationship between the MBTI® and the Jungian Type Survey (JTS) to determine if the scales correlated and if the instruments measured the same theory. The researchers established there was a significant relationships (p<.05) between the MBTI® E-I dichotomy and the separate extraversion and introversion scales of the JTS, the MBTI® S-N dichotomy and the separate sensation and intuiting scales of the JTS, and the MBTI® T-F dichotomy and the separate thinking and feeling scales. The JTS survey does not have judging or perceiving scales since Katherine Briggs added the implicit J-P dichotomy to the MBTI®. Overall, the study demonstrated the JTS and MBTI® both measure the same constructs established by Carl Jung’s Theory of Psychological Type.

**Health-Promoting Lifestyle**

The Health-Promoting Lifestyle Profile II (HPLP-II) was implemented to assess healthy lifestyle behaviors (see Appendix B). The HPLP II is a 52-item scale designed to
measure the likelihood of engaging in health-promoting behaviors through a four-point response (never (1), sometimes (2), often (3), and routinely (4)). The instruments six subscales are added together to give an aggregate health-promoting lifestyle score.

The six subscales are physical activity, nutrition, interpersonal relations, spiritual growth, stress management and health responsibility. The physical activity items address regularly scheduled activity as part of a planned program or part of everyday leisure activity for fitness and health goals. The nutrition items address the selection and consumption of foods essential for well-being and health and are consistent with the dietary guidelines for Americans. The interpersonal relations items assess one's ability to develop intimate, close, meaningful relationships with effective communication patterns and not just casual acquaintances. The spiritual growth items describe one's sense of inner wholeness and peace, one’s having a sense of meaning and purpose to life, and one’s working towards goals to achieve that purpose. The stress management items assess the individual's ability to identify and mobilize psychological and physical resources to control or reduce anxiety. The health responsibility items assess one's active sense of accountability for well-being, health, education about health, and proactive informed decisions when seeking professional healthcare (Walker, Sechrist, & Pender, 1987).

Walker and Hill-Polerecky (1996) tested the validity and reliability of the HPLP II using data from 712 adults aged 18-92 years. Content validity was established through literature review and the evaluation of content experts. Construct validity was supported by factor analysis that confirmed the six subscales of health-promoting lifestyles and by convergence with the Personal Lifestyle Questionnaire (r = .68). Criterion-related
validity was indicated by significant correlations with concurrent measures of perceived health status and quality of life ($r's = .27$ to $.49$). Cronbach’s alpha for the total scale for the English version was .94. Cronbach’s alphas for the subscales ranged from .79 to .87: Health Responsibility was .86, Physical Activity was .85, Nutrition was .80, Spiritual Growth was .86, Interpersonal Relations was .87, and Stress Management was .79. The 3-week test-retest stability coefficient for the total scale was .89 (Walker & Hill-Polerecky, 1996).

The scores on the subscales were obtained by calculating the mean of the individual’s responses. The items included on each scale were as follows:

- **Health Responsibility**: 3, 9, 15, 21, 27, 33, 39, 45, 51
- **Physical Activity**: 4, 10, 16, 22, 28, 34, 40, 46
- **Nutrition**: 2, 8, 14, 20, 26, 32, 38, 44, 50
- **Spiritual Growth**: 6, 12, 18, 24, 30, 36, 42, 48, 52
- **Interpersonal Relations**: 1, 7, 13, 19, 25, 31, 37, 43, 49
- **Stress Management**: 5, 11, 17, 23, 29, 35, 41, 47
- **Health-Promoting Lifestyle**: 1 to 52

Scores were summed for each subscale and overall scale and then divided by the number of items for the corresponding scale for each subscale and the total scale to attain a mean. The average mean on each scale is 2.5. Subscales with scores above the mean indicate a higher level of health-promoting behavior on the appropriate scale. The overall scale is identical. Scores below the mean indicate lower levels of health-promoting behavior on the associated scale.
The revised instrument has been widely used in studies of adolescents, adults, and older adults (Callaghan, 2006; Larouche, 1998; Pullen, Walker, & Fiandt, 2001). The instrument allows researchers to better measure patterns of health-promoting behaviors in intervention and outcome studies (Walker & Hill-Polerecky, 1996). Permission was granted to use the HPLP II instrument by the author, Dr. Susan Noble Walker, on November 15, 2009 (see Appendix F).

**Data Coding**

In order to perform statistical analysis several independent variables were coded by the investigator. The results of the MBTI® yields personality preferences from the four personality dichotomies: extraversion(E) or introversion(I), sensing (S) or intuiting (N), thinking(T) or feeling(F), and judging(J) or perceiving(P). The four personality dichotomies were coded as follows: I=0 / E=1, S=0 / N=1, T=0 / F=1, J=0 / P=1. Taken together, the four personality preferences determine an individual’s four letter personality type (e.g. ISFJ). A SPSS syntax was written to code each personality type one though 16 (e.g. if (introvertextravert=0 and sensingintuiting=0 and thinkingfeeling=1 and judgingperceiving=0) mbti=1 [ISFJ]). Sex was coded 0 for male and 1 for female (M=0, F=1). Due to the large number of Caucasians and low numbers for all other ethnicities, ethnicity was coded 0 for Caucasian and 1 for non-Caucasian (C=0, N=1). A SPSS syntax was written to code the categorical academic classification into one of four variables (e.g. freshman (1), sophomore (0), junior (0) and senior (0); freshman (0), sophomore (1), junior (0) and senior(0); etc.). The mean household income was determined by using the state and county information reported by subjects and searching the U.S. Census Bureau database (2009).
frequently requested items collected from various Census Bureau programs. Summaries are available for the nation, states, counties, and cities with 25,000 or more people.

Social position (SES) was determined from the father/male guardian’s and mother/female guardian’s education level and occupation using Hollingshead’s Two-Factor Index of Social Position (Miller & Salkind, 2002, p. 462). First, the father/male guardian’s occupation is located in one of Hollingshead’s categories (categorized by income potential and ranked in 1 of 7 categories, with 1 being the highest score and 7 being the lowest). Once the father’s/male guardian’s occupation is placed in the category it is multiplied by a factor weight of 7 to obtain an occupation score. Second, the father/male guardian’s education is ranked from 1 (Graduate Professional) to 7 (Less than 7th Grade). Then, the father/male guardian’s education rank is multiplied by a factor weight of 4 to obtain an education score. Lastly, the occupation score and education score are added together to attain a social index score. The social index score and SES are inversely related with a lower social index scores indicating a higher SES. The following is an example given in Miller and Salkind (2002, p. 462):

“If one were to compute a score for the manager of Kroger grocery store who had completed high school and one year of business college, the procedure would be as follows:

| Father Scale Score + Factor Weight = Partial Score |
|-----------------|-----------------|-----------------|
| Occupation | 3 | 7 | 21 |
| Education | 3 | 4 | 12 |

Hollingshead’s Two-Factor Social Index score ranges:

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>7 – 49</td>
</tr>
<tr>
<td>Education</td>
<td>4 – 28</td>
</tr>
<tr>
<td>Social Index</td>
<td>11-77</td>
</tr>
</tbody>
</table>
The two cigarette smoking items were adapted from the ACHA-NCHA (2009). Each cigarette smoking item included response ranges for the number of days an individual smoked and the number of cigarettes smoked per day the last 30 days. The response ranges yielded categorical data (e.g. 0 days, 1-2 days, 3-5 days, 6-9 days, 10-19 days, 20-30 days). In order to attain numerical data for analysis, mid-points for each category were calculated. For example, the mid-point of 14.5 was used for a response of “10-19 days”.

The alcohol use items were adapted from the National Survey on Drug Use and Health (SAMHSA, 2010). The alcohol use dependent variables yielded categorical data (e.g. 0 days, 1-2 days, 3-5 days, 6-9 days, 10-19 days, 20-30 days). In order to attain numerical data for analysis, mid-points for each category were calculated. For example, the mid-point of 14.5 was used for a response of “10-19 days”.

The scores for the Health-Promoting Lifestyle Profile II were obtained by calculating the means for the six subscales using the scoring template (see Appendix E). The mean for all questions was calculated to acquire an aggregate health-promoting lifestyle score. The results of the HPLP II yielded seven separate mean scores.

Research packets were excluded from the study if subjects did not report sex, complete the alcohol use and cigarette smoking questions, complete the MBTI®, and complete the HPLP II. These were required for hypotheses testing. Blank responses on additional questions were entered as missing data and had no numeric value.

**Data Analysis**

Data were entered into the computer and analyzed by the investigator using the "Statistical Package for the Social Sciences" 18.0 (SPSS 18.0, 2009), an analytical
software package for *Windows*, developed by Nie, Hull, and Bent in 1968 at Stanford University. Descriptive data were described in percentages, frequencies, means, and standard deviations, and displayed in table format. Multiple linear regression was used to test the hypotheses and determine the predictive ability of the independent variables. Stepwise regression was used to further explore the predictor variables relationship to the outcome variables and construct a model. Tabachnick and Fidell (2001, p.144) state “stepwise regression is a model-building rather than a model-testing procedure. As an exploratory technique, it may be useful for such purposes as eliminating variables that are clearly superfluous in order to tighten up future research.” Thus stepwise regression was not used as a testing procedure but as an avenue to aid in model development.

**Summary**

This chapter presented the methods and procedures implemented in the study. The study design and sample selection procedures were discussed in detail. A description of the measurement tools with psychometric properties demonstrated the efficacy of the cross-sectional instruments and their usefulness for this study. The methods of data collection, data coding, and data analysis were presented. The study results and discussion will be presented in Chapter four.
CHAPTER 4:
RESULTS & DISCUSSION

Overview

The purpose of the study was to examine the relationship between MBTI® personality preferences and types and both selected health-promoting and selected risk-taking behaviors among residential college students. In addition, possible mediating demographic variables were studied and models constructed. The chapter consists of five sections: description of the sample, demographics, study variables, hypothesis tests, and discussion of results. The study used two cross-sectional instruments and demographic questionnaire to obtain data. Descriptive and inferential statistics were used to answer the research questions.

Description of the Sample

A total of 682 residential students could have participated in the study. Six-hundred and eighty-two research packets were developed and distributed at the mandatory floor meetings. Upon attending the floor meetings it was found that although the meetings were mandatory there was no penalty for students not attending. Thus, the mandatory floor meetings had 585 students attend out of the possible 682. Of the 585 possible subjects, the survey administrators returned 452 survey packets. Forty-six survey packets did not provide one of the following criteria to participate in the study and were excluded: sex, alcohol use and cigarette smoking questions, MBTI®, or HPLP II. The full sample of 406 for data analysis reflects a 69% response rate.
Demographic Variables

Sex and Age

The sample consisted of 245 female (60.3%) and 161 male (39.7%) residential students. The sex breakdown parallels University Housing’s residential population of 60.2% female and 39.8% male. The subject’s age range and sex are shown in Table 4.1. The majority (75.9%) were 18 years or 19 years of age, with 18 year olds having the highest percentage (43.6%). Overall, 399 subjects (98.3%) were 18 to 22 years of age. The mean age of the sample was 19.01 years ($SD=1.30$).

<table>
<thead>
<tr>
<th>Age</th>
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<th>Total</th>
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<tbody>
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<tr>
<td>19</td>
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</tr>
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<td>26</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. $N=406$

Race/Ethnicity

Three-hundred-fifty-five subjects (87.4%) were Caucasian. The remaining 12.6% of the sample consisted of 20 Black subjects (4.9%), 11 multi-ethnic subjects (2.7%),
four Asian/Pacific Islanders (1%), and four Hispanics (1%). Five subjects selected “Other” and seven subjects selected “No Response” to the question.

*Academic Classification*

One-hundred, ninety-six subjects (48.3%) were freshman. One-hundred, twenty-nine sophomores accounted for 31.8% of the sample. The remaining subjects consisted of 46 juniors (11.3%), 34 seniors (8.4%), and one graduate student (0.2%).

*Mean Household Income*

Mean household income for the sample was determined by using the reported county and state information and searching the U.S. Census Bureau website (U.S. Census Bureau, 2009). The range of the sample for mean household income was $19,829 to $107,075. The overall mean of the sample for household income was $46,259 ($N=406$, $SD=13,603$).

*Social Position*

Parental social position was determined using Hollingshead’s Two-Factor Index of Social Position (Miller & Salkind, 2002). The Two-Factor Index of Social Position incorporates parental/guardian education and occupation and is determined for each parent/guardian, if applicable. The lower the social position score, the higher the socioeconomic status and scores can range from 11 to 77. The male parent/guardian’s social position range was 11 to 73 with a mean of 39.76 ($N=344$, $SD=15.70$). The female parent/guardian’s social position range was 11 to 77 with a mean of 38.22 ($N=364$, $SD=16.64$). Sixty-two subjects did not report education, occupation, or both for male parent/guardian and forty-two subjects did not report education, occupation, or both for
female parent/guardian. Examples given by subjects for not reporting a parent/guardian’s information was “death” or “single parent home”.

**Study Variables**

*Health Promoting Lifestyle Profile II (HPLP II)*

The HPLP II was used to measure the selected health-promoting behaviors. The HPLP II is a self-report instrument that measures six health-promoting behaviors, and taken together gives an aggregate health-promoting lifestyle score. The 52-item summated behavior scale employs a 4-point response format to measure the following domains: nutrition, physical activity, stress management, spiritual growth, interpersonal relations, and health responsibility. The mean for each health-promoting behavior is calculated using the responses to the subscales, and the overall health-promoting lifestyle is determined by calculating the mean of all 52-items (Walker, 1995). The results are presented in Table 4.2. The overall means for each of selected health-promoting behaviors were the following: nutrition 2.36 ($SD=.56$), interpersonal relations 2.99 ($SD=.56$), health responsibility 2.09 ($SD=.56$), spiritual growth 3.01 ($SD=.54$), stress management 2.48 ($SD=.48$), and physical activity 2.36 ($SD=.63$). Female subjects scored higher on each health-promoting behavior with the exception of physical activity. Means on the interpersonal relations and spiritual growth behaviors were above average. Health responsibility had the lowest mean for both sexes. The most interesting finding was four of the six health-promoting behaviors were below average, but the health-promoting lifestyle (average of all questions) was above average. Interpersonal relations and spiritual growth mean scores were much higher than the remaining four behavior mean scores were lower, resulting in a slightly above average health-promoting lifestyle score.
for the sample. Kuder-Richardson 21 reliability estimates for the sample’s health-promoting behaviors scores were as follows: Nutrition .79, Interpersonal Relations .75, Health Responsibility .66, Spiritual Growth .74, Stress Management .51, and Physical Activity .72. Cronbach’s alpha for the total scale was .82.

Table 4.2. Descriptive Statistics for the Health-Promoting Lifestyle Profile II

<table>
<thead>
<tr>
<th>Health Behavior</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( SD )</td>
</tr>
<tr>
<td>Nutrition</td>
<td>2.32</td>
<td>.57</td>
</tr>
<tr>
<td>Physical Activity*</td>
<td>2.43</td>
<td>.62</td>
</tr>
<tr>
<td>Stress Management</td>
<td>2.48</td>
<td>.48</td>
</tr>
<tr>
<td>Spiritual Growth***</td>
<td>2.89</td>
<td>.55</td>
</tr>
<tr>
<td>Interpersonal Relations***</td>
<td>2.79</td>
<td>.53</td>
</tr>
<tr>
<td>Health Responsibility*</td>
<td>2.01</td>
<td>.54</td>
</tr>
<tr>
<td>Health Promoting Lifestyle**</td>
<td>2.49</td>
<td>.40</td>
</tr>
</tbody>
</table>

Note. \( N=406; *p \leq 0.05; **p \leq 0.005; ***p \leq 0.0005 \) (t-test: significant mean differences for sex)

Myers-Briggs Type Inventory® (MBTI®)

The MBTI® was the personality inventory used to determine personality preferences and types for the sample. The MBTI® is a 93-item, self-report inventory that identifies an individual’s four dichotomous personality preferences. The combination of the personality preferences gives the individual his/her four-letter personality type. The four dichotomous personality preferences are introversion (I) or extraversion (E), sensing (S) or intuiting (N), thinking (T) or feeling (F), and judging (J) or perceiving (P). The results for the dichotomous preferences by sex are shown in Table 4.3.
Table 4.3. Crosstab for MBTI Dichotomous Preferences by Sex

<table>
<thead>
<tr>
<th>MBTI® Dichotomy</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introversion</td>
<td>59</td>
<td>85</td>
<td>144</td>
<td>35.5</td>
</tr>
<tr>
<td>Extraversion</td>
<td>102</td>
<td>160</td>
<td>262</td>
<td>64.5</td>
</tr>
<tr>
<td>Sensing</td>
<td>81</td>
<td>116</td>
<td>197</td>
<td>48.5</td>
</tr>
<tr>
<td>Intuition</td>
<td>80</td>
<td>129</td>
<td>209</td>
<td>51.5</td>
</tr>
<tr>
<td>Thinking</td>
<td>85</td>
<td>67</td>
<td>152</td>
<td>37.4</td>
</tr>
<tr>
<td>Feeling</td>
<td>76</td>
<td>178</td>
<td>254</td>
<td>62.6</td>
</tr>
<tr>
<td>Judging</td>
<td>59</td>
<td>119</td>
<td>178</td>
<td>43.8</td>
</tr>
<tr>
<td>Perceiving</td>
<td>102</td>
<td>119</td>
<td>228</td>
<td>56.2</td>
</tr>
</tbody>
</table>

Note. N=406

There were mean differences for sex and personality preferences (shown in Table 4.4). There were slight differences for sex between the introvert/extravert and sensing/intuiting dichotomies. However, there were significant differences for sex between the thinking/feeling and judging/perceiving dichotomies ($p \leq 0.0005$).

Table 4.4. Descriptive Statistics for the MBTI® Personality Preferences by Sex

<table>
<thead>
<tr>
<th>MBTI® Dichotomy</th>
<th>Sex</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introversion/Extraversion</td>
<td>Male</td>
<td>.63</td>
<td>.48</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.65</td>
<td>.48</td>
</tr>
<tr>
<td>Sensing/Intuition</td>
<td>Male</td>
<td>.50</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.53</td>
<td>.50</td>
</tr>
<tr>
<td>Thinking/Feeling**</td>
<td>Male</td>
<td>.47</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.73</td>
<td>.45</td>
</tr>
<tr>
<td>Judging/Perceiving*</td>
<td>Male</td>
<td>.63</td>
<td>.48</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.51</td>
<td>.50</td>
</tr>
</tbody>
</table>

Note. N=406; (Male=161, Female=245); *$p \leq 0.01$; **$p \leq 0.0005$ (t-test: significant mean differences for sex); 0=Introvert, 1=Extravert; 0=Sensing, 1=Intuiting; 0=Thinking, 1=Feeling; 0=Judging, 1=Perceiving
Frequencies for MBTI® personality types are shown in Table 4.5. The most represented personality type was ENFP, which accounted for 20.2% of the sample. The MBTI® personality types with the least representation were INTJ and INTP with nine subjects (2.2%) each. Kuder-Richardson 21 reliability estimates for the sample’s MBTI® preference dichotomies were as follows: Introversion/Extraversion .93, Sensing/Intuiting .96, Thinking/Feeling .94, and Judging/Perceiving .95.

Table 4.5. Frequencies for MBTI® Personality Types

<table>
<thead>
<tr>
<th>MBTI® Type</th>
<th>Sample Frequency</th>
<th>Sample Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTJ</td>
<td>34</td>
<td>8.4</td>
</tr>
<tr>
<td>ISFJ</td>
<td>25</td>
<td>6.2</td>
</tr>
<tr>
<td>INFJ</td>
<td>18</td>
<td>4.4</td>
</tr>
<tr>
<td>INTJ</td>
<td>9</td>
<td>2.2</td>
</tr>
<tr>
<td>ISTP</td>
<td>10</td>
<td>2.5</td>
</tr>
<tr>
<td>ISFP</td>
<td>11</td>
<td>2.7</td>
</tr>
<tr>
<td>INFP</td>
<td>28</td>
<td>6.9</td>
</tr>
<tr>
<td>INTP</td>
<td>9</td>
<td>2.2</td>
</tr>
<tr>
<td>ESTP</td>
<td>28</td>
<td>6.9</td>
</tr>
<tr>
<td>ESFP</td>
<td>35</td>
<td>8.6</td>
</tr>
<tr>
<td>ENFP</td>
<td>82</td>
<td>20.2</td>
</tr>
<tr>
<td>ENTP</td>
<td>24</td>
<td>5.9</td>
</tr>
<tr>
<td>ESTJ</td>
<td>27</td>
<td>6.7</td>
</tr>
<tr>
<td>ESFJ</td>
<td>28</td>
<td>6.9</td>
</tr>
<tr>
<td>ENFJ</td>
<td>27</td>
<td>6.7</td>
</tr>
<tr>
<td>ENTJ</td>
<td>11</td>
<td>2.7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>406</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Developed by Author

Cigarette Smoking

The cigarette smoking items were adapted from the ACHA-NCHA (2009). Eighty percent (N=325) of the sample did not smoke in the last 30 days. Of the 20%
of the sample who did smoke, the results reveal smoking at the extremes. The highest percentage of smokers (5.7%) smoked one or two days in the last 30 days. The second highest smoking rate (4.7%) was subjects who smoked all 30 days. Of the 81 subjects who smoked, 23.5% were daily smokers.

In regards to the number of cigarettes smoked, 8.9% of the total sample, or 44.5% of the subjects who smoked, smoked 2-5 cigarettes per day. The second number of cigarettes smoked per day (3.9%) was less than one cigarette per day. Only 4.7% of smokers smoked six or more cigarettes per day. However, the results are decisive in that 23.5% of smokers were daily smokers and 23.5% of smokers smoked six or more cigarettes per day. The findings reveal daily smokers smoked the majority of the cigarettes.

There were sex and ethnicity differences for cigarette smoking (shown in Tables 4.6). Male subjects had a higher percentage (27.3%) of smokers compared to female subjects (17.8%). Overall, of the 20% of the sample who smoked, 54.3% were male subjects even though the sample population was 60.2% female. Male subjects smoked more days in the last month than female subjects (Male, $M=3.32$ days; Female, $M=2.28$ days). Male subjects smoked more cigarettes in the last 30 days (Male, $M=1.07$ cigarettes; Female, $M=.85$ cigarettes). Nineteen percent of Caucasian subjects smoked; whereas 23% of non-Caucasian subjects smoked. However, Caucasian subjects reported heavier smoking with 5% smoking six or more cigarettes per day as opposed to 2% of non-Caucasian subjects.
Table 4.6. Crosstab for Cigarettes Smoked by Sex and Ethnicity

<table>
<thead>
<tr>
<th>Number of cigarettes smoked in the last 30 days</th>
<th>Sex</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Did not smoke</td>
<td>117</td>
<td>208</td>
</tr>
<tr>
<td>Less than 1 Cigarette per day</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>1 Cigarette per day</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>2-5 Cigarette per day</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>6-10 Cigarette per day</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>11-20 Cigarette per day</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>More than 20 Cigarettes per day</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. N=406

Alcohol Use

The alcohol use items were adapted from the National Survey on Drug Use and Health (NSDUH) (SAMHSA, 2010). Fifty-three percent of subjects consumed alcohol in the last 30 days. Binge drinking and alcohol consumption was prevalent in the sample (shown in Table 4.7). Thirty-seven percent of the sample reported binge drinking in the last 30 days. The study sample reported binge drinking frequently each month. Just over 14% of the sample reported binge drinking six or more days in the last 30 days. Forty-nine percent of the freshman had consumed alcohol and 36% reported binge drinking.
Table 4.7. Crosstab for Alcohol by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Consumer</th>
<th>Abstainer</th>
<th>Drinker</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>87</td>
<td>90</td>
<td>36.2</td>
</tr>
<tr>
<td>19</td>
<td>63</td>
<td>68</td>
<td>32.1</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>21</td>
<td>43.1</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>6</td>
<td>48.1</td>
</tr>
<tr>
<td>22</td>
<td>8</td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>23</td>
<td>3</td>
<td>0</td>
<td>33.3</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>26</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

*Note. N=399*

Nearly a quarter (22.9%) of the subjects reported drinking rapidly (four or more shots per hour or funneling alcohol) in the last 30 days. Seven percent of the sample reported drinking rapidly six or more days of the last 30 days. Thirty percent of the sample had been drunk in the last 30 days with 8.5% having been drunk six or more times in the last 30 days.

Of the subjects who drank in the last 30 days (N=215), the mean number of days alcohol was consumed was 3.54 days. The means for alcohol consumption, binge drinking, heavy drinking, and drinking rapidly by sex during the last 30 days are shown in Table 4.8. Males drank significantly more than females in the sample ($p \leq .005$). Males were significantly more likely to binge drink ($p \leq .01$) and get drunk ($p \leq .01$).
Table 4.8. Means for Alcohol Use by Sex

<table>
<thead>
<tr>
<th>Mean # of Days in the last 30 the following occurred:</th>
<th>Male</th>
<th>Female</th>
<th>Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had at least one drink</td>
<td>4.79*</td>
<td>2.72</td>
<td>3.54</td>
</tr>
<tr>
<td>Had five or more drinks in one sitting</td>
<td>2.89*</td>
<td>1.80</td>
<td>2.23</td>
</tr>
<tr>
<td>Drank enough to get drunk</td>
<td>2.16*</td>
<td>1.20</td>
<td>1.58</td>
</tr>
<tr>
<td>Drank rapidly</td>
<td>1.54</td>
<td>1.10</td>
<td>1.27</td>
</tr>
</tbody>
</table>

*Note. * *p* ≤ 0.01 (t-test: significant difference for sex)*

**Hypothesis Tests**

The research questions for the study are restated below. The hypotheses guided the statistical analysis. Regression analysis was used to determine the predictive value of the model. As an exploratory technique, a stepwise regression was calculated to clarify which, if any, predictor variables to enter into the model.

**Research Questions:**

1. Can health-promoting behaviors measured by the Health-promoting Lifestyle Profile II be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality types and/or personality preferences as measured by the Myers-Briggs Type Indicator®?

2. Can cigarette smoking be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality type preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?

3. Can alcohol use behaviors be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality type preferences and/or personality types as measured by the Myers-Briggs Type Indicator®?
**Hypothesis 1.** Sex, Age, Ethnicity, Academic Classification, Mean Family Income, Parental Social Position, MBTI® Personality Preferences and Health-Promoting Behaviors and Lifestyle

A series of seven multiple linear regressions were conducted using the predictor variables (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality preferences) on both the selected health-promoting behavior means and aggregate health-promoting lifestyle mean. The first multiple linear regression assessed the predictor variables’ effect on nutrition. The analysis revealed the predictor variables explained an insignificant amount of variation for nutrition ($R^2 = .058$, $F(14, 308) = 1.356, p = .17$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed only ethnicity ($R^2 = .018, B = -.207, t = 2.362, p = .019$) had a significant predictive relationship and should be entered into the model. In conclusion, Caucasian subjects predicted significantly more nutrition behaviors and accounted for 1.8% of the variance.

The second multiple linear regression assessed the predictor variables’ effect on interpersonal relations. The analysis revealed the predictor variables explained a moderate, significant amount of variation for interpersonal relations ($R^2 = .227, F(14, 308) = 6.450, p = .0005$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed four predictor variables had a significant predictive relationship and should be entered into the model (see Appendix L). In conclusion, female subjects, Caucasian subjects, lower father’s social position (higher SES), and subjects preferring extraversion predicted significantly more interpersonal relations behaviors and accounted for 19.3% of the variance.
The third multiple linear regression assessed the predictor variables effect on health responsibility. The analysis revealed the predictor variables explained an insignificant amount of variation for health responsibility \( (R^2=.058, F(14, 308)=1.366, p=.17) \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a significant predictive relationship and should be entered into the model (see Appendix L). In conclusion, male subjects and freshman predicted significantly less health responsibility behaviors and accounted for 2.9% of the variance.

The fourth multiple linear regression assessed the predictor variables’ effect on spiritual growth. The analysis revealed the predictor variables explained a moderate, significant amount of variation for spiritual growth \( (R^2=.123, F(14, 308)=3.072, p=.0005) \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed four predictor variables had a significant predictive relationship and should be entered into the model (see Appendix L). In conclusion, female subjects, Caucasian subjects, subjects preferring extraversion, and subjects preferring judging predicted significantly more spiritual growth behaviors and accounted for 9.8% of the variance.

The fifth multiple linear regression assessed the predictor variables’ effect on stress management. The results revealed the predictor variables explained an insignificant amount of variation for stress management \( (R^2=.042, F(14, 308)=.969, p=.49) \). A stepwise regression was calculated with the predictor variables to construct a model. The results found only the judging/perceiving preference dichotomy \( (R^2=.025, B=-.150, t=2.833, p=.005) \) had a significant predictive relationship and should be entered
into the model. Subjects preferring judging predicted significantly more stress
management behaviors and accounted for 2.5% of the variance.

The sixth multiple linear regression assessed the predictor variables’ effect on
physical activity. The analysis revealed the predictor variables explained an insignificant
amount of variation for physical activity ($R^2 = .052$, $F(14, 308) = 1.206$, $p = .27$). A stepwise
regression was calculated with the predictor variables to construct a model. The stepwise
regression revealed no variables were significant and should be entered into the model.

The seventh multiple linear regression assessed the predictor variables’ effect on
health-promoting lifestyle. The results revealed the predictor variables explained a
moderate, significant amount of variation for health-promoting lifestyle ($R^2 = .113$, $F(14,$
$308) = 2.796$, $p = .001$). A stepwise regression was calculated with the predictor variables
to construct a model. The results revealed four predictor variables had a significant
predictive relationship and should be entered into the model (see Appendix L). In
conclusion, female subjects, Caucasian subjects, subjects preferring extraversion and
judging predicted significantly more health-promoting behaviors and accounted for 8.0%
of the variance.

The hypotheses were supported as, taken together, the predictor variables did
have a significant predictive relationship with interpersonal relations, spiritual growth,
and health-promoting lifestyle. However, the hypotheses were not supported for
nutrition, health responsibility, stress management, and physical activity as, taken
together, the predictor variables did not have a significant predictive relationship.
Hypothesis 2. Sex, Age, Ethnicity, Academic Classification, Mean Family Income, Parental Social Position, MBTI® Personality Types and Health-Promoting Behaviors and Lifestyle

A series of seven multiple linear regressions were conducted using the predictor variables (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality types) on both the selected health-promoting behavior means and aggregate health-promoting lifestyle mean. The first multiple linear regression assessed the predictor variables’ effect on nutrition. The analysis revealed the predictor variables explained a moderate, significant amount of variation for nutrition ($R^2=.117$, $F(25, 297)=1.569$, $p=.044$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a significant predictive relationship and should be entered into the model (see Appendix M). The ENTJ personality type and Caucasian subjects predicted significantly more nutrition behaviors and accounted for 5.6% of the variance.

The second multiple linear regression assessed the predictor variables’ effect on interpersonal relations. The analysis revealed the predictor variables explained a large, significant amount of variation for interpersonal relations ($R^2=.251$, $F(25, 297)=3.989$, $p=.0005$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed seven predictor variables had a significant predictive relationship and should be entered into the model (see Appendix M). In conclusion, male subjects, INTP personality type, INFP personality type, and ISTJ personality type predicted significantly less interpersonal relations behaviors. Caucasian subjects, lower father’s social position (higher SES), and ESTJ personality type predicted significantly
more interpersonal relations behaviors. The seven predictor variables accounted for 20.5% of the variance for interpersonal relations.

The third multiple linear regression assessed the predictor variables’ effect on health responsibility. The results revealed the predictor variables explained an insignificant amount of variation for health responsibility ($R^2 = .108$, $F(25, 297) = 1.441$, $p = .08$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed three predictor variables had a significant predictive relationship and should be entered into the model (see Appendix M). In conclusion, the ENTJ personality type and ENFJ personality type predicted significantly more health responsibility behaviors. Freshman class standing predicted significantly less health responsibility behaviors. The three predictor variables accounted for 4.8% of the variance for health responsibility.

The fourth multiple linear regression assessed the predictor variables’ effect on spiritual growth. The analysis revealed the predictor variables explained a moderate, significant amount of variation for spiritual growth ($R^2 = .142$, $F(25, 297) = 1.969$, $p = .005$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed five predictor variables had a significant predictive relationship and should be entered into the model (see Appendix M). In conclusion, female subjects, Caucasian subjects, and ESTJ personality type predicted significantly more spiritual growth behaviors. The INTP personality type and INFP personality type predicted significantly less spiritual growth behaviors. The five significant predictor variables accounted for 10.3% of the variance for spiritual growth.
The fifth multiple linear regression assessed the predictor variables’ effect on stress management. The results revealed the predictor variables explained an insignificant amount of variation for stress management \( (R^2=0.064, F(25, 297)=0.815, p=0.72) \). A stepwise regression was calculated with the predictor variables to construct a model. The stepwise regression revealed no variables were significant and should be entered into the model.

The sixth multiple linear regression assessed the predictor variables’ effect on physical activity. The analysis found the predictor variables explained a moderate, significant amount of variation for physical activity \( (R^2=0.139, F(25, 297)=1.915, p=0.006) \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed five predictor variables had a significant predictive relationship and should be entered into the model (see Appendix M). In conclusion, ENTJ personality type, ESFP personality type, INTJ personality type, ENFJ personality type, and male subjects predicted significantly more physical activity behaviors and accounted for 9.2% of the variance.

The seventh multiple linear regression assessed the predictor variables’ effect on health-promoting lifestyle. The analysis revealed the predictor variables explained a moderate, significant amount of variation for health-promoting lifestyle \( (R^2=0.158, F(25, 297)=2.232, p=0.001) \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed five predictor variables had a significant predictive relationship and should be entered into the model (see Appendix M). Female subjects, Caucasian subjects, and ENTJ personality type predicted significantly more health-promoting behaviors. INFP personality type and INTP personality type predicted
significantly less health-promoting behaviors. The five significant predictor variables accounted for a moderate 8.9% of the variance for health-promoting lifestyle.

The hypotheses were supported as, taken together, the predictor variables did have a significant predictive relationship with nutrition, interpersonal relations, spiritual growth, physical activity, and health-promoting lifestyle. However, the hypotheses were not supported for health responsibility and stress management as, taken together, the predictor variables did not have a significant predictive relationship.

**Hypothesis 3. Sex, Age, Ethnicity, Academic Classification, Mean Family Income, Parental Social Position, MBTI® Personality Preferences and Cigarette Smoking**

Two multiple linear regressions were conducted using the predictor variables (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality preferences) on cigarette smoking and cigarettes smoked. The first multiple linear regression assessed the predictor variables’ effect on the number of days cigarettes were smoked. The analysis revealed the predictor variables explained an insignificant amount of variation for number of days cigarettes were smoked ($R^2 = .065$, $F(14, 308) = 1.530, p = .10$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a significant predictive relationship and should be entered into the model (see Appendix N). Subjects whose father had a higher social position (lower SES) and preferred the perceiving personality preference smoked more days in the last month and accounted for 4.1% of the variance for cigarette smoking.
The second multiple linear regression assessed the predictor variables’ (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality preferences) effect on cigarettes smoked. The analysis revealed the predictor variables explained an insignificant amount of variation for number of cigarettes smoked ($R^2 = .076, F(14, 308) = 1.797, p = .038$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a significant predictive relationship and should be entered into the model (see Appendix N). Higher father’s social position (lower SES) and subjects preferring perceiving predicted significantly more cigarettes smoked in the last month and accounted for 4.7% of the variance.

The hypothesis was not supported as, taken together, the predictor variables did not have a significant predictive relationship with cigarette smoking. However, father’s social position and the perceiving preference had a significant predictive effect on cigarette smoking.

**Hypothesis 4. Sex, Age, Ethnicity, Academic Classification, Mean Family Income, Parental Social Position, MBTI® Personality Types and Cigarette Smoking**

Two multiple linear regressions were conducted using the predictor variables (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality types) on cigarette smoking and cigarettes smoked. The first multiple linear regression assessed the predictor variables’ effect on number of days cigarettes were smoked. The analysis revealed the predictor variables explained an insignificant amount of variation for number of days cigarettes were smoked ($R^2 = .100, F(25, 297) = 1.327, p = .14$). A stepwise regression was calculated with the predictor
variables to construct a model. The results revealed three predictor variables had a significant predictive relationship and should be entered into the model (see Appendix N). Higher father’s social position (lower SES), ISTP personality type and ENFP personality type predicted significantly more days smoked in the last month and accounted for 5.9% of the variance.

A second multiple linear regression assessed the predictor variables’ effect on the number of cigarettes smoked. The analysis revealed the predictor variables explained an insignificant amount of variation for number of cigarette smoked ($R^2=.094$, $F(25, 297)=1.237$, $p=.21$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a significant predictive relationship and should be entered into the model (see Appendix N). Higher father’s social position (lower SES) and/or ENFP personality type predicted significantly more cigarettes smoked in the last month and accounted for 4.6% of the variance.

The hypotheses were not supported as, taken together, the predictor variables did not have a significant predictive relationship with cigarette smoking or cigarettes smoked. However, father’s social position, ISTP personality type, and ENFP personality type had a significant predictive effect on cigarette smoking.

**Hypothesis 5. Sex, Age, Ethnicity, Academic Classification, Mean Family Income, Parental Social Position, MBTI® Personality Preferences and Alcohol Use Behaviors**

A series of four multiple linear regressions were conducted using the predictor variables (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality preferences) on the four alcohol use behaviors. The
The first multiple linear regression assessed the predictor variables’ effect on numbers of days alcohol was consumed. The analysis revealed the predictor variables explained a moderate, significant amount of variation for alcohol consumption ($R^2=.174$, $F(14, 308)=4.645$, $p=.0005$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed five predictor variables had a significant predictive relationship and should be entered into the model (see Appendix O). In conclusion, increased age, Caucasian subjects, male subjects, subjects preferring perceiving, and subjects preferring extraversion predicted significantly more days alcohol was consumed in the last month and accounted for 14.2% of the variance.

The second multiple linear regression assessed the predictor variables’ effect on number of days subjects reported binge drinking. The analysis revealed the predictor variables explained a moderate, significant amount of variation for binge drinking ($R^2=.136$, $F(14, 308)=3.459$, $p=.0005$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a significant predictive relationship and should be entered into the model (see Appendix O). In conclusion, subjects preferring perceiving and subjects preferring extraversion predicted significantly more days binge drinking in the last month and accounted for 8.7% of the variance.

The third multiple linear regression assessed the predictor variables’ effect on numbers of days subjects reported heavy drinking. The analysis revealed the predictor variables explained a small, significant amount of variation for heavy drinking ($R^2=.084$, $F(14, 308)=2.015$, $p=.016$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed two predictor variables had a
significant predictive relationship and should be entered into the model (see Appendix O). In conclusion, subjects preferring perceiving and subjects preferring extraversion predicted significantly more days heavy drinking in the last month and accounted for 4.9% of the variance.

The fourth multiple linear regression assessed the predictor variables’ effect on numbers of days subjects reported drinking rapidly. The analysis revealed the predictor variables explained an insignificant amount of variation for rapid drinking \( R^2=.072, F(14, 308)=1.704, p=.054 \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed the judging/perceiving preference dichotomy had a significant predictive relationship and should be entered into the model. In conclusion, subjects preferring perceiving \( R^2=.039, F(1, 321)=13.047, p=.0005 \) predicted significantly more days drinking rapidly in the last month and accounted for 3.9% of the variance.

The hypotheses were supported as, taken together, the predictor variables did have a significant predictive relationship with alcohol consumption, binge drinking, and heavy drinking. However, the hypothesis was not supported for rapid drinking as, taken together, the predictor variables did not have a significant predictive relationship.

Hypothesis 6. Sex, Age, Ethnicity, Academic Classification, Mean Family Income, Parental Social Position, MBTI® Personality Types and Alcohol use Behaviors

A series of four multiple linear regressions were conducted using the predictor variables (age, sex, ethnicity, academic classification, parental social position, mean household income, and personality types) on the four alcohol use behaviors. The first
multiple linear regression assessed the predictor variables’ effect on numbers of days alcohol was consumed. The analysis revealed the predictor variables explained a moderate, significant amount of variation for alcohol consumption ($R^2 = .193$, $F(25, 297) = 2.837$, $p = .0005$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed seven predictor variables had a significant predictive relationship and should be entered into the model (see Appendix P). In conclusion, increased age, Caucasian subjects, male subjects, ESTP personality type, ESFP personality type, ENTP personality type and ENFP personality type predicted significantly more days alcohol was consumed in the last month and accounted for 15.8% of the variance.

The second multiple linear regression assessed the predictor variables’ effect on numbers of days subjects reported binge drinking. The analysis revealed the predictor variables explained a moderate, significant amount of variation for binge drinking ($R^2 = .16$, $F(25, 297) = 2.257$, $p = .001$). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed six predictor variables had a significant predictive relationship and should be entered into the model (see Appendix P). In conclusion, the ISTP personality type, ESTP personality type, ESFP personality type, ENTP personality type, ESTJ personality type and ENFP personality type predicted significantly more days subjects reported binge drinking in the last month and accounted for 12.2% of the variance.

The third multiple linear regression assessed the predictor variables’ effect on numbers of days subjects reported heavy drinking. The analysis revealed the predictor variables explained a moderate, significant amount of variation for heavy drinking
\( R^2 = .116, F(25, 297) = 1.564, p = .045 \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed three predictor variables had a significant predictive relationship and should be entered into the model (see Appendix P). In conclusion, the ISTP personality type, ESFP personality type and ENFP personality type predicted significantly more days subjects reported heavy drinking in the last month and accounted for 6.5% of the variance.

The fourth multiple linear regression assessed the predictor variables’ effect on numbers of days the subjects reported rapid drinking. The analysis revealed the predictor variables explained an insignificant amount of variation for rapid drinking \( (R^2 = .103, F(25, 297) = 1.370, p = .12) \). A stepwise regression was calculated with the predictor variables to construct a model. The results revealed three predictor variables had a significant predictive relationship and should be entered into the model (see Appendix P). In conclusion, the ISTP personality type, ESFP personality type and ENFP personality type predicted significantly more days subjects reported rapid drinking in the last month and accounted for 6.3% of the variance.

The hypotheses were supported as, taken together, the predictor variables did have a significant predictive relationship with alcohol consumption, binge drinking and heavy drinking. However, the hypothesis was not supported for rapid drinking as, taken together, the predictor variables did not have a significant predictive relationship.


**Discussion of Results**

**Demographic Variables**

The research reported similar findings between the demographic variables and the residential population (shown in Table 4.9). The systematic random sample provided a means to describe how well the sample represented the residential population.

**Mean Household Income**

The overall mean of the sample for household income was $46,259 ($N=406$, $SD=13,603$). The reported mean is above the mean household income for Kentucky of $41,489 and below the mean household income for the United States of $52,029 (U.S. Census Bureau, 2009).

**Table 4.9. Demographic Percentage of the Sample vs. University Housing**

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Sample Percentage</th>
<th>University Housing Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>39.7</td>
<td>39.8</td>
</tr>
<tr>
<td>Female</td>
<td>60.3</td>
<td>60.2</td>
</tr>
<tr>
<td>Mean Age of Population</td>
<td>19.01</td>
<td>19.64</td>
</tr>
<tr>
<td><strong>Academic Classification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>48.3</td>
<td>46.1</td>
</tr>
<tr>
<td>Sophomore</td>
<td>31.8</td>
<td>31.1</td>
</tr>
<tr>
<td>Junior</td>
<td>11.3</td>
<td>12.5</td>
</tr>
<tr>
<td>Senior</td>
<td>8.4</td>
<td>10.1</td>
</tr>
<tr>
<td>Graduate</td>
<td>.2</td>
<td>.1</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>87.4</td>
<td>88.9</td>
</tr>
<tr>
<td>Black</td>
<td>4.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Multi-ethnic</td>
<td>2.7</td>
<td>Not Reported</td>
</tr>
</tbody>
</table>

*Note. N=406*
Normative data for the HPLP II has not been established and therefore, comparisons to instrument norms could not be made. The aggregate health-promoting lifestyle mean for the sample was 2.56. The study mean was very similar to the health-promoting lifestyle means reported by LaRouche (1998) of 2.58 and Oleckno and Blacconiere (1990) of 2.57. Dubois (2006) reported a health-promoting lifestyle mean of 2.68, which is slightly higher than the previously reported means. Female subjects scored higher on every behavior except physical activity. The LaRouche (1998) and Dubois (2006) studies reported female subjects scored higher on each of the subscales. In all the cited studies the lowest health-promoting subscale was health responsibility and the two highest subscales were interpersonal relations and spiritual growth.

The sample’s reliability estimates for the HPLP II were compared to Walker and Hill-Polerecky (1996) reliability estimates (shown in Table 4.10). The current study’s reliability estimates were consistently lower than reported by the instrument developers. The Kuder-Richardson 21 is a rough estimate of internal consistency and may have led to the large reported differences in several of the health-promoting behaviors. None-the-less, caution should be taken as two of the six measures were below the acceptable level of .70.
Table 4.10. Reliability Estimates for Health-Promoting Lifestyle Profile II

<table>
<thead>
<tr>
<th>Health-Promoting Lifestyle Behaviors</th>
<th>Kuder-Richardson 21 for Sample</th>
<th>Cronbach’s alpha*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td>.79</td>
<td>.80</td>
</tr>
<tr>
<td>Interpersonal Relations</td>
<td>.75</td>
<td>.87</td>
</tr>
<tr>
<td>Health Responsibility</td>
<td>.66</td>
<td>.86</td>
</tr>
<tr>
<td>Spiritual Growth</td>
<td>.74</td>
<td>.86</td>
</tr>
<tr>
<td>Stress Management</td>
<td>.51</td>
<td>.79</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>.72</td>
<td>.85</td>
</tr>
<tr>
<td>Health-Promoting Lifestyle</td>
<td>.82**</td>
<td>.94</td>
</tr>
</tbody>
</table>

Note: *Cronbach’s alpha reported by Walker and Hill-Polerecky (1996); **Cronbach’s alpha

Myers-Briggs Type Inventory® (MBTI®)

The MBTI® indentifies an individual’s four dichotomous personality preferences. The combination of the personality preferences gives the individual his/her four-letter personality type. The four dichotomous personality preferences are introversion or extraversion, sensing or intuiting, thinking or feeling, and judging or perceiving. The sample results vary from a national college sample (N=27,156, 56% female, 44% male) shown in Table 4.11. Myers et al. (1998) reported 55.8% preferred extraversion, 59.9% preferred sensing, 53.5% preferred feeling, and 55.5% preferred judging. The national sample data vary considerably on each of the four dichotomies. However, the national sample data were collected between the years of 1971 and 1982 and the personality preferences of the college population may have changed in the last 28 years.
Table 4.11. Frequencies for MBTI® Personality Types vs. National Sample

<table>
<thead>
<tr>
<th>MBTI® Type</th>
<th>Sample Frequency</th>
<th>National Sample Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTJ</td>
<td>8.4</td>
<td>9.5</td>
</tr>
<tr>
<td>ISFJ</td>
<td>6.2</td>
<td>8.7</td>
</tr>
<tr>
<td>INFJ</td>
<td>4.4</td>
<td>3.3</td>
</tr>
<tr>
<td>INTJ</td>
<td>2.2</td>
<td>3.7</td>
</tr>
<tr>
<td>ISTP</td>
<td>2.5</td>
<td>4.5</td>
</tr>
<tr>
<td>ISFP</td>
<td>2.7</td>
<td>5.0</td>
</tr>
<tr>
<td>INFP</td>
<td>6.9</td>
<td>5.5</td>
</tr>
<tr>
<td>INTP</td>
<td>2.2</td>
<td>4.2</td>
</tr>
<tr>
<td>ESTP</td>
<td>6.9</td>
<td>4.6</td>
</tr>
<tr>
<td>ESFP</td>
<td>8.6</td>
<td>6.5</td>
</tr>
<tr>
<td>ENFP</td>
<td>20.2</td>
<td>9.6</td>
</tr>
<tr>
<td>ENTP</td>
<td>5.9</td>
<td>5.0</td>
</tr>
<tr>
<td>ESTJ</td>
<td>6.7</td>
<td>10.6</td>
</tr>
<tr>
<td>ESFJ</td>
<td>6.9</td>
<td>10.6</td>
</tr>
<tr>
<td>ENFJ</td>
<td>6.7</td>
<td>4.8</td>
</tr>
<tr>
<td>ENTJ</td>
<td>2.7</td>
<td>4.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


There were slight differences for sex between the introvert/extravert and sensing/intuiting dichotomies. However, there were significant differences for sex between the thinking/feeling and judging/perceiving dichotomies ($p \leq 0.005$). The significant difference for the thinking/feeling dichotomy was expected as research has consistently shown females prefer the feeling preference more than males (Myers et al., 1998). The significant difference for the judging/perceiving dichotomy was not expected and cannot be explained by previous literature.
The sample size of 406 subjects is a relatively small sample size for assessing 16 personality types, which could explain the differences between the study sample and the national sample (i.e. overrepresentation of ENFP’s). Although MBTI® personality types are not equally represented in the population, a study with one personality type equal to 20.2% of the total sample was not anticipated. The overrepresentation of ENFP’s could not be explained by previous literature. The MBTI® personality types with the least representation were INTJ and INTP with nine subjects (2.2%) each. In the national sample of college students the least represented personality type was INFJ (3.3%), and the most represented types were ESTJ and ESFJ with 10.6% each (Myers et al., 1998).

The sample’s reliability estimates for the MBTI® preference dichotomies were compared to Myers et al. (1998) reliability estimates (shown in Table 4.12). The current study’s reliability estimates were slightly higher than those reported by the instrument developer. The MBTI® preference dichotomies for the sample demonstrated high internal consistency.

### Table 4.12. Reliability Estimates for Myers-Briggs Type Inventory®

<table>
<thead>
<tr>
<th>Health-Promoting Lifestyle Behaviors</th>
<th>Kuder-Richardson 21 for sample</th>
<th>Cronbach’s alpha*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraversion/Introversion</td>
<td>.93</td>
<td>.90-.91</td>
</tr>
<tr>
<td>Sensing/Intuiting</td>
<td>.96</td>
<td>.91-.95</td>
</tr>
<tr>
<td>Thinking/Feeling</td>
<td>.94</td>
<td>.88-.91</td>
</tr>
<tr>
<td>Judging/Perceiving</td>
<td>.95</td>
<td>.92-.93</td>
</tr>
</tbody>
</table>

Note: *Cronbach’s alpha reported by Myers et al. (1998)

### Cigarette Smoking

The results for the number of cigarettes smoked and days subjects’ smoked revealed smoking at the extremes. The highest percentage of smokers, smoked one or
two days in the last 30 days. The results are consistent with research from Moran, Wechsler, and Riggot (2004) and Waters et al. (2006) that illustrated the majority of smoking in college is inconsistent, social smoking. The second highest smoking percentage (4.7%) were subjects who smoked all 30 days, which was similar to ACHA (2010) data reporting 4.6% of college students smoked all 30 days. Of the subjects who smoked, 23.5% were daily smokers. The 23.5% daily smoking rate is comparable to the result reported by the CDC that revealed Kentucky’s 18 to 24 age cohort has nearly double the rate of daily smokers at 28.2% than the national rate of 14.4% (CDC, 2009e). In addition, the ACHA-NCHA (2010) reported 13.8% of college students had smoked in the last 30 days, which is lower than the 20% of subjects who smoked in the study sample.

There were sex differences for cigarette smoking. Male subjects had a higher percentage (27.3%) of smokers compared to female subjects (17.8%). However, the disparity between male and female current smokers was larger than the Kentucky data presented by the CDC (2009e) of 27.1% for males and 24.2% for females. Research has consistently shown the gap between males and female smokers is closing (Wechsler et al., 2002, ACHA-NCHA, 2010). A possible explanation for the nearly 10% difference in cigarette smoking between sexes is the definition of smoking. Wechsler et al. (2002) and Waters (2006) concluded the majority of college smokers are social smokers, and social smokers do not believe they are smokers. Female subjects in the sample scored significant higher on interpersonal relations than males. Combine the higher interpersonal relations scores with beliefs of social smokers and it is conceivable there was a higher number of female subjects who were social smokers and thus, did not
indicate they were cigarette smokers. Furthermore, the subjects had been on campus three days or less before completing the instruments which would not have allowed much time for social situations where smoking could occur.

The results from the sample revealed Caucasian subjects smoked less than non-Caucasian subjects. The CDC (2009e) results conflict with the study sample results as Caucasians smoked more than non-Caucasians in both the Kentucky and national samples. As discussed previously, a possible explanation for the conflicting results is the concept of social smoking. There was a statistically significant difference for ethnicity and interpersonal relations ($p \leq .01$). Caucasian subjects reported significantly more participation in interpersonal relation behaviors. Social smoking has been found to be a significant motive for college smokers (Moran, Wechsler, & Rigotti, 2004; Jackson, Colby, & Sher, 2010). However, research has determined the majority of social smokers do not believe they are smokers, and may not report that they are smokers. With Caucasian subjects reporting higher interpersonal relations behaviors, it is plausible they did not identify themselves as smokers resulting in the conflicting results.

**Alcohol Use**

The alcohol use items were adapted from the National Survey on Drug Use and Health (NSDUH) (SAMHSA, 2010). Fifty-three percent of subjects consumed alcohol in the last 30 days. Given 88.4% of the sample was between 18 and 20 years of age, the results resemble the NSDUH data that reported 49.7% of 18 to 20 year olds drank alcohol in the last 30 days (SAMHSA, 2010). An important note, the legal age to consume alcohol in Kentucky is 21 years, which indicates many college students in the sample are participating in an illegal activity.
Binge drinking was prevalent in the sample (shown in Table 4.13). Thirty-seven percent of the sample reported binge drinking in the last 30 days. Again, this is comparable to NSDUH data where 34.7% of 18 to 20 year olds engaged in binge drinking in the last 30 days (SAMHSA, 2010). Just over 14% of the sample reported binge drinking six or more days in the last 30 days. These statistics are staggering and certainly a cause for alarm among university officials and health professionals, but are on par with national statistics. Data from the NSDUH confirms alcohol consumption is prevalent before the age of 18, but the NSDUH results are significantly lower than the reported study sample. Twenty-six percent of 16 and 17 year olds had consumed alcohol and 17% of 16 and 17 year olds reported binge drinking in the last 30 days (SAMHSA, 2010). The fact the freshmen had been on campus for less than one day before survey administration is cause for concern given the significantly higher alcohol consumption and binge drinking rates reported for the 18 year old, incoming students.

There are no reported results on rapid drinking or drinking to get drunk from the NSDUH or ACHA-NCHA. Sex differences were reported with males drinking significantly more than females in the study ($p \leq .005$). Males were significantly more likely to binge drink ($p \leq .01$) and get drunk ($p \leq .01$). These results are consistent with data from the Behavioral Risk Factor Surveillance System (BRFSS) and NSDUH, which both report higher alcohol consumption and binge drinking rates for males (CDC, 2009c; SAMHSA, 2010). Forty-nine percent of the freshman had consumed alcohol and 36% had engaged in binge drinking. Freshman completed the instruments their first day on campus so these behaviors are preceding college attendance and are significant concerns for university administrators and those living in the local community.
Table 4.13. Crosstab for Binge Drinking by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Abstainer</th>
<th>Drinker</th>
<th>% Binge Drinker</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>113</td>
<td>64</td>
<td>36.2</td>
</tr>
<tr>
<td>19</td>
<td>89</td>
<td>42</td>
<td>32.1</td>
</tr>
<tr>
<td>20</td>
<td>29</td>
<td>22</td>
<td>43.1</td>
</tr>
<tr>
<td>21</td>
<td>14</td>
<td>13</td>
<td>48.1</td>
</tr>
<tr>
<td>22</td>
<td>8</td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>1</td>
<td>33.3</td>
</tr>
<tr>
<td>24</td>
<td>0</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>28</td>
<td>0</td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. N=399

Discussion of Selected Health Behaviors

Nutrition

The results for nutrition varied when MBTI® personality preferences and MBTI® personality types were included with the demographic predictor variables. When the predictor variables included personality preferences the model was not significant. A stepwise regression revealed only ethnicity had a predictive relationship. Ethnicity, specifically Caucasian subjects, participated in significantly more nutrition behaviors. This finding is comparable to the CDC (2007) report that found Caucasians ate more fruits and vegetables than minorities. Adams and Colner (2008) reported minority students consumed significantly lower fruits and vegetables than Caucasian students.

The second model, which included personality types, was significant. The researcher is unsure why the interactions of the dichotomous preferences to form whole types made the difference in the models. Even though the model was significant, the
stepwise regression revealed only two predictor variables were entered into the model. Ethnicity and the ENTJ personality type had a significant relationship and reported significantly more nutrition behaviors. The ENTJ personality type is decisive, assertive, and enjoys long-term planning and goal-setting (Myers, 2003). ENTJ’s are usually well-informed, enjoy expanding knowledge, and are great at solving problems. These characteristics would appear to provide a foundation for improved nutritional practices.

An interesting non-finding was the lack of sex as a predictor for nutrition. Numerous studies have reported male and female students differ significantly with consumption of fruits and vegetables and high fat foods (Kasparek et al., 2008; Adams & Colner, 2008; Racette et al., 2005; Dinger, 1999). The results should be considered with caution as the predicted variance was low (11.7%). The stepwise regression that included personality types had a total of 25 variables, which may have artificially inflated the already low variance explained by the model.

*Interpersonal Relationship*

The results revealed both models were significant predictors for interpersonal relations. The first model with MBTI® personality preferences found sex, the introversion/extraversion preference dichotomy, ethnicity, and Father’s social position were significantly predictive. Female subjects, subjects preferring extraversion, Caucasian subjects, and lower father’s social position (higher SES) predicted significantly more interpersonal relations behaviors.

Hale, Hannum, and Espelage (2005) found social supports were predictive of health status in female subject but not males. Lee and Robbins (1998) reported female subjects had higher social connectedness than male subjects. Research has consistently
shown female subjects score significantly higher on interpersonal relations (Oleckno & Blacconiere, 1990; LaRouche, 1998; Lee & Loke, 2005; Dubois, 2006). Subjects with extraversion would be expected to have higher interpersonal relations behaviors as extraverts gain energy from interacting with their external environment. In addition, female subjects in college have a higher preference for extraversion than introversion (Myers, et al., 1998). Zaleski, Levey-Thors, and Schiaffino (1998) found subjects of higher socioeconomic status reported higher perceived social support. The results are consistent with the literature and suggest these predictors are central to research with interpersonal relations or social support. The inconsistent finding was with ethnicity. Dubois (2006) found minorities had higher interpersonal relation scores. However, the current study had little diversity as 87% of the sample was of Caucasian ethnicity, which may have provided the conflicting results.

The second model included MBTI® personality types and revealed sex, ethnicity, and Father’s social position were significantly predictive. These results were similar to the first model. In addition, the INTP personality type, ISTJ personality type, INFP personality type, and ESTJ personality type were significantly predictive. The INTP personality type, ISTJ personality type, and INFP personality type predicted lower interpersonal relations behaviors. Research by Hammer (1991) revealed INTP, INFP, and ISTJ personality types ranked 15, 14 and 11 respectively out of the sixteen MBTI® types for social resources. As expected, personality types with introversion were ranked lowest for social support. The one commonality with the types that predicted lower interpersonal relations behaviors was the “I” (introversion). Subjects preferring introversion are private, contained, and focus on his/her inner world (Myers et al., 1998).
Introverts would naturally have less of a preference for social gatherings and group events. Myers (2003) used detached, reserved, withdrawn, and autonomous to describe INTP’s, INFP’s and ISTJ’s. The finding parallels the first model that found introverts participated in significantly less interpersonal relations behaviors. The ESTJ personality type reported significantly more interpersonal relations behaviors. ESTJ’s are logical, practical, clear, and objectively critical (Myers, 2003). ESTJ types are efficient organizers of people and focus on getting results. The “E” preference supports the need to draw energy from the outer world of people. Hammer (1991) reported the ESTJ personality type was ranked second out of the 16 MBTI® personality types for social resources. Furthermore, seven out of the eight personality types with extraversion were ranked in the top eight for social resources.

Health Responsibility

For health responsibility, neither model including MBTI® personality preferences or types demonstrated a significant predictive relationship. In the first model none of the individual MBTI® personality preferences had a predictive relationship, but sex and freshmen academic classification were significant. Female subjects scored significantly higher while freshman scored significantly lower on health responsibility. Female subjects have consistently scored higher on health responsibility in other studies (Oleckno & Blacconiere, 1990; LaRouche, 1998; Dubois, 2006) and this study supported the existing research. Freshmen would be expected to have lower scores on health responsibility. The freshmen students are moving from parent-centered health care to self-care. This is possibly the first time the freshmen students have had to take responsibility for their own health.
The second model included MBTI® personality types and revealed sex was significantly predictive. In addition, the ENTJ and ENFJ personality types predicted significantly more health responsibility behaviors. The ENTJ personality type is decisive, assertive, assume leadership roles, and enjoy long-term planning and goal-setting (Myers, 2003). The characteristics of the ENTJ type are what would be projected of an individual who would take control of his/her health. The ENFJ personality type is warm, compassionate, loyal, imaginative, and devote energy to help others (Myers, 2003). ENFJ’s are attuned to the needs of others, and want to help others fulfill their potential. The researcher is unsure why these characteristics would provide a base for higher individual health responsibility. The ENFJ personality type is focused on developing others and harmony. In addition, ENFJ’s base decisions on personal values, but this still does not provide a comprehensive explanation. The results may be explained as both personality types have the E, N, & J preferences. Taken together, the three preferences must provide a foundation for individuals to take charge of their health choices. As mentioned in the first model, the individual personality preferences did not have a significant relationship with health responsibility so the interactions among the three preferences may be the defining factors.

Spiritual Growth

The results revealed models including MBTI® personality preferences and types were significant predictors for spiritual growth. The first model including MBTI® personality preferences found sex, ethnicity, introversion/extraversion preference dichotomy, and judging/perceiving preference dichotomy had a significant predictive relationship. Female subjects, Caucasian subjects, subjects preferring extraversion, and
subjects preferring judging resulted in subjects participating in more spiritual growth behaviors.

Nagel and Sgoutas-Emch (2007) and Nelms et al. (2007) reported female subjects were more likely to report spirituality was important than male subjects. Nagel and Sgoutas-Emch (2007) found female subjects were more likely to report spirituality influences their health. Waite, Hawks and Gast (1999) revealed women had higher spiritual well-being than men, which the researchers concluded correlated with women participating in more beneficial health behaviors. In addition, female subjects score significantly higher on spiritual growth (Oleckno & Blacconiere, 1990; LaRouche, 1998; Dubois, 2006).

The literature revealed a lack of consistency with ethnicity and spiritual growth. Dubois (2006) and Nelms et al. (2007) found African-Americans scored higher for spiritual growth and spirituality than Caucasian subjects. However, Nagel and Sgoutas-Emch (2007) found Caucasian subjects reported higher spirituality. None of the reported studies, including the current study, were overly diverse with an average of 84% of the samples reporting Caucasian ethnicity.

In regards to personality preferences, the judging and extraverted preferences were significantly predictive, which add to the literature. The predictive effect of the extraverted preference would be expected as many spiritual avenues, such as churches, synagogues, and temples, are considered social, living environments. Subjects preferring extraversion attain energy from the environment and thus, spiritual individuals may seek these venues. The judging preference was not expected to have significant relationship. Subjects preferring judging are organized, scheduled, systematic, goal-oriented, and
short- and long-term planners (Myers, 2003). After defining these characteristics, it is difficult to determine how the characteristics could relate to spiritual growth. However, reading the definition for spiritual growth provided by Walker and Hill-Polerecky (1996, p. 1) it states as part of the definition that “maximizing human potential for wellness through…working towards goals in life” is essential to developing spiritual growth. Apparently the characteristics that define judging are related to the underlying concepts for spiritual growth as defined by Walker and Hill-Polerecky.

The second model included MBTI® personality types revealed sex and ethnicity were significantly predictive. In addition, three personality types were significantly predictive. The ESTJ predicted significantly more spiritual growth behaviors. The INFP and INTP personality types predicted significantly less spiritual growth behaviors. Hammer (1991) reported the INFP and INTP types were ranked 10\textsuperscript{th} and 14\textsuperscript{th} respectively out of the 16 MBTI® personality types for spiritual resources. INFP’s are sensitive, caring and idealistic (Myers et al., 1998). The INFP type is loyal to their values and wants an external life that mirrors these values. Characteristics of the INTP type is logic, analytical, detached, and objectively critical (Myers, 2003). INTP’s are mentally quick, insightful and intensely curious (Myers et al., 1998). Characteristics of INTP’s, such as being objectively critical, may make it difficult to understand and participate in spiritual growth. A large segment of spirituality is organized religion. In religious organizations, faith (defined differently by different religious organizations) is required in order to believe and participate. Individuals who are critical, logical and analytical may find it increasingly difficult to believe in something that is not tangible. In contrast, ESTJ personality types had significantly increased participation in spiritual growth behaviors.
ESTJ’s are practical, realistic, systematic, and decisive (Myers, 2003). Additional characteristics are conscientious, dependable, outspoken, and self-confident (Myers et al., 1998). These characteristics do not appear to match characteristics of spirituality. Hammer (1991) reported ESTJ’s were ranked 11th out of the 16 MBTI® personality types for spiritual resources. The limited research available does not confirm the positive relationship between the ESTJ personality type and spiritual growth.

*Stress Management*

Neither model including MBTI® personality preferences or types demonstrated a significant predictive relationship with stress management. However, a specific MBTI® personality preference had a predictive relationship. The judging/perceiving preference dichotomy was significantly predictive. The judging preference predicted significantly more stress management behaviors. This finding could be predicted. The judging preference is organized, planned, systematic, and tries to avoid last-minute stresses (Myers et al., 1998). The characteristics of the judging preference are synonymous with stress reduction.

The second model including MBTI® personality types did not find any significant predictor variables. In the first model judging predicted more stress management behaviors, but none of the whole personality types that included “J” (judging) demonstrated a predictive relationship. Apparently, the combinations of the other preferences to determine a whole type decrease the affect of the judging preference when predicting increased stress management behaviors.

Interestingly, sex was not found to be a predictor even though research has demonstrated sex differences with stress and stress management (Singh & Upadhyay, 2008; APA, 2010; Ross, Niebling & Heckert, 1999). Misra and McKean (2000) reported
greater stress management techniques for female subjects. There was only a .01 mean
difference in self-reported stress management scores for female and male subjects in the
current study.

**Physical Activity**

The results for physical activity varied when MBTI® personality preferences and
MBTI® personality types were included with the demographic predictor variables. When
the predictor variables included personality preferences the model was not significant. A
stepwise regression revealed physical activity could not be explained by any of the
predictor variables.

However, when personality types were incorporated with the demographic
predictor variables the model was significant. The researcher is unsure why the
interactions of the dichotomous preferences to form whole types made the difference in
the models. Physical activity could be predicted by sex and four MBTI® personality
types. Male subjects, ENTJ, ESFP, INTJ, and ENFJ personality types predicted
significantly more physical activity behaviors.

Research has demonstrated sex is a mediating variable for physical activity.
Several studies have reported males exercise more than females (Steptoe et al., 2002;
Buckworth & Nigg, 2004; Nelson, Gortmaker, Subramanian, & Weschler, 2007;
CDC2009d). Huang et al. (2003) found men were more likely to exercise and exercised
more days per week. The results for sex are consistent with available research.

ESFP’s, INTJ’s, ENTJ’s and ENFJ’s personality types demonstrated a significant
positive relationship with physical activity. The results are similar to Shelton’s (1996)
study that reported ENFJ’s, ENTJ’s and INTJs had the highest percentage of subject’s
exercise. The agreement is with the letter “J” (judging). Individuals who prefer judging
are scheduled, systematic, methodical, and organized (Myers, 2003). These characteristics would be expected of subjects who participate in physical activity. The first strategy individuals learn when attempting exercise is to make it part of their daily routine in order to have long-term success. Furthermore, ENFJ’s, ENTJ’s, ESFP’s and INTJ’s have a few similar characteristics. The four personality types strive for efficiency, are responsible, and realistic.

Three of the four types begin with “E” (extraversion). Extraverts are more sociable, expressive, take initiative to develop relationships, and are energized by people and activity (Myers et al., 1998). Extraverts seek out social situations, and physical activity provides an avenue for “social activity”. For extraverts, physical activity would provide an ideal setting to energize or “recharge” his/her psyche. In related research, Raynor and Levine (2009) reported individuals with high extraversion, as defined by the NEO personality inventory (NEO-PI), were more likely to exercise. Rhodes and Smith (2006) revealed the NEO extraversion trait was a correlate of physical activity. As noted in chapter three, the extraversion trait (as defined by the NEO-PI) has been directly associated (p<.001) with the MBTI® introversion/ extraversion dichotomy (McCrae & Costa, 1989; MacDonald et al., 1994).

The INTJ personality type had a positive predictive relationship with physical activity. This is the only personality type beginning with an “I” (introversion) that had a significant positive relationship with any of the studied behaviors. Important to note, the INTJ personality type was the lowest represented type in the study population with only nine subjects, which equaled 2.2% of the sample population. INTJ personality types are insightful, independent, conceptual, rational, and concise (Myers, 2003). INTJ’s are
long-range thinkers who are objectively critical, and have high standards of competence and performance. Myers et al. (1998) found the INTJ personality type reported health was the most important value to them, and they were the only type to report health as their most important value. Although there doesn’t appear to be an associating between the characteristics of the INTJ type and physical activity, the results and past research show INTJ’s view health as important.

**Aggregate Health-Promoting Lifestyle**

The results revealed models including MBTI® personality preferences and types were significant predictors for health-promoting lifestyle. The first model including MBTI® personality preferences found sex, the introversion/extraversion preference dichotomy, the judging/perceiving preference dichotomy, and ethnicity had a predictive relationship. Female subjects, subjects preferring extraversion, subjects preferring judging and Caucasian subjects reported significantly more health-promoting lifestyle behaviors.

Research has demonstrated female subjects participate in significantly more health-promoting behaviors (Oleckno & Blacconiere, 1990; LaRouche, 1998; Dubois, 2006). In addition, female subjects in the current study scored higher on five out of the six subscales so the expectation would be the aggregate health-promoting lifestyle would be higher for female subjects. The current finding with Caucasian subjects reporting significantly higher scores is inconsistent with Dubois (2006) study that found African-Americans had higher scores for health promoting lifestyle.

The second model included MBTI® personality types revealed sex and ethnicity were significantly predictive. These results are similar to the first model for health-
promoting lifestyle. In addition, three personality types were significantly predictive. ENTJ, INFP and INTP personality types were significant for health-promoting lifestyle behaviors. The ENTJ personality type had a significant positive relationship with health-promoting lifestyle. This finding was expected as health-promoting lifestyle is an aggregate score of the subscales. ENTJs had a significant predictive relationship with nutrition, health responsibility, and physical activity. The ENTJ personality type is decisive, assertive, assumes leadership roles, and enjoys long-term planning and goal-setting (Myers, 2003). Myers et al. (1998) describes ENTJs as self-confident and effective managers of human and material resources to achieve goals. The characteristics of the ENTJ type are consistent with individual attributes expected to take control and participate in health-promoting behaviors.

The INFP and INTP personality types participated in significantly less health-promoting behaviors. The three commonalities with the types are the I, N, and P preferences. INTP personality types are logical, analytical, detached, and objectively critical (Myers, 2003). INTP’s have been described as mentally quick and insightful (Myers et al., 1998). INFP personality types are sensitive, concerned, idealistic and loyal (Myers, 2003). INFP’s have been described as difficult to understand, original, with a long-range vision (Myers et al., 1998). Both types are independent, quiet, curious, and creative. Although these characteristics do not appear to have a negative relationship with health-promoting lifestyle; the characteristics must present a framework for decreased participation in health-promoting activities and behaviors. As found in the first model for health-promoting lifestyle, both the judging and extraversion preferences were predictive of healthier lifestyles. Neither of the two personality types is represented with
an “E” (extraversion) or “J” (judging) preference. The introversion and perceiving preferences may have been the deciding factor for the negative relationship with health-promoting lifestyle.

**Cigarette Smoking**

Neither model including MBTI® personality preferences or types demonstrated a significant predictive relationship with the number of days cigarettes were smoked. However, in the first model father’s social position and the judging/perceiving preference dichotomy had a predictive relationship. The results revealed the perceiving personality preference and higher father’s social position (lower SES) could predict significantly more days cigarettes were smoked.

Subjects whose father had a higher social position score (lower SES) predicted more days smoking. The CDC (2009a) reported persons with lower socioeconomic status smoked more, had more health problems caused by smoking, and had higher tobacco related mortality. The judging/perceiving personality preference is concerned with how individuals deal with the outer world. Characteristics for the perceiving preference are spontaneity, flexibility, open-mindedness, and being energized by last minute pressures (Myers, 2003). The lack of organization, schedules, and plans appear to lead to additional cigarette smoking. After a thorough review of the literature, the researcher could not find research with MBTI® personality preferences and cigarette smoking. However, there is research with the NEO-PI and cigarette smoking. The constructs for the NEO-PI have been directly correlated (p<.001) with the MBTI® dichotomous preferences (McCrae & Costa, 1989; MacDonald et al., 1994). The NEO-PI’s low conscientiousness is significantly correlated to the MBTI®’s perceiving
preference (McCrae & Costa, 1989; MacDonald et al., 1994). Vollrath and Torgersen (2008) found individuals with low conscientiousness were significantly more likely to use tobacco. Hong and Paunonen (2009) and Raynor and Levine (2009) reported individuals with low conscientiousness smoked more cigarettes. The current study appears to corroborate the direct link between the MBTI® and NEO-PI (Big Five).

Surprisingly, the extraversion preference did not have a predictive affect for cigarette smoking. The Vollrath and Torgersen (2008), Hong and Paunonen (2009) and Raynor and Levine (2009) studies reported individuals with NEO-PI high extraversion trait were significantly more likely to use tobacco and/or smoke. The researcher is unsure why the MBTI® extraversion personality preference was not significant. Social smoking has been found to be a significant motive for college smokers and subjects preferring extraversion are more social than their introverted counterparts (Moran, Wechsler, & Rigotti, 2004; Jackson, Colby, & Sher, 2010). However, research has determined the majority of social smokers do not believe they are smokers, and may not have reported they were smokers. This may explain the lack of significance for the extraversion preference.

The second model included MBTI® personality types and revealed higher father’s social position (lower SES) could predict significantly more days cigarettes were smoked. These results are similar to the first model for cigarette smoking. In addition, two personality types, ENFP and ISTP, were significant for the number of days cigarettes were smoked. Both personality types predicted significantly more days cigarettes were smoked. Descriptions provided for each of the types does not reveal why these two personality types would be significant. ENFP’s are curious, creative, energetic,
enthusiastic, and spontaneous (Myers, 2003). ISTP’s are practical, realistic, analytical, and logical (Myers et al., 1998). However, the one, and only, commonality between the two types is the “P” perceiving preference. As found with the model including personality preferences, the perceiving preference predicted significantly more cigarette smoking. Higher father’s social position (lower SES) and the perceiving preference appear to be the deciding factors for cigarette smoking using the selected predictor variables.

**Alcohol Use Behaviors**

*Alcohol Consumption*

The results revealed models including MBTI® personality preferences and types were significant predictors for the number of days alcohol was consumed. The first model including MBTI® personality preferences found age, sex, ethnicity, introversion/extraversion preference dichotomy, and judging/perceiving preference dichotomy were predictors for alcohol consumption. Male subjects, Caucasian subjects, increased age, subjects preferring extraversion and perceiving increased the number of days alcohol was consumed.

Sex differences with alcohol consumption have been consistently reported. Males consume more alcohol, more times per week, than females (ACHA, 2010; Raynor & Levine, 2009; Hong & Paunonen, 2009; CDC, 2009c; Benton, Benton, & Downey, 2006; Labrie, Hummer, & Pedersen, 2006). Studies have shown ethnicity differences with alcohol consumption. The CDC (2009c) reported Caucasians drank more (58.3 % to 42.7%) than minorities. Wechsler et al. (2002) and Huang, Dejong, Towvim, and Shneider (2009) studies revealed Caucasians drank more than other minorities. Research
on age and alcohol consumption has had mixed findings. Wechsler et al. (2002) found alcohol consumption increased from freshman through junior years, but then decreased during the senior year. Huang et al. (2009) reported students abstained from alcohol less each year beginning with freshman, thus an increase in alcohol use each year from freshman to senior years.

The extraversion and perceiving preference predicted more alcohol use. The introvert/extravert dichotomy describes where individuals focus their attention and attain energy from the environment. Extraverts are more sociable, expressive, take initiative to develop relationships, and are energized by people and activity (Myers et al., 1998). The judging/perceiving preference dichotomy is focused on how individuals deal with the outside world. Subjects preferring perceiving are spontaneous, flexible, casual, and are energized by last minute pressures (Myers, 2003). After a thorough review of the literature, the researcher was unable to find studies that utilized the MBTI® with alcohol behaviors. Nonetheless, there is similar research utilizing the NEO personality instrument. The constructs for the NEO-PI have been directly correlated (p<.001) with the MBTI® dichotomous preferences (McCrae & Costa, 1989; MacDonald et al., 1994). The NEO-PI’s high extraversion and low conscientiousness are significantly associated to the MBTI®’s extraversion and perceiving preferences (McCrae & Costa, 1989; MacDonald et al., 1994). Vollrath and Torgersen (2008) found individuals with high extraversion and low conscientiousness were significantly more likely to consume alcohol. Raynor and Levine (2009) reported similar results; individuals with high extraversion and low conscientiousness were more likely to consume alcohol. Hong and Paunonen (2009) reported men with low conscientiousness and high extraversion drank
more times per week. Personality preferences, as measured by the MBTI®, do appear to corroborate with the NEO-PI results for alcohol consumption.

The second model included MBTI® personality types and revealed age, sex, and ethnicity, were predictors for alcohol consumption. These finding are similar to the first model including personality preferences. In addition, ESTP’s, ENTP’s, ESFP’s, and ENFP’s predicted significantly more days alcohol was consumed. The consistent preferences with the significant types were “E” and “P”. As reported in the first model, the perceiving and extraversion preference predicted significantly more days alcohol was consumed. Interestingly, all of the personality types with “E” (extraversion) and “P” (perceiving) were significant predictors for the number of days alcohol was consumed. The results point to the characteristics of social interaction and spontaneity as predictors for alcohol consumption. Vaisman-Tzachor and Lai (2008) concluded social involvement was positively correlated to increased alcohol consumption. Labrie, Hummer, and Pedersen (2006) reported social motives were the most important reason for consuming alcohol. The individual preferences that construct the whole types appear to be the prevalent predictors for increased alcohol use.

**Binge Drinking**

The results revealed models including MBTI® personality preferences and types were significant predictors for the number of days subjects reported binge drinking. The first model including MBTI® personality preferences found the introversion/extraversion preference dichotomy and the judging/perceiving preference dichotomy were predictors for alcohol consumption. Subjects preferring extraversion and perceiving increased the number of days they reported binge drinking.
Extraverts prefer social environments and research has shown the link between social involvement and motives with alcohol consumption (Vaisman-Tzachor & Lai, 2008; Labrie, Hummer, & Pedersen, 2006). Once more, the researcher was not able to find research using the MBTI® with binge drinking, but there is research with the NEO-PI and binge drinking. As discussed with alcohol consumption, the NEO-PI’s high extraversion and low conscientiousness are significantly associated (p<.001) to the MBTI®’s extraversion and perceiving preferences (McCrae & Costa, 1989; MacDonald et al., 1994). Vollrath and Torgersen (2008) reported more binge drinking from subjects with high extraversion and low conscientiousness. Raynor and Levine (2009) found similar results with high extraversion and low conscientiousness associated with increased binge drinking. The perceiving preference predicted the majority of variance for binge drinking.

The second model included MBTI® personality types and revealed six personality types were predictors for binge drinking. The ISTP, ESTP, ESFP, ENTP, ESTJ, and ENFP personality types predicted significantly more binge drinking. The constants with the significant types are the “E” and “P. Five out of the six types begin with extraversion and five out of the six types end with perceiving. Important to note, all the personality types with “E” and “P” are represented. As reported in the first model, the perceiving and extraversion preference predicted significantly more binge drinking. As with alcohol consumption, the individual preferences that construct the whole types appear to be the prevalent predictors for increased binge drinking.

Unexpectedly, the results did not demonstrate a significant relationship with the thinking/feeling preference dichotomy. Research has demonstrated agreeableness is
inversely related to alcohol consumption (Raynor & Levine, 2009; Malouff et al., 2007). The NEO-PI’s agreeableness is directly related (p<.001) to the MBTI®’s thinking/feeling preference (McCrae & Costa, 1989; MacDonald et al., 1994). The researcher would have expected the feeling preference to predict significantly more binge drinking.

*Heavy Drinking*

The results revealed models including MBTI® personality preferences and types were significant predictors for the number of days subjects reported heavy drinking. The first model including MBTI® personality preferences determined the introversion/extraversion preference dichotomy and judging/perceiving preference dichotomy were predictors for alcohol consumption. Subjects preferring extraversion and perceiving increased the number of days they reported binge drinking.

The second model included MBTI® personality types and revealed three personality types were predictors for heavy drinking. The ISTP, ESFP, and ENFP personality types predicted significantly more binge drinking. These three types were also significant predictors for alcohol consumption and binge drinking. The perceiving preference is involved in all three significant personality types. The spontaneity and “fly by the seat of your pants” of subjects preferring perceiving must play an important role in alcohol use behaviors. After a thorough review of the literature, the researcher was unable to locate published research regarding rapid drinking.

*Rapid Drinking*

The results revealed neither of the models including MBTI® personality preferences and types was significant for the number of days subjects reported rapid drinking (funneling). However, the first model including MBTI® personality preferences
found the judging/perceiving preference dichotomy were predictors for rapid drinking. Subjects preferring perceiving increased the number of days they reported rapid drinking.

The second model included MBTI® personality types and revealed three personality types were predictors for heavy drinking. The ISTP, ESFP, and ENFP personality types predicted significantly more rapid drinking. These three types were also significant predictors for alcohol consumption, binge drinking, and heavy drinking. The perceiving preference is involved in all three significant personality types. After a thorough review of the literature, the researcher was unable to locate published research regarding heavy drinking.

**Conclusion**

The results for the MBTI® personality preferences and types were presented. The MBTI® results had two unexpected outcomes. First- was the overrepresentation of the ENFP personality type, which accounted for 20% of the total sample. Second- was the significant mean difference by sex for the judging/perceiving personality preference. Neither outcome could be explained by the literature.

The HPLP II results were reported and revealed female subjects had higher mean scores for nutrition, interpersonal relations, health responsibility, spiritual growth, stress management, and aggregate health-promoting lifestyle. Male subjects had higher mean scores for physical activity. The overall sample mean for health-promoting lifestyle was slightly above average at 2.56.

The results for the research hypotheses were reported. The models demonstrated a significant predictive relationship with nutrition, interpersonal relations, spiritual growth, physical activity, health-promoting lifestyle, alcohol consumption, binge
drinking, and heavy drinking. When the models were not significant, specific predictor variables revealed a significant predictive relationship. However, interpretation of the results should be done with caution. The variance explained by each model was consistently low, which reveals there are variables that account for more variance in the selected health behaviors.

The discussion of the results had challenges as certain dependent variables had little-to-no published research with which to make comparisons. The researcher was unable to find comparable research involving personality and spiritual growth, interpersonal relations, health-promoting lifestyle, heavy drinking, and rapid drinking. Torgersen and Vollrath (2006) expressed concern for the lack of research on the relationship between personality types and health behaviors.
CHAPTER 5:
SUMMARY, LIMITATIONS, IMPLICATIONS, & RECOMMENDATIONS

The chapter presents a summary of the study findings. Following the summary, the limitations of the study will be discussed. Lastly, implications of the findings and recommendations for further study will be presented.

Summary

The purpose of the study was to examine the relationship between MBTI® personality preferences and types and both selected health-promoting and selected risk-taking behaviors among residential college students. Furthermore, several potential mediating demographic variables were added to the study to assess their relationships to the selected health behaviors. Models were built with the significant predictor variables as an exploratory technique and to aid in future research.

Personality has long been considered to have a relationship with human actions, but there has been little research between health behavior and personality constructs until the last two decades. The overwhelming majority of this research has utilized personality trait instruments, such as the NEO-PI (McCrae and Costa, 1989), and has yielded promising results. Conversely, as discussed by Vollrath and Torgersen (2006), personality type research has just recently begun. The Myers-Briggs Type Inventory® has been used to determine the personality types of individuals for over 50 years and is the most widely used personality instrument in the world (Myers et al., 1998). Yet, there is little published research on MBTI® personality preferences/types and health behaviors. Even after an exhaustive search, the researcher could not find any published studies of the MBTI®'s relationship to any of the selected health-promoting behaviors or alcohol use. The current study extends personality and health research by utilizing a personality
“type” instrument on the selected health behaviors. In addition, the study builds onto the existing personality “trait” research with the selected health behaviors.

There were 406 randomly sampled residential students who volunteered to participate in the study. The age range of subjects was between 18-28 years with 98.3% reporting between 18-22 years. Two self-report, cross-sectional instruments (MBTI® & HPLP II) and a demographic questionnaire were used to obtain data.

Three research questions guided the study with the following results.

1. Can health-promoting behaviors measured by the Health-promoting Lifestyle Profile II be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality types and/or personality preferences as measured by the Myers-Briggs Type Indicator®? The results revealed the models were significant for nutrition, interpersonal relations, spiritual growth, physical activity, and aggregate health-promoting lifestyle. The health responsibility and stress management models were not significant, although the behaviors had specific predictor variables that were significant.
   a. Interpersonal relations was predicted by the ISTJ type, INTP type, INFP type, ESTJ type, extraversion preference, father’s social position, sex, and ethnicity.
   b. Spiritual growth was predicted by the ESTJ type, INFP type, INTP type, extraversion preference, judging preference, sex, and ethnicity.
   c. Physical activity was predicted by the ESFP type, INTJ type, ENTJ type, ENFJ type, and sex.
d. Health-promoting lifestyle was predicted by the ENTJ type, INTP type, INFP type, extraversion preference, judging preference, sex, and ethnicity.

e. Nutrition was predicted by the ENTJ type and ethnicity.

f. Health responsibility was predicted by the ENFJ type, ENTJ type, sex, and freshman academic classification.

g. Stress management was predicted by the judging preference.

2. Can cigarette smoking be predicted by sex, age, ethnicity, academic classification, mean family income, parental social position, and personality type preferences and/or personality types as measured by the Myers-Briggs Type Indicator®? The results revealed the overall model was not significant for cigarette smoking.

   a. Cigarette smoking (# of days cigarettes were smoked in last month) was predicted by the ENFP type, ISTP type, perceiving preference, and father’s social position.

   b. Cigarettes smoked (# of cigarettes smoked per day) was predicted by the ENFP type, perceiving preference, and father’s social position.

3. Can alcohol use be predicted by sex, age, ethnicity, mean family income, academic classification, parental social position, and personality type preferences and/or personality types as measured by the Myers-Briggs Type Indicator®? The results revealed the overall models were significant for alcohol consumption, binge drinking, and heavy drinking. The model for rapid drinking was not significant.
a. Alcohol consumption was predicted by the ESTP type, ENTP type, ESFP type, ENFP type, extraversion preference, perceiving preference, age, ethnicity, and sex.

b. Binge drinking was predicted by the ESTP type, ESFP type, ENFP type, ENTP type, ESTJ type, ISTP type, extraversion preference, and perceiving preference.

c. Heavy drinking (getting drunk) was predicted by the extraversion preference, perceiving preference, ISTP type, ESFP type, and ENFP type.

d. Rapid drinking (funneling) was predicted by the perceiving preference, ISTP type, ESFP type, and ENFP type.

Additional key findings from the study:

1. Three personality types were significant predictors for more than two of the health-promoting behaviors. The ENTJ personality type was a significant positive predictor of health-promoting behaviors. ENTJ subjects participated in significantly more nutrition, health responsibility, physical activity, and health-promoting lifestyle behaviors. The ENTJ’s appear to be active participants in positive health behaviors. The INTP and INFP personality types were significant negative predictors of health-promoting behaviors. The two personality types predicted significantly less participation in interpersonal relations, spiritual growth, and health-promoting lifestyle behaviors. Overall, eight out of the 16 personality types were predictors of a selected health-promoting behavior, but only these three had a significant relationship with more than two health-promoting behaviors.
2. There appear to be risk-taking personality types. The ISTP and ENFP personality types were significant predictors for increased participation in cigarette smoking, number of cigarettes smoked, alcohol consumption, binge drinking, heavy drinking, and rapid drinking. These two personality types were the only types to be significant predictors of all the selected risk-taking behaviors. The combination of the preferences to form the whole type may provide a foundation for a risk-taking personality. Furthermore, neither of the types were predictors for any of the selected health-promoting behaviors. Future research may conclude the self-destructive nature of these two personality types.

3. The results revealed the significance of the introversion/extraversion and judging/perceiving preference dichotomies with health-promoting and risk-taking behaviors. The introversion/extraversion preference dichotomy had a predictive relationship with interpersonal relations, spiritual growth, health-promoting lifestyle, alcohol consumption, binge drinking, heavy drinking, and rapid drinking. The judging/perceiving preference dichotomy had a predictive relationship with spiritual growth, stress management, health-promoting lifestyle, alcohol consumption, binge drinking, heavy drinking, and cigarette smoking. Interestingly, the introversion/extraversion and judging/perceiving preference dichotomies are considered “attitudes” in Jung’s theory. The “mental functions” are the sensing/intuiting and thinking/feeling preference dichotomies in Jung’s theory, which had no impact on the health-promoting and risk-taking behaviors. The results demonstrate the attitudes of the MBTI® were most important when predicting health behaviors.
4. The results revealed the positive effect of extraversion and the negative effect of introversion on health-promoting behaviors. Personality types beginning with an “I” or “E” preference with a significant relationship with a health-promoting behavior demonstrated a truly dichotomous result. Significant personality types that began with an “I” had a negative relationship with the health-promoting behaviors/lifestyle and significant personality types beginning with “E” had a positive relationship with health-promoting behaviors/lifestyle. An example was the ENTJ, ESFP, and ENFJ personality types predicted significantly more physical activity behaviors. The introverted types predicted significantly less health-promoting behaviors, such as the INTP personality type predicted significantly lower interpersonal relations and spiritual growth behaviors. The only exception for “I” types was the INTJ type predicted more physical activity behaviors. The results demonstrate how an individual gains energy (outward or inward) has a significant effect on his/her participation in positive health behaviors.

5. The results revealed the opposite effect extraversion had on health-promoting behaviors and risky-health behaviors. Extraversion predicted significantly more participation in health-promoting behaviors, such as interpersonal relations, spiritual growth, and health-promoting lifestyle. In contrast, extraversion predicted more participation in risky health behaviors, such as increased alcohol consumption, binge drinking, heavy drinking, and rapid drinking. There appears to be a positive and negative side to the extraversion preference and the subsequent characteristics.
6. The results revealed ethnicity had an effect on health-promoting and risk-taking behaviors. Ethnicity was a significant predictor for nutrition, interpersonal relations, spiritual growth, health-promoting lifestyle, and alcohol consumption. In the vast majority of studies cited, ethnicity was used only to generalize the sample population to the total population. The results reveal ethnicity should be added as a mediating variable in future research involving both health-promoting and health-risk behaviors. An important note for this study is although the sample population mirrored the total population, the population as a whole was not diverse. Eighty-eight percent of the sample reported Caucasian ethnicity and an additional three percent selected “no response” or “other”. The remaining nine percent was divided among the remaining ethnicities.

7. The results revealed sex had an effect on health-promoting and risk-taking behaviors. Sex was a significant predictor for interpersonal relations, health responsibility, spiritual growth, physical activity, health-promoting lifestyle, and alcohol consumption. Sex has been considered in numerous studies, but some studies only use sex to generalize the sample population to the total population. The results reveal sex should be added as a mediating variable in future research involving both health-promoting and risk-taking behaviors. In the current study, accounting for sex yielded improved results.

8. The results confirmed the direct relationship between the NEO-PI and the MBTI® personality instruments. Although the NEO-PI is a personality trait instrument and the MBTI® is a personality type instrument, there was considerable agreement with the findings. Research has reported a direct correlation between the two, but
there have not been findings published using similar variables. The NEO-PI Extraversion trait, specifically high extraversion, and the MBTI® extraversion preference revealed a significant relationship with alcohol use behaviors and physical activity. In addition, the NEO-PI conscientious trait, specifically low conscientiousness, and the MBTI® perceiving preference reported a significant relationship with alcohol use behaviors and cigarette smoking. One reported finding from the NEO-PI research and the current selected behaviors was not supported using the MBTI® preferences. The NEO-PI Extraversion trait, specifically high extraversion, reported a positive relationship with cigarette smoking, but this was not supported by the MBTI® extraversion preference. The current study supports the direct correlation between the two personality instruments and the efficacy of using the MBTI® in research, particularly health behavior research.

**Limitations**

1. The study used a cross-section design. The research looked at a specific point in time and the results may not be consistent over time. A longitudinal study is needed to determine if these results are consistent. Moreover, the freshmen subjects (44% of the sample) had been on campus less than 24 hours before survey administration; therefore many of the health habits reported were pre-college.

2. The instruments used in the study were self-report. Although self-report instruments have been shown to be reliable, there is always a chance of response bias. As illustrated by data provided by the CDC, Kentuckians have shown a lack
of consistency with responses to health related questions (e.g. 67% stated they were overweight or obese, but 80% stated they were in good to excellent health).

3. The study used stepwise regression for model development. Stepwise regression was not used to test the model, but as an explanatory method and to build a model for future research. However, there can be undesirable results when using stepwise regression. Altman and Andersen (1989) reported several problems with stepwise variable selection such as:

   a. it yields R-squared values that are biased high,
   
   b. the method yields confidence intervals for effects and predicted values that are falsely narrow,
   
   c. a sequence of F-tests is often used to control the inclusion or exclusion of variables, but these are carried out on the same data and so there will be problems of multiple comparisons for which many correction criteria have been developed,
   
   d. it yields P-values that do not have the proper meaning,
   
   e. it gives biased regression coefficients that need shrinkage (the coefficients for remaining variables are too large),
   
   f. and it has problems in the presence of collinearity.

4. Numerous independent variables were significant predictors for the selected health behaviors, but the variance explained by the predictor variables was small. This is particularly accurate when personality types were tested, as there were 16 variables in addition to the demographic variables. A large amount of predictor variables can artificially inflate the variance. However, even with the 25 (types
plus demographic variables) predictor variables the variance was still consistently 
small, with the exception of interpersonal relations. There must be factors outside 
of the studied variables that are significant and account for more variance in the 
selected health behaviors.

5. The results of the MBTI® yield one of 16 possible personality types for each 
subject. These personality types are not evenly distributed among the population. 
Large samples are required in order to provide accurate results. With the current 
sample, five of the 16 personality types had 11 subjects or less. In order to 
provide more reliable results a larger sample would be needed so even the least 
represented type would have an ample number of subjects. The significant 
models including personality types, such as nutrition, interpersonal relations, 
spiritual growth, and physical activity, should be viewed with caution.

6. The study used MBTI® Form M, which is the most accurate paper version of the 
MBTI® to determine personality preferences and type. Sixty-five percent of the 
sample using Form M would have the same type preferences on all four 
constructs if administered again. However, the computer version of the MBTI® 
reports 95% of a sample would have had the same type preferences on all four 
constructs. The computer version weights the questions, which provides more 
accurate and reliable results.

7. The HPLP II provides valid and reliable results for the selected health behaviors, 
but normative data has not been established. The developer of the instrument, 
Pender, asserts the means for each of the selected health-promoting behaviors and 
aggregate health-promoting lifestyle is an average score for the health behaviors.
Scores above the mean are high and scores below the mean are low. The lack of normative data may lead to inaccurate conclusions as the true average for each of the subscales has not been determined. As researchers continue to use the instrument and numerous data are generated, the results may establish that a score of 2.6 is the true average for stress management, not the stated 2.5. The results of the current study were similar to results from other studies using the HPLP II.

8. Mean family income was acquired by taking the reported county and state information and searching the U.S. Census Bureau’s database. The current study was completed at a regional university where the majority of the students were from targeted counties. By using the Census Bureau’s information, every student from the same county was given the same mean family income (e.g. Fayette County contributed 10% of the sample). Mean family income was not a significant predictor for any of the selected health behaviors and it is unknown if the method for determining family income affected the results.

9. The findings determined ethnicity is a significant variable when studying the selected health behaviors. However, the results should be viewed with caution. Although the study sample mirrored the overall population, the overall population was not diverse with 88% reporting Caucasian ethnicity. In addition, ethnicity was compressed into a binary variable; thus the results could not identify which ethnicity, other than Caucasian, was responsible for the significant relationship.

Implications

Findings from the study have implications for students, health educators, and university counselors. Each of these groups will be discussed with relevant examples.
Student Implications

Increasing health-promoting behaviors and reducing risk-taking behaviors is vital to college success and long-term health. Understanding the predictive relationship personality has with participating in these health behaviors would allow the individual to make appropriate adjustments. Although the MBTI® personality types are innate, the preferences that compose the types are just that, preferences. Myers (2003) likened preferences to right- or left-handedness. A right-handed person can write with his/her left-hand, but it will never be as good as writing with the preferred hand. None-the-less, right-handed individuals can learn to write with their left-hand with adequate practice and the same could be applied to preferences. Individuals could learn how to use their less preferred preference to engage in healthier behaviors.

The results established numerous findings with personality preferences and types. For example, subjects preferring introversion participated in less interpersonal relations. If an individual knows he/she is an introvert, and thus is less likely to participate in this behavior, he/she could work on developing extraverted characteristics such as working to be more sociable, expressive, and attuned to the environment. Increasing these actions would naturally increase interpersonal relations, which may increase the likelihood of the person engaging in a healthier behavior.

In contrast, the extraversion preference was predictive of alcohol use behaviors. As discussed in the literature, social motives are a large reason for collegiate drinking. An extraverted person has an innate preference for social situations and gains energy from interacting with his/her environment. If a student knows he/she has a preference for extraversion, he/she would also know to be aware of social conditions that lead to consuming alcohol and try to avoid those social situations.
The study revealed personality preferences and types were a significant predictor for several of the selected health behaviors. The key is for students to know their personality preferences and the influence these factors have on their health related behaviors. Without this knowledge, the results will have no impact. This is where health educators are critical.

*Health Educator Implications*

Health educators on collegiate campuses provide vital programs that include courses and workshops on relevant health topics. Research has documented many health educators focus on risk-taking behaviors and the immediate negative consequences these behaviors have on the individual and community. However, research has revealed health-promoting behaviors are of equal importance, and college students are at a critical point for adopting these behaviors. The current study presents results health educators could use to facilitate both the effectiveness and efficiency of the selected health behaviors.

First, health educators would need to be certified to administer the MBTI®. The MBTI® certification program provides information on personality type theory, validity, reliability, scoring, and interpretation of results. Once health educators understood the theory of personality type and MBTI® use, they could begin to apply this knowledge to the relationship between personality and health behavior(s). Presenting information regarding personality preferences/types and the study findings would help students develop knowledge to make health enhancing decisions about their lifestyles. In addition, health educators could teach skills to implement those decisions into their everyday lives. An example would be to inform extraverted students that extraversion
has been found to predict significantly more alcohol consumption, and social situations are triggers. Health educators could teach skills on effective refusal skills and how to avoid social situations where alcohol is normally consumed. A critical point for students to understand is that having one personality preference or type is not better than another. One of the five key assumptions presented by Myers, et al. (1998) is one type, or preference, is not superior to another. Each of the personality preferences and whole types has positive and negative characteristics, and building skills to reduce these negative characteristics, as it pertains to health, would be the health educator’s primary focus.

Health educators could use the results for marketing programs. Marketing to introverts and extraverts, or judging and perceiving subjects would look markedly different. For instance, introverted subjects were less likely to participate in physical activity. As a result, marketing individual options for physical activity, such as running or golf, would be an effective strategy to gain their attention and possibly move them from pre-contemplation to contemplation.

The most significant use of the results may be in the development of health education programs and initiatives. Building programs or prevention initiatives could be more effective using approaches more comfortable, or preferable, to the potential target audience. Case in point, students who preferred perceiving were significantly more likely to smoke cigarettes. Understanding perceiving subjects are more impulsive, unplanned, and seek to experience life would allow health educators to design programs that focus on skills to better regulate and manage life. Perceiving students who learn to be more scheduled, planned, and structured may lead to reduced cigarette smoking.
Demographic factors demonstrated a significant relationship with several of the selected health behaviors. Although many of the demographic variables, such as sex and ethnicity, are biologic and cannot be changed, integrating the results into programs could yield more successful and long-term results. For example, male students were less likely to participate in spiritual growth behaviors. Health educators could use the finding to design initiatives targeting male students to increase participation in spiritual opportunities. Furthermore, freshmen were less likely to take responsibility for their health. Using this information helps direct educators attention toward teaching freshman the importance of being active participants in their health. The results are particularly important for universities, such as the one where the study was conducted, that require freshman to live on campus. Providing resident hall coordinators or resident assistants of freshman resident halls with this knowledge allows the staff to be efficient and focused on a health initiative that needs improvement.

Lastly, the HPLP II provided significant results for health educators. The study concluded stress management, nutrition, physical activity, and health responsibility were below average for the subjects. These results provide peer educators areas for the development of programs and marketing strategies. As discussed in the literature review, health-promoting behaviors are less of a focal point for health educators. Being able to target specific health-promoting behaviors in need of improvement allows for efficient programming and marketing.
University Counselor Implications

The study has significance for counseling students on the selected health behaviors. University counselors understand personality constructs and correlates, and as a result would easily be able to implement strategies into counseling sessions. First, the results revealed subjects preferring perceiving were less likely to use stress management techniques. Counselors could develop programs for perceiving students on time management, effective planning, and techniques to help deal with stressor in their lives.

Additionally, the study reported extraverted subjects were more likely to consume alcohol and binge drink. Extraverts prefer open communication, and social and expressive environments. Providing social, expressive opportunities, such as group therapy, would provide the ability for counselors to reach more students while still being effective. Counselors could address the individual characteristics of extraversion to help students develop alternate strategies for finding safe social environments free of alcohol or teaching refusal skills in alcohol settings.

Recommendations

The following recommendations are provided for further research in the area of personality preferences/types and the selected health behaviors.

1. When using MBTI® personality types, conduct research with a large(r) sample.

   The study revealed several of the personality types were significant predictors for specific health-promoting and risk-taking behaviors. MBTI® personality types are not evenly distributed among the population. Conducting a study with a large population, much larger than the 406 subjects in the current study, would provide
an adequate sample so even the least represented personality type would be large enough for more conclusive statistical analysis.

2. Future research with personality preferences and types needs to use a more reliable instrument to assess the personality constructs. The *MBTI® Manual* (1998) maintains individuals who use Form M have a 65% probability of attaining the same four preferences if taken again. In order to establish more accurate results, the computer version of the MBTI® could be used. The computer version of the MBTI® reports a 95% probability of attaining the same four preferences. In addition, the new paper Majors PTI is an instrument based on the MBTI® that provides the same results as the MBTI®, but asserts it has a 95% probability of attaining the same four preferences (Majors, 2011). Since personality types are determined by the four dichotomous preferences, a more reliable instrument would provide superior results.

3. Conduct research using the dominant function of the MBTI® personality types. Completing the MBTI® provides a four-letter personality type. Myers and Briggs developed a method to determine an individual’s dominant function from the subject’s four-letter personality type. The dominant function is defined as “the function that is assumed to be the first developed, most conscious, and most differentiated, and which becomes the governing force dominating and unifying one’s life” (Myers et al., 1998, p. 390). The dominant function is what a person uses in the most difficult, complex situation because it most comfortable and has demonstrated the most success. The dominant function is established by taking the result of an individual’s judging/perceiving attitude and applying it to the
corresponding mental function. As discussed in the literature review (see Table 2.1), the sensing/intuiting preferences are the perceiving functions and the thinking/feeling preferences are the judging functions. The results of an individual’s judging/perceiving attitude determines which of the mental functions is extraverted, and by default the other mental function is introverted. The mental function that matches the result of the introversion/extraversion preference is the dominant function. An example is the ISTP’s dominant function is introverted thinking. There are eight possible dominant functions, which mean two personality types share the same dominate function. INTP’s have the same dominant function as the example above. Using the dominant functions of the MBTI® in research could determine if an individual’s most effective and efficient function is predictive of health behaviors.

4. Conduct research using the preference clarity category (PCC) for the MBTI® personality preferences. Preference clarity index (PCI) scores are used to determine each of the four personality preferences of an individual when using the MBTI®. The PCI is made up of raw scores from questions on each dichotomy and demonstrate how much an individual favors one pole of the dichotomy over its opposite. Once the raw scores are added for each preference of a dichotomy, the higher scored preference is considered the individuals preferred preference. The score of the preferred preference can then be placed into a preference clarity category (PCC). The PCC reports the clarity of a reported preference for one or the other pole in the dichotomy. The categories are slight, moderate, clear, and very clear. An individual may have a very clear preference for extraversion,
slight preference for sensing, slight preference for feeling, and a moderate preference for judging – ESFJ personality type. Research cited in the MBTI® Manual (1998) concludes the higher the preference clarity category the more confident the reported preference will remain the same if tested again. Research including the PCC’s, possibly eliminating individuals with a slight PCC for a dichotomy, may provide improved results as the subject’s preferences are less likely to change. This could also allow a researcher to use the more cost effective Form M while increasing the reliability of reporting subject’s preferences.

5. Further research is needed to determine if these findings can be replicated. The results of the study revealed personality preferences and types provided a significant model for nutrition, interpersonal relations, spiritual growth, and physical activity. Using an instrument designed to study a specific behavior, as opposed to one instrument that measures numerous behaviors, may yield more conclusive results. Although personality preferences and types did not provide a predictive model for health responsibility and stress management, utilizing specific instruments designed to study these behaviors could either disprove or substantiate the non-predictive relationship.

6. Future research needs to include demographic variables, such as sex and ethnicity, to evaluate their relationship with health behaviors. Demographic variables revealed a significant relationship with several of the health-promoting and risk-taking behaviors. As noted, many of the cited studies used demographic variables to compare to the general population, but did not include them as mediating variables.
7. Conduct research with personality constructs/facets, such as MBTI® preferences and types, and alternate health behaviors that affect college students. A thorough review of the literature revealed there was very modest published research on MBTI® preferences/types and health behaviors. The current study provides a foundation for the MBTI®’s use in health research. Collegiate student health behaviors such as illicit drug use, eating disorders, and sexual activity offer stimulating opportunities for research with the MBTI®.
Appendix A

University of Kentucky
IRB Certification
EXEMPTION CERTIFICATION

MEMO: Billy Martin,
Kinesiology - Health Promotion
108 Jemima Dr.
Richmond, KY -40475
PI phone #: (859) 622-8145

IROM: Institutional Review Board
To Office of Research Integrity

SUBJECT: Exemption Certification for Protocol No. 10-0448-C4B

DATE: July 7, 2010

On June 24, 2010 it was determined that your project entitled, The Relationship OF Personality Type To Health-Promoting Behaviors In A Residential College Population, meets federal criteria to qualify as an exempt study.

Because the study has been certified as exempt, you will not be required to complete continuation or final review reports. However, it is your responsibility to notify the IRB prior to making any changes to the study. Please note that changes made to an exempt protocol may disqualify it from exempt status and may require an expedited or full review.

The Office of Research Integrity will hold your exemption application for six years. Before the end of the sixth year, you will be notified that your file will be closed and the application destroyed. If your project is still ongoing, you will need to contact the Office of Research Integrity upon receipt of that letter and follow the instructions for completing a new exemption application. It is, therefore, important that you keep your address current with the Office of Research Integrity.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's Guidance and Policy Documents webpage [http://www.research.uky.edu/ori/human/guidance/hm#Pirespl]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's website [http://www.research.uky.edu/ori]. If you have questions, need additional information, or would like a paper copy of the abovementioned document, contact the Office of Research Integrity at (859) 257-9428.
Appendix B

Eastern Kentucky University
IRB Certification
NOTICE OF IRB EXEMPTION STATUS
Protocol Number: 11-005
Institutional Review Board IRB0000G836, DHHS FWA00003332

Principal Investigator:  Billy Marin

Project Title:  The Relationship of Personality Type to Health-Promoting Behaviors in a Residential College Population

Exemption Date:  7/21/2010

Approved by:  Dr. Marcia Pierce, IRB Member

This document confirms that the institutional Review Board (IRB) has granted exempt status for the above referenced research project is outlined in the application submitted for IRB review with an immediate effective date. Exempt status means that your research is exempt from further review for a period of three years from the original notification date if no changes are made to the original protocol. If you plan to continue the project beyond three years, you are required to reapply for exemption.

Principal Investigator Responsibilities: It is the responsibility of the principal investigator to ensure that all investigators and staff associated with this study meet the training requirements for conducting research involving human subjects and follow the approved protocol.

Adverse Events: Any adverse or unexpected events that occur in conjunction with this study must be reported to the IRB within ten calendar days of the occurrence.

Changes to Approved Research Protocol: If changes to the approved research protocol become necessary, a description of the changes must be submitted for IRB review and approval prior to implementation. If the changes result in a change in your project’s exempt status, you will be required to submit an application for expedited or full IRB review. Changes include, but are not limited to, those involving study personnel, subjects, and procedures.

Other Provisions of Approval, if applicable: This study has been approved by the IRB at the University of Kentucky as Protocol Number 10-0448-X48 and is part of the principal investigator’s doctoral studies.

Please contact Sponsored Programs at 859-622-3536 or send email to gus.benson@eku.edu or tiffany.hamblin@eku.edu with questions.
Appendix C

Demographic Questionnaire
Demographic Questionnaire

Please answer by marking your selection in the box provided or writing on the line provided.

1. Current Age: ________

2. In what state is the high school from which you graduated? __________________________

3. In what city did you graduate from high school? __________________________

4. What is the name of the county in which your high school was located? __________________________

5. Gender:
   Male □ Female □

6. Race/Ethnicity:
   Asian/Pacific Islander □
   Black, non-Hispanic □
   Caucasian, non-Hispanic □
   Hispanic □
   Native American □
   Multi-ethnic □
   Other □
   I do not wish to respond □

7. Academic Classification:
   Freshman □ Junior □ Graduate Student □
   Sophomore □ Senior □

8. What is the occupation of your father (male guardian)? __________________________
   What is the occupation of your mother (female guardian)? __________________________
   If you answered retired, deceased, or disabled to #9 then what was his/her occupation prior to that? father (male guardian) __________________________ mother (female guardian) __________________________

9. What is the highest level of education of your
   Father (Male guardian) Mother (Female guardian)
   Graduate Professional (e.g. masters, doctorate, MD, chiropractor) □ □
   College/University Graduation (4 year degree) □ □
   Partial College Training (completed at least 1 year of college) □ □
   High School Diploma (GED) □ □
   Partial High School (completed 10th or 11th grade) □ □
   Junior High School (completed 7th through 9th grade) □ □
   Less than 7th grade □ □
10. During the last 30 days, on how many days did you smoke per day?

- 0 days
- 1 or 2 days
- 3 or 5 days
- 6 or 9 days
- 10 to 19 days
- 20 to 29 days
- All 30 days

11. During the last 30 days, on the days you smoked, how many cigarettes did you smoke per day?

- Did not smoke in the past 30 days
- Less than 1 cigarette per day
- 1 cigarette per day
- 2-5 cigarettes per day
- 6-9 cigarettes per day
- 10-20 cigarettes per day
- More than 20 cigarettes per day

12. During the past 30 days, on how many days did you engage in the following:

a) Had at least 1 drink of alcohol?

- 0 days
- 1-2 days
- 3-5 days
- 6-9 days
- 10-19 days
- 20-30 days

b) Had five or more drinks of alcohol during one sitting?

- 0 days
- 1-2 days
- 3-5 days
- 6-9 days
- 10-19 days
- 20-30 days

c) Drank enough to get drunk—unsteady, dizzy, or sick to your stomach, or passed out or blacked out—?

- 0 days
- 1-2 days
- 3-5 days
- 6-9 days
- 10-19 days
- 20-30 days

d) Drank rapidly: shooting beer, funneling, 4+ shots per hour?

- 0 days
- 1-2 days
- 3-5 days
- 6-9 days
- 10-19 days
- 20-30 days
Appendix D

Health Promoting Lifestyle Profile II
**LIFESTYLE PROFILE II**

**DIRECTIONS:** This questionnaire contains statements about your present way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the frequency with which you engage in each behavior by circling:

- **N** for never,  **S** for sometimes,  **O** or often, or  **R** for routinely

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>NEVER</th>
<th>SOMETIMES</th>
<th>OFTEN</th>
<th>ROUTINELY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Discuss my problems and concerns with people close to me.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>2.</td>
<td>Choose a diet low in fat, saturated fat, and cholesterol.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>3.</td>
<td>Report any unusual signs or symptoms to a physician or other health professional.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>4.</td>
<td>Follow a planned exercise program.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>5.</td>
<td>Get enough sleep.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>6.</td>
<td>Feel I am growing and changing in positive ways.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>7.</td>
<td>Praise other people easily for their achievements.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>8.</td>
<td>Limit use of sugars and food containing sugar (sweets).</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>9.</td>
<td>Read or watch TV programs about improving health.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>10.</td>
<td>Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>11.</td>
<td>Take some time for relaxation each day.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>12.</td>
<td>Believe that my life has purpose.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>13.</td>
<td>Maintain meaningful and fulfilling relationships with others.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>14.</td>
<td>Eat 6-11 servings of bread, cereal, rice and pasta each day.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>15.</td>
<td>Question health professionals in order to understand their instructions.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>16.</td>
<td>Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>17.</td>
<td>Accept those things in my life which I can not change.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>18.</td>
<td>Look forward to the future.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>19.</td>
<td>Spend time with close friends.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>20.</td>
<td>Eat 2-4 servings of fruit each day.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>22.</td>
<td>Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>23.</td>
<td>Concentrate on pleasant thoughts at bedtime.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>24.</td>
<td>Feel content and at peace with myself.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>25.</td>
<td>Find it easy to show concern, love and warmth to others.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>26.</td>
<td>Eat 3-5 servings of vegetables each day.</td>
<td>N</td>
<td>S</td>
<td>O</td>
<td>R</td>
</tr>
</tbody>
</table>
27. Discuss my health concerns with health professionals.  
28. Do stretching exercises at least 3 times per week.  
29. Use specific methods to control my stress.  
30. Work toward long-term goals in my life  
31. Touch and am touched by people I care about.  
32. Eat 2-3 servings of milk, yogurt or cheese each day.  
33. Inspect my body at least monthly for physical changes/danger signs.  
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).  
35. Balance time between work and play.  
36. Find each day interesting and challenging.  
37. Find ways to meet my needs for intimacy.  
38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.  
39. Ask for information from health professionals about how to take good care of myself.  
40. Check my pulse rate when exercising.  
41. Practice relaxation or meditation for 15-20 minutes daily.  
42. Am aware of what is important to me in life.  
43. Get support from a network of caring people.  
44. Read labels to identify nutrients, fats, and sodium content in packaged food.  
45. Attend educational programs on personal health care.  
46. Reach my target heart rate when exercising.  
47. Place myself to prevent tiredness.  
48. Feel connected with some force greater than myself.  
49. Settle conflicts with others through discussion and compromise.  
50. Eat breakfast.  
51. Seek guidance or counseling when necessary.  
52. Expose myself to new experiences and challenges.

© S.N. Walker, K. Sechrest, N. Pender, 1995
For information about this scale go to www.unmc.edu/nursing/.
Appendix E

Health-Promoting Lifestyle Profile II
Scoring Instructions
HEALTH-PROMOTING LIFESTYLE PROFILE II

Scoring Instructions

Items are scored as

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Never (N)</td>
</tr>
<tr>
<td>2</td>
<td>Sometimes (S)</td>
</tr>
<tr>
<td>3</td>
<td>Often (O)</td>
</tr>
<tr>
<td>4</td>
<td>Routinely (R)</td>
</tr>
</tbody>
</table>

A score for overall health-promoting lifestyle is obtained by calculating a mean of the individual's responses to all 52 items; six subscale scores are obtained similarly by calculating a mean of the responses to subscale items. The use of means rather than sums of scale items is recommended to retain the 1 to 4 metric of item responses and to allow meaningful comparisons of scores across subscales. The items included on each scale are as follows:

- Health-Promoting Lifestyle 1 to 52
- Health Responsibility 3, 9, 15, 21, 27, 33, 39, 45, 51
- Physical Activity 4, 9, 16, 22, 28, 34, 40, 46
- Nutrition 2, 8, 14, 20, 26, 32, 38, 44, 50
- Spiritual Growth 6, 12, 18, 24, 30, 36, 42, 48, 52
- Interpersonal Relations 1, 7, 13, 19, 25, 31, 37, 43, 49
- Stress Management 5, 11, 17, 23, 29, 35, 41, 47

3/95: snw
Appendix F

Permission for HPLP II
Dear Colleague:

Thank you for your interest in the Health-Promoting Lifestyle Profile II. The original Health-Promoting Lifestyle Profile became available in 1987 and has been used extensively since that time. Based on our own experience and feedback from multiple users, it was revised to more accurately reflect current literature and practice and to achieve balance among the subscales. The Health-Promoting Lifestyle Profile II continues to measure health-promoting behavior, conceptualized as a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization and fulfillment of the individual. The 52-item summated behavior rating scale employs a 5-point response format to measure the frequency of self-reported health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations and stress management. It is appropriate for use in research within the framework of the Health Promotion Model (Pender, 1987), as well as for a variety of other purposes.

The development and psychometric evaluation of the English and Spanish language versions of the original instrument have been reported in:


Copyright of all versions of the instrument is held by Susan Noble Walker, EdD, RN, FAAN, Karen R. Sechrist, PhD, RN, FAAN and Nola J. Pender, PhD, FN, FAAN. The original Health-Promoting Lifestyle Profile is no longer available. You have permission to download and use the HPLP II for non-commercial data collection purposes such as research or evaluation projects provided that content is not altered in any way and the copyright/permission statement at the end is retained. The instrument may be reproduced in the appendix of a thesis, dissertation or research grant proposal. Reproduction for any other purpose, including the publication of study results, is prohibited.

A copy of the instrument (English and Spanish versions), scoring instructions, an abstract of the psychometric findings, and a list of publications reporting research using all versions of the instrument are available for download.

Sincerely,

Susan Noble Walker, EdD, FN, FAAN
Professor Emeritus
Appendix G

Survey Administrator Instructions
STANDARDIZED INTRODUCTORY REMARKS TO BE MADE WHEN DISTRIBUTING RESEARCH PACKETS TO SUBJECTS

Research project examining the relationship between personality type preferences and health-promoting behaviors

Billy Martin
Department of Kinesiology and Health Promotion
University of Kentucky
Lexington, KY

Dear Resident Assistant,

Thank you for your assistance with distributing the instruments for this study. As we discussed earlier this summer, you are to disseminate the provided packets to all residents who volunteer to participate. Before doing so, please read the following statement word-for-word to all those participating in the study. After reading the information, please have all residents complete and return ALL three assessments given to them in their packets. More in depth information about the study as well as contact information is in the Participation letter provided.

Students may use either a pencil or a blue or black ink pen on the assessments. If a student does not wish to answer a certain question, they may leave it blank.

If you should have any questions regarding the study during implementation, please call me at ____________.

Thank you again for your assistance,

Billy Martin
Doctoral Student
University of Kentucky

Flipped over for reading instructions:
Please read the following items word-for-word before distributing the research packets:

- University Housing is participating in a research study being conducted through the University of Kentucky.

- The study is to examine the relationship between personality type preferences and health-promoting behaviors among residential college students.

- Participation involves completing three short surveys, which combined should take approximately 30 minutes to complete.

- Your participation in this research is strictly voluntary.

- Your completion and submission of the study packets indicates your consent to participate.

- All of these surveys are anonymous and any information you provide will not be identifiable to you.

- Once you have completed all surveys, please place the packet in the envelope held by the RA.

- Please keep all three instruments stapled together.

- Please do not put any identifying marks on the instruments.

- If you are interested in the Myers-Briggs Personality Type Inventory®, there will be three programs offered to residential students throughout the fall semester. Information will be posted in the residence halls after these program dates and times have been finalized.
Appendix H

Participation Letter
Participation Letter

Research Title: The Relationship of Personality Type to Health-Promoting behaviors in a Residential College Population

You are invited to participate in a research study designed to determine if there is a relationship between personality type and health-promoting behaviors. This study is being conducted by Billy Martin, doctoral candidate in Kinesiology and Health Promotion at the University of Kentucky. The study is being guided by Dr. Richard Riggs, dissertation committee chair.

You were selected as a possible participant because you are currently a residential student at Eastern Kentucky University. Participation is entirely voluntary. If you decide to participate, all you need to do is complete a Demographic Questionnaire, Myers-Briggs Type Inventory® and the Health-Promoting Lifestyle Profile II. Completion of these three surveys will take approximately 30 minutes.

You must be age 18 or older to participate in this study. Consent for participation is implied with your completion and submission of these surveys.

There are no direct benefits for your participation. However, the results of this study could lead to development, implementation, and improvement of health education/promotion programs specific to the EKU student population.

To the best of our knowledge, the risk of filling out the three instruments will have no more risk of harm than you would experience in everyday life. Only the researcher will have access to the surveys and no attempt will be made to identify the participants. The only information that will be collected will be the participants’ responses to the questions. No identifying information is requested. The collective data may be used in publications or presentations. The information you provide will be grouped with the responses of others and will not be associated with any single individual. You may choose to withdraw from the study at any time by not submitting any or all of the questions or surveys. However, after you have submitted the surveys there will be no way of withdrawing your information since we have no way of identifying your surveys. There will be three MBTI® programs offered to the residential students during the semester as an alternative to participate. The programs will be advertised once scheduled.

Your decision whether or not to participate will not jeopardize your future relations with University Housing or Eastern Kentucky University. If you have any questions please contact the principal investigator Billy Martin, (859) 622-8145 (billy.martin@eku.edu) or research advisor Dr. Richard Riggs, (859) 257-3645 (rsrigg01@uky.edu).

For more information regarding your rights as a research participant you may contact the Office of Research Integrity by phone at (859) 257-9428.

Thank you for your consideration.
Sincerely,

Billy Martin
Doctoral Candidate, Kinesiology and Health Promotion
Appendix I

Approval Letter from University Housing
June 8, 2010

To Whom It May Concern

University Housing formally gives investigator Billy Martin access to residential students in the 14 campus residence halls. It is my understanding he will be using systematic sampling and certain floors will be chosen to take part in a study using the Myers-Briggs Type Inventory, Health-Promoting Lifestyle Profile II, and a short demographic questionnaire. Individuals will be trained to distribute the study by Mr. Martin before our mandatory floor meetings on August 23rd, 2010 at 9:00pm. Mr. Martin will be available to contact if any questions or concerns are brought forth. Please contact me if there are further questions regarding use of the university residence halls or residential students.

Sincerely,

[Signature]

Kenna Middleton
Director, University Housing
Eastern Kentucky University
Kenna.Middleton@eku.edu
(W) (859) 622-4806
(F) (859) 622-8384
Appendix J

Permission to Reprint Health-Promotion Model
From: Nola Pender [mailto:npender@umich.edu]
Sent: Monday, May 24, 2010 12:23 PM
To: Martin, Billy
Subject: Re: Permission to reprint the Revised HPM

Dear Billy:

You have my permission to reprint the Health Promotion Model in your dissertation and related documents. You can find an electronic copy at:

www.nursing.umich.edu/faculty/pender_nola.html

Wishing you good health,

Nola Pender

-----------------------------
FROM: Martin, Billy
SENT: Sunday, April 25, 2010 6:35 PM
TO: npender@umich.edu
SUBJECT: Permission to use Revised HPM

Dr. Pender,

I am a doctoral student in Kinesiology and Health Promotion at the University of Kentucky. I am attempting to complete my dissertation on the relationship between personality types and health promoting lifestyle behaviors. I have received permission from Dr. Walker to use the HPLP II and would greatly appreciate if I could obtain permission to reprint the Revised Health Promotion Model in my dissertation. The diagram would be very helpful as a reference as I explain the theory behind the HPLP II. If possible, could you grant permission to reprint? Thank you.

In Health,

Billy Martin
Doctoral Candidate
University of Kentucky
Kinesiology and Health Promotion
Appendix K

MBTI® National Representative Sample
USA: Distribution of the Types of University Students
(Total = 27,156, Males = 12,637, Females = 14,519)

<table>
<thead>
<tr>
<th>Type</th>
<th>ISTJ</th>
<th>T = 9.5%</th>
<th>M = 12.5%</th>
<th>F = 6.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ISFJ</td>
<td>T = 8.7%</td>
<td>M = 5.4%</td>
<td>F = 11.5%</td>
</tr>
<tr>
<td></td>
<td>INFJ</td>
<td>T = 3.3%</td>
<td>M = 2.7%</td>
<td>F = 3.8%</td>
</tr>
<tr>
<td></td>
<td>INTJ</td>
<td>T = 3.7%</td>
<td>M = 5.4%</td>
<td>F = 2.2%</td>
</tr>
<tr>
<td></td>
<td>ESTP</td>
<td>T = 4.5%</td>
<td>M = 6.8%</td>
<td>F = 2.5%</td>
</tr>
<tr>
<td></td>
<td>ISFP</td>
<td>T = 5%</td>
<td>M = 4.1%</td>
<td>F = 5.7%</td>
</tr>
<tr>
<td></td>
<td>INFP</td>
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<td>M = 5.3%</td>
<td>F = 5.7%</td>
</tr>
<tr>
<td></td>
<td>INTP</td>
<td>T = 4.2%</td>
<td>M = 6.6%</td>
<td>F = 2.1%</td>
</tr>
<tr>
<td></td>
<td>ESTP</td>
<td>T = 4.6%</td>
<td>M = 6.7%</td>
<td>F = 2.8%</td>
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<tr>
<td></td>
<td>ESFP</td>
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<td>M = 4.4%</td>
<td>F = 8.3%</td>
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<tr>
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<td>ENFP</td>
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<td>M = 6.3%</td>
<td>F = 11.7%</td>
</tr>
<tr>
<td></td>
<td>ENTP</td>
<td>T = 5%</td>
<td>M = 6.8%</td>
<td>F = 3.5%</td>
</tr>
<tr>
<td></td>
<td>ESTJ</td>
<td>T = 10.6%</td>
<td>M = 12.8%</td>
<td>F = 8.7%</td>
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<td>M = 5.5%</td>
<td>F = 15.1%</td>
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<td>M = 3%</td>
<td>F = 6.4%</td>
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<td>M = 5.8%</td>
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<tr>
<td></td>
<td>ISTJ</td>
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<td>T = 2353</td>
<td>M = 687</td>
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<tr>
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<td>M = 377</td>
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<td>ENTJ</td>
<td>T = 1200</td>
<td>M = 732</td>
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<td></td>
<td><strong>Total</strong></td>
<td><strong>E 55.8%, I 44.2%</strong></td>
<td><strong>S 59.9%, N 40.1%</strong></td>
<td><strong>T 46.5%, F 53.5%</strong></td>
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<tr>
<td></td>
<td><strong>Males</strong></td>
<td><strong>E 51.2%, I 48.8%</strong></td>
<td><strong>S 58.2%, N 40.1%</strong></td>
<td><strong>T 63.4%, F 36.6%</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Females</strong></td>
<td><strong>E 59.8%, I 40.2%</strong></td>
<td><strong>S 61.4%, N 38.6%</strong></td>
<td><strong>T 31.8%, F 68.2%</strong></td>
</tr>
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Appendix L

Stepwise Regressions for Predictor Variables (preferences) on Health-Promoting Behaviors
<table>
<thead>
<tr>
<th>Health-Promoting Behavior</th>
<th>Predictor Variable</th>
<th>Constant</th>
<th>B (2.815)</th>
<th>Std. Error B (.095)</th>
<th>t (29.761)</th>
<th>Sig. (.0005)</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal Relations</td>
<td>Sex</td>
<td>.369</td>
<td>.057</td>
<td>6.424</td>
<td>.005</td>
<td>.117</td>
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<tr>
<td></td>
<td>Introvert/Extravert</td>
<td>.260</td>
<td>.059</td>
<td>4.418</td>
<td>.005</td>
<td>.045</td>
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<tr>
<td></td>
<td>Ethnicity</td>
<td>-.276</td>
<td>.103</td>
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<td>.008</td>
<td>.019</td>
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<tr>
<td></td>
<td>Father’s Social Position</td>
<td>-.004</td>
<td>.002</td>
<td>-2.168</td>
<td>.031</td>
<td>.012</td>
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</table>

$R²=.193, F(4, 319)=19.016, p=.0005$

<table>
<thead>
<tr>
<th>Health Responsibility</th>
<th>Constant</th>
<th>B (2.078)</th>
<th>Std. Error B (.057)</th>
<th>t (36.308)</th>
<th>Sig. (.0005)</th>
<th>R²</th>
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<tbody>
<tr>
<td>Sex</td>
<td></td>
<td>.137</td>
<td>.062</td>
<td>2.193</td>
<td>.029</td>
<td>.015</td>
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<td>Freshmen</td>
<td></td>
<td>-.131</td>
<td>.061</td>
<td>-2.146</td>
<td>.033</td>
<td>.014</td>
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</table>

$R²=.029; F(2, 320)=4.792; p=.009$

<table>
<thead>
<tr>
<th>Spiritual Growth</th>
<th>Constant</th>
<th>B (2.886)</th>
<th>Std. Error B (.067)</th>
<th>t (43.273)</th>
<th>Sig. (.0005)</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
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<td>.059</td>
<td>3.511</td>
<td>.001</td>
<td>.043</td>
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<tr>
<td>Ethnicity</td>
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<td>.005</td>
<td>.022</td>
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<tr>
<td>Introvert/Extravert</td>
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<td>.187</td>
<td>.063</td>
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<td>.003</td>
<td>.018</td>
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<tr>
<td>Judging/Perceiving</td>
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<td>-.140</td>
<td>.060</td>
<td>-2.333</td>
<td>.020</td>
<td>.015</td>
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</tbody>
</table>

$R²=.098, F(4, 318)=8.640, p=.0005$

<table>
<thead>
<tr>
<th>Health-Promoting Lifestyle</th>
<th>Constant</th>
<th>B (2.490)</th>
<th>Std. Error B (.050)</th>
<th>t (49.642)</th>
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<th>R²</th>
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<tbody>
<tr>
<td>Sex</td>
<td></td>
<td>.120</td>
<td>.045</td>
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<td>.027</td>
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<td>Introvert/Extravert</td>
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<td>.148</td>
<td>.047</td>
<td>3.138</td>
<td>.002</td>
<td>.018</td>
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<tr>
<td>Judging/Perceiving</td>
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<tr>
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<td>.080</td>
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<td>.025</td>
<td>.015</td>
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</table>

$R²=.080, F(4, 318)=6.880, p=.0005$
Appendix M

Stepwise Regressions for Predictor Variables (types) on Health-Promoting Behaviors
<table>
<thead>
<tr>
<th>Health-Promoting Behavior</th>
<th>Predictor Variable</th>
<th>Constant</th>
<th>B</th>
<th>Std. Error B</th>
<th>t</th>
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<th>R²</th>
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<td>Interpersonal Relations</td>
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R² = .205, F(7, 311) = 11.363, p = .0005

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R² = .056; F(2, 320) = 9.441; p = .0005

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R² = .048, F(3, 319) = 5.396, p = .001

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R² = .103, F(5, 317) = 7.283, p = .0005

197
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<th>Health-Promoting Behavior</th>
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$R^2=.092, F(5, 317)=6.393, p=.0005$

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$R^2=.089, F(5, 317)=6.229, p=.0005$
Appendix N

Stepwise Regressions for Predictor Variables on Cigarette Smoking
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<th>Smoking Behavior</th>
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<td># of days cigarettes were smoked in last 30 days (Preferences)</td>
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<td>.025</td>
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<td># of cigarettes smoked per day the last 30 days (types)</td>
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Appendix O

Stepwise Regressions for Predictor Variables (preferences) on Alcohol Use Behaviors
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<th>Std. Error B</th>
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<th>Sig.</th>
<th>R²</th>
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R²=.142, F(5, 317)=10.477, p=.0005

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<th>Sig.</th>
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R²=.087, F(2, 320)=15.311, p=.0005

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<th>Sig.</th>
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R²=.049, F(3, 319)=5.396, p=.001

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<th>Std. Error B</th>
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<th>Sig.</th>
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R²=.039, F(1, 321)=13.047, p=.0005
Appendix P

Stepwise Regressions for Predictor Variables (types) on Alcohol Use Behaviors
<table>
<thead>
<tr>
<th>Alcohol Use Behavior</th>
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<td>R² = .122, F(6, 316) = 7.346, p = .0005</td>
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<td>ESFP Personality Type</td>
<td>2.338</td>
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<td>ENFP Personality Type</td>
<td>1.206</td>
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<tr>
<td>R² = .063, F(3, 319) = 7.181, p = .0005</td>
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