

**ASSOCIATION OF HEALTH RISK BEHAVIORS AND ACADEMIC ACHIEVEMENT  
AMONG COLLEGE FRESHMEN**

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# **ASSOCIATION OF HEALTH RISK BEHAVIORS AND ACADEMIC ACHIEVEMENT AMONG COLLEGE FRESHMEN**

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University of Pittsburgh, 2005

The purpose of this research was to explore the association between priority health risk behaviors and academic achievement among college freshmen. Priority health risk behaviors have been defined by the Centers for Disease Control and Prevention (CDC) as those health risk behaviors that contribute to the leading causes of death, illness, and social problems among young adults in the United States including tobacco use; alcohol and other drug use; unhealthy dietary behaviors; inadequate physical activity; sexual behaviors that result in sexually transmitted diseases, and/or unintended pregnancies; and behaviors that result in unintentional and intentional injuries. The primary aims of this study were: 1) to determine which of the priority health risk behaviors have the strongest independent association to academic achievement and 2) to determine the association between the number of priority health risk behaviors engaged in by college freshmen and end-of-first-term academic achievement. This study was descriptive in nature and employed a cross-sectional study design. A total of 196 first semester freshmen completed the CDC's National College Health Risk Behavior Survey (NCHRBBS) to assess risk in each priority health risk behavior category. In addition, participants answered several supplemental questions designed to assess additional health behaviors and general academic background information. For each priority health risk behavior, key questions were chosen for analysis and a cut point was used to classify each respondent as either "at risk" or "not at risk". Upon completion of their first term of study, participant survey responses were matched with their end-of-first-term QPA. Results of independent t-tests to assess the relation between each priority health risk behavior and academic achievement revealed a significant association to QPA for tobacco use ( $p = 0.05$ )

and binge drinking ( $p = 0.02$ ). Results of a subsequent stepwise regression revealed no significant effect for tobacco use or binge drinking on QPA when additional covariates such as SAT score, high school class rank and number of missed classes were included in the analysis. Results of a simple linear regression found no significant relation ( $p = 0.12$ ) between number of risk behaviors and QPA.

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## **1.0 INTRODUCTION**

### **1.1 INTRODUCTION AND RATIONALE**

The purpose of this research was to explore the association between priority health risk behaviors and academic achievement among college freshmen. Improvement of academic performance has always been a major concern among our colleges and universities. Perhaps the fact that academic performance in college is highly correlated to career success motivates this concern (Tan, 1991). A common measure of academic performance is a student's overall quality point average (QPA), which is defined as a grade point average weighted by the number of credits for each class in which a letter grade is earned. Determining which factors may affect a student's quality point average is thus of paramount importance. In particular, a primary concern for faculty and administrative staff in higher education has been to better understand the factors that may impact the academic performance of students during their freshman year. In essence, a better understanding of the numerous variables that may affect student academic performance early in the student's college career, may afford a more timely opportunity to effect positive change in academic performance. Therefore, by targeting specific variables that affect QPA during the freshman year, overall academic achievement may be enhanced throughout the entire college experience.

In search of the best predictors of academic achievement during this very important initial year of the college experience, research has revealed both traditional (high school QPA, high school class rank, standardized test scores) and non-traditional (personality, demographic and/or environmental) factors being used to help predict academic success. Although these factors, have contributed significantly to the understanding of the potential for academic success, their overall predictive value is quite low (Mouw & Khanna, 1993). Thus, the search continues for additional constructs, which may be used either singularly or in combination with one another to better predict academic performance, especially during this most important freshmen year. One such construct is health behaviors.

Although previous research has explored a variety of health-related variables in several dimensions of health and their relationship to academic achievement, studies primarily focusing on the relationship between academic achievement and the health risk behaviors that contribute to the leading causes of death, illness, and social problems among young adults are minimal.

## **1.2 STATEMENT OF THE PROBLEM**

The major focus of this research was to examine the association between health-related variables, and academic performance. The main threats to the health status of adolescents and young adults are the risky behaviors they engage in and the choices they make with regard to their health behaviors. The Centers for Disease Control and Prevention have identified six priority health risk behaviors that contribute to the leading causes of morbidity and mortality in the United States. These six priority health risk behaviors are: behaviors that contribute to unintentional

and intentional injuries; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy, HIV (human immunodeficiency virus) infection, and other sexually transmitted diseases; dietary patterns that contribute to disease; and insufficient physical activity. These behaviors are often established in childhood, extend into adulthood, and are interrelated. The specific purpose of this research was thus to explore the association between these priority health risk behaviors and academic achievement among college freshmen. There were two specific aims of this study. The first specific aim was to determine which of the priority health risk behaviors has the strongest independent association to academic achievement. The second specific aim was to determine the association between the total number of priority health risk behaviors engaged in by a sample of college freshmen and their end-of-first-term academic achievement. This study assessed priority health risk behavior using the National College Health Risk Behavior Survey (Centers for Disease Control, 1997).

By exploring the association between health risk behavior and academic achievement in the college freshman population a better understanding of the potential impact of health behaviors on academic achievement may be realized. By specifically determining which health risk behaviors may be most associated with decreased academic performance, viable options, such as increased health education programming, can then be explored to help reduce these health related risk behaviors among the college student population.

### **1.3 RESEARCH HYPOTHESIS**

It was hypothesized that the greater the number of health-related risk behaviors engaged in by college freshmen, the lower the level of academic achievement as measured by end-of-first-term overall quality point average (QPA).

### **1.4 EDUCATIONAL SIGNIFICANCE**

School leaders, administrative staff, faculty and students often remain unconvinced that improving student health represents a means to achieving improved academic outcomes. However, a rich body of research has begun to evolve that indicates a direct link between student health risk behavior and academic success. An interesting point to note is that the greatest frequency and degree of perceived health risk behavior related academic problems may occur in the first years of college. One potential explanation is that this relatively young population whose coping skills have not been fully formed, may initially choose negative health behaviors to cope with college pressures, thereby increasing their risk of academic difficulties (Lall & Schandler, 1991).

Thus, early identification of health related risk behaviors and immediate steps to modify these behaviors might be essential if academic success is to be assured. By exploring further the association between health risk behavior and academic achievement in the college freshman population, it was the intent of this research to gain not only a better understanding of the association, but more importantly, to determine specifically which health risk behaviors were

most highly associated with decreased academic performance. Increased health education programming, required health education classes for all college freshman, increased health counseling, and improved college-centered health treatment programs may all be viable options to help reduce health-related risk behavior among college students and enhance their academic success. Future research may then determine the effectiveness of health enhancing programs that target specific risk behaviors as a way to improve academic achievement among college students. This is an area of untapped research that has great potential benefit and merits future consideration.

## **2.0 REVIEW OF THE RELATED LITERATURE**

The purpose of this research study was to explore the association between priority health risk behaviors and academic achievement among college freshmen. The study focused on the six priority health risk behaviors identified by the Centers for Disease Control and Prevention (CDC) as the leading contributors to morbidity and mortality among young adults in the United States. The 1995 National College Health Risk Behavior Survey questionnaire was used to assess the priority health risk behaviors in a representative sample of college freshmen. The following literature review provides support for the significance of this study.

## **2.1 BACKGROUND**

Throughout years of educational research, the personal determinants of academic success in college remain an important question and improvement of academic performance has always been a major concern among our colleges and universities. Perhaps the fact that academic performance in college is directly related to career success motivates this concern (Tan, 1991). A common measure of academic performance in university students is one's overall quality point

average (QPA). Determining which factors may negatively affect a student's quality point average at the college level is thus of paramount importance and offers great potential value.

Current research reveals several indicators, which have served to predict academic achievement in college. These factors may be grouped into several domains: cognitive, affective, and social/environmental, each of which may be either positively or negatively associated with academic performance. The cognitive indicators consist of high school quality point average (QPA), High School class rank, and performance on various college entrance exams such as the American College Testing program (ACT) or the Scholastic Aptitude Test (SAT). The affective indicators include self-perception of abilities, study skills, and persistence/motivation. Among the social/environmental factors that may impact on these predictors are gender, ethnicity, parental education, socioeconomic status and health behaviors.

The purpose of this research was to explore the effect of health behaviors, specifically whether health risk behaviors have a negative effect on overall academic achievement in the college freshman population. Research on the college freshman population is of significant interest because of its potential to directly impact educational programming and services early in the academic experience of young adults. As a direct result, overall academic performance may be enhanced throughout the student's college career.

## **2.2 TRADITIONAL DETERMINANTS OF ACADEMIC ACHIEVEMENT**

For many years, researchers and educators have been most concerned with the question of which predictors are the most accurate determinants of academic success. Prediction studies of college

performance are most often conducted using a sample of freshman. Typically a prediction equation is developed with the criteria being QPA at the end of the first semester or at the end of the freshman year (Mouw & Khanna, 1993). Traditional predictors are cognitive assessments such as high school performance and entrance test scores.

College entrance examinations such as the Scholastic Aptitude Test (SAT) or the American College Testing program (ACT) are two common tests that most high school students take to determine cognitive ability. Although the SAT and ACT are the most recognized predictors of success there are many additional cognitive tools which have been used to predict potential academic achievement in college. Previous academic performance, including high school quality point average (QPA) and high school class standings/rank, has been a commonly used predictor of academic success in college (Hoyt, 1966; Haplin, Haplin and Hauf, 1976; and Rowan, 1978). In an extensive review of thirty years of research, Mouw & Khanna (1993) report the best overall predictors among cognitive, affective, and social predictors are a combination of the cognitive determinants, specifically high school performance and standardized tests. However, Mouw & Khanna further report that the ability to predict college success using these means is disappointingly low (average  $R^2 \leq .25$ ). Gutafson & Balke (1993) have also found that correlations between intelligence and academic success have proved to be only moderate, and they can have high variability.

### **2.3 NON-TRADITIONAL DETERMINANTS OF ACADEMIC ACHIEVEMENT**

In search of more pertinent and perhaps more powerful predictors, recent research has concentrated on nontraditional predictors of academic achievement in college. Non-traditional predictors have been categorized into broad categories of personal characteristics consisting of personality, demographic, and/or environmental variables. Models exploring single factors such as personality traits (Gough & Lanning, 1986), study behaviors and attitudes (Mathiasen, 1984), gender (Kanoy, Latta & Wester, 1989), major (Balkin, 1987), and working/ not working during college (Green and Jaquess, 1987) have reported even lower correlation coefficients. In fact, throughout the research, the use of single factor models to serve as determinants of academic achievement has resulted in low predictive value (Mouw, 1993). However, in a recent study by Snyder, Shorey, Cheavens, Pulvers, Adams & Wiklund (2002), the single construct of hope (the process of thinking about one's goals, along with the motivation to move toward these goals and the ways to achieve these goals) appeared to be a statistically significant determinant ( $p < 0.01$ ) of college students' academic performances over the course of their undergraduate careers.

Several multivariate approaches to predicting college success have also been reported. Using a multifactor model of intellectual ability, previous achievement, self-concept and motivation to predict academic achievement, Castejon & Vera-Munoz (1996) reported a coefficient of multiple correlation of  $R = 0.895$ . Fraser (1987) reported that a student's family in combination with social, cultural and economic determinants may be a significant predictor of academic success. Achievement has been highest among youth from more advantaged backgrounds, students from high-socioeconomic status families, and those living with both parents (Smerdon 1999). In another study, Musgrave-Marquart, Bromley & Dalley (1997)

reported that three variables (conscientiousness, neuroticism and openness) had the greatest role in predicting college QPA. Results of these and other most recent studies indicate that the traditional and nontraditional factors affecting academic achievement are interrelated and when combined, significantly serve to increase predictability (Britton & Tesser, 1991; Robbins, Spence & Clark, 1991; Schommer, 1993; Larose & Roy, 1995; Larose, Robertson, Roy & Legault, 1998, Dweck, 1999).

In summary, extensive research has been aimed at finding which single factor and/or combination of factors promotes or inhibits academic achievement. Although several traditional and nontraditional constructs have contributed significantly to the understanding of academic performance, each elucidates only a portion of the prediction equation. Thus, it is apparent that there are other constructs, yet unidentified, which may help to better predict academic achievement, especially during the most crucial freshman year. In efforts to continue the search for pertinent and perhaps more powerful predictors of academic achievement in the college freshman population, the construct of health behaviors warrants consideration.

## **2.4 HEALTH BEHAVIOR DETERMINANTS OF ACADEMIC ACHIEVEMENT**

Health behaviors potentially affecting college student QPA include a wide range of actions and habits in several dimensions of health: physical, emotional, social and spiritual (Mouw & Khanna, 1993). Specific health behaviors a college student may decide to adopt can be classified as either a risk behavior or protective behavior. A risk behavior is an action or a characteristic of one's environment that may cause injury, illness or premature death. Protective behaviors are

the opposite of risk behaviors. Protective behaviors are actions or characteristics of the environment in which one lives that promote health, safety and well-being (Meeks, Heit, & Page, 2003). Health behaviors most commonly studied in college students are nutrition; exercise; hygiene practices; sleeping patterns; alcohol and other drug use; tobacco use; sexual behaviors; and safety patterns. Which protective or risk behaviors a college student prefers is a matter of personal choice, often determined by several important factors. Among the primary factors that have been empirically related to health behavior are gender, age, ethnicity, family values, parental and peer relationships, personal health knowledge, personal values and attitudes, academic achievement, self-esteem, self-efficacy, and perceived susceptibility and vulnerability (Boehm, Selves, Raleigh, Ronis, Butler & Jacobs, 1993; Dusenbury, Botvin, Baker & Laurence, 1991; Eisen & Zellman, 1986; Kasen, Vaughan, & Walter, 1992; O'Rourke, Smith & Nolte, 1984; Ransom, 1992).

The linkages between these multiple factors are complex and have yet to be elucidated. However, several researchers have begun to explore their multidimensional effects. With regard to differences in gender, Boehm et al. (1993); Newell-Withrow (1986); and Sherman (1992) found that females were more likely to practice positive health behaviors than males. Fardy, White, Clark, Hurster, Magel, Amodio & McDermott (1994) noted, however, that females were, on average, less physically active than males.

Age may be indirectly related to cognitive development and in turn directly affect a specific choice of health behavior. For example, Bailey and Hubbard (1990) suggested that older adolescents (ages 18-21) might be more capable of assessing negative outcomes or consequences of health risk behaviors than their younger peers. Also, the health behaviors of college students

are believed to be more influenced by their friends or peer group, whereas younger adolescents are believed to fully reflect parental health behaviors and attitudes (Boehm et al. 1993).

Although most studies on adolescent health behaviors involved Caucasian subjects, ethnicity or race is an important factor differentially affecting health behavior. White students were more likely to smoke cigarettes than African American students and white adolescents were more likely to use seat belts than African American adolescents. African American adolescents were more likely to wear motorcycle helmets compared to Hispanic adolescents (Kann, Warren, Collins, Ross, Collins & Kolbe, 1993). Newell-Withrow (1986) found that African American teens engaged in more self-care, health enhancing behaviors, such as exercise, nutrition, and hygiene, than their White counterparts. Suicide rates appear to be highest among males and in particular, among white males (Kann, Kinchen, Williams, Ross, Lowry, Grunbaum & Kolbe, 2000). Homicide continues to be the leading cause of death in African American and Hispanic adolescents, whereas motor vehicle crashes are the leading cause of death among Caucasian adolescents (Fingerhut, Ingram & Feldman, 1998).

Family and peer relationships have been found to significantly affect the health beliefs and behaviors of adolescents (Bailey & Hubbard, 1990; Lau, Quadrel & Hartman, 1990; O'Rourke et al., 1984; Riccio & Howe, 1991). For example, Riccio and Howe (1991) reported that adolescents were more likely to wear seat belts if their friends and parents did. In addition, smoking behavior has long been shown to be impacted by parental and peer relationships. Parental and peer interactions also affect initiation of marijuana use (Bailey and Hubbard, 1990). Adolescents who have been encouraged to be more autonomous by their parents were less likely to initiate early sexual intercourse (Turner, Irwin, Tschann & Millstein, 1993).

Regarding psychological variables such as self-efficacy, self-esteem, and positive outcome expectations, adolescents with low self-efficacy were more likely to engage in risky sexual behavior (Kasen et al., 1992). Jemmott and Jemmott (1992) reported that adolescents with high self-efficacy, the belief that a behavior is or is not within one's control (Bandura, 1977), were more likely to state the intent to use condoms.

With respect to cognitive factors, an important point to note is that not only does cognitive ability serve as a predictor of academic achievement in college, but factors related to cognition may also impact a student's health behavior choice. Low academic performance was found to be associated with overall increased health risk behavior among adolescents (Bailey & Hubbard, 1990; Kann et al., 1993). Perhaps these health-compromising behaviors may be seen as inadequate or dysfunctional coping styles as a result of increased educational demands (Koval & Pedersson, 1999). Jackson, Bee-Gate & Henriksen (1994) reported that children who score low on measures of competency, such as academic achievement, were more likely to initiate and maintain tobacco use. Thus, if academic achievement affects health behavior choice, will health behaviors affect academic achievement? Specifically, will engaging in negative health behaviors have a detrimental affect on academic achievement? The major purpose of this study was to investigate this specific research question.

It was outside the scope of this research to consider the entire range of health behaviors that can impact a student's academic achievement in college. However, it was the goal of this study to investigate the potential impact on academic performance of six major categories of health-related risk behaviors identified as having the greatest impact on health by the Centers for Disease Control and Prevention (CDC): behaviors that contribute to unintentional and intentional injuries; tobacco use; alcohol and other drug use; sexual behaviors that contribute to

unintended pregnancy, HIV (human immunodeficiency virus) infection, and other sexually transmitted diseases; dietary patterns that contribute to disease; and insufficient physical activity. Although several studies have reported the influence of individual health indicators, such as sufficient sleep, social support, and time management on academic performance, few have focused on the cluster of behaviors identified as those with the greatest influence on health. With the exception of several studies on the relationship of alcohol to academic performance, college-specific information regarding academic performance and its relation to health risk behaviors is rare.

#### **2.4.1 Dietary Behaviors**

The effects of eating breakfast, (Meyers, Sampson, Weitzman, Rogers & Kayne, 1989; Benton, 1992; Pollitt, 1995; Berkey, Rockett, Gillman, Field & Colditz, 2003) and other nutritional variables on elementary students' (Kalman, 1997) academic performance have received a great deal of attention in the literature. Large randomized controlled trials and assessments of the impact of the School Breakfast Program have shown consistent increases in standardized test scores and reductions in absenteeism, tardiness, and psychosocial problems (Pollitt & Mathews, 1998). Children who skip breakfast are also less likely to self-report that they were doing well in school (Berkey et al., 2003). Poor diets that lack proper balance and adequate nutrients have long been associated with impaired academic performance. Students judged as having insufficient nutrient intake have shown significant improvement in nonverbal intelligence, which is highly associated with academic performance, when given vitamin and mineral supplementation (Schoenthaler, Bier, Young, Nichols & Jansenns, 2000). Inadequate fruit and vegetable consumption has also been associated with several psychosocial correlates such as

weight dissatisfaction and poor academic performance (Neumark-Sztainer, Story, Resnick & Blum, 1996). Obesity, often a result of poor dietary habits consisting of excessive caloric intake, high fat and high sugar consumption, has been associated with several undesirable outcomes. In addition to physical complications, obese learners suffer significant psychological and social consequences. Obese children, beginning as early as kindergarten, are stigmatized, not only by adults, but also by their peers. The detrimental effects of ostracism on self-esteem have been demonstrated to exert a negative impact on learning (Korsch, 1986).

Nutritional practices among college students have indicated several interesting findings. Negative dietary behaviors of college students have consisted of over-eating or under-eating; over-consumption of high fat, high calorie, fast food meals and snacks; and excessive intake of empty calories through alcohol consumption, skipping breakfast, and diets deficient in adequate nutritional value. Perhaps these poor dietary habits are due to lack of money, time, access to cooking facilities, and other barriers that may make healthy choices more difficult. According to the National College Health Risk Behavior Survey, 20.5% of college students have been classified as being overweight based on body mass index calculations. Only 26.3% of college students' nationwide report eating at least five or more servings of fruits and vegetables per day, and over 20% report eating three or more servings per day of foods typically high in fat content (Centers for Disease Control, 1997). Results of research are mixed, however, indicating in some instances that college students tend to practice more healthful habits and make healthier food choices than non-students (Georgiou, Betts, Hoerr, Keim, Peters, Stewart & Voichick, 1997). With regard to college students, little information on the association between college students'

nutritional habits and academic performance can be found. A single study including university students reported improved recall and spatial memory as a result of eating breakfast (Benton, 1992).

#### **2.4.2 Alcohol, Tobacco, and Other Drug Use**

Studies have shown that drug use can interfere with cognitive functioning, memory, sensation, and perception. Researchers confirmed that abuse of tobacco, alcohol, and other drugs can stifle creativity, thwart imagination, and suppress ambition, all leading to a possible decrease in academic performance (Symons, Cinelli, James & Groff, 1997; Hopps, Davie & Lewin, 1999). Interestingly, nearly one third of all college students report being current users of cigarettes or smokeless tobacco (Centers for Disease Control, 1997). Four in five college students drink alcohol, and two in five engage in heavy episodic drinking (Wechsler, Lee, Kuo, Seibring, Nelson & Lee, 2002). Heavy episodic drinking may be defined as the consumption of five or more drinks in a row at least once in the past two weeks for men and four or more drinks in a row in the past two weeks for women (Wechsler & Nelson, 2001). Reports indicate significantly greater weekly drinking frequency and overall consumption among freshman relative to upper classmen (Lall & Schandler, 1991; Saltz & Elandt, 1986). Excessive alcohol consumption in particular continues to be a problem among the college population. Several studies have indicated that problem-drinking behavior, particularly among college students, can lead to significant academic difficulties including poor academic performance, as assessed by lower course grades, being placed on academic probation, lower rates of college degree attainment, and spending fewer hours studying (Wolaver, 2002; Wood, Sher & McGowan, 2000;

Smith, Collins, Kreisberg, Volpicelli & Alterman, 1987; Hanson & Engs, 1986; Friedman, Glickman & Utada, 1985; Wechsler & McFadden, 1979).

The process of distinguishing between problem drinking and alcoholism is often difficult. Problem drinking may be defined as a pattern of alcohol use in which a drinker's behavior causes personal difficulties or difficulties for other people (Payne & Hahn, 2000). There may be no true line of demarcation to distinguish the two, with the exception that an alcoholic is unable to stop drinking. Data from Lall and Schandler (1991) indicate a negative correlation between average weekly alcohol consumption and grade point average. Students who reported drinking greater amounts of alcohol on average in one week reported lower QPAs than students who reported consuming lower levels of alcohol. It is of interest to note that the students in this study were classified neither as problem drinkers nor as alcoholics, indicating that even moderate alcohol consumption may have a negative impact on academic achievement in college. Wolaver (2002) reports of an association between heavy drinking and poor academic performance that is stronger for underage students than for students at least 21 years old, and suggests that heavy drinking may have a particularly greater adverse effect on students' academic performance in their freshman and sophomore years. In one recent study of high achievers, Paschal & Freisthler (2003) failed to find any association between heavy alcohol use and academic performance in college when controlling for high school class rank and academic aptitude.

Illicit drug use consisting of marijuana, various stimulants, and inhalants also plays a significant role in the social context of college life and has been found to exert a direct effect on educational achievement. Approximately 18% of college students report being current users of marijuana and 16.1% report currently using other illegal drugs (Centers for Disease Control, 1997). Numerous studies have found that young people who use illicit drugs such as marijuana

tend to be characterized by reduced levels of academic achievement, including: lower QPA; negative attitudes towards school; reduced satisfaction with school; poorer overall school performance; greater absenteeism; higher rates of expulsion or suspension from school; and higher rates of school dropout (Brook, Brook, Rosen & Rabbitt, 2003; Lynskey & Hall, 2000). Once again, the association between illicit drug usage and educational achievement may reflect the fact that risk factors and life processes that encourage the use of illicit drugs such as deviant peer pressure and non-supportive family relationships, may also encourage educational underachievement. Research by Fergusson, Horwood & Beaurais (2003) reports that, after adjusting for several confounding factors such as family socio-economic status, high school achievement and adolescent conduct problems, there remained a statistically significant negative association between heavy cannabis use (100 or more uses by age 20) and academic success.

Glendinning, Hendry & Shucksmith (1995) and Musgrave-Marquart, Bromley & Dalley (1997) state that in line with several other studies, smoking appears to be the strongest predictor of educational success. Smoking may indicate that an adolescent may lack control over his or her life or it may be an attempt to help manage stress during a time of increased pressure to succeed academically. Although no single health compromising or health promoting lifestyle has been identified, several health-compromising behaviors have been found to be associated with smoking. High-risk behaviors, such as using marijuana, drinking heavily, and having multiple sex partners are the strongest correlates of smoking status among United States college students (Emmons, Wechsler, & Abraham, 1998). In theory, smoking may be the main indicator of a rebellious lifestyle in which education is given less importance and more interest is directed towards other aspects of life, such as leisure, peers and “street culture” (Glendinning et al, 1995;

West & Sweeting, 1997). Consistent with this theory is Mugrave-Marquart et al.'s (1997) finding that QPA was negatively correlated ( $p < .05$ ) with the use of alcohol and nicotine in a sample of 161 college student volunteers.

### **2.4.3 Injury-Related Behaviors**

Unintentional and intentional injury risks including motor vehicle related injuries, abuse, homicide, and suicide represent a serious threat to well being. Limited data directly link the incidence of intentional and unintentional injury to academic performance in the college age population, perhaps because several concomitant variables exist in this associative pathway. The cause of most unintentional and intentional injury in the college population is alcohol (Hingson, Heeren, Zakocs, Kopstein & Wechsler, 2002). Thus, the link between injury-related behavior and academic achievement may be indirect, i.e., through alcohol use.

Research does confirm that children who witness chronic violence and abuse, either directly or indirectly, may exhibit poor concentration, shorter attention span, and a general decline in academic performance. Furthermore, students living with violence often manifest numerous physical problems including sleep disturbances, stomach distress, headaches, asthma attacks and stress-related illnesses; these may carry over to the school setting, causing a negative impact on educational experiences (Lorion & Saltzman, 1993). Disparate results have been reported in a recent study by Rosenthal & Wilson (2003), who found that prior exposure to community violence and academic performance in college were not related among a sample of 385 students of color.

Among the most prominent risk behaviors leading to both intentional and unintentional injury in college students is the lack of safety belt use, driving after drinking, riding with a driver

who had been drinking alcohol, drinking while boating or swimming, and suicide ideation and attempts (Centers for Disease Control, 1997). Nationwide, 9.2% of college students rarely or never use safety belts, 27.4% of college students report having driven a vehicle after drinking alcohol, and 35.1% report having ridden with a driver who had been drinking alcohol. In addition, 30.5 % report having drunk alcohol while boating or swimming within the past year (Centers for Disease Control (1997).

Among college students, suicide is the third leading cause of death (accidents and homicides being first and second). Students aged 18-24 years were more likely than students over 25 to have seriously considered attempting suicide or to have made a suicide plan (Centers for Disease Control, 1997). Although there are no specific tests capable of identifying suicidal “personality”, specific factors associated with suicide have been identified. College students at a higher risk for suicide commonly have been observed to have a history of depression or physical abuse; to abuse alcohol; and to experience psychosocial problems and multiple stressors, such as the breakup of a relationship, conflicts with parents, legal difficulties, and school difficulties or failure (American Academy of Pediatrics – Committee on Adolescence, 2000).

The crucial link between suicide and depression is of particular significance when exploring the association between the health risk behavior of suicide and academic achievement. Depression in college students is manifested in several ways. For some students the symptoms consist of low self-esteem, discouragement, irritability, a feeling of helplessness, fatigue, and a diminished ability to think or concentrate. Other students exhibit psychosomatic symptoms or behavioral problems, consisting of persistent physical complaints, deterioration in academic performance, truancy, and other self-destructive behaviors. Students, who were identified as being clinically depressed in one study, spent less time doing homework, had a lower grade point

average, and experienced increased suicidal thoughts (Field, Diego & Sanders, 2001<sub>a</sub>). Reports by Haines, Norris & Kashy (1996), were consistent with the above findings, showing that depressed mood was negatively related to academic performance among college students. Heiligenstein, Guenther, Hsu & Herman (1996) reported that the risk of academic impairment among college students became likely at only moderate-to- severe levels of depression.

#### **2.4.4 Physical Inactivity**

The majority of research in this area has taken a positive approach and examined the association between school-based physical activity programs and academic achievement, specifically at the elementary and high school level. When increased time is allocated to physical activity in the school curriculum, academic performance is maintained or even enhanced, despite the reduction in time allocated to academic study (Shephard, 1997). Findings from this research suggest that the rate of academic learning per unit of class time is enhanced in students who are more physically active. The results of several additional studies suggest a positive association between physical activity and academic outcomes consisting of increased concentration and improved academic performance in a variety of academic content areas (Centers for Disease Control, 1990; Kolbe, Green, Foreyt et al., 1986; Field et al., 2001<sub>b</sub>, Aaron & Gallagher 2003). Support for this association is found in research indicating that cognitive functioning may be enhanced following exercise because of reduced sympathetic hyperarousal and greater blood oxygen content which in turn contribute to enhanced neurotransmitter regulation (Dustman, Emmerson & Shearer, 1994). The positive association between physical exercise and academic success may thus be

reciprocal. Exercise may increase energy to perform schoolwork, and having increased energy may allow one to engage actively both in schoolwork and exercise. Regular exercise may also combat depression or relieve stress (Brosse, Sheets, Lett & Blumenthal, 2002).

Disparate results have been noted among researchers who have evaluated the effect of exercise on university students' academic performance. One study involving 891 upperclassmen and graduate students found students who exercised vigorously seven or more hours per week obtained significantly lower grades than students who moderately exercised six or fewer hours weekly or not at all (Turbow, 1985). Adolescents who participate in daily exercise may be athletes who direct their time and energy more to sports rather than to academic pursuits. On the other hand, lack of exercise has been found to be associated with psychosocial problems such as loneliness, depression, and emotional distress (Page & Tucker, 1994), which may alter the potential for academic success. In addition, Pate, Heath, Dowda & Stewart (1996) found that low physical activity level among students was associated with low perception of academic performance. A study involving 200 first year college students (Trockel, Barnes & Egget, 2000), however, was unable to show a significant relationship between academic achievement and exercise. It is of interest to note that over 60% of college students nationwide do not report exercising vigorously for at least 20 minutes, three days a week (Centers for Disease Control, 1997).

#### **2.4.5 Sexual Behaviors**

Results from the National College Health Risk Behavior Survey (Centers for Disease Control, 1997) indicate that, nationwide, over 86% of college students have had sexual intercourse during their lifetime and more than one third of college students report having had sex with six or more

partners. Among currently sexually active college students, 29.6% reported that they or their partner used a condom during last sexual intercourse and 16.6% reported they had drunk alcohol or used drugs at last sexual intercourse. Having multiple sex partners, not choosing to use condoms, and using alcohol immediately prior to or during sexual activity have all been associated with a greater risk of HIV infection, sexually transmitted disease, and unintended pregnancy.

Studies that specifically target the college freshman population and the relationship between sexual behaviors and academic achievement are rare. The majority of research has been done on students at the middle and high school level, and focuses on the relationship between precocious sexual involvement, including teenage pregnancy and sexually transmitted diseases, on the one hand, and risks to both health status and educational outcomes, on the other. Studies confirm that childbirth during the high school years is associated with significantly reduced academic achievement (Nord, Moore, Morrison, Brown & Mace, 1992; Caldas, 1994). Other data have confirmed that adolescents who become pregnant in early to mid-adolescence tend to have lower grades, and continue to participate in sexually risky behaviors that may lead to sexually transmitted disease and a greater incidence of HIV infection (Caldas, 1994; Males, 1993). Research reported by Turner, Irwin, Tschann, & Millstein (1993) and Kasen, Vaughan, & Walter (1992) indicate increased sexual risk taking behavior among students with low self-efficacy and parental support. These psychological and social/environmental variables, as discussed above, have shown negative associations with academic performance.

## **2.5 PRIORITY HEALTH RISK BEHAVIOR ASSESSMENT**

This study assessed priority health risk behavior using the National College Health Risk Behavior Survey (NCHRBS). The NCHRBS was developed in 1995 by the National Center for Chronic Disease Prevention and Health Promotion of the Centers for Disease Control and Prevention (CDC) and is a part of the CDC Youth Risk Behavior Surveillance System (YRBSS). The YRBSS consists of national, state, and local surveys monitoring health behaviors among high school students; a household survey monitoring the behaviors of youth between the ages of 12 and 21 who are currently in or out of school; and the National College Health Risk Behavior Survey created to examine the health risk behaviors among college students in the nation. The NCHRBS, a standard questionnaire consisting of 96 multiple-choice items, monitors priority health risk behaviors that contribute to the leading causes of death, illness, and social problems among young adults in the United States. These include tobacco use; unhealthy dietary behaviors; inadequate physical activity; alcohol and other drug use; sexual behaviors that may result in HIV infection, other sexually transmitted diseases, and unintended pregnancies; and behaviors that may result in unintentional and intentional injuries and violence including suicide (Centers for Disease Control, 1997).

Consultation with CDC representative Dr. Jo Anne Grunbaum, Senior Health Information Specialist, Division of Adolescent School Health, and a review of available published reports indicated that no validity or reliability tests have been conducted specifically on the NCHRBS. In 1992, the CDC did conduct a test-retest reliability study of the original Youth Risk Behavior Survey (YRBS) questionnaire (Brener, Collins, Kann, Warren & Williams, 1995). The YRBS is the standard questionnaire instrument used in national, state, and local school-based surveys including the national survey of college students (NCHRBS). The study used 1,679 students

enrolled in 7<sup>th</sup>- through 12<sup>th</sup>-grade classes, measured on two occasions 14 days apart. Results indicated that 71.7% of the questionnaire items had “substantial” or higher reliability (kappa = 61-100%), according to the qualitative values assigned for the various Kappa statistic categories suggested by Landis and Koch, 1977. Moreover, no significant differences were found between the prevalence estimates at time 1 and time 2. Responses of seventh grade students were less consistent than those of students in higher grades, indicating that the YRBS is best suited for students in grade eight or above. The study was the first to demonstrate the test-retest reliability of all major categories of priority health risk behaviors among a diverse sample of adolescents.

To address the question of validity in regard to self-reported health-risk behavior among adolescents, Brener, Billy & Grady (2003) reviewed the existing empirical literature to assess cognitive and situational factors that may affect the validity of self-reported behaviors in each of the priority health risk areas. Results of their literature search revealed a potential for compromised accuracy of self-reports because some health-risk behaviors are difficult to recall, and some are so sensitive that respondents would rather not report them. In addition, adolescents may purposely either over-report or under-report some health-risk behaviors, depending on whether the behavior was viewed as socially desirable or undesirable. Furthermore, the factors affecting validity do not threaten the validity of self-reports of each type of behavior equally. The YRBS and subsequent NCHRBS continue to be widely used, despite the validity problems that may affect self-report measures of health risk behaviors.

## **2.6 SUMMARY AND CONCLUSIONS**

In conclusion, findings from many noted researchers confirm strong negative relationships between student health risk behavior and educational outcomes. However, as noted, most research is centered at the elementary/middle and high school level. Although some research is evident at the college level concerning the association between risk behavior and academic achievement, the majority has focused on the health risks posed by alcohol and drug use, with few and mixed findings reported for other risk behaviors. Thus, the present study is the only known effort to empirically address two very significant questions: 1) what is the relationship between the full range of priority health risk behaviors and academic achievement in the college freshman population, and 2) which priority health risk behaviors are most likely to be related to academic achievement? In order to address these research questions, the National College Health Risk Behavior Survey was administered to determine priority health risk to a representative sample of college freshman at a single university.

### **3.0 METHODS**

The purpose of this investigation was to explore the association between priority health risk behaviors and academic achievement among college freshmen. There were two specific aims of the study. The first specific aim was to determine which of the priority health risk behaviors had the strongest independent association to academic achievement. The second specific aim was to determine the association between the total number of priority health risk behaviors engaged in by a sample of college freshmen and their end-of-first-term academic achievement.

#### **3.1 SUBJECTS**

The participants in this study were all part-time and full-time freshmen at the University of Pittsburgh at Greensburg, (a regional campus of the University of Pittsburgh system located in a rural area, about 30 miles outside of Pittsburgh, PA), 18 years and older, and enrolled in Freshman Seminar classes during the Fall 2004 semester. Students residing both off-campus and in on-campus residence halls were included in the study.

Freshman Seminar is a credit-earning, letter-grade course designed exclusively for, and open only to, first-year students. The course is a one-credit elective class that meets twice

weekly for 50 minutes per session over a 15-week term. All freshmen students have equal access to the class. The Freshman Seminar classes are advertised at all freshman orientation sessions, and each academic advisor at the University of Pittsburgh at Greensburg recommends that all freshman students enroll. There is no coercion to enroll in this class on the part of advisors, faculty, or administration.

The students who have previously enrolled in the Freshman Seminar classes appear to be a representative sample of the freshman population at the University of Pittsburgh at Greensburg based on prior research reported by the Registrar's Office (S. Mileca, personal communication, February 16, 2004). Included in Table 3.1 are the most recent statistics on the 2004-2005 Freshman class which indicates no significant differences in end-of-first term QPA ( $p = 0.15$ ), high school class rank percentile ( $p = 0.21$ ), and SAT scores ( $p = 0.79$ ) between students who took the Freshman Seminar class and those students who did not participate in Freshman Seminar. However, significant differences were found among freshman seminar and non-seminar students in major ( $p = 0.004$ ), residence status ( $p = 0.03$ ), and gender ( $p = 0.01$ ).

All participants were briefed on the general purpose of the present research by the study's principal investigator, and were asked to complete a written consent form prior to participation (Appendix A). The consent form specifically authorized the Registrar's Office of the University of Pittsburgh at Greensburg to release the students' end-of-first-term QPA and first semester grades to the Database Manager, in addition to participant's High School class rank and SAT score. The University of Pittsburgh's Institutional Review Board (IRB) approved all procedures of the proposed study (Appendix B).

All students who participated in the research study were entered into a drawing as a result of their participation. One (1) grand prize of \$50.00 and four (4) \$25.00 prizes were awarded based on a random drawing.

Table 3.1 Comparison Statistics of 2004-2005 Freshman Class at the University of Pittsburgh at Greensburg

		All FT Freshmen	All Freshman Seminar Students	All Non-Freshman Seminar Students	p-value
<b>Gender</b>	Men	214 (47.2%)	119 (58.9%)	95 (46.4%)	0.01**
	Women	239 (52.8%)	103 (41.1%)	136 (53.6%)	
<b>1<sup>st</sup> Semester QPA</b>	Mean (SD) (Men & Women)	2.85 ( $\pm$ .82)	2.91 ( $\pm$ .77)	2.80 ( $\pm$ .86)	0.15
<b>HS Rank</b>	1 <sup>st</sup> Fifth	70 (15.5%)	35 (15.8%)	35 (15.2%)	0.21
	<b>Top Tenth</b>	42 (9.3%)	17 (7.7%)	25 (10.8%)	
	2 <sup>nd</sup> Fifth	164 (36.2%)	88 (39.6%)	76 (32.9%)	
	3 <sup>rd</sup> Fifth	122 (26.9%)	58 (26.1%)	64 (27.7%)	
	4 <sup>th</sup> Fifth	18 (4.0%)	11 (5.0%)	7 (3.0%)	
	5 <sup>th</sup> Fifth	1 (0.2%)	1 (0.5%)	0 (0%)	
	unranked	36 (7.9%)	12 (5.4%)	24 (10.4%)	
<b>SAT</b>	Mean (SD) of Composite	1060 ( $\pm$ 106.48)	1059 ( $\pm$ 98.61)	1062 ( $\pm$ 113.77)	0.79
<b>Major</b>	Behavioral Science	67 (14.8%)	38 (17.1%)	29 (12.6%)	0.004**
	Natural Science	43 (9.5%)	19 (8.6%)	24 (10.4%)	
	Humanities	33 (7.3%)	20 (9.0%)	13 (5.6%)	
	Management	61 (13.5%)	33 (14.9%)	28 (12.1%)	
	Health	86 (19.0%)	29 (13.0%)	57 (24.7%)	
	Education	17 (3.8%)	14 (6.3%)	3 (1.3%)	
	Engineering	35 (7.7%)	14 (6.3%)	21 (9.0%)	
	Undecided	111 (24.5%)	55 (24.8%)	56 (24.2%)	
<b>Residence</b>	On-Campus	281 (62.0%)	149 (67.1%)	132 (57.1%)	0.03*
	Off-Campus	172 (38.0%)	73 (32.9%)	99 (42.9%)	

\*Significant at  $p \leq 0.05$  (comparison between students enrolled and not enrolled in the Freshman Seminar class)

\*\*Significant at  $p \leq 0.01$  (comparison between students enrolled and not enrolled in the Freshman Seminar class)

### 3.2 EXPERIMENTAL DESIGN

The study was descriptive in nature and employed a cross-sectional study design. The primary dependent variable in this study was end-of-first-term quality point average (QPA) as reported from the Office of the Registrar at the University of Pittsburgh at Greensburg. The primary independent variables were the six priority health risk behaviors as identified by the Centers for Disease Control and Prevention (CDC).

QPA was determined by the following standard procedure by the Office of the Registrar at the University of Pittsburgh at Greensburg. For each course,  $i$ , the student is awarded a grade ( $g_i$ ), according to the grade point schedule in the Table 3.2 below, credits ( $c_i$ ), and quality points ( $q_i$ ).

Table 3.2 Letter Grade with Corresponding QPA Value

Grade	Quality Points
A or A+	4.00
A-	3.75
B+	3.25
B	3.00
B-	2.75
C+	2.25
C	2.00
C-	1.75
D+	1.25
D	1.00
D-	0.75
F	0.00

The grade is determined by the instructor based on the student's performance in the course, the number of credits is determined as part of the course definition, and the number of quality points is computed as:  $q_i = c_i g_i$ . The overall QPA is calculated as:  $QPA = \frac{\sum q_i}{\sum c_i}$ .

To access the primary independent variables in this study, a standard questionnaire, the National College Health Risk Behavior Survey (NCHRBS) was administered to study participants. The NCHRBS, a paper/pencil survey written in multiple choice format, monitors priority health risk behaviors that contribute to the leading causes of death, illness, and social problems among young adults in the United States. These include tobacco use; unhealthy dietary behaviors; inadequate physical activity; alcohol and other drug use; sexual behaviors that may result in HIV infection, other sexually transmitted diseases, and unintended pregnancies; and behaviors that may result in unintentional and intentional injuries such as motor vehicle crashes and violence, including suicide (Centers for Disease Control, 1997).

### 3.3 DATA COLLECTION

In the twelfth week of the fall term, during students' regularly scheduled Freshman Seminar class time, students were asked to voluntarily complete the NCHRBS (Appendix C). Students were asked to place no personal identifiers on the survey answer sheet, but were asked to print the last five digits of their SS# on a cover sheet that was temporarily attached to their answer sheet. Immediately following the collection of survey responses, all student answer sheets were assigned an individual participant ID number. A master list of ID number with matching SS# was kept separate from the student survey responses in a locked file cabinet.

Although the NCHRBS includes multiple questions that address the various priority health risk behaviors, a key group of questions provided the analytic focus for this study. The CDC has designated the questions selected for analysis in this study as key/sentinel questions, to gauge overall general risk in each priority health risk behavior category. The key questions, which served as the basis for the study's primary analysis, are listed in Table 3.3. Cut points for determining at-risk behavior in each behavior category have been determined by the CDC on the basis of prior research (Centers for Disease Control, 1997).

In addition to the primary independent variables of priority health risk behaviors, the following demographic and background information, which are included in the NCHRBS, were obtained from the survey responses and analyzed as possible covariates in the study.

- Age
- Gender
- Fulltime/Part Time status
- Ethnicity
- Mother/Father education level
- # Hours worked per week
- Resident/Commuter status
- Marital status
- With whom student lives
- Athlete/Non-athlete

Table 3.3 NCHRBS Key Questions for Analysis and Cut Points for Risk Determination

<b>Priority Health Risk Category</b>	<b>NCHRBS Item # and Question Content</b>	<b>Cut point for Risk Determination</b>
1. Unintentional/ Intentional Injuries	#24 During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?	Drinking and driving on $\geq 1$ time during the 30 days preceding survey.
2. Tobacco use	#36 During the past 30 days, on how many days did you smoke cigarettes?	Smoked cigarettes on $\geq 1$ of the 30 days preceding survey.
3. Alcohol and Other Drug Use	#44 During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is within a couple of hours?	Had drunk $\geq 5$ drinks of alcohol on at least one occasion on $\geq 1$ of the 30 days preceding survey.
4. Risky Sexual Behaviors	#65 The last time you had sexual intercourse did you or your partner use a condom?	Student answers no to question.
5. Poor Dietary Habits	#81 Yesterday, how many times did you eat fruit? #82 Yesterday, how many times did you drink fruit juice? #83 Yesterday, how many times did you eat green salad? #84 Yesterday, how many times did you eat cooked vegetables?	*Composite score Had eaten $< 5$ servings of fruit, fruit juice, green salad, and cooked vegetables during the day preceding survey.
6. Insufficient Physical Activity	#88 On how many of the past 7 days did you exercise or participate in sports activities for at least 20 minutes that made you sweat and breathe hard, such as basketball, jogging, swimming laps, tennis, fast bicycling, or similar vigorous aerobic exercise?	Engaged in activities that caused sweating and hard breathing for $< 20$ minutes on $\leq 2$ days of the 7 days preceding survey.

After successfully receiving approval for this study from the Institutional Review Board, permission was granted by the Registrar's Office at the University of Pittsburgh at Greensburg to retrieve all academic records of the study participants. High School class rank and SAT scores, were obtained for each participant from the Office of the Registrar at the University of Pittsburgh at Greensburg, as measures of previous academic achievement, and were also included as covariates in the study.

As part of a secondary analysis, and in order to 1) assess a number of affective behaviors and previous health risk behaviors engaged in prior to coming to college, which may potentially serve to mediate or confound the relationship between priority health risk behavior and academic achievement in the freshman population, and 2) to further explore potential secondary outcomes in addition to QPA, twenty-four questions were added to the original ninety-six multiple choice questions contained in the NCHRBS. Included among the twenty-four supplemental questions were questions that addressed the following general topics. In order to assess various health and affective behaviors found in previous research to have a potential effect on academic achievement, questions assessing amount of sleep (Trockel, Barnes & Egget, 2000), time management (Britton & Tesser, 1991), time spent studying (Mathiasen, 1984), amount of hope (Snyder, Shorey, Cheavens, Pulvers, Adams & Wiklund, 2002), amount of social support (Smerdon, 1999; and Fraser, 1987), and stress/depression (Haines, Norris & Kashy, 1996), were added to the survey. Also questions to gauge recent change in health risk behavior were added. A question asking participants to identify their college major was added. Questions that address the student's health status throughout the current semester and any class absenteeism due to personal illness were included. In addition, questions were added to measure the potential for

intermediate and/or secondary outcomes such as receiving a lower grade on an exam/project, receiving an incomplete grade and/or dropping a course, that may serve to impact the primary outcome variable of end-of-first-term QPA.

Permission is commonly granted by the CDC and was granted in the present study (J. Grunbaum, personal communication, May 25, 2004), to add the additional questions and to amend the original survey questionnaire in order to better meet the intended purpose of this research. Thus, the response alternative for housing (Question 9, NCHRBS, Appendix C) was increased to accommodate the fact the University of Pittsburgh at Greensburg has academic village residences, not just college dormitories/residence halls. The additional questions, specifically noted on the survey and numbered 97 through 120 (Appendix C), were pilot tested by a small group of freshman students and were found to be easily understood by the students involved in the pilot and appropriate for the intended population of study. The entire survey took study participants approximately 30 minutes to complete.

Upon completion of the first term of study, the Database Manager, a faculty member at the University of Pittsburgh at Greensburg, who, as such, had the authority to secure student academic records through the Office of the Registrar, matched each student's survey responses with their respective end-of-first-term quality point average (QPA). Following the matching of the two data sets, personal identifiers were removed from each student's official academic records, and a composite data file was subsequently released to the Principal Investigator for statistical analysis.

### **3.4 STATISTICAL ANALYSES**

There were two primary analyses conducted on the data from this study, each one addressing one of the study's two specific aims. The first primary analysis was conducted in order to determine which of the priority health risk behaviors were significantly related to academic achievement, assessed both independently and in the presence of known covariates. A covariate in this study was defined as any variable having a significant independent association to QPA. The second primary analysis was conducted to determine the relation between the total number of health risk behaviors engaged in by the college freshmen studied and their end-of-first-term academic achievement, assessed both independently and in the presence of known covariates. Twenty-six potential covariates included gender, ethnicity, resident status, high school class rank, SAT score, mother's education level, father's education level, athlete/non-athlete status, hours worked per week, study time per week, level of social support, number of visits to nurse/doctor due to feeling sick or ill, prior tobacco use, prior alcohol use, prior drug use, prior diet, prior physical activity, prior personal safety, prior safe sexual behavior, feeling of being overwhelmed by time pressure, number of days of class missed due to feeling ill, number of hours of sleep per weekday night, number of hours of sleep per weekend night, number of days eating breakfast in a typical week, hopefulness about the future, and use of a day planner.

#### **3.4.1 Identification of Covariates**

Prior to performing the primary analyses, several univariate analyses were performed in order to determine which of the above listed potential covariates were significantly related to QPA. The related covariates were identified by examining the relationship of each variable to QPA using one of three methods. If the covariate was a categorical variable, the relationship was tested

using a one-way ANOVA, and if the categorical variable was dichotomous an independent t-test was performed. A significant relationship was determined by the overall F-test, which identified whether the mean QPA was equal for all categories. A significant p-value ( $\leq 0.05$ ) indicated if at least two of the category means were not equal, and therefore the covariate had some effect on QPA. If the covariate was continuous, the relationship was tested using a Pearson Product-Moment correlation coefficient. A significant p-value ( $\leq 0.05$ ) for the correlation coefficient indicated a linear relation between the covariate and QPA. Covariates identified by any of these methods as having some relationship to QPA were used in subsequent regression models. Details of these analyses are described in sections 3.4.2 and 3.4.3.

### **3.4.2 Primary Analysis 1**

The first primary analysis was performed to identify which of the six priority health risk behaviors had a significant effect on academic achievement. For each priority health risk behavior, a cut point, based on Center for Disease Control research (1997) was used to classify each respondent as either “at risk” or “not at risk” (Table 3.3). Six separate t-tests were used to compare the mean QPA of the group of students “not at risk” for each of the six priority health risk behaviors to the mean QPA of the “at risk”. For each health risk behavior that showed a significant mean difference between the “at risk” and “not at risk” groups, a stepwise regression was performed to determine whether the effect remained significant in the presence of covariates known to be significantly related to QPA (on the basis of the analyses described in section 3.4.1). The purpose of these procedures was to determine if the variance in QPA explained by the health risk behavior, taken alone, and identified by t-test above, was unique to that behavior or could be better explained by other factors in a more complex model. The stepwise regression for each

health risk behavior analyzed used QPA as the dependent variable and the health risk behavior plus the covariates identified as significantly related to QPA as independent variables. The stepwise procedure builds the model empirically, by choosing the most significant predictor variable to place in the model, then choosing the next most significant predictor variable to add to the model from all those remaining, and so on until there are no more significant predictor variables to be added. Each step of the stepwise regression analysis allows for inclusion of the next best predictor of QPA whose p-value is  $\leq 0.05$  in the regression model. The resulting model thus includes only those predictor variables that are found to explain a unique and significant ( $p \leq 0.05$ ) proportion of the total variance in QPA.

### **3.4.3 Primary Analysis 2**

Primary analysis 2 was conducted in order to determine the association between the total number of priority health risk behaviors engaged in by the college freshmen surveyed and their end-of-first-term academic achievement (QPA). For each respondent, the number of risk behaviors for which they were judged to be “at risk” by CDC criteria was counted. A simple linear regression was performed to determine the strength of the linear relationship between the number of health risk behaviors engaged in by the students and their QPAs. In addition, a stepwise multiple regression was performed to determine whether this effect changed in the presence of covariates known to be significantly related to QPA (as described in section 3.4.1). The stepwise regression for each health risk behavior used QPA as the dependent variable and the total number of “at risk” health risk behaviors, plus the covariates identified as significantly related to QPA as independent variables. The stepwise procedure builds the model empirically by choosing the most significant predictor to place in the model, then choosing the next most significant predictor

to add to the model from all those that remain and so on, until there are no more significant predictors to be added. The resulting model thus includes only those predictor variables that are found to explain a unique and significant ( $p \leq 0.05$ ) proportion of the total variance in QPA.

## **4.0 RESULTS**

The purpose of this study was to explore the association between priority health risk behaviors and academic achievement among college freshmen. There were two specific aims of this investigation. The first specific aim was to determine which of the priority health risk behaviors had the strongest independent association to academic achievement. The second specific aim was to determine the association between the total number of priority health risk behaviors engaged in by the college freshmen studied and their end-of-first-term academic achievement (QPA).

### **4.1 SAMPLE CHARACTERISTICS**

All participants were first semester freshman students enrolled in the Freshman Seminar classes at the University of Pittsburgh at Greensburg. Each participant completed the National College Health Risk Behavior Survey (NCHRBS) during the twelfth week of the Fall 2004 semester. Although a total of 222 freshmen were enrolled in the Freshman Seminar classes, 26 students did not participate because they were not present in class on the day the survey was administered. All students present in class on the day of the survey administration participated. Therefore, the analyses presented were performed on 196 (106 males, 90 females) first semester freshmen

students enrolled in the Freshman Seminar classes, who voluntarily completed the NCHRBS during their regularly scheduled class time. This represents an overall participation rate of 88%.

#### **4.1.1 Outcome Variable (QPA)**

Mean results for the primary outcome variable, end-of-first-term QPA, are presented in Figure 4.1. The first term overall mean QPA, reported by the Office of the Registrar at the University of Pittsburgh at Greensburg, for the participants was 3.05 ( $\pm .64$ ). Results of a t- test revealed a significant difference in QPA ( $p = 0.03$ ) between male ( $2.96 \pm .59$ ) and female ( $3.15 \pm .68$ ) study participants at the end of the first term of study (Figure 4.1). Females showed better performance than males.

#### **4.1.2 Socio-demographic and High School Academic Characteristics**

The participants' socio-demographic and academic background characteristics are presented in Table 4.1. The overall mean age of the participants was 18.3 years ( $\pm .61$ ) with mean age indistinguishable between males ( $n = 106$ ) and females ( $n = 90$ ). The majority of the participants were White (93%), had never been married (99%), and lived in campus housing (67%). Most of the participants reported that both their mother (68%) and father (64%) had completed more than a high school education. Ninety-eight percent (98%) were full-time students, carrying the minimum class load of 12 credit hours. Most of the participants did not work for pay (54%) and did not participate in intercollegiate sports (74%). Results of chi-square tests and t-tests, where appropriate, revealed no significant differences between males and females on any of the socio-demographic variables.

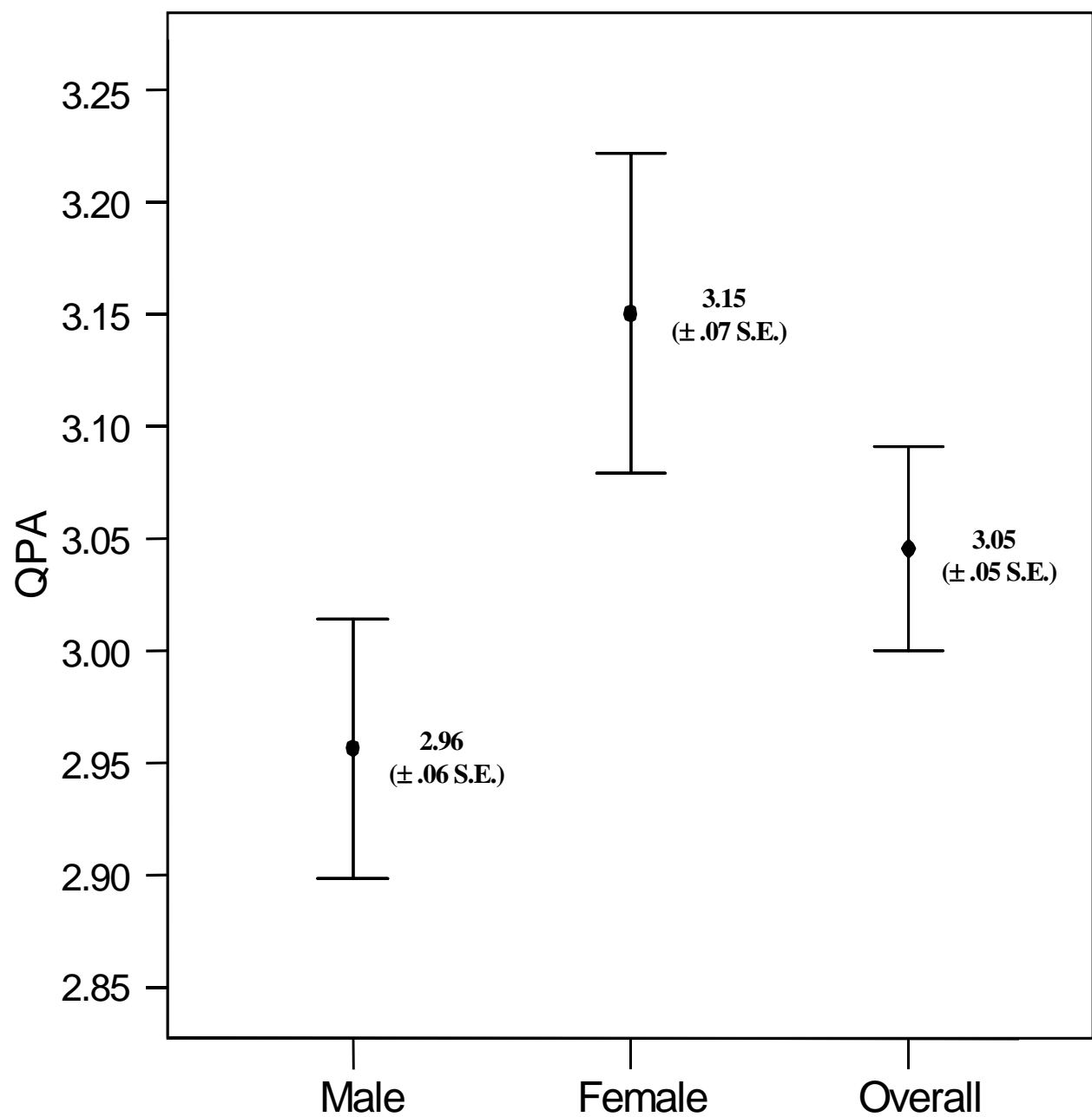


Figure 4.1 Mean  $\pm$  Standard Error for End-of-First-Term QPA in a Sample of College Freshmen

Table 4.1 Socio-Demographic and High School Academic Characteristics in a Sample of College Freshmen

<b>Variable</b>	<b>Total (N=196)</b>	<b>Males (N=106)</b>	<b>Females (N=90)</b>	<b>P value</b>
Mean Age ( $\pm$ SD)	18.3 ( $\pm$ .61)	18.3 ( $\pm$ .56)	18.3 ( $\pm$ .65)	0.52
White	93.4%	91.5%	95.6%	0.26
Mother > high school ed.	68.4%	71.7%	64.5%	0.20
Father > high school ed.	64.3%	66.0%	62.2%	0.52
Never been married	98.5%	98.1%	98.9%	0.66
Resident student	67.3%	62.3%	73.3%	0.11
Full time status	98.0%	98.1%	97.8%	0.87
Did not work for pay	54.1%	56.6%	51.1%	0.44
Non-athlete	73.5%	71.7%	75.6%	0.54
Mean SAT Score ( $\pm$ SD)	1057 ( $\pm$ 101.66)	1081 ( $\pm$ 101.77)	1029 ( $\pm$ 94.59)	<0.001**
H.S. Top tenth (%)	8.7%	0.9%	17.8%	<0.001**
Study $\leq$ 5-7 hrs./week	56.7%	66.0%	45.5%	0.004**

\*\*Significant at  $p \leq 0.01$  (comparison between males and females)

The mean high school SAT score for the participants was 1057 ( $\pm 101.66$ ) and overall, 8.7% were ranked in the top ten percent of their high school class. Significant differences were found for SAT score, high school class rank and number of hours spent studying between males and females. Males on average earned higher SAT scores than females ( $p < 0.001$ ); however, more females were ranked in the top ten percent of their high school class than their male counterparts ( $p < 0.001$ ). The majority of the sample (57%) reported spending an average of 5-7 hours or less per week studying during their initial semester at college. Males reported less time studying each week than females ( $p = 0.004$ ).

#### **4.1.3 Psychosocial and General Health Behavior Characteristics**

Descriptive statistics for various psychosocial and general affective health behavior characteristics of the participants are presented in Table 4.2. A large portion (75%) of the participants reported receiving social support either often enough or more than often enough to meet their needs. Approximately one-third (30%) of the participants reported, that they always or usually felt overwhelmed by time pressure (females  $>$  males,  $p = 0.03$ ). The majority of respondents (61%) reported feeling very hopeful about the future. Females more often than males reported having used a planner or checklist to manage their time and meet responsibilities (73% vs. 30%, respectively,  $p < 0.001$ ).

The majority of the participants reported visiting the nurse or doctor  $\leq 2$  times during the semester due to sickness or feeling ill (72%) and having missed one or more classes on  $\leq 1$  day because they were not feeling well (68%). Sixty-five percent (65%) reported getting an average of  $\geq 7$  hours of sleep on weekday nights and 71% reported getting an average of  $\geq 7$  hours of sleep on weekend nights. Less than one-fifth (17%) of the participants reported eating breakfast.

Table 4.2 Psychosocial and General Health Behavior Characteristics in a Sample of College Freshmen

<b>Variable</b>	<b>Total (N= 196)</b>	<b>Males (N = 106)</b>	<b>Females (N = 90)</b>	<b>p-value</b>
Social support met needs ( $\geq$ often enough)	75.0%	75.5%	74.4%	0.87
Always or usually felt overwhelmed by time pressure	30.1%	23.6%	37.8%	0.03*
Felt very hopeful about future	61.2%	66.0%	55.6%	0.13
Used planner $\geq$ often to manage time	50.0%	30.1%	73.4%	<0.001**
Visited nurse/Dr. $\leq$ 2 times during semester/ill	72.4%	76.4%	67.8%	0.18
Missed $\geq$ 1 or more classes on $\leq$ 1 day/ill	67.8%	72.7%	62.3%	0.14
Received average $\geq$ 7 hrs. sleep weekday nights	65.3%	66.9%	63.3%	0.59
Received average $\geq$ 7 hrs. sleep weekend nights	70.9%	72.6%	68.8%	0.56
Ate breakfast everyday	17.3%	16.0%	18.9%	0.60

\*Significant at  $p \leq 0.05$  (comparison between males and females)

\*\*Significant at  $p \leq 0.01$  (comparison between male and females)

#### **4.1.4 Perceived Effects of Health Behavior on Academic Performance**

Data representing participants' self-reports of a perceived relationship between particular health behaviors and various intermediate and/or secondary outcomes are presented in Table 4.3. Among participants who reported using alcohol since coming to college, the vast majority of users (95.4%) indicated that alcohol did not affect their academic performance. Almost half (44.8%) of those who experienced stress, depression, anxiety and/or sleep difficulties since coming to college reported either receiving a lower grade on an exam/assignment, anticipated receiving a lower grade in a course, or dropping a course or anticipated receiving an incomplete grade in a course as a result of these health problems. Among participants who had experienced relationship difficulties since coming to college, over one-quarter (25.2%) indicated that their academic achievement had been affected. Among those who experienced eating disorders or diet/weight problems since coming to college (14.3%), the vast majority reported their academic achievement had not been affected by these problems. Only females reported a negative impact of an eating disorder or diet/weight problem on their first term academic performance. Nearly one-fifth (19.6%) of the participants who experienced personal injury or illness since coming to college reported either receiving a lower grade on an exam/assignment and/or anticipated receiving a lower grade in a course as a result of this health concern. No participant reported having experienced problems with sexually transmitted diseases or pregnancy in the 12 weeks since coming to college.

Table 4.3 Percentage of Freshmen Students in a Sample Reporting a Perceived Relationship Between Particular Health Behaviors and Various Intermediate Academic Outcomes

Variable	Total	Males	Females	p-value
Alcohol use	(N = 108) 4.6%	(N = 62) 3.2%	(N = 46) 6.5%	0.42
Stress, depression, anxiety, sleep difficulties	(N = 143) 44.8%	(N = 67) 52.2%	(N = 76) 38.2%	0.09
Relationship issues	(N = 135) 25.2%	(N = 69) 33.3%	(N = 66) 16.7%	0.03*
Eating disorders or diet/weight problems	(N = 31) 9.7%	(N = 6) 0%	(N = 25) 12.0%	0.37
Personal injury/illness	(N = 51) 19.6%	(N = 26) 19.2%	(N = 25) 20.0%	0.95
Sexually transmitted disease/pregnancy	(N = 0) 0%	(N = 0) 0%	(N = 0) 0%	NA

\*Significant at  $p \leq 0.05$  (comparison between males and females). Percentages reported are for students who reported engaging/experiencing the particular risk behavior since coming to college.

#### **4.1.5 Prevalence of Priority Health Risk Behavior**

The prevalence of each of the six priority health risk behaviors is summarized in Table 4.4. The majority of the participants reported not driving while drinking (84.2%), not smoking cigarettes (72%), and not engaging in binge drinking (60.2%) during the 30 days prior to the survey. The majority of the participants reported either never having had sexual intercourse or that they had used a condom during their last sexual intercourse (81.1%). With regard to poor dietary habits, a total of 50.5% of the participants reported having eaten no fruit on the day preceding the survey. Females reported having eaten no fruit more often than males (males = 48.1%, females = 53.5%). Over one-third (36.2%) of the participants reported not drinking any fruit juice on the day before the survey. Females reported not drinking any fruit juice more often than males (males = 34%, females = 38.9%). Over one-half of the participants (59.2%) reported not eating any green salad on the day preceding the survey. Males reported not eating any green salad more often than females (males = 62.3%, females = 55.6%). Over one-half of the participants (53.6%) reported not eating any cooked vegetables on the day before the survey. Females reported not eating any cooked vegetables more often than males (males = 50.9%; females = 56.7%). Nearly two-thirds (65.3%) reported not having engaged in vigorous exercise at recommended levels ( $\geq 3$  days) during the week preceding the survey. Females reported not having engaged in vigorous activity more often than males (males = 60.4%, females = 71.2%).

Table 4.4 Prevalence of Priority Health Risk Behaviors in a Sample of College Freshmen

<b>DRINKING AND DRIVING</b> (Past 30 days)			
	<b>Total (N = 196)</b>	<b>Males (N = 106)</b>	<b>Females (N = 90)</b>
0 times	84.2%	81.1%	87.8%
1 time	7.7%	7.5%	7.8%
2 or 3 times	6.1%	7.5%	4.4%
6 or more times	2.0%	3.8%	0%
<b>TOBACCO USE</b> (Past 30 days)			
I have never smoked	43.4%	40.6%	46.7%
0 days	28.6%	31.1%	25.6%
1-2 days	10.7%	10.4%	11.1%
3-5 days	2.6%	4.7%	0%
6-9 days	2.6%	3.8%	1.1%
10-19 days	4.1%	3.8%	4.4%
20-29 days	4.6%	3.8%	5.6%
30 days	3.6%	1.9%	5.6%
<b>BINGE DRINKING</b> (Past 30 days)			
Never	13.3%	10.4%	16.7%
0 days	46.9%	45.3%	48.9%
1-2 days	21.4%	23.6%	18.9%
3-5 days	10.2%	11.3%	8.9%
6-9 days	5.6%	5.7%	5.6%
10-19 days	2.0%	2.8%	1.1%
20-29 days	0.5%	0.9%	0%
30 days	0%	0%	0%
<b>NON-USE OF CONDOMS</b> (Last sexual encounter)			
Never had sexual intercourse	36.7%	41.5%	31.1%
Yes	44.4%	43.4%	45.6%
No	18.4%	14.2%	23.3%
Did not choose to answer	0.5%	0.9%	0%

Table 4-4 (continued)

<b>POOR DIETARY HABITS (Fruit intake, yesterday)</b>			
	<b>Total (N = 196)</b>	<b>Males (N = 106)</b>	<b>Females (N = 90)</b>
0 times	50.5%	48.1%	53.3%
1 time	32.1%	33.0%	31.1%
2 times	13.3%	16.0%	10.0%
3 or more times	4.1%	2.8%	5.6%
<b>POOR DIETARY HABITS (Fruit juice intake, yesterday)</b>			
0 times	36.2%	34.0%	38.9%
1 time	36.2%	34.0%	38.9%
2 times	19.4%	25.5%	12.2%
3 or more times	8.2%	6.6%	10.0%
<b>POOR DIETARY HABITS (Green salad intake, yesterday)</b>			
0 times	59.2%	62.3%	55.6%
1 time	36.7%	34.0%	40.0%
2 times	3.6%	3.8%	3.3%
3 or more times	0.5%	0%	1.1%
<b>POOR DIETARY HABITS (Cooked vegetable intake, yesterday)</b>			
0 times	53.6%	50.9%	56.7%
1 time	38.8%	40.6%	36.7%
2 times	6.6%	8.5%	4.4%
3 or more times	1.0%	0%	2.2%
<b>INSUFFICIENT PHYSICAL ACTIVITY (Vigorous exercise, past 7 days)</b>			
0 days	30.6%	26.4%	35.6%
1 day	14.8%	13.2%	16.7%
2 days	19.9%	20.8%	18.9%
3 days	14.3%	14.2%	14.4%
4 days	7.7%	10.4%	4.4%
5 days	6.1%	7.5%	4.4%
6 days	2.6%	2.8%	2.2%
7 days	4.1%	4.7%	3.3%

#### **4.1.6 Classification of Risk and Comparisons to National Sample**

In order to identify the total number of students classified as “at risk” for each of the six priority health risk behaviors, cut points determined by the CDC (Centers for Disease Control, 1997) were used to classify the students into two groups; those “at risk” and those who were “not at risk” for each priority health risk behavior. Table 4.5 includes the percent of students (overall and by gender) in the sample classified as “at risk” for each priority health risk as well as comparison data from a national sample.

A total of 15.8% of the University of Pittsburgh at Greensburg (UPG) sample were classified as “at risk” due to drinking and driving whereas 27.4% of the national sample reported drinking and driving on  $\geq 1$  time during the 30 days preceding the survey. Males in the UPG sample more often than females reported having driven while drinking, however, the difference was not statistically significant ( $p = 0.20$ ).

A total of 28.1% of the UPG sample compared to 29.0% of the national sample were classified as “at risk” due to tobacco use, reporting having smoked cigarettes on  $\geq 1$  of the 30 days preceding the survey. Males in the UPG sample reported having smoked more often during the 30 days prior to the survey than females (males = 28.3%, females = 27.8%). Results of a chi-square test revealed no significant difference ( $p = 0.94$ ) between the percentage of males and females in the UPG sample engaged in this risk behavior.

A total of 39.8% of the UPG sample in comparison to 34.5% of the national sample were “at risk” due to binge drinking, having drunk  $\geq 5$  drinks of alcohol on at least one occasion on  $\geq 1$  of the 30 days preceding the survey. Males in the UPG sample reported having engaged in binge

drinking more often than females (males = 44.3%, females = 34.4%). Results of a chi-square test revealed no significant difference ( $p = 0.16$ ) between the percentage of UPG males and females engaged in binge drinking.

The national sample reported safer sexual practices than the UPG sample; 18.9% of the UPG sample were classified as “at risk” due to non-condom use during the last time they had sexual intercourse compared to 14.0% in the national sample. In the UPG sample, females reported not having used a condom during their last sexual intercourse more often than males (males = 15.1%, females = 23.3%), however the difference was not statistically significant ( $p = 0.14$ ).

A total of 85.2% of the UPG sample compared to 73.7% of the national sample were classified as “at risk” due to poor dietary habits, having failed to eat five or more servings of fruits and vegetables on the day preceding the survey (composite score of eating  $< 5$  fruit, fruit juice, green salad and/or cooked vegetables). Slightly more females were classified as “at risk” than males in the UPG sample (males = 84%, females = 86.7%), however again the difference was not statistically significant ( $p = 0.60$ ).

Determined “at risk” due to insufficient physical activity, reporting not engaging in vigorous exercise for  $\geq 20$  minutes on  $\geq 3$  days of the 7 days preceding the survey, were 65.3% of the UPG sample compared to 62.4% of the national sample. Females in the UPG sample reported not having engaged in vigorous activity more often than males (males = 60.4%, females = 71.1%), however, results of a chi-square test revealed no significant difference ( $p = 0.12$ ) between the percentage of males and females in the UPG sample reporting this risk behavior.

Table 4.5 Prevalence of "At Risk" Classification for Each Priority Health Risk Behavior in a Sample of College Freshmen and Comparisons to NCHRBS Data of 1995

<b>At Risk Behavior</b>	<b>National Sample <sup>1</sup> (N = 4,609)</b>	<b>Total (*Study Sample) (N = 196)</b>	<b>Males (*Study Sample) (N = 106)</b>	<b>Females (*Study Sample) (N = 90)</b>	<b>p- value <sup>2</sup></b>
Drinking and Driving	27.4%	15.8%	18.9%	12.2%	0.20
Tobacco Use	29.0%	28.1%	28.3%	27.8%	0.94
Binge Drinking	34.5%	39.8%	44.3%	34.4%	0.16
Non-use of condoms	14.0%	18.9%	15.1%	23.3%	0.14
Poor dietary habits	73.7%	85.2%	84.0%	86.7%	0.60
Insufficient physical activity	62.4%	65.3%	60.4%	71.1%	0.12

<sup>1</sup>Centers for Disease Control Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey – United States, 1995. *Morbidity and Mortality Weekly Report CDC Surveillance Summary*, 1997, 46(SS-6), 1-54.

<sup>2</sup> Significant at  $p \leq 0.05$  (reported p values were determined by using chi-square tests to determine differences in percentage of “at risk” behavior between males and females in current study).

\*Study sample represents students who participated in the current study (UPG students enrolled in the Freshman Seminar class who had completed the NCHRBS).

## **4.2 RESULTS OF ANALYSES**

### **4.2.1 Identification of Covariates**

Results of the univariate analyses conducted to identify potential covariates to the primary outcome variable (QPA) are presented in Table 4.6. Using t- tests or ANOVAs for dichotomous and non-dichotomous categorical variables, respectively, the following variables were found to have a significant relation to QPA: gender ( $p = 0.04$ ), ethnicity ( $p = 0.03$ ), perceived social support ( $p = 0.03$ ), prior tobacco use ( $p = 0.01$ ), feeling overwhelmed by time pressure ( $p = 0.001$ ), and hopefulness about the future ( $p = 0.03$ ). For continuous variables, Pearson correlations were calculated to examine the relation to QPA. All associations were weak to moderate ranging from  $-0.45$  to  $+0.25$  for the following variables: SAT score ( $r = .25$ ), high school class rank percentile ( $r = -0.45$ ), number of visits to nurse/Dr. due to feeling sick or ill ( $r = -0.20$ ), missing class due to feeling sick or ill ( $r = -0.24$ ), and eating breakfast ( $r = .20$ ).

Table 4.6 Association of Covariates with QPA in a Sample of College Freshmen

<b>Socio-demographic and Academic Characteristics</b>		
	<b>p – value <sup>1</sup></b>	<b>r – value <sup>2</sup></b>
Gender	0.04*	
Ethnicity	0.03*	
Mother Education level	0.56	
Father Education level	0.22	
Resident Status	0.90	
Hrs. work for pay/wk.	0.87	
College Athlete	0.06	
SAT Score		.25*
H.S. Rank percentile		-.45*
Study time/wk	0.46	
<b>Psychosocial and General Health Behavior Characteristics</b>		
Perceived Social Support meeting needs	0.03*	
Feeling overwhelmed by time pressure	0.001**	
Feeling hopeful about future	0.03*	
Using planner to manage time	0.12	
Number visits to nurse/Dr. due to illness		-.20*
Missing class due to illness		-.24*
Hrs. sleep weekday nights		-.10
Hrs. sleep weekend nights		-.03
Eating breakfast		.20*
Prior Tobacco Use	0.01*	

\*Significant at  $p \leq 0.05$

\*\*Significant at  $p \leq 0.01$

<sup>1</sup>p-values determined by t-tests or ANOVA

<sup>2</sup>r-values determined by Pearson product moment correlations

#### 4.2.2 Results of Primary Analysis 1

The first primary analysis was performed to identify the health risk behaviors which had a significant effect on academic achievement. Results of the six independent t-tests used to compare the mean QPAs of those students identified as “at risk” due to each health behavior with those students identified as “not at risk” are presented in Table 4.7. The analyses revealed a significant association to QPA for tobacco use ( $p = 0.05$ ) and binge drinking ( $p = 0.02$ ).

Table 4.7 Comparison of QPA between "At Risk" and "Not At Risk" College Freshmen

Variable	Mean QPA (SD) “At Risk”	Mean QPA (SD) “Not At Risk”	p-value
Drinking and Driving	2.94 ( $\pm 0.56$ )	3.07 ( $\pm 0.65$ )	0.31
Tobacco Use	2.90 ( $\pm 0.66$ )	3.10 ( $\pm 0.62$ )	0.05*
Binge Drinking	2.91 ( $\pm 0.67$ )	3.13 ( $\pm 0.61$ )	0.02*
Non-Condom Use	2.96 ( $\pm 0.69$ )	3.07 ( $\pm 0.63$ )	0.34
Poor Dietary Habits	3.06 ( $\pm 0.63$ )	2.94 ( $\pm 0.67$ )	0.35
Insufficient Physical Activity	3.08 ( $\pm 0.58$ )	2.99 ( $\pm 0.75$ )	0.39

\*Significant at  $p \leq 0.05$

In order to assess whether the risk behaviors remained significant in the presence of covariates, separate stepwise multiple regression analyses were performed for each of the two statistically significant risk behaviors, using only those covariates identified as significantly related to QPA (Table 4.6). Results of the stepwise regression are reported in Table 4.8. The results revealed no significant effect for tobacco use on QPA when the additional covariates were included in the model as prior predictors. Hence, in the presence of the identified covariates, (those covariates found to be significantly related to QPA in previous univariate analyses) tobacco use was unable to explain a unique and significant proportion of the variance in QPA. Identical results were found for the stepwise multiple regression performed using binge drinking and the covariates identified as significantly related to QPA (see Table 4.8). The results revealed no significant effect for binge drinking on QPA when the additional covariates (those covariates identified as being significantly related to QPA in Table 4.6) were included in the model as prior predictors.

Each step of the stepwise regression analysis allowed for inclusion of the next best predictor of QPA with a  $p$  value  $\leq 0.05$  in the regression model. Accordingly, when the  $p$  value increased to  $> 0.05$  for a variable as the model was constructed, it was discarded. Using this procedure, the following variables remained in the regression model as predictors of QPA resulting in an overall  $R^2 = .41$ : high school class rank percentile, feeling overwhelmed by time pressure, missing class due to illness, SAT score, perceived adequacy of social support, gender, and hopefulness about the future.

Table 4.8 Stepwise Regression Analysis of Variables in a Study of Health Risk Behaviors and QPA among a Sample of College Freshmen

<b>Model <sup>1</sup></b>	<b>Unstandardized Coefficients</b>	<b>Standardized Coefficients</b>	<b>p-value</b>	<b>Cumulative R<sup>2</sup></b>
	<b>B</b>	<b>B</b>		
H.S.class rank percentile	-.014	-.375	<0.001	.20
Overwhelmed by time pressure	.070	.135	0.031	.27
Days missed class/illness	-.096	-.229	<0.001	.31
Total SAT score	.002	.268	<0.001	.34
Support meets needs	-.097	-.187	0.002	.38
Sex of respondent	.197	.153	0.022	.40
Hopefulness about future	-.139	-.125	0.038	.41

Dependent Variable: QPA

<sup>1</sup>Variables in order of entry into multiple regression model

### 4.2.3 Results of Primary Analysis 2

The second primary analysis was conducted in order to determine the association between the number of priority health risk behaviors engaged in by college freshmen and end-of-first-term academic achievement. Frequency data for number of risk behaviors engaged in by the participants is presented in Table 4.9. The majority of the participants (81.1%) reported having engaged in two or more of the priority health risk behaviors.

Table 4.9 Percentage of Multiple Risk Behaviors in a Sample of College Freshmen

# Risk behaviors	Total (N = 196)	Males (N = 106)	Females (N = 90)	*p-value
0	4.1%	4.7%	3.3%	
1	14.8%	13.2%	16.7%	
2	35.2%	34.9%	35.6%	
3	23.5%	25.5%	21.1%	
4	15.8%	17.0%	14.4%	
5	5.6%	4.7%	6.7%	
6	1.0%	0%	2.2%	
Mean ( $\pm$ SD)	2.53 ( $\pm$ 1.25)	2.51( $\pm$ 1.20)	2.56 ( $\pm$ 1.32)	0.80

\*p-value represents comparison in the mean number of risk behaviors between males and females

A simple linear regression was performed using total number of health risk behaviors engaged in as the independent variable and QPA as the dependent variable. The results of the regression analysis, found no significant linear relationship ( $p = .12$ ) between total number of risk behaviors and academic achievement as measured by end-of-first-term QPA. A t-test revealed no significant difference in the mean number of risk behaviors engaged in between males and females ( $p = 0.80$ ). A scatter plot of the results of the linear regression depicting the relation between number of risk behaviors and QPA is presented in Figure 4.2.

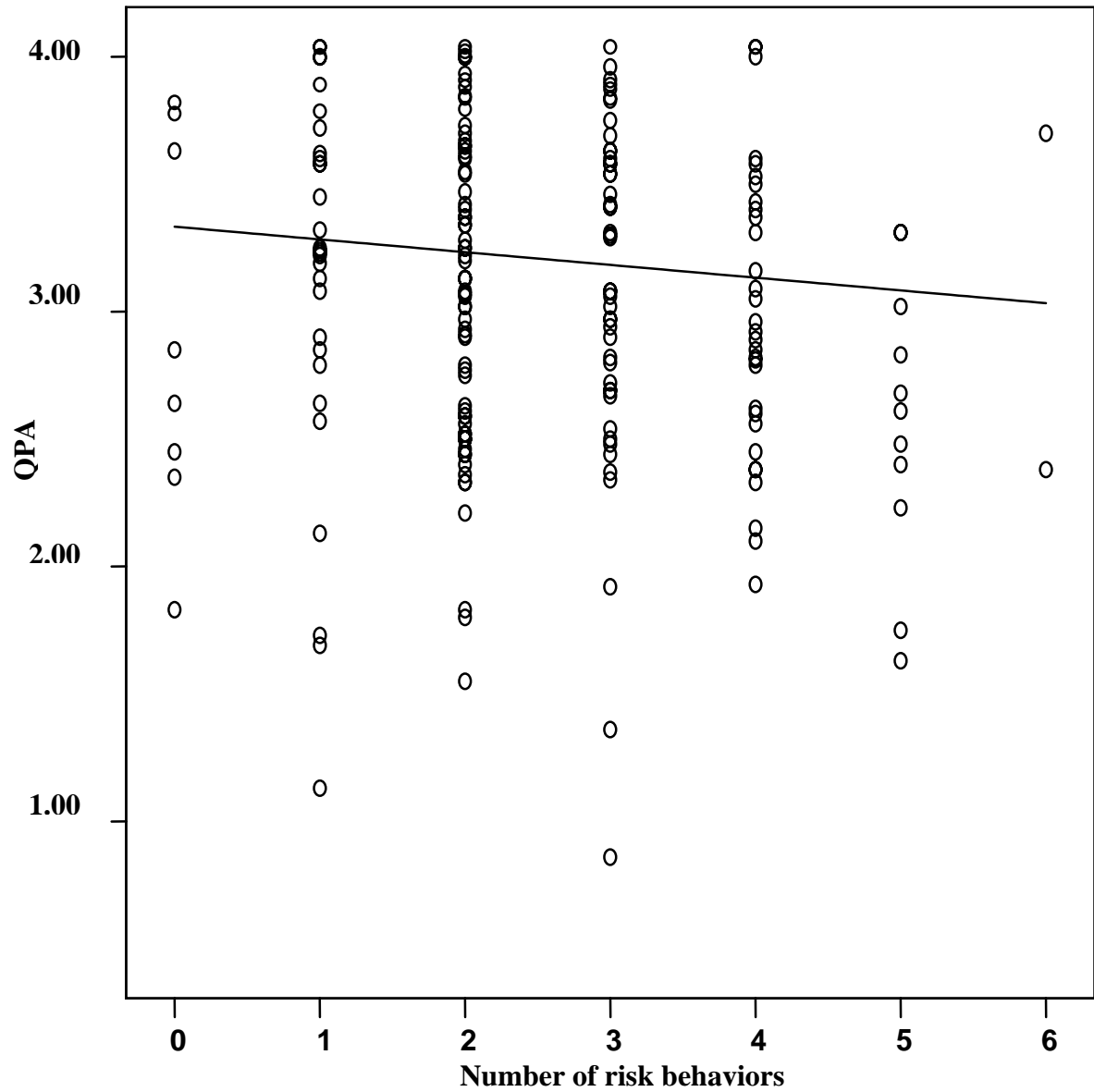


Figure 4.2 Scatter Plot of Relation between Number of Risk Behaviors and QPA in a Sample of College Freshmen

In addition, to this simple linear regression analysis, a stepwise multiple regression analysis was performed to determine whether the association between total number of risk behaviors and QPA changed in the presence of the covariates known to be significantly related to QPA (Table 4.6). The stepwise multiple regression used QPA as the dependent variable and total number of health risk behaviors as well as the identified covariates as independent variables. Once again, the results of the multiple regression analysis were identical to those reported in Table 4.8. The analysis indicated that there was no significant relation between the number of risk behaviors and QPA when the additional covariates were included as prior predictors in the analysis.

## **5.0 DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS**

Research concerning the major factors that affect academic achievement has been a paramount concern among colleges and universities throughout the 20<sup>th</sup> century and remains a source of classic inquiry among school leaders, administrators, faculty and scholars well into the 21<sup>st</sup> century. A common measure of academic performance in college students is overall quality point average (QPA). To gain a better understanding of the key factors which may serve to impact the overall QPA of students, especially during their initial year in college, has been a primary research focus. Perhaps, focusing on college freshmen and identifying key factors that affect student academic performance early in the student's college career, may offer the greatest and a more timely opportunity to affect positive change in academic performance throughout the entire college experience.

Prior research has revealed several traditional factors such as high school QPA, high school class rank and standardized test scores on the Scholastic Aptitude Test (SAT) or the American College Testing program (ACT) as major determinants of academic success in college (Hoyt, 1966; Haplin, Haplin and Hauf, 1976; Rowan, 1978; Mouw & Khanna, 1993; Gutafson & Balke, 1993). In addition, several non-traditional factors, such as personality, demographics, and/or environmental factors have been shown to relate to academic performance in college (Mathiasen, 1984; Gough & Lanning, 1986; Balkin, 1987; Fraser, 1987; Green & Jaquess, 1987; Kanoy, Latta & Wester, 1989; Mouw, 1993; Castejon & Vera-Munoz, 1996; Musgrave-Marquart,

Bromley & Dalley, 1997; Smerdon, 1999; and Snyder et al., 2002). The impact of specific health behaviors on one's academic success has also been explored, and has included a wide range of behaviors that reflect the physical, emotional, social and spiritual dimensions of health (Mouw & Khanna, 1993).

It was beyond the scope of the present research to consider the entire range of health behaviors that might impact a college student's academic performance. The purpose of the research was to investigate the impact of priority health risk behaviors on academic achievement among college freshmen. There are six priority health risk behaviors identified as having the greatest impact on health by the Centers for Disease Control and Prevention (CDC): behaviors that contribute to unintentional and intentional injuries such as driving a vehicle while intoxicated; tobacco use; alcohol use such as binge drinking and other drug use; sexual behaviors such as not using a condom during sexual intercourse that may contribute to unintended pregnancy, HIV infection, and other sexually transmitted diseases; poor dietary habits that contribute to disease; and insufficient physical activity.

There were two specific aims of this investigation. The first was to determine which of the priority health risk behaviors had the strongest independent association to academic achievement. The second specific aim was to determine the association between the total number of priority health risk behaviors engaged in by college freshmen and their end-of-first-term QPA. Health risk behavior was assessed by means of a standard questionnaire, the National College Health Risk Behavior Survey (NCHRBS). Twenty-four additional questions were added to the NCHRBS's original ninety-six, in order to assess various health and affective behaviors found in previous research to have a potential effect on academic achievement (Trockel, Barnes & Egget, 2000; Britton & Tesser, 1991; Mathiasen, 1984; Snyder et al., 2002; Smerdon, 1999;

Fraser, 1987, Haines, Norris & Kashy, 1996). The purpose of investigating additional variables, such as amount of sleep, time management, time spent studying, amount of hope, amount of social support, feeling of time pressure, missed classes due to illness, recent changes in health behavior that were attributable to risky behavior and possible short-term academic outcomes related to health behavior (lowered grade on assignment, incomplete grade, dropped course) was twofold. It was hypothesized that the above variables might either serve to a) mediate or confound the relationship between priority health risk behavior and academic achievement, and/or b) provide a means to better understand the complexity of the relationship with regard to the intermediate outcomes (lower grade on an exam/project, receiving an incomplete grade and/or dropping a course) that may lie along the associative pathway between health behavior and academic achievement and serve to impact the primary outcome variable of end-of-first-term QPA. The survey was administered during the Fall 2004 semester to a sample of 196 (106 males, 90 females) freshmen at the University of Pittsburgh at Greensburg who were enrolled in the Freshman Seminar classes. End-of-first-term academic achievement was assessed by participants' earned QPA at the end of the first semester, as reported by the Office of the Registrar at the University of Pittsburgh at Greensburg.

## **5.1 DISCUSSION OF RESULTS**

### **5.1.1 National Data Comparison Findings**

Since this study was largely descriptive in nature, it is appropriate to compare the incidence of priority health risk behavior of students in this study, a sample of freshman at the University of

Pittsburgh at Greensburg (UPG), to the national sample (students involved in the CDC's NCHRBS of 1995). Although no significant difference was found in tobacco use between the national sample and the UPG sample, significant differences ( $p \leq 0.05$ ) were found across all other priority health risk behavior categories between the two groups. Overall, it appears that the sample of UPG students have a significantly higher prevalence of risky health behaviors than the national average with the exception of drinking and driving. Perhaps, the reduced risk of drinking and driving among the sample of UPG students in comparison to the national sample may be partly explained by the fact that UPG freshmen are not permitted to have cars on campus. In an attempt to understand the higher prevalence of health risk behavior among the UPG sample compared to the national sample in the remaining priority health risk behavior categories, perhaps an important fact to consider is that the national survey was performed in 1995, which represents a considerable time difference and may suggest that the prevalence of health risk behaviors among college students in general has increased over the last decade. Updated data from the CDC may be of significant interest in exploring this possibility. The CDC is currently planning to conduct the NCHRBS with a national sample again sometime in late 2005, depending on available resources (J. Grunbaum, Senior Health Information Specialist, personal communication, March 9, 2004). Whether the changes in health risk behavior among college students is a trend or pertinent to this study alone would be of significant practical use to health educators, college administrators and student service personnel in planning health risk intervention programs at the university setting.

### **5.1.2 Findings of Univariate Analyses for Covariates**

Although numerous variables were considered as potential mediators or confounders, results of a series of univariate analyses performed to identify potential covariates found the following variables to have a significant independent relation to QPA: gender, ethnicity, SAT score, high school class rank percentile, perceived social support meeting needs, visits to nurse/doctor due to feeling sick or ill, prior tobacco use, feeling overwhelmed by time pressure, missing class due to feeling sick or ill, eating breakfast, and hopefulness about future (Table 4.6).

One consideration that guided the choice of supplemental measures used in the study was the likelihood that engaging in health risk behavior prior to coming to college could significantly impact QPA during the first term of the freshman year. Although the influence of previous risk behaviors in each of the priority health risk behavior categories was assessed, it is important to note that only previous tobacco use was shown to be a significant contributor to end-of-first-term QPA in univariate analyses. Since prior health risk behavior in each of the other priority health risk behavior categories was not found to be significantly related to QPA, details of the analyses were not presented in this report.

Data consistent with the univariate findings of the present study for significant independent associations to QPA for gender, and eating breakfast were reported by Trockel, Barnes & Egget (2000). The relationship between SAT score and QPA as well as high school class rank and QPA reported in this study also directly support previous research reported by Hoyt, 1996; Haplin, Haplin and Hauf, 1976; Rowan, 1978; and Mouw & Khanna, 1978. A result of particular interest in this study was the significant association found between hope and QPA, which confirms a most recent study conducted by Snyder et al, 2002. In previous research single factor models used to predict academic achievement have resulted in generally low

predictive value; however the single construct of hope (the process of thinking about one's goals and moving ahead toward these goals) appears to provide a significant predictive value in determining academic performance. Additional covariates identified in this study to serve as possible determinants of academic achievement in college such as ethnicity, missing class, social support meeting one's needs and time management/feeling overwhelmed by time pressures, support similar findings reported by Fraser, 1987; Smerdon, 1999; Mathiasen, 1984, Gough & Lanning, 1986 and Mouw and Knanna, 1993. Regarding the construct of prior tobacco use, no study to date was found to have investigated tobacco use prior to coming to college and its effect on academic achievement. However, students who reported prior use of tobacco in this study were more likely to report current use. Thus, the significant association between prior use of tobacco and QPA found in this study indirectly supports findings which reveal current tobacco use to be a predictor of educational success (Glendinning et al., 1995 and Musgrave-Marquart et al., 1997).

### **5.1.3 Findings of Primary Analysis 1**

The first primary analysis in the present research was performed to identify those health risk behaviors which had a significant effect on academic achievement. Results of the six separate independent t-tests comparing the mean QPAs of students "not at risk" to the mean QPAs of students "at risk" for each of the six health risk behaviors revealed tobacco use and binge drinking to have a significant effect on QPA. As discussed above, the association of tobacco use and academic performance supports research by Glendinning et al., 1995 and Musgrave-Marquart et al., 1997, which revealed tobacco use, specifically cigarette smoking, to be a strong predictor of educational success. The findings also support previous research indicating heavy

alcohol use, such as binge drinking, leading to significant academic difficulties including poor academic performance, reflected in lower course grades (Wolaver, 2002; Wood, Sher & McGowan, 2000; Smith, Collins, Kreisberg, Volpicelle & Alterman, 1987; Hanson & Engs, 1986; Friedman, Glickman & Utada, 1985; Wechsler & Mc Fadden, 1979). It is also of interest to note that drinking heavily has been noted as a strong correlate of smoking status among United States college students (Emmons, Wechsler, & Abraham, 1998). Thus, drinking and smoking may not be independent health risk behaviors but may often occur simultaneously in those individuals engaged in either of the two risk behaviors.

Although tobacco use and binge drinking were shown to have a significant independent association to QPA, results of a stepwise multiple regression analyses performed separately on each of the above two health risk behaviors revealed no significant effect for either tobacco use or binge drinking when the previously identified covariates known to be significantly related to QPA were included in the model (Table 4.6). As previously proposed, the purpose of creating a more complex model was to determine if the variance in QPA explained by the health risk behavior, identified by the independent t-test, is unique to that behavior or could be better explained by other factors in the more complex model. The separate stepwise regression analyses for tobacco use and binge drinking used QPA as the dependent variable and the specific health risk behavior (tobacco use or binge drinking) and the covariates identified in Table 4.6 as independent variables. Using this procedure, the following variables remained in the regression model as predictors of QPA: high school rank percentile, feeling overwhelmed by time pressure, missing class, SAT score, social support meeting needs, gender, and hopefulness about the future. The stepwise regression analysis determined that the above independent variables accounted for 41.3% of the total variance in QPA. The high school class rank percentile

appeared to explain the greatest proportion of the variance, approximately 20%. The findings of the above two stepwise regression analyses indicated that when the initial covariate of high school class rank percentile was entered into the model, neither tobacco use nor binge drinking were able to explain a unique portion of the variance of QPA between the “at risk” and “not at risk” groups. Perhaps most noteworthy was the appreciable drop in p value for tobacco use from the initial significant  $p = 0.05$  to  $p = 0.50$  and binge drinking from the initial  $p = 0.02$  to  $p = 0.45$  when number of days of class missed due to illness was entered as a covariate in the model. Whether the missed classes were due to sickness/illness related to binge drinking and/or tobacco use is certainly a question that could support further study. Although it is beyond the scope of this research, further studies, using a more theoretical model such as path analysis would be of benefit to investigate an indirect link between various health risk behaviors and academic achievement.

It is also of interest to note that four covariates found in the original univariate analyses to have a significant independent association to QPA, eating breakfast, ethnicity, number of visits to nurse/doctor due to feeling sick, and prior tobacco use, were no longer found to be significant predictors of QPA in the multiple regression model. This finding was not surprising considering the following facts. The sample was predominately white (93%), thus the sample did not represent significant variability among ethnic class to become perhaps a significant covariable. In addition, the number of times sick resulting in visits to nurse/doctor was already considered in a subsequent variable, number of missed classes due to feeling sick, which is perhaps more indicative of just feeling sick in affecting one’s QPA. In regard to prior tobacco use, if prior tobacco use in high school affected high school QPA, then this change in QPA has already been accounted for in the model under high school class rank, and no longer explained a unique

portion of the variance. Perhaps, most noteworthy was the finding in regard to eating breakfast. Although results of the univariate analysis revealed eating breakfast to be independently associated with QPA, when entered into the multiple regression model with all other covariates identified as significantly related to QPA in Table 4.6, eating breakfast no longer was found to be significantly related to QPA. This finding supports recent research by Trockel, Barnes & Egget (2000), who found no significant affect on semester QPA for eating breakfast after controlling for the effects of several covariates. These findings are discrepant to research reported earlier in Chapter 2 stating that eating breakfast resulted in improved immediate recall and spatial memory among university students (Benton, 1992). This discrepancy in findings may be due in part to the design of the studies and the major differences in the number and types of variables considered for analysis.

#### **5.1.4 Findings of Primary Analysis 2**

The second primary analysis was conducted in order to determine the association between the number of priority health risk behaviors engaged in by college freshmen and end-of-first-term academic achievement. Although no significant association between the number of risk behaviors and QPA were found, the scatter plot illustrated in Figure 4.2 does show a slight linear trend between number of risk behaviors and academic achievement, indicating as the number of risk behaviors engaged in increased, the QPA decreased.

Results of a follow-up stepwise multiple regression, performed to determine whether the association between the number of risk behaviors and QPA changed in the presence of the

covariates known to be significantly related to QPA, revealed that the number of risk behaviors still did not explain a significant portion of the variance in QPA when these covariates were entered into the model.

It is important to note that when analyzing the independent association between each of the priority health risk behaviors and QPA, four of the six priority health risk behaviors revealed a negative association to QPA which were; drinking and driving, tobacco use, binge drinking, and non-condom use. However, two of the priority health risk behaviors; poor dietary habits, and insufficient physical activity revealed a positive association to QPA (see Table 4.7). Perhaps the disparate results are due to the inherent differences between the categories of the priority health risk behaviors which may complicate the above analyses. Perhaps drinking and driving, tobacco use, binge drinking, and non-use of condoms are associated with risk taking behavior whereas poor dietary habits and insufficient physical activity are more associated with poor lifestyle habits. It may be beneficial to examine only the above four priority health risk behaviors that had a negative association to QPA in further analyses in order to determine the association between the total number of risk behaviors and QPA. However, the primary aim of this research centered on the six priority health risk behaviors as identified by the CDC and thus all six categories were included in the analyses.

## **5.2 STUDY LIMITATIONS**

The following limitations should be noted in this study. Perhaps the most important limitation is the fact that this was a survey based on self-reported health risk behavior. The truthfulness and

accuracy of such self-reports may be compromised because some health-risk behaviors are difficult to recall and some are so sensitive that participants may not want to report them. In addition adolescents may under-report some health risk behaviors because they may believe engaging in these behaviors is socially unacceptable or they may over-report some risk behaviors because they may feel these behaviors as socially desirable. None the less, self-report surveys remain as a viable diagnostic tool in research on human behavior.

In addition, since the subjects were not selected randomly, the ability to generalize the results to a larger population is in question. Thus, perhaps the results of this study may be generalized only among four year institutions having similar demographic characteristics (e.g., location, size, and socioeconomic status etc.) of the students enrolled. Another limitation is the fact that an enforced, alcohol-free policy exists among all students at this small, rural liberal arts college, making consideration of the effects of alcohol consumption on QPA perhaps questionable.

Although a preliminary analysis reported in this investigation indicated that the participants in this study (students enrolled in the Freshman Seminar classes) were comparable to the non-participants (students not enrolled in the Freshman Seminar classes) based on comparable SAT scores, high school class rank, and end-of-first-term QPA, significant differences were evident for gender, major and residence status between groups. Relative to all UPG freshmen, females are underrepresented in the group taking Freshman Seminar as well as campus non-resident students. Students majoring in humanities, social sciences, education and management are overrepresented while those in science, health, and engineering (potentially more academically challenging majors) are underreported. Perhaps students in natural science majors do not have time in their somewhat more demanding academic schedules to opt taking

the Freshman Seminar class or they may believe they already possess all entry skills needed to successfully transition to a higher education setting. Thus, whether the sample was a valid representation of all freshman students enrolled at the University of Pittsburgh at Greensburg can not be determined since pre-existing conditions of the study participants were not controlled for.

Furthermore, the 26 students who were not in class on the day the survey was administered may be of concern. If these students were inherently different from the students who attended class on the day of the survey is not known. If the absent students were sick on the day of the survey, it is a possible confound related to the independent variable, health risk behavior. If they simply skipped class for non-health reasons, it is a possible confound related to the dependent variable, QPA (possibly reflecting lack of motivation).

### **5.3 CONCLUSION AND APPLICATION OF FINDINGS**

A better understanding of the numerous variables which may affect academic performance in a student's college career is of significant importance if one hopes to enhance that performance. The most advantageous scenario would be to identify those variables which affect student performance early on in the college experience thus affording a more timely opportunity to affect positive change in subsequent academic outcome. With this in mind, the goal of the present study was to explore health risk behavior and its relation to academic success among college

freshmen. Although, modest results were revealed, perhaps due to aforementioned limitations, several findings appear relevant in offering a greater insight into how health risk behavior may be related to academic success.

Students who were determined in this study to be “at risk” due to tobacco use, binge drinking, drinking and driving, and non-use of condoms earned on average lower end of first term overall QPA’s compared to their “not at risk” counterparts. Although poor dietary habits and insufficient physical activity did not reveal any linear relationship to QPA, it is interesting to note that 85.2% of the sample was determined at risk due to poor dietary habits and 65.3% of the sample was at risk due to insufficient physical activity. This represents a significant proportion of freshmen at the University of Pittsburgh at Greensburg and should be a cause for concern. Research is abundant regarding the strong link between diet, exercise and the leading causes of death in our society today of cardiovascular disease and cancer. In addition, exercise has been shown to decrease obesity which is currently rising to epidemic proportions among the youth in our country. As this study suggests, feeling overwhelmed by time pressure is significantly associated with lower academic achievement during the first semester of this most important freshman year. Exercise is a viable means to reduce stress and increase concentration skills thereby serving to enhance academic performance (Kolbe, Green, Foreyt et al., 1986; Field et al., 2001<sub>b</sub>, and Aaron & Gallagher, 2003). Since health risk behaviors may result in health problems, a student may miss class because of sickness or illness related to the health risk behavior. This current study has clearly revealed the significant correlation between the number of days of missed classes and QPA. In addition although no significant association was found between the number of risk behaviors engaged in and academic achievement, clearly there is linearity in the relationship which is evident upon close inspection of the data.

These findings can certainly serve as an impetus and a means to justify increased health education programming, the need for required health education classes during the freshman year, and improved health counseling and additional comprehensive college-centered health treatment programs. Granted, academic achievement is determined by many factors that are interrelated and together serve to impact the overall academic outcome. Perhaps many may be skeptical and say that health risk behavior is too small of a portion of the puzzle, to make a difference in academic performance. However, by increasing health promotion at the college level, the results may be two-fold. 1) Even a small increase in academic performance as a result of decreased health risk behavior is a welcome outcome to school leaders, administrative staff, faculty and students in our highly competitive society and 2) perhaps more importantly, by decreasing health risk behavior among our students, we can improve the health of our future by improving the health of our youth.

#### **5.4 RECOMMENDATIONS FOR FUTURE RESEARCH**

Based on the findings of this research the following recommendations for future research regarding health risk behavior and academic achievement are offered:

1. Considering only a relatively small sample was used in the current study, it would be beneficial to widen the scope of this research to include larger universities both public and private to compare the health risk behaviors to current national data.

2. The students who participated in this study may not be typical of the general college student population of larger metropolitan campuses, thus extending this study to include the population of all freshman students at a large university would provide for interesting follow-up research and comparison.
3. The results indicated a significant outcome on QPA for missing class due to illness or feeling sick, and it would be of interest to explore further the correlation between each health risk behavior and poor class attendance.
4. Studies designed to investigate possible secondary outcomes of health risk behaviors, such as receiving a lower grade on a test or paper, or receiving an incomplete grade in a class or dropping a class, that may serve to later impact the overall QPA would be of great interest in helping to define the causative pathway between health risk behavior and academic performance.
5. Studies designed to measure correlations between health behavior change over time and changes in academic performance would serve as a vital step in determining cause and effect relationships between health risk behavior and academic achievement.
6. Studies designed to determine the effect on academic achievement of various health enhancing programs that target specific health risk behaviors also present an area of investigation offering great potential for long term benefit.

## **APPENDIX A**

### **INFORMED CONSENT FORM**

University of Pittsburgh  
Institutional Review Board  
Approval Date: September 20, 2004  
Renewal Date: September 19, 2005  
IRB Number: 0408077

## CONSENT TO ACT AS A PARTICIPANT IN A RESEARCH STUDY

**TITLE:** Association of Health Risk Behaviors and Academic Achievement  
Among College Freshmen

**PRINCIPAL INVESTIGATOR:** Vickilyn Barnot, M.Ed.  
Instructor of Health & Physical Education  
University of Pittsburgh at Greensburg  
B-1 Smith Hall  
Telephone: 724-836-9946

**SOURCE OF SUPPORT:** None

### *Why is this research being done?*

You are being asked to participate in a research study in which we will examine the association between health risk behaviors and academic achievement among college freshmen. The primary aim of this research is to determine which health risk behaviors may have the strongest association to academic achievement. The secondary aim is to determine the association between number of health risk behaviors engaged in by a college freshman and end of first term academic achievement.

### *Who is being asked to take part in this research study?*

You are being invited to take part in this research study because you are a college freshman. All college freshmen at the University of Pittsburgh at Greensburg who are enrolled in the Freshman Seminar classes may volunteer to participate in this study.

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***What procedures will be performed for research purposes?***

If you decide to take part in this research study, you will undergo the following procedures:

You will be asked to complete the National College Health Risk Behavior Survey (NCHRBS). This survey has been developed by the National Center for Chronic Disease Prevention and Health Promotion of the Centers of Disease Control (CDC). This is a paper/pencil survey, consisting of 96 multiple choice items, which monitors priority health risk behaviors that contribute to the leading causes of death, illness, and social problems among young adults in the United States including tobacco use; unhealthy dietary behaviors; inadequate physical activity; alcohol and other drug use; sexual behaviors that may result in HIV infection, other sexually transmitted diseases, and unintended pregnancies; and behaviors that may result in unintentional and intentional injuries. In addition you will be asked to complete 24 supplemental multiple-choice questions that have been added to the original NCHRBS that address additional health issues and general background information.

You will be asked to provide the last five digits of your SS# to a cover page attached to your questionnaire answer sheet.

The survey will be conducted during your regularly scheduled class time in your Freshman Seminar class and will take approximately 30 minutes to complete. Following the survey, your survey responses will be scored and will later be matched with your overall end of first term grades, grade point average, High School class rank and SAT Score obtained from the University Registrar's Office.

***What are the possible risks, side effects, and discomforts of this research study?***

There is the risk of a breach of confidentiality of information obtained in this research study with regard to information concerning your academic records and/or your responses to the questionnaire. However, the following procedures will be strictly followed in order to protect your confidentiality. Immediately following the collection of survey responses, survey answer sheets will be assigned an individual participant ID number. A master list of ID number with matching last five digits of participant's SS# will be kept separate from the survey responses and in a locked file cabinet.

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The Database Manager for the Office of the Registrar at the University of Pittsburgh at Greensburg will use the last five digits of participant's SS# solely as a personal identifier in order to match survey responses with the following academic records: end of first term grades and grade point average, High School Class Rank, and SAT Score. Upon completion of the matching of the data sets, student personal identifiers will be removed from the above listed official academic records, and the data will be subsequently released to the Principal Investigator for statistical analysis.

There is no additional foreseeable risk or discomfort from completing the survey form above those that may be experienced during daily living.

***What are possible benefits from taking part in this study?***

There is no direct benefit to study participants from taking part in this study. You may become more aware of your health related risk behaviors as a result of participation in this study. However, such a benefit cannot be guaranteed.

***Will my insurance provider or I be charged for the costs of any procedures performed as part of this research study?***

Neither you, nor your insurance provider, will be charged for the costs of any of the procedures performed for the purpose of this research study.

***Will I be paid if I take part in this research study?***

You will not be paid for participation in this research study. However, upon completion of the survey questionnaire, your name/SS# will be entered into a drawing for participation in this study. One (1) grand prize award of \$50.00 and four (4) \$25.00 prizes will be awarded.

***Who will know about my participation in this research study?***

Any information about you obtained from this research study will be kept as confidential (private) as possible. All records related to your involvement in this research study will be stored in a locked file cabinet. Your identity on these records will be indicated by a participant ID number rather than by your name, and the information linking these ID numbers with your identity will be kept separate from the research records. You will not be identified by name in any publication of the research results unless you sign a separate consent form giving your permission (release).

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***Will this research study involve the use or disclosure of my identifiable medical information?***

This research study will not involve the use or disclosure of your identifiable medical information.

**Who will have access to identifiable information related to my participation in this research study?**

In addition to the investigator listed on the first page of this authorization (consent) form and an appointed research Database Manager, the following individuals will or may have access to identifiable information related to your participation in this research study:

Authorized representatives of the University of Pittsburgh Research Conduct and Compliance Office may review your identifiable research information for the purpose of monitoring the appropriate conduct of this research study.

In unusual cases, the investigators may be required to release identifiable information related to your participation in this research study in response to an order from a court of law. If the investigators learn that you or someone with whom you are involved is in serious danger or potential harm, they will need to inform, as required by Pennsylvania law, the appropriate agencies.

***For how long will the investigators be permitted to use and disclose identifiable information related to my participation in this research study?***

The investigators may continue to use and disclose, for the purposes described above, identifiable information related to your participation in this research study for a minimum of 5 years and for as long (indefinite) as it may take to complete this research study.

***Is my participation in this research study voluntary?***

Your participation in this research study, to include the use and disclosure of your identifiable information for the purposes described above, is completely voluntary. (Note, however, that if you do not provide your consent for the use and disclosure of your identifiable information for the purposes described above, you will not be allowed, in general, to participate in the research study.)

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Whether or not you provide your consent for participation in this research study will have no affect on your current or future relationship with the University of Pittsburgh. You are not under any obligation to participate in this research study and non-participation will in no way affect your grade in this class or any other class enrolled in at the University of Pittsburgh at Greensburg.

***May I withdraw, at a future date, my consent for participation in this research study?***

You may withdraw, at any time, your consent for participation in this research study, to include the use and disclosure of your identifiable information for the purposes described above. (Note, however, that if you withdraw your consent for the use and disclosure of your identifiable information for the purposes described above, you will also be withdrawn, in general, from further participation in this research study.) Any identifiable research recorded for, or resulting from, your participation in this research study prior to the date that you formally withdrew your consent may continue to be used and disclosed by the investigators for the purposes described above.

To formally withdraw your consent for participation in this research study you should provide a written and dated notice of this decision to the principal investigator of this research study at the address listed on the first page of this form.

Your decision to withdraw your consent for participation in this research study will have no affect on your current or future relationship with the University of Pittsburgh.

\*\*\*\*\*

**VOLUNTARY CONSENT**

All of the above has been explained to me and all of my current questions have been answered. I understand that I am encouraged to ask questions about any aspect of this research study during the course of this study, and that such future questions will be answered by the researcher listed on the first page of this form. Any questions I have about my rights as a research participant, will be answered by the Human Subject Protection Advocate of the IRB Office, University of Pittsburgh (1-866-212-2668).

University of Pittsburgh  
Institutional Review Board  
Approval Date: September 20, 2004  
Renewal Date: September 19, 2004  
IRB Number: 0408077

**By signing this form, I agree to participate in this research study. A copy of this consent form will be given to me. Furthermore I give my permission to the Office of the Registrar at the University of Pittsburgh at Greensburg to release my end of first term grades and GPA in addition to my High School class rank and SAT score to the principal investigator.**

\_\_\_\_\_  
Participant's Signature

\_\_\_\_\_  
Date

#### CERTIFICATION of INFORMED CONSENT

I certify that I have explained the nature and purpose of this research study to the above-named individual(s), and I have discussed the potential benefits and possible risks of study participation. Any questions the individual(s) have about this study have been answered, and we will always be available to address future questions as they arise."

Vickilyn Barnot  
Printed Name of Person Obtaining Consent

Principal Investigator  
Role in Research Study

\_\_\_\_\_  
Signature of Person Obtaining Consent

November, 2004  
Date

## **APPENDIX B**

### **IRB APPROVAL CONFIRMATION**




## University of Pittsburgh

### *Institutional Review Board*

3500 Fifth Avenue  
Ground Level  
Pittsburgh, PA 15213  
(412) 383-1480  
(412) 383-1146 (fax)

#### MEMORANDUM:

TO: Vickilyn Barnot

FROM: Christopher Ryan, Ph.D., Vice Chair 

DATE: September 21, 2004

SUBJECT: IRB# 0408077: Association of Health Risk Behaviors and Academic Achievement Among College Freshmen

The above-referenced proposal has received expedited review and approval from the Institutional Review Board under 45 CFR 46.110 (7).

If applicable, please include the following information in the upper right-hand corner of all pages of the consent form:

Approval Date: September 20, 2004  
Renewal Date: September 19, 2005  
University of Pittsburgh  
Institutional Review Board  
IRB# 0408077

Adverse events which occur during the course of the research study must be reported to the IRB Office. Please call the IRB Adverse Event Coordinator at 412-383-1519 for the current policy and forms.

The protocol and consent forms, along with a brief progress report must be resubmitted at least **one month prior** to the expiration date noted above for annual renewal as required by FWA00008790 (University of Pittsburgh), FWA00006735 (University of Pittsburgh Medical Center) and FWA00000600 (Children's Hospital of Pittsburgh).

**Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.**

CR:ky

## **APPENDIX C**

### **NATIONAL COLLEGE HEALTH RISK BEHAVIOR SURVEY**

**This survey is about health behavior. The information you provide will help to identify the kind of health programs and services college students need.**

**Completing the survey is voluntary and the answers you give will be safeguarded to the fullest extent possible in accordance with the applicable statutes. No individual responses will be reported, so please answer every question as honestly as you can. Mark only one answer to every question.**

**Do not write your name or SS# on the survey.**

**THANK YOU VERY MUCH FOR YOUR HELP**

**Important**

- Read each question carefully.
- Use a #2 pencil only.
- Mark your answers on the scantron only.
- Make dark marks.
- Erase completely to change your answer.

1. How old are you?

- A. 18
- B. 19
- C. 20
- D. 21
- E. 22
- F. 23 & over

2. What is your sex?

- A. Female
- B. Male

3. What is your class standing?

- A. Freshman
- B. Sophomore
- C. Junior
- D. Senior
- E. Graduate student
- F. Other

4. What is your current year in college?

- A. 1<sup>st</sup> year
- B. 2<sup>nd</sup> year
- C. 3<sup>rd</sup> year
- D. 4<sup>th</sup> year
- E. 5<sup>th</sup> year
- F. 6<sup>th</sup> year
- G. 7<sup>th</sup> year
- H. 8<sup>th</sup> year and beyond

5. Are you a full-time student?

- A. Yes
- B. No

6. How do you describe yourself?

- A. White – not Hispanic
- B. Black – not Hispanic
- C. Hispanic – or Latino
- D. Asian or Pacific Islander
- E. American Indian or Alaskan Native
- F. Other

7. What is your marital status?

- A. Never been married
- B. Married
- C. Separated
- D. Divorced
- E. Widowed
- F. Other

8. With whom do you currently live? (**Select only one answer**)

- A. Alone
- B. Spouse/Domestic partner
- C. Parent(s)/guardian(s)
- D. Other relatives
- E. Your children
- F. Other

9. Where do you currently live?

- A. College dormitory or residence hall
- B. Academic Village
- C. Off-campus housing
- D. Parent/guardian's home
- E. Other

10. Are you a member of a social fraternity or sorority?

- A. Yes
- B. No

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

- A. 0 hours
- B. 1-9 hours
- C. 10-19 hours
- D. 20-29 hours
- E. 30-39 hours
- F. 40 hours
- G. More than 40 hours

12. Do you have any kind of health care coverage, including health insurance or prepaid plans such as HMOs (health maintenance organizations)?

- A. Yes
- B. No
- C. Not sure

13. How much education does your mother have?

- A. She did not finish high school
- B. She graduated from high school or attained a GED
- C. She had some education after high school
- D. She graduated from college
- E. Not sure

14. How much education does your father have?

- A. He did not finish high school
- B. He graduated from high school or attained a GED
- C. He had some education after high school
- D. He graduated from college
- E. Not sure

**The next 15 questions ask about safety and violence.**

15. How often do you wear a seat belt when riding in a car driven by someone else?

- A. Never
- B. Rarely
- C. Sometimes
- D. Most of the time
- E. Always

16. How often do you wear a seat belt when driving a car?

- A. I do not drive a car
- B. Never wear a seat belt
- C. Rarely wear a seat belt
- D. Sometimes wear a seat belt
- E. Most of the time wear a seat belt
- F. Always wear a seat belt

17. During the past 12 months, how many times did you ride a motorcycle?

- A. 0 times
- B. 1-10 time
- C. 11-20 times
- D. 21-39 times
- E. 40 or more times

18. When you rode a motorcycle during the past 12 months, how often did you wear a helmet?

- A. I did not ride a motorcycle during the past 12 months
- B. Never wore a helmet
- C. Rarely wore a helmet
- D. Sometimes wore a helmet
- E. Most of the time wore a helmet
- F. Always wore a helmet

19. During the past 12 months, how many times did you ride a bicycle?

- A. 0 times
- B. 1-10 times
- C. 11-20 times
- D. 21-39 times
- E. 40 or more times

20. When you rode a bicycle during the past 12 months, how often did you wear a helmet?

- A. I did not ride a bicycle during the past 12 months.
- B. Never wore a helmet
- C. Rarely wore a helmet
- D. Sometimes wore a helmet
- E. Most of the time wore a helmet
- F. Always wore a helmet

21. During the past 12 months, how many times did you go boating or swimming?

- A. 0 times
- B. 1-10 times
- C. 11-20 times
- D. 21-39 times
- E. 40 or more times

22. When you went boating or swimming during the past 12 months, how often did you drink alcohol?

- A. I did not go boating or swimming during the past 12 months
- B. Never drank alcohol
- C. Rarely drank alcohol
- D. Sometimes drank alcohol
- E. Most of the time drank alcohol
- F. Always drank alcohol

23. During the past 30 days, how many times did you ride in a car or other vehicle driven by someone who had been drinking alcohol?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

24. During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

25. During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club? Do not count carrying a weapon as part of your job.

- A. 0 days
- B. 1 day
- C. 2 or 3 days
- D. 4 or 5 days
- E. 6 or more days

26. During the past 30 days, on how many days did you carry a gun? Do not count carrying a gun as part of your job.

- A. 0 days
- B. 1 day
- C. 2 or 3 days
- D. 4 or 5 days
- E. 6 or more days

27. During the past 12 months, how many times were you in a physical fight?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or 7 times
- F. 8 or 9 times
- G. 10 or 11 times
- H. 12 or more times

28. During the past 12 months, with whom did you fight?

- A. I did not fight
- B. A total stranger
- C. A friend or someone I know
- D. A boyfriend, girlfriend, or date
- E. My spouse or domestic partner
- F. A parent, brother, sister, or other family member
- G. Other

29. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

**Sometimes people feel so depressed and hopeless about the future that they may consider attempting suicide, that is, taking some action to end their own life. The next four questions ask about suicide.**

30. During the past 12 months, did you ever seriously consider attempting suicide?

- A. Yes
- B. No

31. During the past 12 months, did you make a plan about how you would attempt suicide?

- A. Yes
- B. No

32. During the past 12 months, how many times did you actually attempt suicide?

- A. 0 times
- B. 1 time
- C. 2 or 3 times
- D. 4 or 5 times
- E. 6 or more times

33. If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?

- A. I did not attempt suicide during the past 12 months
- B. Yes
- C. No

**The next eight questions ask about tobacco use.**

34. Have you ever tried cigarette smoking, even one or two puffs?

- A. Yes
- B. No

35. How old were you when you smoked a whole cigarette for the first time?

- A. I have never tried smoking
- B. I have never smoked a whole cigarette
- C. 12 years old or younger
- D. 13 or 14 years old
- E. 15 or 16 years old
- F. 17 or 18 years old
- G. 19 or 20 years old
- H. 21 to 24 years old
- I. 25 years old or older

36. During the past 30 days, on how many days did you smoke cigarettes?

- A. I have never smoked
- B. 0 days
- C. 1 or 2 days
- D. 3 to 5 days
- E. 6 to 9 days
- F. 10 to 19 days
- G. 20 to 29 days
- H. All 30 days

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

- A. I have never smoked
- B. I did not smoke cigarettes during the past 30 days
- C. Less than 1 cigarette per day
- D. 1 cigarette per day
- E. 2 to 5 cigarettes per day
- F. 6 to 10 cigarettes per day
- G. 11 to 20 cigarettes per day
- H. More than 20 cigarettes per day

38. Have you ever smoked cigarettes regularly, that is, at least one cigarette every day for 30 days?

- A. I have never smoked
- B. Yes
- C. No

39. How old were you when you first started smoking cigarettes regularly (at least one cigarette every day for 30 days)?

- A. I have never smoked
- B. I have never smoked cigarettes regularly
- C. 12 years old or younger
- D. 13 or 14 years old
- E. 15 or 16 years old
- F. 17 or 18 years old
- G. 19 or 20 years old
- H. 21 to 24 years old
- I. 25 years old or older

40. Have you ever tried to quit smoking cigarettes?

- A. I have never smoked
- B. Yes
- C. No

41. During the past 30 days, on how many days did you use chewing tobacco or snuff, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?

- A. 0 days
- B. 1 or 2 days
- C. 3 or 5 days
- D. 6 to 9 days
- E. 10 to 19 days
- F. 20 to 29 days
- G. All 30 days

**The next three questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, and liquor such as rum, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.**

42. How old were you when you had your first drink of alcohol other than a few sips?

- A. I have never had a drink of alcohol other than a few sips
- B. 12 years old or younger
- C. 13 or 14 years old
- D. 15 or 16 years old
- E. 17 or 18 years old
- F. 19 or 20 years old
- G. 21 to 24 years old
- H. 25 years old or older

43. During the past 30 days, on how many days did you have at least one drink of alcohol?

- A. I have never had a drink of alcohol other than a few sips.
- B. 0 days
- C. 1 or 2 days
- D. 3 to 5 days
- E. 6 to 9 days
- F. 10 to 19 days
- G. 20 to 29 days
- H. All 30 days

44. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

- A. I have never had a drink of alcohol other than a few sips.
- B. 0 days
- C. 1 or 2 days
- D. 3 to 5 days
- E. 6 to 9 days
- F. 10 to 19 days
- G. 20 to 29 days
- H. All 30 days

**The next three questions ask about marijuana use.**

45. During your life, how many times have you used marijuana?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 to 99 times
- G. 100 or more times

46. How old were you when you tried marijuana for the first time?

- A. I have never tried marijuana.
- B. 12 years old or younger
- C. 13 or 14 years old
- D. 15 or 16 years old
- E. 17 or 18 years old
- F. 19 or 20 years old
- G. 21 to 24 years old
- H. 25 years old or older

47. During the past 30 days, how many times did you use marijuana?

- A. I have never tried marijuana
- B. 0 times
- C. 1 or 2 times
- D. 3 to 9 times
- E. 10 to 19 times
- F. 20 to 39 times
- G. 40 or more times

**The next 10 questions ask about cocaine and other drug use.**

48. During your life, how many times have you used any form of cocaine including powder, crack, or freebase?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 to 99 times
- G. 100 or more times

49. How old were you when you tried any form of cocaine, including powder, crack, or freebase, for the first time?

- A. I have never tried any form of cocaine.
- B. 12 years old or younger
- C. 13 or 14 years old
- D. 15 or 16 years old
- E. 17 or 18 years old
- F. 19 or 20 years old
- G. 21 to 24 years old
- H. 25 years old or older

50. During the past 30 days, how many times did you use any form of cocaine, including powder, crack, or freebase?

- A. I have never tried any form of cocaine
- B. 0 times
- C. 1 or 2 times
- D. 3 to 9 times
- E. 10 to 19 times
- F. 20 to 39 times
- G. 40 or more times

51. During your life, how many times have you used the crack or freebase forms of cocaine?

- A. I have never tried any form of cocaine
- B. 0 times
- C. 1 or 2 times
- D. 3 to 9 times
- E. 10 to 19 times
- F. 20 to 39 times
- G. 40 to 99 times
- H. 100 or more times

52. During you life, how many times have you sniffed glue, or breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?

- A. 0 times
- B. 1 to 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 to 99 times
- G. 100 or more times

53. During your life, how many times have you taken steroid pills or shots without a doctor's prescription?

- A. 0 times
- B. 1 to 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 to 99 times
- G. 100 or more times

54. During your life, how many times have you used any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, or heroin?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 to 99 times
- G. 100 or more times

55. During the past 30 days, how many times have you used any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, or heroin?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

56. During the past 30 days, how many times have you used any illegal drug in combination with alcohol?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

57. During your life, how many times have you used a needle to inject any illegal drug into your body?

- A. 0 times
- B. 1 time
- C. 2 or more times

**The next 15 questions ask about sexual behavior. For the purpose of this survey, sexual intercourse is defined as vaginal intercourse, anal intercourse, or oral/genital sex.**

58. How old were you when you had sexual intercourse for the first time?

- A. I have never had sexual intercourse.
- B. 12 years old or younger
- C. 13 or 14 years old
- D. 15 or 16 years old
- E. 17 or 18 years old
- F. 19 or 20 years old
- G. 21 to 24 years old
- H. 25 years or older

59. During your life, with how many females have you had sexual intercourse?

- A. I have never had sexual intercourse
- B. I have never had sexual intercourse with a female
- C. 1 female
- D. 2 females
- E. 3 females
- F. 4 females
- G. 5 females
- H. 6 or more females

60. During the past 3 months, with how many females have you had sexual intercourse?

- A. I have never had sexual intercourse
- B. I have never had sexual intercourse with a female
- C. I have had sexual intercourse with a female, but not during the past 3 months.
- D. 1 female
- E. 2 females
- F. 3 females
- G. 4 females
- H. 5 females
- I. 6 or more females

61. During your life, with how many males have you had sexual intercourse?

- A. I have never had sexual intercourse
- B. I have never had sexual intercourse with a male
- C. 1 male
- D. 2 males
- E. 3 males
- F. 4 males
- G. 5 males
- H. 6 or more males

62. During the past 3 months, with how many males have you had sexual intercourse?

- A. I have never had sexual intercourse
- B. I have never had sexual intercourse with a male
- C. I have had sexual intercourse with a male, but not during the past 3 months
- D. 1 male
- E. 2 males
- F. 3 males
- G. 4 males
- H. 5 males
- I. 6 or more males

63. During the past 30 days, how many times did you have sexual intercourse?

- A. I have never had sexual intercourse
- B. 0 times
- C. 1 time
- D. 2 or 3 times
- E. 4 to 9 times
- F. 10 to 19 times
- G. 20 or more times

64. During the past 30 days, how often did you or your partner use a condom?

- A. I have never had sexual intercourse
- B. I have not had sexual intercourse during the past 30 days
- C. Never used a condom
- D. Rarely used a condom
- E. Sometimes used a condom
- F. Most of the time used a condom
- G. Always used a condom

65. The last time you had sexual intercourse, did you or your partner use a condom?

- A. I have never had sexual intercourse
- B. Yes
- C. No

66. Did you drink alcohol or use drugs before you had sexual intercourse the last time?

- A. I have never had sexual intercourse
- B. Yes
- C. No

67. The last time you had sexual intercourse, what method did you or your partner use to prevent pregnancy?

- A. I have never had sexual intercourse
- B. No method was used to prevent pregnancy
- C. Birth control pills
- D. Condoms
- E. Withdrawal
- F. Some other method
- G. Not sure

68. How many times have you been pregnant or gotten someone pregnant?

- A. I have never had sexual intercourse
- B. 0 times
- C. 1 time
- D. 2 or more times
- E. Not sure

69. During your life, have you ever been forced to have sexual intercourse against your will?

- A. Yes
- B. No

70. How old were you the first time you were forced to have sexual intercourse against your will?

- A. I have never been forced to have sexual intercourse against my will
- B. 4 years old or younger
- C. 5 to 12 years old
- D. 13 or 14 years old
- E. 15 or 16 years old
- F. 17 or 18 years old
- G. 19 or 20 years old
- H. 21 to 24 years old
- I. 25 years old or older

71. How old were you the last time you were forced to have sexual intercourse against your will?

- A. I have never been forced to have sexual intercourse against my will
- B. 4 years old or younger
- C. 5 to 12 years old
- D. 13 or 14 years old
- E. 15 or 16 years old
- F. 17 or 18 years old
- G. 19 or 20 years old
- H. 21 to 24 years old
- I. 25 years old or older

72. Have you ever had your blood tested for the AIDS virus/HIV infection?

- A. Yes
- B. No
- C. Not sure

**The next eight questions ask about body weight?**

73. How do you describe your weight?

- A. Very underweight
- B. Slightly underweight
- C. About the right weight
- D. Slightly overweight
- E. Very overweight

74. Which of the following are you trying to do about your weight?

- A. Lose weight
- B. Gain weight
- C. Stay the same weight
- D. I am not trying to do anything about my weight

75. During the past 30 days, did you diet to lose weight or keep from gaining weight?

- A. Yes
- B. No

76. During the past 30 days, did you exercise to lose weight or to keep from gaining weight?

- A. Yes
- B. No

77. During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?

- A. Yes
- B. No

78. During the past 30 days, did you take diet pills to lose weight or to keep from gaining weight?

- A. Yes
- B. No

79. What is your height range?

- A. 5 feet or under
- B. 5 feet, 1 inch to 5 feet, 2 inches
- C. 5 feet, 3 inches to 5 feet, 4 inches
- D. 5 feet, 5 inches to 5 feet, 6 inches
- E. 5 feet, 7 inches to 5 feet, 8 inches
- F. 5 feet, 9 inches to 5 feet, 10 inches
- G. 5 feet, 11 inches to 6 feet
- H. 6 feet, 1 inch to 6 feet, 2 inches
- I. 6 feet, 3 inches to 6 feet, 4 inches
- J. 6 feet, 5 inches and above

80. What is your weight range?

- A. 90 pounds or under
- B. 91 to 110 pounds
- C. 111 to 130 pounds
- D. 131 to 150 pounds
- E. 151 to 170 pounds
- F. 171 to 190 pounds
- G. 191 to 210 pounds
- H. 211 to 230 pounds
- I. 231 to 250 pounds
- J. 251 pounds or more

**The next seven questions ask about food you ate yesterday. Think about all meals and snacks you ate yesterday from the time you got up until you went to bed. Be sure to include food you ate at home, on campus, at restaurants, or anywhere else.**

81. Yesterday, how many times did you eat fruit?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 times or more times

82. Yesterday, how many times did you drink fruit juice?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 or more times

83. Yesterday, how many times did you eat green salad?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 or more times

84. Yesterday, how many times did you eat cooked vegetables?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 or more times

85. Yesterday, how many times did you eat hamburger, hot dogs, or sausage?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 or more times

86. Yesterday, how many times did you eat French fries or potato chips?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 or more times

87. Yesterday, how many times did you eat cookies, doughnuts, pie or cake?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 or more times

**The next seven questions ask about physical activity.**

88. On how many of the past 7 days did you exercise or participate in sports activities for at least 20 minutes that made you sweat or breathe hard, such as basketball, jogging, swimming laps, tennis, fast bicycling, or similar aerobic activities?

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days

89. On how many of the past 7 days did you do stretching exercises, such as toe touching, knee bending, or leg stretching?

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days

90. On how many of the past 7 days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days

91. On how many of the past 7 days did you walk or bicycle for at least 30 minutes at a time? (Include walking or bicycling to or from class or work.)

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days

92. During this school year, on how many intercollegiate college sports teams did you participate?

- A. 0 teams
- B. 1 team
- C. 2 teams
- D. 3 or more teams

93. During this school year, on how many intramural college sports teams did you participate?

- A. 0 teams
- B. 1 team
- C. 2 teams
- D. 3 or more teams

**The next three questions ask about AIDS education and health information.**

94. Have you ever been taught about AIDS or HIV infection in your college classes?

- A. Yes
- B. No
- C. Not sure

95. During your college career, where on your college campus did you receive information about avoiding AIDS or HIV infections? **(Select only one answer)**

- A. College classes
- B. Residence hall or other campus housing
- C. Student clubs or organizations
- D. Student health center
- E. Health fair
- F. Pamphlets, brochures, or newsletters
- G. College newspapers
- H. Informal discussion with friends
- I. Other
- J. I was not provided with any information

96. Which of the following health topics are you most likely to receive information about from your university? **(Select only one answer)**

- A. Tobacco use prevention
- B. Alcohol and other drug use prevention
- C. Violence prevention
- D. Injury prevention and safety
- E. Suicide prevention
- F. Pregnancy prevention
- G. Sexually transmitted disease (STD) prevention
- H. AIDS or HIV infection prevention
- I. Dietary behaviors and nutrition
- J. Physical activity and fitness

**THE FOLLOWING QUESTIONS  
HAVE BEEN ADDED TO THE  
NATIONAL COLLEGE HEALTH  
RISK BEHAVIOR SURVEY.**

**The following questions address your health behaviors prior to beginning college and any change in health behaviors that may have recently occurred.**

97. Prior to beginning college, did you smoke cigarettes or use tobacco products?

- A. I **did not use** tobacco products at all prior to coming to college
- B. I used tobacco products **more** prior to coming to college.
- C. I used tobacco products **about the same** as I have since coming to college.
- D. I used tobacco products **less** prior to coming to college.

98. Prior to beginning college, did you drink alcohol?

- A. I **did not drink** alcohol at all prior to coming to college.
- B. I drank alcohol **more** prior to coming to college.
- C. I drank alcohol **about the same** as I have since coming to college.
- D. I drank alcohol **less** prior to coming to college.

99. Prior to beginning college, did you use any illicit drugs, such as marijuana, cocaine, LSD, PCP, ecstasy, speed, ice, heroin, or inhalants to get high?

- A. I **did not use** any illicit drugs at all prior to coming to college.
- B. I used illicit drugs **more** prior to coming to college.
- C. I used illicit drugs **about the same** as I have since coming to college.
- D. I used illicit drugs **less** prior to coming to college.

100. Prior to beginning college, how would you characterize the healthfulness of your diet?  
(When answering this question, please note that a healthy diet consists of 5 or more servings of fruits/fruit juice and/or vegetables per day, and limited consumption of sweets and high fat foods.)

- A. My diet was **more** healthful prior to coming to college.
- B. My diet is **about the same** in healthfulness since coming to college.
- C. My diet was **less** healthful prior to coming to college.

101. Prior to beginning college, how would you characterize your level of physical activity/exercise ?

- A. I engaged in **more** exercise/physical activity prior to coming to college.
- B. I engaged in **about the same** amount of exercise/physical activity as I have since coming to college.
- C. I engaged in **less** exercise/physical activity prior to coming to college.

102. Prior to beginning college, how would you characterize the safety of your personal behavior? (When answering this question, please note that personal safety reduces the risk of personal injury and includes wearing a seatbelt when driving or riding, wearing a helmet when biking or riding a motorcycle, not drinking when driving, boating, or swimming, not engaging in physical fights, and not carrying a weapon.)

- A. I practiced **more** personal safety prior to coming to college.
- B. I practiced **about the same** amount of personal safety as I have since coming to college.
- C. I practiced **less** personal safety prior to coming to college.

103. Prior to beginning college, how would you characterize the safety of your sexual behavior? (When answering this question, please note that safe sexual practices reduce the risk of sexually transmitted diseases and unintended pregnancy, and include using condoms, practicing birth control, limiting the number of partners, and avoiding the use of force and alcohol or drugs in connection with sexual intercourse.

- A. I **did not engage** in sexual intercourse prior to coming to college.
- B. I practiced **more** safe sexual behavior prior to coming to college.
- C. I practiced **about the same** amount of safe sexual behavior as I have since coming to college.
- D. I practiced **less** safe sexual behavior prior to coming to college.

**The following questions ask about study behaviors and personality factors. Please note, the following items concern your current behavior.**

104. How many hours do you spend in a typical week studying or doing homework?

- A. less than 2 hours per week
- B. 2-4 hours per week
- C. 5-7 hours per week
- D. 8-10 hours per week
- E. 11-13 hours per week
- F. 14-16 hours per week
- G. 17-19 hours per week
- H. 20 or more hours per week

105. How often do you feel overwhelmed by time pressure?

- A. Always
- B. Usually
- C. Often
- D. Sometimes
- E. Rarely
- F. Never

106. How often do you use a planner or check list to manage time and meet responsibilities?

- A. Always
- B. Usually
- C. Often
- D. Sometimes
- E. Rarely
- F. Never

107. How often do you feel the support you get from friends, family members, and professors meets your needs?

- A. Always
- B. Usually
- C. Often
- D. Sometimes
- E. Rarely
- F. Never

108. To what extent do you feel hopeful about the future?

- A. Very hopeful
- B. Somewhat hopeful
- C. Not hopeful

**The following questions ask about your general health habits and health status.**

109. During a typical weekday night, on average, how many hours of sleep do you get per night?

- A. 10 hours or more per night
- B. 9 hours per night
- C. 8 hours per night
- D. 7 hours per night
- E. 6 hours per night
- F. 5 hours per night
- G. 4 hours per night
- H. 3 hours per night
- I. 2 or less hours per night

110. During a typical weekend night (Friday/Saturday night), on average how many hours of sleep do you get per night?

- A. 10 hours or more per night
- B. 9 hours per night
- C. 8 hours per night
- D. 7 hours per night
- E. 6 hours per night
- F. 5 hours per night
- G. 4 hours per night
- H. 3 hours per night
- I. 2 or less hours per night

111. During this present semester how many times were you sick or did not feel well?

- A. 0 times
- B. 1 time
- C. 2 times
- D. 3 times
- E. 4 times
- F. 5 times
- G. 6 times
- H. 7 times
- I. 8 times
- J. 9 or more times

112. During this present semester, how many days did you miss one or more classes because you were not feeling well?

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days
- I. 8 days
- J. 9 or more days

113. In this present semester, during a typical week, on how many days did you eat breakfast?

- A. 0 days
- B. 1 day
- C. 2 days
- D. 3 days
- E. 4 days
- F. 5 days
- G. 6 days
- H. 7 days

114. Since coming to college, how has alcohol use affected your academic performance?

- A. I have not used alcohol since coming to college.
- B. I have used alcohol since coming to college, but my academics have not been affected.
- C. I have received a lower grade on an exam or assignment due to my use of alcohol.
- D. I anticipate receiving a lower grade in at least one of my courses this term due to my use of alcohol.
- E. I have dropped a course or I anticipate receiving an incomplete in at least one of my courses this term due to my use of alcohol.

115. Since coming to college, how has stress, depression, anxiety, and or sleep difficulties affected your academic performance?

- A. I have not experienced these problems since coming to college.
- B. I have experienced one or more of these problems since coming to college, but my academics have not been affected
- C. I have received a lower grade on an exam or assignment due to one or more of these problems.
- D. I anticipate receiving a lower grade in at least one of my courses this term due to one or more of these problems.
- E. I have dropped a course or I anticipate receiving an incomplete in at least one of my courses this term due to one or more of these problems.

116. Since coming to college, how has relationship difficulties, family illness or concern for a troubled friend or family member affected your academic performance?

- A. I have not experienced these problems since coming to college.
- B. I have experienced one or more of these problems since coming to college, but my academics have not been affected.
- C. I have received a lower grade on an exam or assignment due to one or more of these problems.
- D. I anticipate receiving a lower grade in at least one of my courses this term due to one or more of these problems.
- E. I have dropped a course or I anticipate receiving an incomplete in at least one of my courses this term due to one or more of these problems.

117. Since coming to college, how have eating disorders or diet/weight problems affected your academic performance?

- A. I have not experienced these problems since coming to college.
- B. I have experienced these problems since coming to college but my academics have not been affected.
- C. I have received a lower grade on an exam or assignment due to these problems.
- D. I anticipate receiving a lower grade in at least one of my courses this term due to these problems.
- E. I have dropped a course or I anticipate receiving an incomplete in at least one of my courses this term due to these problems.

118. Since coming to college, how has personal injury or illness affected your academic performance?

- A. I have not experienced these problems since coming to college.
- B. I have experienced these problems since coming to college, but my academics have not been affected.
- C. I have received a lower grade on an exam or assignment due to these problems.
- D. I anticipate receiving a lower grade in at least one of my courses this term due to these problems.
- E. I have dropped a course or I anticipate receiving an incomplete in at least one of my courses this term due to these problems.

119. Since coming to college, how has sexually transmitted disease, pregnancy (yours or your partner's) affected your academic performance?
- A. I have not experienced these problems since coming to college.
  - B. I have experienced these problems since coming to college, but my academics have not been affected.
  - C. I have received a lower grade on an exam or assignment due to these problems.
  - D. I anticipate receiving a lower grade in at least one of my courses this term due to these problems.
  - E. I have dropped a course or I anticipate receiving an incomplete in at least one of my courses this term due to these problems.

120. What is your academic major?
- A. Undeclared/Undecided
  - B. Accounting/ Management
  - C. Administration of Justice
  - D. American Studies/Anthropology/ History/ Political Science/ Social Sciences/Pre Law
  - E. Mathematics
  - F. Biological Science/ Environmental Science/ Natural Sciences/ Health Careers
  - G. Communications/ English Writing/Literature/ Humanities
  - H. Psychology
  - I. Management Information Systems
  - J. Interdisciplinary Arts

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