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## ENERGY DRINK CONSUMPTION (WITH AND WITHOUT ALCOHOL) AND ITS RELATIONSHIP TO RISKY BEHAVIOR, RISK AWARENESS, AND BEHAVIORAL INTENTION IN COLLEGE STUDENTS

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THESIS

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A thesis submitted in partial fulfillment of the  
requirements for the degree of Masters of Science in the  
College of Education  
at the University of Kentucky

By

Julia Kristine Buchanan

Lexington, Kentucky

Director: Dr. Melinda Ickes, Professor

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## ABSTRACT OF THESIS

### ENERGY DRINK CONSUMPTION (WITH AND WITHOUT ALCOHOL) AND ITS RELATIONSHIP TO RISKY BEHAVIOR, RISK AWARENESS, AND BEHAVIORAL INTENTION IN COLLEGE STUDENTS

The purpose of this study was to assess the relationships between energy drink consumption (with and without alcohol) and other risky behaviors; students' overall awareness level of the risks for consuming energy drinks; and overall behavioral intention to consume energy drinks among college students at the University of Kentucky. A total of 277 students enrolled during the Spring 2012 semester responded to the online survey, 46.5% (n=129) of which were considered energy drink users. Students classified as energy drink users participated in other risky behaviors more often than non-users ( $p=0.001$ ). In addition, energy drink users exhibited a higher awareness level for the risks associated with energy drink consumption both with ( $p=0.000$ ) and without ( $p=0.000$ ) alcohol. Those who were more aware of the risks associated with energy drink consumption, both with ( $p=0.001$ ) and without ( $p=0.001$ ) alcohol, were found to have increased intention to consume energy drinks within the next month compared to those with lower awareness levels. There is a need for future research on this topic, as well as a need for expanded education and intervention programming for college students regarding the risks of energy drink consumption (with and without alcohol).

**KEYWORDS:** Energy Drinks, Energy Drinks with Alcohol, Risky Behaviors in College Students, Risk Awareness, Behavioral Intention

Julia Kristine Buchanan

July 19, 2012

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## **Chapter 1: Introduction**

### **Background**

An increasingly problematic issue among college students is the excessive consumption of energy drinks and highly caffeinated beverages. Since the 1997 debut of Red Bull, the consumption of energy drinks, and recently energy drinks containing alcohol, has risen among college students (Miller, 2008). This has occurred for reasons relating to pressures to perform well academically as well as socially (Malinauskas, Aeby, Overton, Carpenter-Aeby, & Barber-Heidal, 2007). Companies like Red Bull have been taking advantage of this market, as over 500 new energy drinks debuted in 2006, contributing to a 5.7 billion dollar industry (Malinauskas et al., 2007). The Red Bull company, which originated in Austria, controls nearly half of the energy drink market in the United States, and the number of energy drink companies continues to grow (Kapner, 2008). Other popular brands of energy drinks include Tab Energy, Monster, Rockstar, No Fear, Fixx and Wired X505 (Doehny, 2008). These products are produced by major corporations, such as Pepsico, Coca-Cola, Anheuser Busch, Miller Brewing Company, and Cadbury Schweppes (Kapner, 2008). In addition, these companies have been producing energy drinks pre-mixed with alcohol, and marketing them to underage consumers as well as youth (Kapner, 2008). Popular brands of this mixed beverage include Four Loko and Joose (Brown University, 2008).

### **Prevalence**

Among college students, 51% of participants reported consuming greater than one energy drink each month in an average month for the current semester (Malinauskas et al., 2007). The same study found that 73% of those energy drink consumers had mixed

the beverage with alcohol during the past month (Malinauskas et al., 2007). To support this finding, O'Brien, Rhodes, Wagoner, Wolfson, and McCoy (2008) reported that one-fourth of past 30-day alcohol drinkers consumed at least one energy drink mixed with alcohol in the past month. In addition, Miller (2008) had a similar finding, that 26% of university students reported consuming energy drinks with alcohol in the past 30 days.

### **Physiological Effects**

The main ingredient of concern in energy drinks is caffeine – which causes detrimental effects in the body including dehydration (from the diuretic effect it carries), a reduction in insulin sensitivity, increases in mean arterial blood pressure, chronic headaches, and the possibility for central nervous system, cardiovascular, gastrointestinal and renal dysfunction (Malinauskas et al., 2007). Steinke, Lanfear, Dhanapal, and Kalus (2009) found that ingesting two cans of energy drinks elevated pulse pressure, which “generally serves as a measure of decreased arterial compliance of the larger arteries” (p. 600). Because elevated pulse pressure has been linked to both a greater risk of developing coronary heart disease and impaired coronary vascular reactivity, regular energy drink consumption could play a major role in one’s risk for morbidity and mortality (Steinke et al., 2009).

An even greater problem includes the mixing of energy drinks with alcohol, as 54% of students reported that they have tried this combination (Malinauskas et al., 2007). There are many dangers and risks associated with combining highly caffeinated beverages with alcohol. Clinical studies have shown that ingesting caffeine (a central nervous system stimulant) with alcohol (a depressant) “reduces subjective perceptions of alcohol-induced impairment in comparison to alcohol alone” (Thombs et al., 2008, p.

325). The major concern with this is that the user may “become desensitized to the symptoms of alcohol intoxication, which may increase the potential for alcohol related harm such as alcohol poisoning, physical injury, impaired driving, and sexual victimization” (Thombs et al., 2008, p. 325-326).” Consequently, because the energy drinks act as stimulants in the body and alcohol has the reverse effect, one may perceive they are less intoxicated than they truly are (Miller, 2008).

### **Reasons for Use**

Malinauskas et al. (2007) examined the reasons that students were consuming energy drinks. Reported reasons were to compensate for insufficient sleep (67%), to increase energy (65%), or to mix with alcohol while partying (54%) (Malinauskas et al., 2007). A larger percentage of these users consumed one energy drink to treat the fatigue from lack of sleep or low energy. There are also reports which suggest that the “ingestion of energy drinks alone improves psychomotor performance (motor reaction time, concentration, immediate memory, subjective sensation of alertness, and physical vigor), physical performance, and mood” (Ferreira, Túlio de Mello, Pompéia, & Oliveira de Souza-Formigoni, 2006, p.598).

For partying, mixing three or more energy drinks with alcohol was a common practice, reported by 49% of college students (Malinauskas et al., 2007). One study found that college students report consuming energy drinks with alcohol for reasons such as a reduction in sleepiness and an increase in the pleasure sensation, which suggests that these beverages might reduce the depressant effects and/or increase the excitatory effects of alcohol (Ferreira et al., 2006). Those who consume energy drinks with alcohol may be also doing so for the taste – mixing the sweet energy drink with hard liquor might make

the beverage easier to consume, therefore possibly increasing consumption (Arria, Caldeira, Kasperski, Vincent, Griffiths, & O'Grady, 2011). Combined with alcohol, it is possible that the caffeine in an energy drink could “reduce the subjective feelings of being drunk and therefore lead to dose escalation, with the drinker consuming more alcohol than they otherwise might” (Arria et al., 2011, p. 366).

### **Risk-taking in College Students**

In general, there is reasonable evidence to suggest that college students tend to engage in various risky behaviors, including substance abuse, violence, and eating disorders (Ahearn, 2009). Many times, this is a result of stressful lifestyles and newfound independence. The University of Indiana (2006) reports that more than 30% of all college freshman report feeling overwhelmed a majority of the time. Engaging in these behaviors can have major implications for the students' mental and physical health, as well as their academic performance (Ahearn, 2009). When looking at energy drink consumption and its relationship to a college students' propensity for risk taking, one study found that energy drink consumption rates were positively associated with marijuana use, sexual risk-taking, fighting, seatbelt omission, and taking risks on a dare (Miller, 2008). Implications of the aforementioned study suggested using frequent consumption of energy drink consumption as a screening indicator to identify students at risk for substance use and/or other risky behaviors (Miller, 2008).

When looking at energy drink consumption with alcohol, potential negative effects that may result include individuals consuming higher amounts of alcohol (more susceptible to alcohol poisoning), physical injury, impaired driving, and sexual victimization (Thombs et al., 2009). One study reported that in comparison to students

who consumed only alcohol, students who consumed energy drinks mixed with alcohol had experienced a higher prevalence of alcohol-related consequences, including being taken advantage of sexually, taking advantage of another sexually, riding with a driver who was under the influence of alcohol, being hurt or injured, and requiring medical treatment (O'Brien et al., 2008).

### **Conceptual Approach**

Utilizing a conceptual and/or theoretical approach is important in examining health promotion and behavior change because it brings an understanding to why people engage in health-risk or health-compromising behavior (DiClemente, Crosby, & Kegler, 2002). The Theory of Planned Behavior may be a way to help explain one's decision to act in regards to certain health behaviors. The Theory of Planned Behavior states that "individuals' intention to perform a given behavior is a function of their attitude toward performing the behavior, their beliefs about what relevant others think they should do, and their perception about the ease or difficulty of performing the behavior" (Cottrell, Girvan, & McKenzie, 2009, p. 124; Ajzen, 1991). Thus, the Theory of Planned Behavior has been used as an underlying foundation in beginning to understand college students' consumption of energy drinks, both with and without alcohol, in relation to their intention and related influencing factors.

### **Statement of the Problem**

The often-times stressful lifestyles and newfound independence of American college students can lead to participation in various risky behaviors, including substance abuse, violence, and eating disorders (Ahearn, 2009). Engaging in these behaviors can have major implications for the students' mental and physical health, as well as their

academic performance (Ahearn, 2009). One issue that is threatening the well-being of college students is that of energy drink consumption, both with and without alcohol. The college-student population has proven to be one of the most targeted groups by energy-drink beverage companies, as well as largest group of consumers of energy drinks with alcohol (Malinauskas et al., 2007). It has been found that energy drink consumption is closely related to problem behavior syndrome (Miller, 2008). However, because the rates of production, marketing, and use of energy drinks have risen so greatly in the past decade, many people are simply not aware of the various risks that consumption of these beverages is associated with (Miller, 2008).

Because current literature shows that energy drink consumption (with and without alcohol) is a threat to the health of college students, more evidence is needed not only in regards to their consumption habits, but how this behavior relates to participation in other risky behaviors. There is an existing gap in the literature relating energy drink consumption to risky behaviors, and to the author's knowledge, no published studies exist which analyze the behavior of mixing and consuming energy drinks with alcohol (a fairly new trend) among college students. In addition, the majority of the literature on the topic of college students and energy drinks only looks at consumption habits, which does not delve into the student's attitudes, perception, and intention toward the behavior. This is a gap which this study aimed to fill to gain a better understanding as to how energy drink consumption (with and without alcohol) relates to other risky behavior participation, as well as give some insight into factors which affect the consumption habits of college students.

## **Purpose of the Study**

The purpose of this study was to assess the relationships between energy drink consumption (with and without alcohol) and other risky behaviors among college students at the University of Kentucky, to find out whether a students' risk awareness for consuming energy drinks had an effect on whether or not they consumed these beverages, and to determine if risk awareness affected behavioral intention to consume energy drinks (with and without alcohol).

## **Research Questions**

In order to achieve these aims, several research questions were investigated.

1. What is the past year energy drink usage (with and without alcohol) among University of Kentucky college students?
2. Do students who are energy drink users at the University of Kentucky participate in risky behaviors (i.e. illicit drug use, not wearing a seatbelt, etc.) more often than non-energy drink users?
3. Is there a significant difference between energy drink users and non-energy drink users in risk awareness of energy drink consumption (with and without alcohol) among University of Kentucky college students?
4. Is there a significant difference in behavioral intention to consume energy drinks (with and without alcohol) in those University of Kentucky students who are aware of the risks and those who are not aware?



## **Hypotheses**

The predicted outcomes for this study were tested through responses received from a survey distributed to a convenience sample of University of Kentucky students.

The following hypotheses were addressed:

1. Energy drinks users will exhibit higher participation in other risky behaviors, as compared to non-energy drink users.
  - a. Null hypothesis: There is no significant difference in participation in risky behaviors between energy drink users and non-energy drink users.
2. Energy drink users have a lower awareness level of the risks associated with energy drink consumption than non-energy drink users.
  - a. Null hypothesis: There is no significant difference in awareness level of the risks associated with energy drink consumption between energy drink users and non-energy drink users.
3. Energy drink users will have a lower awareness level of the risks associated with energy drink (with alcohol) consumption than non-energy drink users.
  - a. Null hypothesis: There is no significant difference in awareness level of the risks associated with energy drink (with alcohol) consumption between energy drink users and non-energy drink users.
4. Students who are aware of the health risks involved with consuming energy drinks will have less behavioral intention to use the products within the next 30 days compared with students who are unaware of the health risks associated with consuming energy drinks.

- a. Null hypothesis: There is no significant difference in behavioral intention to use energy drinks in the next 30 days between students who are aware of the risks associated with energy drink consumption and those who are unaware of the risks.
5. Students who are aware of the health risks associated with consuming energy drinks with alcohol will have less behavioral intention to use the products within the next 30 days compared with students who are unaware of the health risks associated with consuming energy drinks with alcohol.
    - a. Null hypothesis: There is no significant difference in behavioral intention to use energy drinks with alcohol in the next 30 days between students who are aware of the risks associated with energy drink with alcohol consumption and those who are unaware of the risks.

### **Implications**

As previously mentioned, research shows that college students have a propensity toward risk-taking (Ahearn, 2009). In addition, the consumption of energy drinks with and without alcohol among college students tends to be related to risk-taking as well (Miller, 2008). By further investigating students' energy drink consumption (with and without alcohol) and their recent and past history regarding risky behaviors, any relationships between the two variables may uncover a potential need for an increase in awareness about the dangers of energy drinks. The results of this analysis may provide health educators with the information necessary to formulate effective awareness programming for college students.

College students tend to overlook the short-term implications of their actions rather than the long-term (Ahearn, 2009). As a result, they may not be aware of the negative physical and mental effects related to energy drink consumption. This study will assess participants' overall awareness level regarding the risks energy drink consumption (with and without alcohol) carries, which will give a clearer understanding on whether educational programming is needed on this topic. In addition, it will be important to find out what effect the students' risk awareness level has on their behavioral intention to consume energy drinks. Results may show a need for future studies into factors which may reduce overall intention to consume the beverages.

### **Delimitations**

The scope of this study included Kinesiology and Health Promotion activity-class (Life Fitness) students as well as students enrolled in General Education courses at the University of Kentucky. These students were surveyed within a five-week time period from January-February 2012. Information collected was based on demographics, energy drink consumption (with and without alcohol), recent history involving risk-taking behaviors, awareness levels of common side effects, and behavioral intention to consume energy drinks (both with and without alcohol in the next 30 days).

### **Limitations**

This study was limited by convenience sampling, utilizing students of activity classes within the Kinesiology and Health Promotion department, as well as students within General Education courses. Because the survey invitation was sent to course instructors first, there is a possibility that the instructors did not then forward the survey on to all of their students, thus limiting the size of the potential sample population. This

may be cause for another limitation, which was a limited number of responses (N=277). Other limitations included data being self-report (participants may have given false or socially desirable responses), using an online survey software which may have limited participation to those who were interested in the topic. Due to the convenience sample and small sample size, results may not be generalized to other college student populations.

### **Definitions**

Terms related to this study are defined in this section.

1. *Energy drinks* are soft drinks containing various ingredients marketed to increase one's real or perceived physiological performance. These ingredients include, but are not limited to carbohydrates, taurine (an amino acid that assists with neurological development and regulation of water and mineral salt concentrations in the blood), glucuronolactone (a natural product resulting from metabolism of glucose), and caffeine (Pettit & DeBarr, 2011).
2. *Energy drinks with alcohol* are alcoholic beverages that contain caffeine as an additive and are packaged in combined form (U.S. Food and Drug Administration, 2010). This term may also represent cocktails containing alcohol and energy drinks as mixers, such as "Red Bull and vodka" and "Jager Bombs" (Jagermeister and Red Bull), often served at bars and nightclubs (O'Brien et al., 2008).

### **Summary**

This chapter introduced the reasons behind why energy drink consumption is both popular among college students as well as potentially harmful for their health. In addition, the college student population's tendency to engage in risk-taking behaviors

was explained. The chapter examined that there may be a possible relationship between energy drink consumption (with and without alcohol) and other risky behaviors, and that there may be a relationship between energy drink risk awareness and usage rates. Another potential relationship was mentioned between students' overall energy drink risk awareness and behavioral intention to consume the beverages. Thus, the purpose of the study and related research questions were established. Concluding the chapter were the limitations, delimitations, and related definitions.

## **Chapter 2: Literature Review**

### **Introduction**

The development, marketing, and consumption of energy drinks within recent years have risen greatly, especially among college students (Miller, 2008). Since the 1984 founding of Red Bull, Dietrich Mateschitz, its creator, has realized the launch of a whole new product category in energy drinks (Red Bull, 2011). An astounding 500 new energy drinks debuted in 2006, which played a major role in creating a 5.7 billion dollar industry (Malinauskas et al., 2007). Mateschitz's company is based in Austria, yet controls nearly half of the energy drink market in the United States (Kapner, 2008). Other popular brands of energy drinks include Monster, Rockstar, Adrenaline Rush, Atomic Energy, Hansen's Hard E, Jones' Whoop Ass, KMX, Niagra, Power House, SoBe, and Virgin Hi Energy. Major corporations, such as Pepsico, Coca-Cola, Anheuser Busch, Miller Brewing Company, and Cadbury Schweppes tend to be in control of many of these products (Kapner, 2008).

Following this growing trend is the production of energy drinks pre-mixed with alcohol. Companies are developing these products, which are a mix of energy drinks (containing anywhere between 80 and 400mg of caffeine), and alcohol (between 6-9% alcohol by volume) (Weldy, 2010). These major companies have also been marketing the products to underage consumers and youth, a group which often includes college students (Kapner, 2008). Energy drinks (neither with nor without alcohol) are not regulated by the Food and Drug Administration (FDA), meaning beverage producers are not required to label their products' caffeine content (Doehny, 2008). Often, energy drinks are marketed

as ‘dietary supplements,’ and are not required to be approved or evaluated before they go on sale to consumers (Doehny, 2008).

### **Prevalence**

Few studies have been performed regarding the energy drink consumption habits among college students. However, in a study done by Attila and Cakir (2011), 48.3% of college students reported ever trying an energy drink (without alcohol). A study done by Malinauskas et al. (2007) found that 51% of college students reported consuming greater than one energy drink each month in an average month for the current semester. For energy drinks with alcohol, the Malinauskas et al. (2007) study found that 54% of participants reported ever trying the beverage, and that 73% of energy drink consumers had mixed the beverage with alcohol during the past month. O’Brien et al. (2008) reported that one-fourth of past 30-day alcohol drinkers consumed at least one energy drink mixed with alcohol in the past month. In addition, Miller (2008) had a similar finding, that 26% of university students reported consuming energy drinks with alcohol in the past 30 days.

### **Reasons for Use**

Some of the reasons that college students report consuming energy drinks (without alcohol) include to compensate for insufficient sleep (67%), to increase energy (65%), or to mix with alcohol while partying (54%) (Malinauskas et al., 2007). Ferreira et al. (2006) reported that ingestion of energy drinks may improve motor reaction time, concentration, immediate memory, and subjective sensation of alertness, physical vigor, physical performance, and mood, all reasons that a typical college student may be inclined to consuming energy drinks. Ferreira et al. (2006) found that college students

report consuming energy drinks with alcohol for reasons such as a reduction in sleepiness and an increase in the pleasure sensation. It was also found that students may be consuming the sweet energy drinks with alcohol for the taste, as to make the hard liquor easier to consume (and possibly increase overall consumption) (Arria, et al., 2011).

Another reason students may consume energy drinks is to cope with stress. Many times, college students spend a lot of time studying (cramming) for exams, or stay up late to finish academic projects (Fitzpatrick, 2007). This can lead to increased caffeine consumption from energy drinks, in order to keep up with pressures to perform well academically (Fitzpatrick, 2007). In a study by Pettit and DeBarr (2011), it was actually found that students who consumed energy drinks had lowered academic performance. The same study also found that students who were characterized by higher levels of perceived stress consumed more energy drinks on any occasion during the past 30 days, compared to those with lower levels of perceived stress (Pettit & DeBarr (2011). This indicates that energy drink consumption, similar to tobacco use or alcohol use, is used as a coping mechanism for stress, but may not lead to increased academic performance (Pettit & DeBarr, 2011).

### **Physiological and Psychological Effects of Energy Drinks**

Energy drinks can have many physiological effects on the body, mainly due to the stimulant ingredients they contain. One of the primary ingredients energy drinks contain is caffeine. In energy drinks, caffeine content can vary greatly (due to no regulations by the FDA, and by varying container size). According to the Center for Science in the Public Interest (CSPI) (2012), the FDA limits caffeine content in sodas to 71mg/12oz serving size. For the same serving size however (12oz), common energy drinks would



have much greater caffeine levels. Red Bull would contain approximately 120mg, Rockstar would contain 180mg, and Cocaine would contain 428.6mg (CSPI, 2012). A typical brewed coffee would contain approximately 80-135mg (CSPI, 2012), but would typically be consumed much more slowly than an energy drink. Because caffeine causes a diuretic effect in the body, dehydration, insulin sensitivity reductions, increases in mean arterial blood pressure, chronic headaches, and the possibility for central nervous system, cardiovascular, gastrointestinal and renal dysfunction can occur (Malinauskas et al., 2007). Steinke et al. (2009) also found that elevated pulse pressure can occur after consuming just two cans of energy drinks (elevated pulse has been linked to increased risk of coronary heart disease). Franks, Schmidt, McCain and Fraer (2012) showed that energy drinks alone increased 24-hour daytime blood pressure levels as well.

In one study, Worthley, Prabhu, De Sciscio, Schultz, Sanders, and Willoughby (2010) examined the effects of energy drinks on blood platelet and endothelial function. Results from the study showed that those who consumed energy drinks had an acute increase in platelet aggregation, and decreased endothelial function. The problem with this is that both of these results have been strongly associated with myocardial infarction (heart attack) and sudden cardiac death (Worthley et al., 2010). Examinations of two case studies involving surgical operations on patients who had consumed energy drinks showed there was an increased risk of intraoperative bleeding (Foran, 2011). This parallels the findings of Worthley et al. (2010), because intraoperative bleeding and hemorrhaging is a result of decreased endothelial functioning, which has been shown to be a result of energy drink consumption (Foran, 2011). Because of this, precautions

before surgeries should be followed regarding what the patient can and cannot consume ahead of time (Foran, 2011).

Acute caffeine intoxication is also a concern associated with energy drink consumption. Because energy drink companies are neither required to list caffeine content nor provide warning labels for their products, consumers may be ingesting higher levels of caffeine than anticipated (Reissig, Strain, & Griffiths, 2008). This is a recognized clinical syndrome which is included in the Diagnostic and Statistical Manual of Mental Disorders and the World Health Organization's International Classification of Diseases (Reissig et al., 2008). Specific symptoms of caffeine toxicity include "nervousness, anxiety, restlessness, insomnia, gastrointestinal upset, tremors, tachycardia, psychomotor agitation, and in rare cases, death" (Reissig, et al., 2008, p. 4).

Recent research has suggested that energy drink use might pose an additional risk for alcohol dependence and nonmedical prescription drug use (Arria & O'Brien, 2011). There is the possibility that "caffeine's neuropharmacologic effects might play a role in the propensity for addiction" (Arria & O'Brien, 2011, p. 601). Although more research needs to be done pertaining to this specific relationship, results of previous studies done on caffeine consumption have shown that there are many health and safety concerns present.

Many other ingredients are present in energy drinks. These include various herbs, pyruvate, protein and amino acids, creatine and cartinine, medium-chain triglycerides, vitamins and minerals, and hornet's saliva (Bonci, 2002). Although some of these ingredients have been shown to have ergogenic effects (consumed alone and in larger

amounts), most have scant or no evidence that any positive effects exist when consumed in energy drinks (Bonci, 2002).

### **Physiological and Psychological Effects of Energy Drinks Mixed with Alcohol**

There are many dangers and risks associated with mixing alcohol and energy drinks together. Because the ingredients in energy drinks act as stimulants in the body, ingesting the beverages with alcohol (a depressant) can “reduce subjective perceptions of alcohol-induced impairment in comparison to alcohol alone” (Thombs et al., 2008, p. 325). One study even showed that energy drinks mixed with alcohol led to “neuropsychological deficits in visuospatial judgments and semantic [verbal] fluency” (Curry and Stasio, 2009, p.480).

In addition, both alcohol and caffeine (main ingredient in energy drinks) are diuretics. Traue and Stahlman (n.d.) report that this can quickly dehydrate the body, which could make an individual more prone to alcohol toxicity. Other factors may also contribute to increased absorption of alcohol into the bloodstream by these mixtures, such as the carbonation and dilution of alcohol into the mixture (Weldy, 2010). Because of the diluted alcohol content, the mixture is emptied from the stomach and enters the faster-absorbing small intestine quicker than beverages with higher concentrations of alcohol (Weldy, 2010). In addition, this stimulant-depressant mixture can cause the consumer to experience other negative effects such as vomiting and respiratory depression after the stimulant effect wears off (Attila & Cakir, 2011).

Another problem with mixing alcohol and energy drinks is that the user may “become desensitized to the symptoms of alcohol intoxication, which may increase the potential for alcohol related harm such as alcohol poisoning, physical injury, impaired

driving, and sexual victimization” (Thombs et al., 2008, p. 325-326).” This can all be due to the caffeine causing the individual to feel less drunk than they really are (Miller, 2008). Ferreira et al. (2006) validate this notion, where participants in that study (after consuming energy drinks mixed with alcohol) had a lower perception of intoxication, but still exhibited diminished motor skills and visual reaction, both of which could lead to disastrous consequences. Marczinski, Fillmore, Bardgett, and Howard. (2011) confirmed this through a study on the effects of energy drinks mixed with alcohol on behavioral control, stating that “the mix of impaired behavioral inhibition and enhanced stimulation is a combination that may make energy drink with alcohol consumption riskier than alcohol consumption alone.”

## **Marketing**

Although the FDA (Food and Drug Administration) regulates the amount of caffeine allowed in one 12 oz. can of soda (71mg), energy drink companies can navigate around this by claiming that their product is a “natural dietary supplement,” thus not needing to be regulated by the FDA (Seifert, Schaechter, Hershorin, & Lipshultz, 2011). The problem with this lies in the fact that energy drink manufacturers are left to determine the safety of their products, and there is no regulation on what is to be printed on their labels (such as warnings, adverse effects, testing, or restrictions against sales or consumption by minors) (Seifert et al., 2011).

Reissig et al. (2008) report that energy drinks tend to be promoted for their stimulant effects. In addition, energy drink companies often claim that their products increase attention, endurance, and performance as well as having a positive effect on weight loss (Reissig et al., 2008). These marketing claims could be reasons why

(according to the Marin Institute) 34% of those age 18-24 report being regular consumers of energy drinks (Simon & Mosher, 2007). Energy drink companies are effective in marketing to this age group, utilizing “grassroots” level strategies as opposed to traditional strategies (television, radio, magazine, and outdoor advertising) (Simon & Mosher, 2007). These include marketing at “events, extreme sports competitions, Internet interactions, and communication among users on Internet sites such as MySpace and Facebook” (Simon & Mosher, 2007, p.1).

Marketing strategies that are utilized to promote alcoholic energy drinks include strategies such as attractive packaging, brand confusion and providing low-cost alternatives (Simon & Mosher, 2007). Energy drinks and alcoholic energy drinks often come in cans that exhibit colorful graphics, exciting fonts, and list sweet, fruity flavors (Simon & Mosher, 2007). In addition, some companies that produce non-alcoholic energy drinks also produce the same beverage mixed with alcohol (which plays upon a consumer’s brand loyalty) (Simon & Mosher, 2007). Pre-mixed alcoholic energy drinks (costing around three dollars per can) can also be a low-cost alternative to purchasing a non-alcoholic energy drink and further mixing it with hard alcohol, which is another reason this is an attractive option for young consumers (Traue & Stahlman, n.d.).

### **In the News**

The growing trend of energy drinks has initiated bans and debates on college campuses. In October 2011, the University of New Hampshire announced that it would be banning the sale of energy drinks on its campus, although it later retracted that decision (Diblasio, 2011). The ban was initially brought about due to the students’ tendency to abuse energy drinks and mix them with alcohol, which included a student

being sent to the hospital (Diblasio, 2011). Although this particular ban was later retracted, the issue has brought about a great debate across the country. After dozens of students were sick and nine hospitalized at Central Washington University after drinking Four Loko (pre-mixed alcoholic beverage), Senator Charles Schumer (D-NY) and others decided to step in and call for the Food and Drug Administration (FDA) to investigate the safety of these beverages (Fulton, 2010). In November 2010, the FDA threatened a ban on Four Loko, warning that “the combination of stimulants, caffeine, and alcohol [is] unsafe and a public health threat” (Somerville, 2011).

Concerning the risk of energy drinks to one’s health, the Substance Abuse and Mental Health Administration (SAMHSA) released data relating to energy-drink related emergency room visits from 2005-2009. In 2005, the number of visits totaled 1,128, while the number in 2009 was 13,114 – an 11-fold increase (SAMHSA, 2011). The number even reached a whopping 16,055 in 2008, the highest number to date (SAMHSA, 2011). This report also mentioned that about 44% of these cases were related to consuming energy drinks with alcohol or illicit drugs, and that 77% of the cases involved individuals ages 18-39 (SAMHSA, 2011). The highest rate (52%) of the combination (energy drink and another substance) related incidents were among users ages 18-25 (SAMHSA, 2011).

### **Link between Energy Drink Consumption and Risky Behaviors**

College students tend to possess stressful lifestyles, as their newfound independence requires them to often times live on their own, support themselves, and balance their academic and social lives (Ahearn, 2009). In addition, there is evidence suggesting that college students tend to engage in various risky behaviors, including

unsafe sex, substance abuse, violence, and eating disorders, which can affect their mental and physical health (Ahearn, 2009). In regards to substance abuse, the National Center on Addiction and Substance Abuse at Columbia University (CASA) (2007) reported that 49% (3.8 million) of full-time college students were found to binge drink and/or abuse prescription and illegal drugs. The CASA (2007) study also found that 22.9% (1.8 million) of full-time college students meet the medical criteria for substance abuse and dependence.

Combined with energy drink consumption (with and without alcohol), risk-taking propensity can be related to marijuana use, sexual risk-taking, fighting, seatbelt omission, and taking risks on a dare, as supported by the Miller (2008) study. In addition, energy drink consumption has also been found to be related to alcoholic tendencies. The study which determined this involved 1,000 university students (Arria, 2011). It was found that those students who “consumed caffeinated energy drinks on a weekly or daily basis drank alcohol more often and in greater quantities, and were more likely to become alcohol dependent than students who used energy drinks occasionally or not at all” (Arria, 2011). This study is another example of the link that energy drink consumption has on risk-taking behavior.

Aside from consuming energy drinks alone, ingesting them with alcohol may bring about even more risk-taking behavior in college students. As was mentioned before, individuals may end up consuming higher amounts of alcohol when also consuming energy drinks, which could ultimately lead to alcohol poisoning (Thombs et al., 2009). In addition, this act could lead to physical injury, impaired driving or riding with someone who was under the influence, taking advantage of another sexually, and sexual

victimization (Thombs et al., 2009; O'Brien et al., 2008). One study by Cleary, Levine, and Hoffman (2011) identified various emergency cases in which young adults were admitted under the influence of the alcoholic energy drink, Four Loko. This product itself contains a 23.5 oz mixture consisting of 12% alcohol, 156mg of caffeine, and unknown amounts of guarana and taurine (Cleary et al., 2011). The case report identified patients who were younger than 25 years old, who had been admitted to the emergency room under altered mental statuses, having been found in potentially dangerous situations (Cleary et al., 2011). These situations included laying on subway tracks, being lost and confused alone in public parks or on public transportation, and being unconscious at school (Cleary et al., 2011). More than one-third of the patients included in this study also possessed blood-alcohol content greater than twice the legal limit (Cleary et al., 2011).

Confirming an inherent risk to consuming energy drinks and alcohol is shown in a study among intercollegiate athletes. In the study, those who were shown to be “combined users” (using energy drinks with alcohol) “consumed significantly more alcohol and had riskier drinking habits (e.g., heavy binge drinking) than athletes who used alcohol only” (Woolsey, Waigandt, & Beck, 2010, p.65). Results from this study can conclude that the combined use of alcohol and energy drinks could potentially contribute to increased risk-taking and negative consequences (Woolsey et al., 2010).

### **Conceptual Approach**

Health behaviors are complex and multifaceted. In order to fully understand the reasoning behind college students' energy drink (with and without alcohol) consumption, it is important to use a conceptual approach. For the purposes of this study, the Theory of

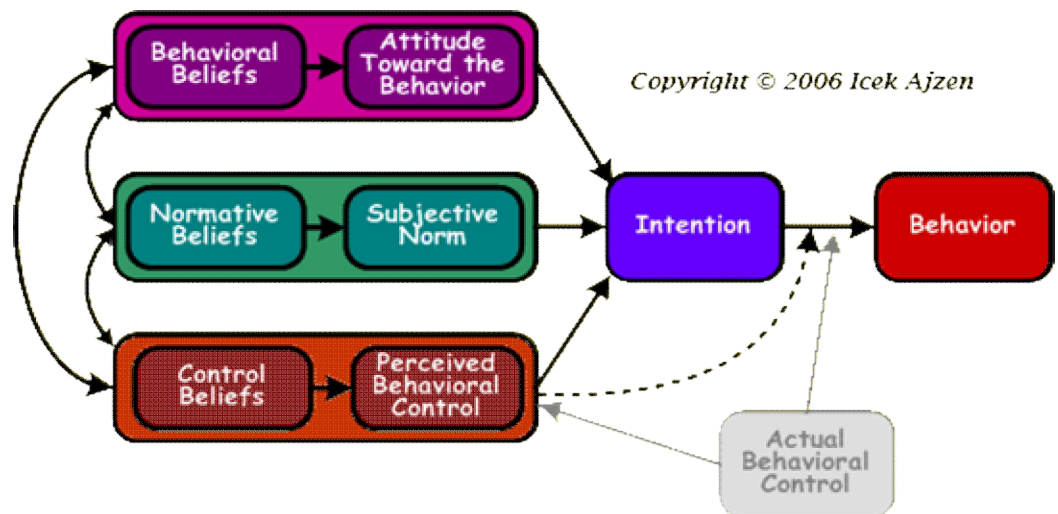


Planned Behavior has been used as an underlying foundation in beginning to understand college students' consumption of energy drinks, both with and without alcohol, in relation to their intention and related influencing factors. The Theory of Planned Behavior involves an individual's intention to engage in a certain behavior (Ajzen, 1991), and has been used in health promotion to target many health behaviors (Frost, 2008). In general, it can be said that the greater the intention one has to perform a behavior, the more likely they are to perform it (Ajzen, 1991). Ajzen (1991) states: "Intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior (p. 179)." A diagram of this theory is displayed below, in

Figure 2.1:

Figure 2.1

*Ajzen's Theory of Planned Behavior*



Highlighting some of the underlying concepts of the Theory of Planned Behavior aided in the development of a conceptual framework to guide the aims of the study. As is

shown in the diagram, the Theory of Planned Behavior involves an individual's attitude toward the behavior, subjective norm, and the individual's perceived behavioral control. According to Ajzen (2006), "Attitude toward a behavior is the degree to which performance of the behavior is positively or negatively valued (n.p.)." In regards to subjective norm, Ajzen (2006) writes, "Subjective norm is the perceived social pressure to engage or not to engage in a behavior (n.p.)." Lastly, regarding perceived behavioral control, Ajzen (2006) states, "Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior (n.p.)." Participants were asked questions which were similar to these constructs in order to gain a better understanding of college students' intention and related factors toward energy drink consumption.

Cottrell et al. (2009) explains that an "individuals' intention to perform a given behavior is a function of their attitude toward performing the behavior, their beliefs about what relevant others think they should do, and their perception about the ease or difficulty of performing the behavior" (p. 124). Ajzen (1991) explains that behavioral intention can "find expression in behavior only if the behavior in question is under volitional control, i.e., if the person can decide at will to perform or not perform the behavior" (p. 181-182). Because of the importance of utilizing a conceptual and/or theoretical approach in health promotion and behavior change (DiClemente et al., 2002), it was intended this theory be used to highlight some of the potential influencing factors related to college students' energy drink consumption. Results from this study may assist future researchers investigating energy drink consumption in college students to more clearly articulate theoretical constructs which may be used in a predictive model for energy drink consumption.

## **Summary**

This literature review provided information relating to the background, marketing, prevalence, reasons for usage, and physiological and psychological effects of energy drink consumption, both with and without alcohol. This information was related to the consumption of these products among college students. In addition, the Theory of Planned Behavior was explained, as it may serve as a foundation in beginning to understand the link between energy drink consumption and risky behavior, in addition to the attitudes, beliefs and perceptions about energy drink consumption among college students.

## **Chapter 3: Methodology**

The purpose of this study was to assess the relationship between energy drink consumption (both with and without alcohol) and other risky behaviors among college students at the University of Kentucky in addition to finding out whether students' risk awareness (for consuming energy drinks with and without alcohol) had an effect on whether or not they consumed or intended to consume these beverages. Differences in risk awareness between energy drink users and non-users were also assessed. This chapter will further explain the research design, target population, sampling procedures, measures used and data analysis for this study.

### **Research Design**

A cross-sectional design was used for this study to collect data on the aforementioned variables at one time, thereby providing a snapshot of how selected variables were represented in a convenience sample of college students. A cross-sectional design can be described by Baumgartner and Hensley (2006) as a "method for testing many groups and assuming each group is representative of all other groups when they are at the point in time (p. 181)." Utilizing a cross-sectional design allow researchers to compare many different variables at the same time (Institute for Work and Health, 2009).

### **Population and Sampling**

**Target population.** The population included a convenience sample of college students enrolled in the Life Fitness Program (activity classes) as well as General Education courses at the University of Kentucky during the spring of 2012. Participants were not excluded based on academic major, grade point average, gender, race/ethnicity, or age. An e-mail was sent to course instructors of 57 Life Fitness activity classes within

the Kinesiology and Health Promotion (KHP) Department, as well as 50 general education course instructors at the University of Kentucky during January and February of 2012. Course instructors were asked to forward the survey invitation on to their enrolled students. It was estimated the survey could have potentially reached 2,000 students (assuming all course instructors forwarded the survey).

According to the University of Kentucky's Office for Institutional Diversity (2011), during the 2008-2009 academic year, the total population of University of Kentucky students was 26,054 undergraduate and graduate students (47% male, 53% female). Seventy-five percent of the student body was age 24 or younger, while the remaining 25% was age 25 and older. The population included students who were classified as white/non-Hispanic (84%), African-American (6%), non-resident alien (5%), Asian (3%), Hispanic (1%), American Indian (<1%), and unclassified (<1%) races. These students represented 93 undergraduate programs, 99 graduate programs, 66 doctoral programs, and 4 professional programs (University of Kentucky, 2011). It was determined by including KHP activity courses and General Education courses, a diverse student body would be reached, as all majors have General Education requirements, and KHP activity courses are open to any student.

**Sampling.** Calculating a required sample size based on the overall student population size at the University of Kentucky was necessary. In doing so, level of statistical significance, statistical power, and effect size were considered. The significance criterion was set at  $\alpha=0.05$ , power was set at 0.80, and a population correlation coefficient of 0.15 was assumed. Using a standard sample size calculator, a minimum sample size of 379 was desired (Raosoft Inc., 2004) in relation to the total

population of University of Kentucky students. After several reminders to instructors of the selected courses, the total number of responses received was 291. After discussing sampling with the thesis committee members, this sample size was approved, because it elicits at least a 90% confidence interval (Raosoft Inc., 2004), which is also commonly accepted in social and behavioral sciences.

### **Description of Measures**

The instrument used for this study was developed using existing measures and literature findings (Appendix A). Many survey items were based off the long version of the Core Survey, a 39-item survey developed in the late 1980's by the Core Institute at Southern Illinois University-Carbondale (Core Institute, 2010). The CORE Survey was used as a template to guide instrument development. According to the Core Institute website, this tool is used by universities to “assess the nature, scope, and consequences of alcohol and other drug use on college campuses,” as well as to “also assess the students' attitudes, perceptions, and opinions about alcohol and drugs.” In a doctoral dissertation entitled *Alcohol and Drugs: Attitudes and Use among Graduate/Professional Students at a Health Science Center*, the Core Survey was utilized. Regarding the survey's validity and reliability, Moorman (2002) writes:

During the construction of the instrument, a panel of experts reviewed each item to ensure content related validity (Presley, Meilman, & Leichliter, 1998). Items were selected for inclusion upon receiving an inter-rater agreement of .90. The Pearson product-moment correlation coefficient ( $r$ ) was utilized to measure the relationship between variables. The results support the claims of stability and reliability of the CORE Alcohol and Drug Survey. Additionally, item reliability

was tested using Cronbach alpha scores and item-to-total-test correlations for a selection of individual items. In almost all cases, the results from the measures met the criteria for inclusion (Presley et al., 1998). Therefore, a valid, reliable, and standardized instrument with an aggregated national database is available for comparison purposes (Presley, Meilman, and Lyster, 1994) (p. 29).

In order to meet the needs of this research study, additional questions were added regarding energy drinks, including rate of consumption, where students purchase the beverage, and a measure of risk awareness pertaining to this behavior. From the original long-form of the CORE Alcohol and Drug Survey, questions 1-9, 11, 14-18, 20, and 30-34 remained unchanged. Questions 10, 12-13, 19, 22-25, 27-28, 30-32, and 37-29 were omitted. In addition, some questions incurred minor alterations in order to be more specific to consumption rates of, risk awareness of, and attitudes toward energy drinks as well as energy drinks with alcohol. These questions from the original CORE Alcohol and Drug Survey were 16, 17, 21, 26, 29, and 35-36.

The final instrument (Appendix A) used in this study included 52 items. In total, 13 questions were included on participant demographics, 5 questions on energy drink consumption habits (with and without alcohol), 4 questions related to participant attitudes toward energy drink consumption, 3 questions related to influence of peers and family, and 2 questions related to availability of energy drinks. In addition, 2 questions were added regarding participants' behavioral intention to consume the beverages. The aforementioned alterations and additions were necessary in order to examine the relationships between consumption of these beverages and risky behaviors, risk awareness, and behavioral intention. The final survey was developed after a review of

related literature, insight from university experts in college health and instrument development, and the use of an underlying conceptual framework highlighting lessons learned from constructs within the Theory of Planned Behavior.

Prior to completing the survey, participants had access to an initial page documenting a waiver of informed consent (Appendix F), the purpose of the research, and an invitation to participate. In addition, participants were made aware that their answers would be kept confidential, as to maintain privacy. Once this was completed, it was intended that the survey would take students approximately 15 minutes to complete. This approximation was based on a pilot test, completed by two students. These students were asked to take the surveys (before the initial distribution date), to determine if the instrument needed to be modified (in which case it did not).

## **Procedures**

**Protection of human subjects.** Prior to issuing the survey, the investigator and faculty advisor completed the CITI Training and gained the University of Kentucky's Institutional Review Board (IRB) approval (Appendix B) to ensure compliance with all ethical considerations in the handling of informed consent, participant interaction, data collection, and analysis.

**Data collection.** All instructors for the activity classes of the Kinesiology and Health Promotion department as well as General Education course instructors received a link for the survey from the researcher (via e-mail) (Appendix C), and were instructed to then distribute it to all students enrolled in their course(s) via e-mail (Appendix D). This e-mail link was produced by the online-software, SurveyMonkey. Results from the online survey could only be accessed by the Principal Investigator (PI) and faculty mentor



through the SurveyMonkey account, which was password-protected. The survey was available online starting late January through February, 2012 (approximately five weeks). After the first and third weeks of having the survey available, a reminder e-mail was sent out to instructors (Appendix E), to remind students to complete the survey. An incentive offered by the researcher for completing the survey was the chance to win one of two \$25 retail gift cards. Participants had the opportunity to enter themselves in the drawing at the end of the survey by providing their e-mail address. The incentive drawing entry was not linked to an individual's survey responses, as to keep survey results confidential. Winners were e-mailed after all data were collected and analyzed (Appendix G).

Once data were collected, only the researchers had access to the completed instruments (saved as electronic files). The instruments and results were stored on a computer in the PI's locked office, accessible only by the PI. The data were entered into the PI's password-protected computer, which was also located in the locked office. Only the PI and faculty mentor had access to these data. Once all of the data were entered, the PI kept it on file, to be held for a period of five years after submission of the final report on this project.

**Missing data.** If the students failed to mark a response throughout the survey, it was considered missing. If any student had more than 20% of the total responses considered missing, their data were eliminated from the study. A total of 14 students were eliminated from this study due to missing data.

### **Data Analysis**

Using the software SPSS 20.0 (IBM, 2011), data were coded and later analyzed. First, frequencies and percentages for descriptive questions were run, as well as

appropriate means and standard deviations calculated. Participants were grouped according to their energy drink consumption status. Because many of the survey participants had consumed both an energy drink with and without alcohol within the past year, one variable was created to not only obtain the largest sample size (leading to enhanced statistical significance), but to represent users of energy drinks as a whole. Separating participants based on energy drink usage with or without alcohol would not have yielded a large enough sample size for analysis. So, the sample population consisted of the following: non-energy drink users (those who have consumed less than 6 energy drinks with or without alcohol the past year) and energy drink users (those who have consumed an energy drink with or without alcohol at least 6 times within the past year). Hypotheses and associated independent and dependent variables are listed below:

1. Energy drinks users will exhibit higher participation in other risky behaviors, as compared to non-energy drink users.
  - a. Independent variable: Energy drink consumption (with and without alcohol)
  - b. Dependent variable: Participation in other risky behaviors
2. Energy drink users have a lower awareness level of the risks associated with energy drink consumption than non-energy drink users.
  - a. Independent variable: Risk awareness (low or high) of energy drink consumption
  - b. Dependent variable: Energy drink consumption (with and without alcohol)
3. Energy drink users will have a lower awareness level of the risks associated with energy drink (with alcohol) consumption than non-energy drink users.

- a. Independent variable: Risk awareness (low or high) of energy drink consumption with alcohol
  - b. Dependent variable: Energy drink consumption (with and without alcohol)
4. Students who are aware of the health risks involved with consuming energy drinks will have less behavioral intention to use the products within the next 30 days
  - a. Independent variable: Risk awareness (low or high) of energy drink consumption
  - b. Dependent variable: Behavioral intention (low or high) to consume energy drinks within the next 30 days
5. Students who are aware of the health risks associated with consuming energy drinks with alcohol will have less behavioral intention to use the products within the next 30 days.
  - a. Independent variable: Risk awareness (low or high) of energy drink consumption with alcohol
  - b. Dependent variable: Behavioral intention (low or high) to consume energy drinks with alcohol within the next 30 days

It was necessary to find if there was any difference between energy drink usage (non-energy drink users and energy drink users) in relation to participation in the various risky behaviors named in the survey. Participants were given a score based on the number of risky behaviors in which they participated. Possible score range for awareness of energy drinks alone was 0.00-22.00, and for energy drinks with alcohol was 0.00-30.00. Those participants scoring above the mean were considered to have a high risky

behavior score, and those below the mean had a low risky behavior score. The subscale for participation in risky behaviors was dichotomized so that analysis of results could be simplified. This led to easily understandable interpretation and presentation of results, with an estimate of the differences between groups. Once variable was dichotomized, a 2x2 chi-square test was performed to calculate any significant difference between each of these groups. According to Choudhuri (2009), the assumptions of a chi-square test are that the population is normal, and that the frequency in any cell is not less than 5.

To satisfy the research question of whether energy drink consumption status is related to risk awareness of the behavior, a chi-square test was also run. The variables for this test were risk awareness (low or high, based on participants' score on how many risks they were aware of) and consumption status of energy drinks (has or has not consumed an energy drink at least 6 times within the past year).

In addition, the final research question involved risk awareness and intention to consume an energy drink with or without alcohol in the next 30 days. To measure intention, participants were asked how much they intended to consume the beverages within the next 30 days. Those who answered 'definitely will consume' and 'probably will consume' were classified as having high intention, while those who answered 'probably will not consume' or 'definitely will not consume' were classified as having low intention. A chi-square test was run, and the variables included risk awareness (low or high), and behavioral intention to consume an energy drink (low or high).

## **Summary**

This chapter outlined the methodology involved with the current study. First, the research design was described (cross-sectional design), as well as the population and

what the sampling procedure entailed. In addition, the development of the measure used for this study was described. Next, the study's procedures were highlighted, including IRB approval, data collection, and exclusion criteria for participants with missing data. Finally, the chapter concluded by describing the processes used for data analysis.

## **Chapter 4: Results and Discussion**

The purpose of this study was to assess the relationship between energy drink consumption (with and without alcohol) and other risky behaviors among college students at the University of Kentucky, to find out whether a students' risk awareness for consuming energy drinks had an effect on whether or not they consumed these beverages, and to see if risk awareness affected behavioral intention to consume energy drinks. This chapter presents the results of this study, summarizing participants' demographics, energy drink usage, engagement in risky behaviors, and risk awareness of energy drink consumption. In addition, responses related to participants' attitudes toward energy drink consumption, influence of peers and family, availability and access to energy drinks, and intent to consume energy drinks are summarized. Finally, the chapter concludes with a discussion and analysis of the study's results, as well as its limitations and a summary of findings.

### **Demographics**

The Energy Drink and Risky Behavior Survey (Appendix A) was sent to students during the Spring 2012 semester at the University of Kentucky. In total there were 291 respondents; however, 14 participants were excluded due to more than 20% of survey responses missing or unanswered. Thus, the adjusted total number of participants was 277. Respondents represented 68 different academic majors, with the most frequent majors including: Kinesiology/Exercise Science (n=54), Nursing (n=16), Biology (n=15), Psychology (n=13), Education (n=12), and Business (n=10). Table 4.1 displays the breakdown of the participants' demographics, including age, gender, race/ethnicity, and marital status. A total of 58.4% (n=162) of the respondents were female, while 40.4%

(n=112) were male. Although the population ranged in age from 17 to 49 years, 94.6% (n=262) of participants were between the ages of 18 and 25 years, with ages 19-21 representing 60.3% (n=167) of the population. The mean age of the population was 21.06 years ( $SD=3.09$ ). The majority of respondents identified themselves as non-Hispanic whites, with a total of 86.6% (n=240). In regards to marital status, 94.5% (n=262) of students responded as single/never married, while a total of 5.1% (n=14) of participants were married/partnered.

Table 4.1

*Demographic Breakdown of Gender, Age, Race/Ethnicity, and Marital Status (N=277)*

Demographic		Frequency	%N	
Gender	Male	112	40.4	
	Female	162	58.4	
	No Response	3	1.1	
Age	17-19	85	30.7	
	20-22	137	49.5	
	23-25	41	14.8	
	26-28	7	2.5	
	29+	7	2.5	
	No Response	0	0.0	
Race/Ethnicity	American Indian/Alaskan Native, Native Hawaiian	2	0.7	
	Hispanic or Latino	8	2.9	
	Asian or Pacific Islander	7	2.5	
	White (non-Hispanic)	240	86.6	
	Black (non-Hispanic)	7	2.5	
	Biracial or multiracial	10	3.6	
	Other	2	0.7	
	No Response	1	0.4	
	Marital Status	Single/Never Married	262	94.5
		Married/Partnered	14	5.1
Divorced		1	0.4	

In addition to basic demographics, participants were also asked to report their current student classification, enrollment status, grade point average (GPA), job status, and housing situation (Table 4.2). A total of 23.8% (n=66) of participants were

sophomores, which was the largest class represented. In total, 84.7% (n=233) of participants were undergraduates, while the remaining 15.3% (n=42) were grad/professional students or other. GPA ranged from A (4.00) to D+ (1.30), however 91.3% (n=253) of students had a GPA between 2.70 (B-) and 4.00 (A). In addition to academic and student status, participants reported their working (job) status. Of the 277 participants, 56.0% (n=155) worked part-time, while 6.1% (n=17) worked full-time. A total of 37.5% (n=103) of students reported they were not currently working. For current housing status, 65.3% (n=181) of participants reported they were currently living off-campus.

Table 4.2

*Demographic Breakdown of Student Classification, Student Status, Grade Point Average, Job Status and Housing Situation (N=277)*

Demographic		Frequency	%N
Student Classification	Freshman	48	17.3
	Sophomore	66	23.8
	Junior	58	20.9
	Senior	63	22.7
	Grad/Professional	40	14.4
	Other	2	0.7
Student Status	Full-time undergraduate (12+ credits)	227	82.5
	Part-time undergraduate (1-12 credits)	6	2.2
	Full-time graduate (9+ credits)	36	13.1
	Part-time graduate (1-9 credits)	6	2.2
Grade Point Average (GPA)	A	107	38.6
	B	146	52.7
	C	21	7.8
	D	3	1.0
Job Status	Employed full-time	17	6.1
	Employed part-time	155	56.0
	Not working	103	37.5
Housing Status	On-campus	94	33.9
	Off-campus	181	65.3



**Past Energy Drink (with and without Alcohol) Use, Substance Use, and Participation in other Risky Behaviors**

In addition to participants’ basic demographics, additional descriptive data were collected based on past energy drink (with and without alcohol) consumption, alcohol consumption, drug use, and engagement in certain risky behaviors. Table 4.3 shows that 40.4% (n=111) of participants did not use energy drinks (without alcohol) within the past year. A total of 16.4% (n=45) used energy drinks 6 times within the past year, and 14.2% (n=39) used energy drinks once in the past year. Table 4.4 shows that for energy drink usage (with alcohol), a total of 73% of participants (n=200) did not use the beverage at all within the past year, while 9.9% of participants (n=27) used the beverage once during the past year, and 10.2% of participants (n=28) used the beverage 6 times within the past year.

Table 4.3

*Past Year Energy Drink Usage (without Alcohol) (N=275)*

Consumption Rates	Frequency	%N
Did not use	111	40.4
Once/year	39	14.2
6 times/year	45	16.4
Once/month	16	5.8
Twice/month	23	8.4
Once/week	25	9.1
3 times/week	10	3.6
5 times/week	4	1.5
Every Day	2	0.7

Table 4.4

*Past Year Energy Drink Usage (with Alcohol) (N=274)*

Consumption Rates	Frequency	%N
Did not use	200	73.0
Once/year	27	9.9
6 times/year	28	10.2
Once/month	7	2.6
Twice/month	6	2.2
Once/week	4	1.5
3 time/week	2	0.7

Energy drink users were classified as having used an energy drink (with and/or without alcohol) at least 6 times within the past year. Thus, a total of 129 individuals were classified as energy drink users (46.5% of the sample population). All other respondents were classified as non-users (n=148, 53.4%), having consumed an energy drink less than 6 times within the past year. This variable was calculated to include respondents who reported consuming an energy drink with or without alcohol (or both) at least 6 times within the past year. For a participant to be considered as having ‘used’ or ‘engaged in’ other substances or risky behaviors, he or she must have done so at least once within the past year.

Past-year participation in risky behaviors has been summarized in Table 4.5, for both energy drink users (N=129) and non-users (N=148). For a participant to be considered as having ‘used’ or ‘engaged in’ other substances or risky behaviors, he or she must have done so at least once within the past year. For energy drink users, the most frequent responses for past-year engagement in risky behaviors were alcohol use (87.5%, n=113), missing a class (86.0%, n=111), performing poorly on a test or important project (79.8%, n=103), doing something they later regretted (70.5%, n=91), not wearing a

seatbelt in the car (49.6%, n=64), and getting into an argument or fight (48.8%, n=63). For non-users, the most frequent responses for past-year engagement in risky behaviors were missing a class (78.3%, n=116), alcohol use (75.6%, n=112), performing poorly on an important test or project (68.2%, n=101), and doing something they later regretted (61.5%, n=91). A greater percentage of energy drink users were found to have engaged in the following risky behaviors, as compared to non-users: tobacco use, alcohol use, marijuana use, cocaine use, amphetamine use, sedative use, opiate use, inhalant use, designer drug use, steroid use, other illegal drug use, missing a class, doing something they later regretted, getting into an argument or fight, participating in an extreme sport, being hurt or injured, riding in a car with someone who was driving under the influence, being in trouble with authorities, seriously thinking about suicide, been taken advantage of sexually, tried to commit suicide, and been arrested for DUI/DWI.

Table 4.5

*Past-Year Participation in Risky Behaviors among Energy Drink Users (N=129) and Non-Energy Drink Users (N=148)*

Risky Behavior	Energy Drink Users	%N	Non-Users	%N
Tobacco	47	36.4	20	13.5
Alcohol	113	87.5	112	75.6
Marijuana	48	37.2	32	21.6
Cocaine	5	3.8	1	0.7
Amphetamines	14	10.8	2	1.4
Sedatives	4	3.1	1	0.7
Hallucinogens	5	3.9	7	4.7
Opiates	3	2.3	0	0.0
Inhalants	1	0.8	0	0.0
Designer drugs	5	3.9	4	2.7
Steroids	1	0.8	0	0.0
Other illegal drugs	2	1.6	1	0.7
Missed a class	111	86.0	116	78.3
Performed poorly on a test or important project	103	79.8	101	68.2
Done something I later regretted	91	70.5	91	61.5
Got into an argument or fight	63	48.8	59	39.8
Not worn a seatbelt while in a car	64	49.6	71	47.9
Participated in an extreme sport	44	34.1	33	22.3
Been hurt or injured	46	35.6	38	25.6
Rode in a car with someone who was driving under the influence	47	36.4	43	29.0
Driven a car while under the influence	28	21.7	24	16.2
Been in trouble with police, residence hall, or other college authorities	14	10.8	11	7.4
Experienced signs/symptoms of an eating disorder	14	10.8	17	11.5
Tried unsuccessfully to stop using drugs or alcohol	6	4.7	7	4.7
Seriously thought about suicide	12	9.3	8	6.8
Have been taken advantage of sexually	10	7.8	10	6.8
Damaged property, pulled fire alarm, etc.	3	2.3	7	4.7
Have taken advantage of another sexually	2	1.5	3	2.0
Tried to commit suicide	2	1.5	0	0.0
Been arrested for DUI/DWI	1	0.8	1	0.7

## Reasons for Consuming Energy Drinks

Reasons for consuming energy drinks (without alcohol) were determined for those who answered that they had ever consumed at least one energy drink (without alcohol) (n=184). Results are summarized in Table 4.6. The most common reasons for consuming energy drinks within the past year were feeling tired from insufficient sleep (54.9%, n=101), increasing overall energy (50.0%, n=92), staying awake to study/finish a project (49.4%, n=91), staying awake for class (32.6%, n=60), and staying awake to drive a car for a long period of time (30.9%, n=57). Other reasons listed in the ‘other’ category included being offered a free sample, wanting to try it/just for fun, and for the taste. Reasons listed for choosing an energy drink over another beverage included wanting to stay awake (60.3%, n=111), feeling tired (54.3%, n=100), the taste (34.2%, n=63), and ease of availability (26.6%, n=49). Reasons listed in this ‘other’ category included calorie count, experimentation, and to help with mental focus.

Table 4.6

*Reasons for Consuming Energy Drinks (without Alcohol) (N=184)*

Reason	Frequency	%N
Feeling tired from insufficient sleep	101	54.9
Increase overall energy	92	50.0
To stay awake to study/finish a project	91	49.4
To stay awake for class	60	32.6
Stay awake to drive a car for a long period of time	57	30.9
To stay awake for work	43	23.3
Drink with alcohol while partying	31	16.8
To deal with stress	17	9.2
To supplement an exercise routine	10	5.4
To treat a hangover	7	3.8

Table 4.7 summarizes the reasons participants consumed energy drinks with alcohol (if they had consumed at least one of these beverages within the past year). A

total of 171 participants reported they had not consumed an energy drink with alcohol in the past year, while 106 did consume an energy drink with alcohol. The most frequent reasons reported for consuming an energy drink with alcohol were to get drunk (50.9%, n=54), to stay awake longer for partying (33.9%, n=36), followed by a friend's influence/offering (32.1%, n=34). Other reasons for consuming an energy drink with alcohol included the beverage being a good mixer with other liquors and taste of the beverage. Reasons reported for consuming this type of beverage over another alcoholic beverage included taste (42.4%, n=45), a friend's influence (31.1%, n=33), stronger effect of the alcohol (23.5%, n=25), alcohol content (22.6%, n=24), and price (8.4%, n=9). Other reasons listed by respondents included wanting to try it/experimentation and to use it as a 'chaser' for stronger liquors.

Table 4.7

*Reasons for Consuming Energy Drinks (with Alcohol) (N=106)*

Reason	Frequency	%N
To get drunk	54	50.9
To stay awake longer for partying	36	33.9
A friend offered it to you	34	32.1
Drink prior to going to bars	19	17.9
To see what would happen/effects	11	10.4
To increase ability to focus mentally	3	2.8
To impress a girl/guy	1	0.94

**Side Effects Experienced after Consuming an Energy Drink (with and without Alcohol)**

Multiple questions on the survey dealt with whether or not respondents had experienced any side effects from consuming energy drinks, both with and without alcohol. For those who had ever consumed an energy drink without alcohol (Table 4.8),

frequencies were calculated to show how many participants had experienced certain side effects as a result. The most common negative side effects experienced by respondents were restlessness (28.1%, n=54) and difficulty sleeping (23.4%, n=45). Other common side effects included experiencing a jolt/crash episode (21.3%, n=41), a headache (20.8%, n=40), and an anxious/irritated feeling (20.8%, n=40). Some participants also mentioned that they had experienced a racing heartbeat as a side effect.

Table 4.8

*Side Effects Experienced as a Result of Consuming an Energy Drink (without Alcohol) (N=192)*

Side Effect Experienced	Frequency	%N
Negative side effects		
Restlessness	54	28.1
Difficulty sleeping	45	23.4
Jolt/crash episode	41	21.3
Headache	40	20.8
Anxious/irritated	40	20.8
Stomach ache	33	17.2
Heart palpitation	23	11.9
Lack of concentration	22	11.5
Nausea	17	8.9
Muscle twitching	16	8.3
Panic attack	3	1.6
Positive side effects		
More energy to go about activities of daily living (ADLs)	68	35.4
Increased ability to focus mentally	52	27.1
Better performance during exercise	18	9.4

For energy drinks with alcohol, side effects experienced are presented in Table 4.9. The most common negative side effects experienced by this group (after consuming an energy drink with alcohol) included getting drunk quickly (41.3%, n=44), experiencing a headache (24.3%, n=26), impaired motor control (18.7%, n=20), and difficulty sleeping (18.7%, n=20).

Table 4.9

*Side Effects Experienced as a Result of Consuming an Energy Drink (with Alcohol)*  
(N=107)

Side Effect Experienced	Frequency	%N
Negative side effects		
Got drunk quickly	44	41.1
Headache	26	24.3
Impaired motor control (loss of balance and coordination)	20	18.7
Difficulty sleeping	20	18.7
Stomach ache	18	16.8
Nausea	18	16.8
Dry mouth	17	15.9
Restlessness	14	13.1
Jolt/crash episode	13	12.1
Heart palpitation	10	9.3
Muscle twitching	8	7.5
Lack of concentration	6	5.6
Anxious/irritated	4	3.7
Panic attack	1	9.3
Positive side effects		
Did not feel drowsy effects of the alcohol	26	24.3
Felt less drunk than I really was	14	13.1

### **Awareness of Energy Drink (with and without Alcohol) Risks**

Because there are many proven health risks associated with consuming energy drinks, it was necessary to determine whether or not survey participants believed that certain side effects could occur. Participants responded based on whether or not energy drinks (with and without alcohol) caused selected side effects. Frequencies were calculated for both energy drink users and non-users.

For energy drinks (without alcohol), results are summarized in Table 4.10. Energy drink users most often believed that the following negative side effects could occur: restlessness (61.2%, n=79), difficulty sleeping (60.5%, n=78), jolt/crash episode (51.1%, n=66), and feeling anxious/irritated (43.4%, n=56). Non-users most often believed that



the following negative side effects could occur: difficulty sleeping (65.5%, n=97), restlessness (65.5%, n=97), jolt/crash episode (65.5%, n=97), and feeling anxious/irritated (59.5%, n=88).

Table 4.10

*Respondents' Perception of Risk for Energy Drink (without Alcohol) Consumption among Energy Drink Users (N=129) and Non-Users (N=148)*

Do energy drinks cause this symptom?	Yes (Users)	%N	Yes (Non-Users)	%N
Jolt/crash episode	66	51.1	97	65.5
Headache	53	41.1	87	58.8
Heart palpitation	45	34.9	82	55.4
Stomach ache	48	37.2	68	45.9
Nausea	30	23.2	60	40.5
Difficulty sleeping	78	60.5	97	65.5
Restlessness	79	61.2	97	65.5
Muscle twitching	44	34.1	85	57.4
Anxious/irritated	56	43.4	88	59.5
Lack of concentration	44	34.1	74	31.8
Panic attack	24	18.6	52	35.1

For energy drinks (with alcohol), results are summarized in Table 4.11. Energy drink users most often believed that energy drinks with alcohol could cause the following negative side effects: get drunk quickly (52.7%, n=68), impaired motor control (51.1%, n=66), headache (44.9%, n=58), and difficulty sleeping (43.4%, n=56). Non-users believed that the following negative side effects could occur for energy drink with alcohol consumption: impaired motor control (60.1%, n=89), headache (59.5%, n=88), nausea (58.1%, n=86), restlessness (58.1%, n=86), and lack of concentration (58.1%, n=86).

Table 4.11

*Respondents' Perception of Risk for Energy Drink (with Alcohol) Consumption among Energy Drink with Alcohol Users (N=129) and Non-Users (N=148)*

Do energy drinks cause this symptom?	Yes (Users)	%N	Yes (Non- Users)	%N
Jolt/crash episode	52	40.3	85	57.4
Dry mouth	44	34.1	82	55.4
Headache	58	44.9	88	59.5
Heart palpitation	42	32.6	82	55.4
Stomach ache	52	40.3	80	54.1
Impaired motor control (loss of balance and coordination)	66	51.1	89	60.1
Nausea	55	42.6	86	58.1
Difficulty sleeping	56	43.4	85	57.4
Restlessness	53	41.1	86	58.1
Muscle twitching	42	32.6	80	54.1
Anxious/irritated	41	31.8	82	55.4
Lack of concentration	48	37.2	86	58.1
Panic attack	30	23.2	71	47.9
Don't feel drowsy effects of alcohol	47	36.4	69	46.6
Get drunk quickly	68	52.7	82	55.4
Person feels less drunk than they really are	45	34.9	71	47.9

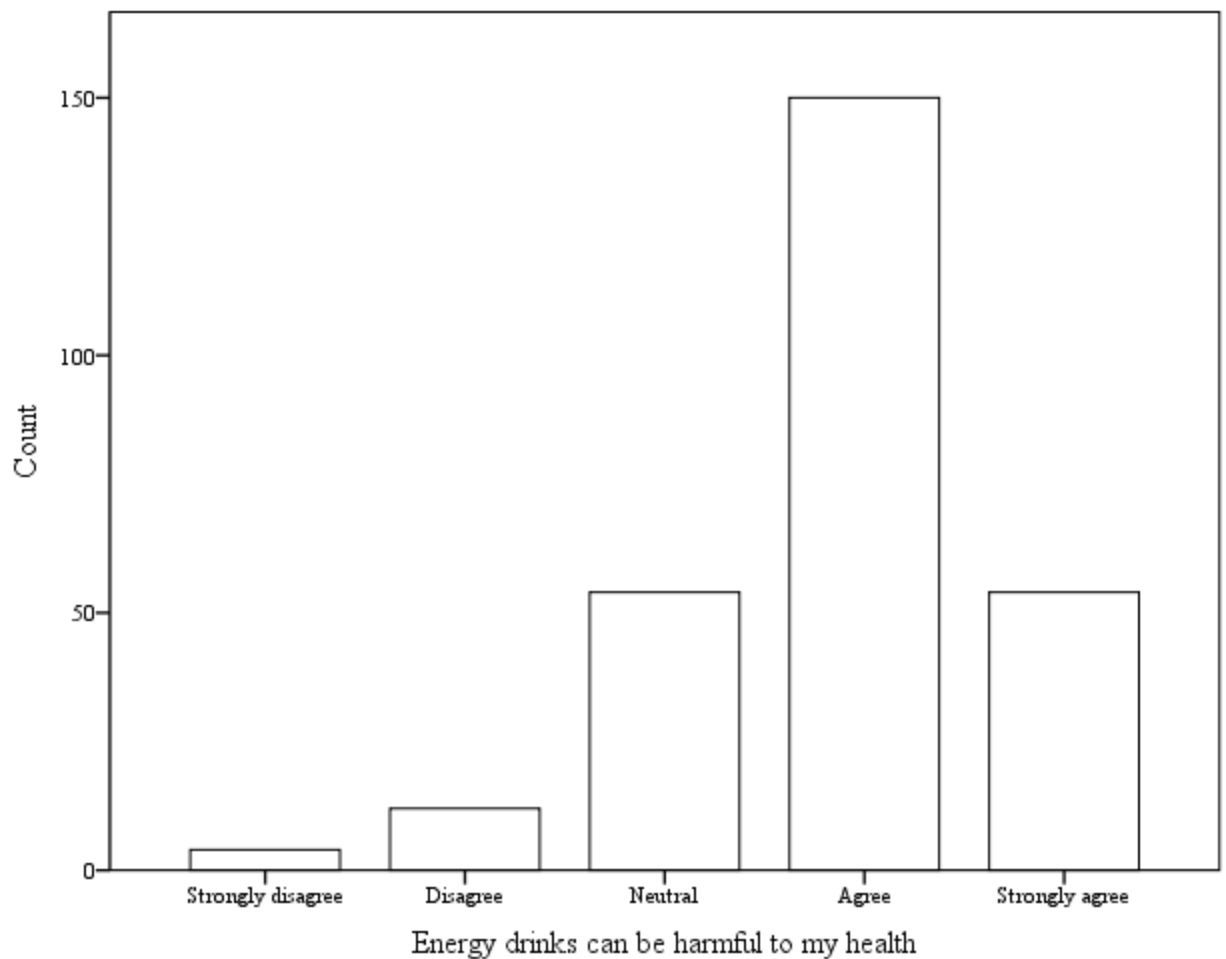
### **Perceived Susceptibility for Health Risks of and Addiction to Energy Drinks (with and without Alcohol)**

Survey participants were asked to rate their agreement on whether energy drinks (both with and without alcohol) could be harmful to their health, and also if they could become addicted to energy drinks. These ratings were based off of a five-point Likert-type scale, ranging from strongly disagree to strongly agree. Figure 4.1 and Figure 4.2 summarize how strongly participants agreed that energy drinks (with and without alcohol) can be harmful to their health.

The majority (73.6%, n=204) of respondents either agreed or strongly agreed that energy drinks could be dangerous to their health, while 5.8% (n=16) disagreed. This trend

continued with the participants' beliefs on whether they could become addicted to energy drinks. A total of 10.1% (n=28) of participants strongly disagreed, 20.2% (n=56) disagreed, 20.9% (n=58) were neutral, 37.2% (n=103) agreed, and 10.5% (n=29) strongly agreed.

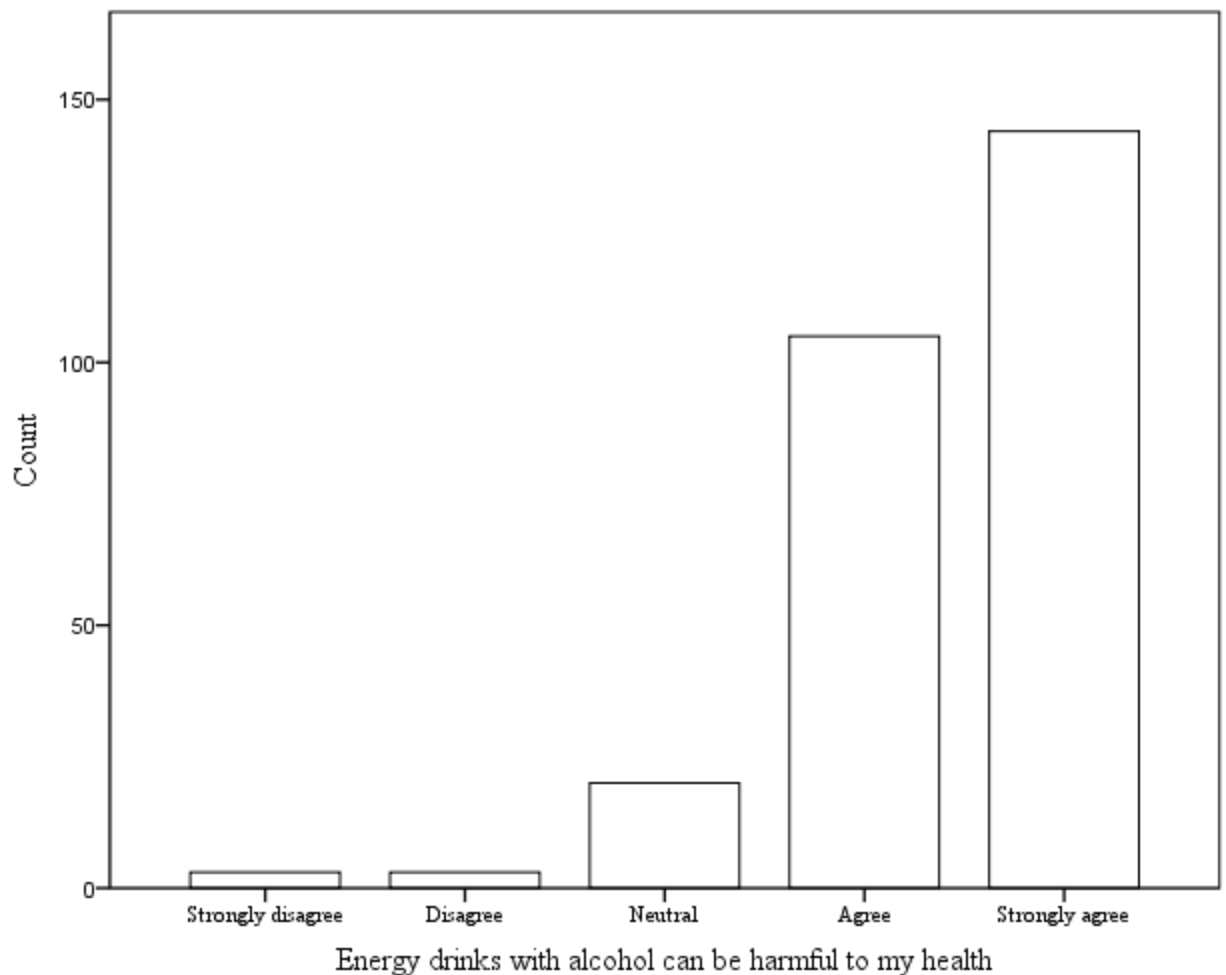
*Figure 4.1:* Results based on how strongly respondents agreed that energy drinks (without alcohol) can be harmful to their health.



Results also showed the majority of respondents agreed that energy drinks with alcohol could be harmful to their health. A total of 51.9% (n=144) of participants strongly

agreed, 37.9% (n=105) agreed, 7.2% (n=20) were neutral, 1.1% (n=3) disagreed, and 1.1% (n=3) strongly disagreed. In total, 89.8% of respondents agreed that energy drinks with alcohol could be harmful to their health. In regards to the beverage's addictive qualities, the majority of participants also agreed that they could become addicted to energy drinks with alcohol. A total of 25.9% (n=72) of participants strongly agreed, 28.9% (n=80) agreed, 20.6% (n=57) were neutral, 12.3% (n=34) disagreed, and 11.6% (n=32) strongly disagreed. So in total, 54.8% of all respondents agreed that they could become addicted to energy drinks with alcohol.

*Figure 4.2:* Results based on how strongly respondents agreed that energy drinks (with alcohol) can be harmful to their health.



## Conceptual Framework

This study was guided by a conceptual framework to determine the influencing factors of energy drink consumption among college students. Building off of the underpinnings of the Theory of Planned Behavior, students responded to questions which involved their intent to consume energy drinks in the future, the possible influence of peers and family, awareness of risk, attitudes, and perception of control regarding energy drink consumption. Table 4.12 shows the level of intent for consuming both energy drinks with and without alcohol in the next 30 days. In both categories of beverages, the most frequent response among participants was ‘definitely will not consume.’ For energy drinks alone, 48.4% (n=134) said they definitely would not consume the beverages within the next 30 days. For energy drinks with alcohol, 61.7% (n=171) said they definitely would not consume the beverages within the next 30 days. Although a small number of participants were undecided, the majority of responses in both categories indicated ‘probably will not consume’ and the ‘definitely will not consume’ responses.

Table 4.12

*Respondents’ Intent to Consume Energy Drinks with and without Alcohol in the Next 30 Days (N=255)*

	Energy Drinks without alcohol	%N	Energy drinks with alcohol	%N
Definitely will consume	19	7.5	10	3.9
Probably will consume	24	9.4	13	5.1
Probably will not consume	61	23.9	50	19.5
Definitely will not consume	134	52.5	171	67.1
Undecided	17	6.7	12	4.6

Similar to the construct of perceived behavioral control, students were asked how much control they had in consuming energy drinks with and without alcohol in the next

30 days. Participants were asked to rate their response anywhere from ‘I feel that I am in complete control’ to ‘I feel that I am completely not in control’ (Table 4.13). For both energy drinks with and without alcohol, the majority of respondents felt they were in complete control. For energy drinks alone, this value was 84.1% (n=233), and for energy drinks with alcohol, the value was 79.4% (n=220). The total of respondents who felt like they had some level of control for consuming energy drinks alone was 87.7% (n=243), compared to the 3.6% (n=10) who felt they were in some way not in control. For energy drinks with alcohol, 84.5% (n=234) of respondents felt that they had some level of control, while 5.4% (n=15) felt that they were in some way not in control.

Table 4.13

*Perceived Level of Control in Consuming Energy Drinks with and without Alcohol in the Next 30 Days (N=250)*

	Energy Drinks without alcohol	%N	Energy drinks with alcohol	%N
I feel that I am in complete control	233	93.2	220	88.0
I feel that I am somewhat in control	10	4.0	14	5.6
I feel that I am somewhat not in control	8	3.2	9	3.6
I feel that I am completely not in control	0	0.0	6	2.4

Questions were asked related to how friends and family would feel about regular energy drink consumption (Table 4.14), as well as how many of the survey participants’ friends consumed energy drinks (Table 4.15). The majority (53.7%, n=146) of participants listed that those who were important to them would be neutral to regular energy drink consumption (without alcohol), while a total of 34.2% (n=93) of participants said that those who were important to them would not approve of this behavior. For

regular energy drink with alcohol consumption, 70.5% (n=191) of participants reported those who were important to them would disapprove or strongly disapprove of this behavior.

Table 4.14

*Attitudes toward Energy Drink Consumption (with and without Alcohol) by those who were Important to Respondents (N=277)*

	Energy drinks without alcohol	%N	Energy drinks with alcohol	%N
Strongly approve	6	2.2	6	2.2
Approve	27	9.9	10	3.7
Neutral	146	53.7	64	23.6
Disapprove	66	24.3	81	29.9
Strongly disapprove	27	9.9	110	40.6

A total of 42.7% (n=117) of participants reported that 1-3 of their friends consumed energy drinks (without alcohol), while a total of 43.3% (n=119) reported that 1-3 of their friends consumed energy drinks with alcohol. For energy drinks (without alcohol), another 47.4% (n=130) reported that four or more of their friends consumed the beverages. For energy drinks mixed with alcohol, 25.8% (n=71) reported that four or more of their friends consumed the beverages.

Table 4.15

*Number of Survey Respondents' Friends who Consume Energy Drinks (with and without Alcohol) (N=275)*

	Energy drinks without alcohol	%N	Energy drinks with alcohol	%N
0 friends	27	9.9	85	30.9
1-3 friends	117	42.7	119	43.3
4-5 friends	56	20.4	35	12.7
6-7 friends	20	7.3	10	3.6
8 or more friends	54	19.7	26	9.5

Using a semantic scale, participants' attitudes toward energy drinks (with and without alcohol) were assessed. Participants were asked whether consuming energy drinks (with and without alcohol) within the next 30 days would be (somewhere along a scale) bad to good, harmful to beneficial, foolish to wise, unenjoyable to enjoyable, and unpleasant to pleasant. Table 4.16 summarizes these attitudes toward energy drink (with and without alcohol) consumption. For all attitudes, the majority of participants felt that the behavior was on the lower (more negative) end of each scale. Neutral responses were excluded. For consuming energy drinks without alcohol, 45.1% (n=125) of participants felt the behavior was bad, and 43.7% (n=121) felt the behavior was foolish. This is compared to 7.6% (n=21) feeling the behavior was good, and 5.1% (n=14) feeling the behavior was wise. For energy drinks mixed with alcohol, 64.3% (n=178) felt the behavior was foolish, and 63.9% (n=177) felt the behavior was harmful. This is compared to 3.6% (n=10) feeling the behavior was wise, and 4.0% (n=11) feeling the behavior was beneficial.

Table 4.16

*Attitudes Toward Energy Drink Consumption (with and without Alcohol) within the Next Month (N=277)*

	Energy drinks without alcohol	%N	Energy drinks with alcohol	%N
Bad	125	45.1	174	62.8
Good	21	7.6	14	5.1
Harmful	118	42.6	177	63.9
Beneficial	29	10.5	11	4.0
Foolish	121	43.7	178	64.3
Wise	14	5.1	10	3.6
Unenjoyable	105	3.8	139	50.2
Enjoyable	57	20.1	35	12.6
Unpleasant	108	3.9	145	52.3
Pleasant	14	5.1	27	9.7



## Hypothesis Tests

The hypotheses of the research questions guided the statistical analyses. A chi-square test was utilized in each analysis. For the first research question, it was necessary to compare energy drink users and non-users according to whether or not they had a high or low risky behavior score. Participants received a risky behavior score based on whether or not they had used certain substances or participated in certain risky behaviors at least once within the past year. The range of risky behavior scores was calculated to be 0.00-23.00. The mean score for this variable was calculated to be 6.22 ( $SD=3.41$ ). Any user who fell under this mean value was classified as having ‘low participation’ in risky behaviors, while those who fell above the mean were classified as having ‘high participation in risky behaviors. The subscale for participation in risky behaviors was dichotomized so that analysis of results could be simplified. Since there were two groups of participants (energy drink users and non-users), creating two groups representing low and high participation in risky behaviors made performing a 2x2 chi-square test possible. This led to easily understandable interpretation and presentation of results, with an estimate of the differences between groups. Frequencies summarized in Table 4.17 were cross-tabulated, and showed that there was a significant difference between energy drink users and non-users and their level of participation in risky behaviors. The null-hypothesis stated that there would be no significant difference in participation in risky behaviors between energy drink users and non-energy drink users. It was found that energy drink users had significantly higher participation in risky behaviors, as compared to non-energy drink users,  $\chi^2(1, N=250) = 10.639, p=0.001$ , so the null-hypothesis was rejected. Of energy drink users, 49.1% ( $n=57$ ) had a low risky behavior score, while 50.9% ( $n=59$ )

had a high risky behavior score. This is compared to the 68.8% (n=93) of non-energy drink users who had a low risky behavior score, and the 30.6% (n=41) of non-energy drink users who had a high risky behavior score.

Table 4.17

*Participation in Risky Behaviors Among Energy Drink Users (N=116) and Non-Users (N=134)*

	Energy Drink Users (n)	%N	Non-Energy Drink Users (n)	%N
Low Risky Behavior Score	57	49.1	93	68.8
High Risky Behavior Score	59	50.9	41	30.6
Total (N)	116		134	

For the second research question, it was necessary to compare energy drink users and non-users according to their risk awareness levels of energy drink consumption (with and without alcohol). Participants received a risk awareness score based on whether or not they believed that energy drinks (with and without alcohol) caused certain symptoms. For energy drinks alone, the range was 11.00-22.00, and the mean score was calculated to be 16.1 ( $SD=4.05$ ), so any user who fell below the mean was classified as having a ‘low awareness level’ of the risks of energy drink consumption, and those who fell above the mean were classified as having a ‘high awareness level.’ For energy drinks without alcohol, the range was 15.00-30.00, and the mean score was calculated to be 20.0 ( $SD=5.66$ ), so any users who fell below the mean was classified as having a ‘low awareness level’ of the risks of energy drink consumption, and those who fell above the mean were classified as having a ‘high awareness level.’ The subscale for risk awareness was dichotomized so that analysis of results could be simplified and easily understandable, as was done with the risky behavior subscale. Separating each of these

variables in this way made performing a 2x2 chi-square test possible, yielding an estimate of the differences between the groups.

The frequencies for energy drinks alone are summarized in Table 4.18, and were cross-tabulated. The null hypothesis stated that there would be no significant difference in risk awareness of energy drinks (without alcohol) between the energy drink users and non-energy drink users. It was found that energy drink users had significantly higher awareness level of the risks of energy drink consumption, as compared to non-energy drink users,  $\chi^2 (1, N=233) = 31.531, p=0.000$ , so the null-hypothesis was rejected. A total of 63.9% (n=76) of energy drink users were found to have high risk awareness, compared to 26.1% (n=31) of non-energy drink users.

Table 4.18

*Risk Awareness of Energy Drink Consumption Among Energy Drink Users (N=119) and Non-Users (N=114)*

	Energy Drink Users (n)	%N	Non-Energy Drink Users (n)	%N
Low Risk Awareness	43	36.1	83	73.9
High Risk Awareness	76	63.9	31	26.1
Total (N)	119		114	

The frequencies for energy drinks with alcohol are summarized in Table 4.19, and were cross-tabulated. The null-hypothesis stated that there would be no significant difference in risk awareness for energy drinks with alcohol between the energy drink users and non-users. Results showed that there was a significant difference between energy drink users and non-users and their awareness level of the risks of energy drinks with alcohol, so the null-hypothesis was rejected. It was found that energy drink users had significantly higher awareness level of the risks of energy drink with alcohol

consumption, as compared to non-energy drink users,  $\chi^2 (1, N=186) = 31.837, p=0.000$ .

A total of 62.8% (n=54) of energy drink users had a high risk awareness of energy drink with alcohol consumption, compared to 22.0% (n=22) of non-energy drink users.

Table 4.19

*Risk Awareness of Energy Drink with Alcohol Consumption Among Energy Drink Users (N=86) and Non-Users (N=100)*

	Energy Drink Users (n)	%N	Non-Energy Drink Users (n)	%N
Low Risk Awareness	32	37.2	78	78.0
High Risk Awareness	54	62.8	22	22.0
Total (N)	86		100	

For the third research question, it was necessary to compare those who intend or don't intend to consume energy drinks (with and without alcohol) and risk awareness level of energy drink (with and without alcohol) consumption. Participants were asked how strong their intention was to consume energy drinks (both with and without alcohol) within the next 30 days. Those who answered that they 'definitely will consume' or 'probably will consume' energy drinks (with and without alcohol) within the next 30 days were considered to have intent to consume the beverages, and those who answered that they 'probably will not consume' or 'definitely will not consume' were classified as not having intent to consume the beverages in the next 30 days. Those who answered 'undecided' were not included in this analysis. The frequencies for intention to consume energy drinks alone and risk awareness of energy drinks alone are summarized in Table 4.20, and were cross-tabulated. The null hypothesis stated there would be no significant difference in behavioral intention to consume the energy drinks among those who were more or less aware of the health risks involved. Results showed that there was a

significant difference between those who had a high awareness level of the risks of energy drinks and those who had a low risk awareness level and their level of intent to consume energy drinks within the next 30 days. It was found that those who had a higher awareness level of the risks of energy drinks (without alcohol) consumption had greater intention to consume energy drinks (without alcohol) in the next 30 days, as compared to those who had a low awareness level,  $\chi^2 (1, N=202) = 11.781, p=0.001$ . Therefore, the null-hypothesis was rejected. A total of 65.0% (n=26) of those who intended to consume energy drinks (without alcohol) in the next 30 days had a high risk awareness, compared to 35.2% (n=57) of those who did not intend to consume the beverages.

Table 4.20

*Intention to Consume Energy Drinks (without Alcohol) in the Next 30 Days according to Risk Awareness Level of Energy Drink (without Alcohol) Consumption*

	Intend to consume (n)	%N	Do not intend to consume (n)	%N
Low Risk Awareness	14	35.0	105	64.8
High Risk Awareness	26	65.0	57	35.2
Total (N)	40		162	

The frequencies for intention to consume energy drinks with alcohol and risk awareness of energy drinks with alcohol are summarized in Table 4.21, and were cross-tabulated. The null-hypothesis stated there would be no significant difference in behavioral intention to consume the beverages among those who were more or less aware of the health risks involved. Results showed that there was a significant difference between those who had a high awareness level of the risks of energy drinks (with alcohol) and those who had a low risk awareness level and their level of intent to consume energy drinks (with alcohol) within the next 30 days, so the null-hypothesis was

rejected. It was found that those who had a lower awareness level of the risks of energy drink (with alcohol) consumption had significantly lower intention to consume energy drinks (with alcohol) in the next 30 days, as compared to those who had a high awareness level,  $\chi^2 (1, N=179) = 11.670, p=0.001$ . A total of 73.6% (n=14) of those who intended to consume energy drinks (with alcohol) in the next 30 days had a high risk awareness, compared to 33.3% of those who did not intend to consume the beverages.

Table 4.21

*Intention to Consume Energy Drinks (with Alcohol) in the Next 30 Days according to Risk Awareness Level of Energy Drink (with Alcohol) Consumption*

	Intend to consume (n)	%N	Do not intend to consume (n)	%N
Low Risk Awareness	5	26.3	100	66.6
High Risk Awareness	14	73.6	50	33.3
Total (N)	19		150	

## Discussion of Results

The purpose of this study was to assess the relationship between energy drink consumption (with and without alcohol) and other risky behaviors among college students at the University of Kentucky, to find out whether a students' risk awareness for consuming energy drinks had an effect on whether or not they consumed these beverages, and to see if risk awareness affected behavioral intention to consume energy drinks. The study included a total of 277 students who were enrolled at the University of Kentucky. The majority of participants were between the ages of 17 and 22 (80.1%) and the largest class represented was sophomores (23.8%). The sample also represented a total of 68 academic majors, the largest group majoring in Kinesiology/Exercise Science (19.5%).

With regards to energy drink usage (without alcohol), 59.2% of participants reported using energy drinks at least once within the past year, and 66.4% reported ever trying an energy drink. The latter percentage is higher than the 48.3% of college students who reported ever trying an energy drink (without alcohol) in a similar study (Attila, 2011). Participants most often reported using the energy drinks (without alcohol) for reasons such as feeling tired from insufficient sleep (54.9%) and to increase overall energy (50.0%). In a 2007 study, Malinauskas et al. surveyed college students about their energy drink consumption habits and reasons for doing so. Results from the current study are consistent with two similar studies, which showed that the most common reasons for consuming energy drinks among college students were to overcome insufficient sleep and to increase energy (Malinauskas et al., 2007; Banda, Marietta, Syler, & Hoover, 2010). It would be interesting for future studies on this topic to also examine the role of gender in consumption of energy drinks (with and without alcohol), in addition to each gender's reasons for consuming the beverages. Findings may be able to further guide how prevention strategies are implemented on college campuses to target males and females separately.

It is possible that for the participants in the current study, insufficient sleep may have been a result of poor time management. A study by Macan, Shahani, Dipboye and Philips (1990) concluded that learning time management skills is an effective coping strategy for stresses relating to the busy academic and social lifestyles of college students. The study found that college students who perceived greater control of their time also reported significantly greater performance and greater work and life satisfaction (Macan et al., 1990). Future studies regarding energy drink consumption may want to explore

whether time management has an effect on usage rates. This may give further insight into whether there is a need for related time management programming on college campuses (with the goal being to reduce energy drink consumption).

For energy drinks with alcohol, 26.7% of participants used the beverages at least once within the past year and a total of 38.2% reported having ever tried the mixture. This finding is lower than the 54% of participants in the Malinuaskas et al. (2007) study who reported ever trying the beverage. The most common reasons reported for using energy drinks with alcohol were to get drunk (50.9%), to stay awake longer for partying (33.9%), and because a friend offered it (32.1%). There were no comparable studies found which evaluated the most common reasons why college students consume energy drinks with alcohol, so there is much potential for future research on this topic.

This study examined the relationship between energy drink users and non-users and their participation in other risky behaviors (i.e. tobacco use, illicit drug use, driving without a seatbelt, etc.). Energy drink users were considered to be those participants who reported consuming an energy drink with or without alcohol at least 6 times within the past year (a total of 46.5% of the population fit this category). After completing a chi-square analysis, it was found that there was a statistically significant difference between the groups, with energy drink users receiving a higher overall risky behavior score compared to non-users ( $p=0.001$ ). More specifically, differences for each risky behavior were examined to determine if there was a notable difference among energy drink users and non-users. The greatest differences between the two groups were seen with tobacco use (energy drink users had a 23% higher usage rate compared to non-energy drink users), marijuana use (16% higher usage rate), and alcohol use (13% higher usage rate). It



is shown that for the majority of risky behaviors listed, energy drink users participated more often than non-users. These findings are consistent a similar study, which found energy drink consumption co-occurred with substance use and other forms of risk taking, especially those of tobacco use, alcohol use, and marijuana use (Miller, 2008). The results of the current study and the Miller (2008) study may show that energy drink consumption (with and without alcohol) may be a predictor of other risky behaviors. It would be important for future studies to examine whether or not the use of energy drinks with or without alcohol directly leads to participation in other risky behaviors and/or further investigate this correlation. If it were true that energy drinks cause participation in other risky behaviors, aiming to reduce energy drink consumption should be a major goal of health promotion programming efforts on campus. Engaging in risky behaviors has been shown to negatively impact students' mental and physical health and academic performance (Ahearn, 2008). Thus, reducing energy drink consumption (and possibly participation in other risky behavior) could lead to increases in students' health status and GPA.

Consumption of energy drinks with and without alcohol carries many potential health risks. Therefore, a major component of this study aimed to examine participants' overall awareness level of these associated risks. Because consuming energy drinks alone pose some different risks than consuming energy drinks with alcohol, risk awareness was assessed separately for each behavior. Many of the health concerns commonly associated with energy drinks include a rapid heartbeat, headaches, nausea, restlessness/insomnia, and anxiety (Reissig et al., 2008). For energy drinks mixed with alcohol, health risks reportedly increase. Some of the risks associated with energy drinks with alcohol include

feeling less drunk than the person really is (increasing potential for alcohol poisoning or driving under the influence) (Miller, 2008), severe dehydration (Traue & Stahlman, n.d.), and physical injury (Thombs et al., 2008). This study assessed the level of awareness of students related to the risks associated with energy drink consumption (with and without alcohol). Results showed that there was a significant difference between energy drinks users and non-users and overall risk awareness for both energy drinks alone ( $p=0.000$ ) and energy drinks with alcohol ( $p=0.000$ ). Energy drink users exhibited a higher risk awareness level for both energy drinks alone and energy drinks with alcohol, compared with non-users.

According to this study's underlying foundation (the Theory of Planned Behavior), an individual's attitudes and beliefs about a respective behavior contribute to behavioral intention (Ajzen, 2006). With that in mind, it was hypothesized that one would be less likely to consume energy drinks (have less behavioral intention) if he or she believed (or were aware) health risks existed about the respective behavior. However, in this study, energy drink users were found to be significantly more aware of the risks, yet they were still consuming the beverages. These results give insight into future programming efforts, which may need to look at a different approach in prevention strategies. This study showed that knowledge of the risks does not necessarily prevent consumption of energy drinks, so it may be necessary to look at the effectiveness of educating on the alternatives to this behavior (which may elicit the same desired effects without causing negative side effects). Some of these alternatives could be ensuring proper water consumption, sufficient amounts of sleep, adequate exercise, and providing recipes for nutritious, energy-boosting beverages/smoothies. To support this, Bandura

(1990) states: "It is not enough to convince people that they should alter risky habits. Most of them also need guidance on how to translate their concerns into efficacious actions (p.1)."

The current study utilizes a conceptual framework, which is guided by the Theory of Planned Behavior. This theory incorporates one's behavioral beliefs (attitude toward the behavior), normative beliefs (subjective norms), and control beliefs (perceived behavioral control) to explain intention to perform a behavior (Ajzen, 2006). In this study, the theory was used as a framework, and the behavior focused on was energy drink consumption, both with and without alcohol. Participants were asked questions which were similar to the constructs of this theory. Similar to the construct of behavioral beliefs, participants were asked about their attitudes toward the consumption of energy drinks, with and without alcohol. Participants were asked how strongly they felt energy drinks could be harmful to their health. The majority (73.6%) of participants either agreed or strongly agreed that energy drinks could be harmful to their health. Because the percentage of respondents who agreed that energy drinks are harmful (73.6%) was so much greater than the percentage of those who actually were considered to be energy drink users (46.5%), the finding is encouraging. It may be beneficial for future studies to use this data in order to analyze whether there was a significant difference between non-users and users and agreement on whether energy drinks are harmful.

For energy drinks with alcohol, the results were similar (as shown in Figure 4.2). A total of 89.8% of participants either agreed or strongly agreed that energy drinks with alcohol could be harmful to their health. A greater percentage of participants agreed that energy drinks with alcohol could be harmful to their health (compared to the results for

energy drinks alone). To continue with this trend, a total of 79.1% of participants felt that consuming energy drinks with alcohol would pose a moderate to great health risk (compared to 42.6% for energy drinks alone). These results show that the majority of students are aware that energy drinks with alcohol pose a significant health risk and possibly a greater risk than energy drinks alone, based on the higher percentage of respondents answering that energy drinks with alcohol could be harmful to their health or pose a significant health risk. Although students realize the risk involved with consuming energy drinks, results show that they are also still consuming (and intend to consume) the beverages. Overall, this shows that awareness of the health risks does not necessarily reduce consumption. Again, future studies would need to explore factors creating this positive influence. Once these influential factors are determined, researchers may then need to implement and test the effectiveness of intervention strategies for reducing energy drink consumption.

According to Ajzen (2006), subjective norms are the perceived social pressures to engage or not engage in a behavior. Similar to the construct of subjective norm participants were asked how much they thought their close friends or family would feel if they regularly consumed energy drinks with or without alcohol. A much higher percentage of participants believed their close friends or family would disapprove of their energy drink with alcohol consumption, compared to energy drinks alone. A total of 33.6% (for energy drinks alone) and 68.9% (for energy drinks with alcohol) of participants believed that their close friends and family would either disapprove or strongly disapprove of the respective behaviors. Future studies may need to examine this question separately, in order to note how strongly close friends would approve or

disapprove of energy drink consumption, and how strongly close family would approve or disapprove of the behavior. Then, the difference in peer and familial approval could be more closely examined. In addition, it would be important to look at how much of an influence students' friends or family's opinions actually have on their energy drink consumption (to see if approval rating affects the decision to consume energy drinks with or without alcohol). Overall, communication must be encouraged so that youth and young adults understand associated health risks. In addition, family members must be aware of these risks as well, especially since energy drink companies target this age group heavily (Kapner, 2008).

Another question similar to subjective norm which was evaluated in this study was peer influence, and how many of the participants' friends consume energy drinks (with and without alcohol). A total of 89.8% of participants reported that at least 1 or more of their friends regularly consume energy drinks, and a total of 69.1% of participants reported that at least 1 or more of their friends regularly consume energy drinks with alcohol. Future studies could look more deeply at peer influence as a cause for energy drink consumption. In all, a wide majority of participants had at least one friend who regularly consumed energy drinks (with and without alcohol). Future studies may find that peer influence is a predictor for energy drink consumption among college students. If this finding is true, strategies can be implemented which help students resist peer pressure. These efforts could utilize various resources on college campuses, including student health centers, counseling centers, and student involvement. Strategies these entities may need to employ would include educating students on refusal skills, ways to build self-esteem, and the many involvement opportunities and resources

available to them. These efforts may work to reduce energy drink consumption (with and without alcohol) among college students if peer pressure is found to be a major factor influencing this behavior.

Participants were asked about perception of control, including questions related to access and availability of energy drinks with and without alcohol. In this study, a total of 93.2% of participants felt that they were in complete control over their decision to consume energy drinks in the next 30 days, and 88.0% of participants felt this way in regards to their decision to consume energy drinks with alcohol in the next 30 days. Although participants were not asked why they may not have felt in complete control, one factor which may have contributed to this is the number of participants' friends who consume the beverages (relating to the subjective norms discussed earlier). Another factor which may have contributed to perceived behavioral control was the beverages' addictive qualities. For energy drinks alone, 47.7% of participants believed they could become addicted, and over half (54.8%) of participants believed they could become addicted to energy drinks with alcohol. Also playing a role in affecting survey participants' behavioral control was availability of the beverages, and how easy it would be for students to obtain them. The majority (98.5%) of participants felt that obtaining an energy drink (without alcohol) would be easy, and the same was true for energy drinks with alcohol, as 80.1% of participants felt that these beverages would be easy to obtain. Because energy drinks (with and without alcohol) are perceived to be easily available, there is greater likelihood that students would seek them out if desired and be successful in doing so.

An additional factor which should be further investigated relates to accessibility of energy drinks (both with and without alcohol). Most participants in this study felt that energy drinks with and without alcohol would be easy to obtain, indicating the beverages were readily available. Although there are no published studies regarding the influence that availability of energy drinks has on intention, Grover (n.d.) explains that this notion is true for alcohol consumption. Grover (n.d.) states, “The more available alcohol is in the environment, the more likely it is that the community will have a higher alcohol consumption rate (p.11).” It would be helpful for future studies to determine if this is also true for energy drink consumption as well. In addition, it would be beneficial for these studies to more closely examine which factors most affect intention, such as peer influence or availability of the beverages around campus. The findings from future studies could help to further guide health promotion efforts aiming to prevent energy drink consumption on college campuses.

Another aim of this study was to determine if there was a significant difference in behavioral intention to consume energy drinks (with and without alcohol) among those students who had high risk awareness and those who had low risk awareness. Students were asked whether or not they intended to consume energy drinks (with or without alcohol) in the next 30 days. For energy drinks alone, there was a significant difference between those who were aware and those who were unaware of the health risks associated, and behavioral intention to consume the beverages in the next 30 days ( $p=0.001$ ). The same finding was also true for energy drinks with alcohol ( $p=0.001$ ). It was hypothesized that those students who had a high awareness level of the health risks involved would have a low behavioral intention to use the products within the next 30

days. Results showed however, that the opposite was true. For both beverages, students who had a high awareness level of associated risks had a high intention to consume the beverages.

Results showed that awareness of the health risks involved may not affect future consumption of the beverages. This is important, because it may lead campus health educators to focus energy drink prevention efforts away from using methods like scare tactics or statistics. As with other issues prevalent among college students (i.e. smoking, drunk driving, etc.), Asper (2006) explains that these methods are not successful. In various studies, strategies used such as scare tactics included films and photos of what would happen if students didn't follow certain health recommendations (Rogers & Mewborn, 1976), and dramatic reenactments of bad decisions (Matwychuk, 2003). In cases like these, the scare tactics were not effective for the adolescent group being studied. The main reason why scare tactics don't work is biological. Studies show that in adolescents, the regions of the brain responsible for controlling impulses and using proper judgment are not fully developed until the early to mid-20's (Asper, 2006). In the current study, the majority of participants were between the ages of 18 and 22, and although shown to be aware of the health risks involved, they still intended to consume energy drinks with and without alcohol.

For future programming efforts involving the prevention of energy drink consumption in this population, it would not be beneficial to utilize scare tactics, based on results from similar studies, the population (age group) being targeted, and the little to no influence risk awareness had toward intention to consume energy drinks. Perhaps more effective methods for reducing energy drink consumption (with and without



alcohol) would be to employ sound intervention strategies based on theoretical guidance. Using these strategies may determine what factors most influence outcomes. From there, the intervention strategies would need to also be tested to determine if results were significant for both the targeted population and health behavior (energy drink consumption).

### **Limitations**

There were several limitations to this study. First, a convenience sample of college students was administered the survey, so the sample may not be representative of the university and/or may not be generalized to other college campuses. In addition, all data was self-report, which in itself lends to threats to validity. One limitation of self report data is social desirability, in which respondents answer in a (possibly untruthful) way which would be socially acceptable (Miller, 2011). According to the University of Southern California's Library Guide (2012), other sources of bias for self-report data includes selective memory (whether or not a respondent remembers a past experience or event), telescoping (when respondent recalls an event at a time different than when it actually took place), attribution (respondent attributes positive outcomes to their own agency, but negative outcomes to external forces), and exaggeration (embellishing events or outcomes as more significant than they actually suggested from other data).

Regarding this study, another limitation was the online format of the survey. Participants were aware of what the general subject matter was before agreeing to participate, so it is possible that students who were knowledgeable about energy drinks had a greater response rate. In addition, energy drinks (with and without alcohol) were

not explicitly defined on the survey. Therefore, some students may have been confused as to what constituted an energy drink.

Finally, there are limitations on what conclusions can be drawn to explain whether energy drink usage causes participation in other risky behaviors. Although results of the study showed that energy drink users participated in risky behaviors more often than non-users, the study did not indicate that consumption of energy drinks was a direct cause for any of the risky behaviors in which students participated. In addition, the underpinnings and constructs of the Theory of Planned Behavior were incorporated as a conceptual model and thus not fully operationalized: therefore, findings cannot be used to generalize theoretical implications.

### **Summary**

This study had several aims, the first being to determine the current status of energy drink consumption among students at the University of Kentucky. Overall, usage rates were slightly higher than those reported in other similar studies. Next, the study aimed to determine if energy drink users participated in risky behaviors more often than non-users. Overall, energy drink users participated in risky behaviors more often than non-users ( $p=0.001$ ), specifically with tobacco, alcohol, and marijuana use. Third, the study examined whether there was a difference between energy drink users and non-users and overall risk awareness of energy drink consumption with and without alcohol. It was expected that energy drink users would have a lesser risk awareness, based on the premise that if they were aware of the health risks, they would not consume the beverage. The findings were opposite however, as energy drink users actually had a higher risk awareness (compared to non-users) of energy drink consumption with alcohol ( $p=0.000$ )

and without alcohol ( $p=0.000$ ). Lastly, the study looked at risk awareness as it compares to behavioral intention to consume energy drinks in the future. It was found that those who had higher risk awareness of energy drinks with alcohol ( $p=0.001$ ) and without alcohol ( $p=0.001$ ) also had a higher intention to consume the respective beverages in the next 30 days, compared to those who had a lower risk awareness.

## **Chapter 5: Summary, Conclusions, and Implications**

### **Summary**

The present study examined college students' current usage rates of energy drinks (with and without alcohol), how high their risk awareness was regarding energy drink consumption, and whether energy drink users participated in risky behaviors more often than non-users. This study also utilized a conceptual approach, guided by the Theory of Planned Behavior. Data collection was guided by the theory's constructs in relation to energy drink consumption. Results from these findings indicate possible factors affecting the students' overall intent to consume energy drinks in the near future, but further studies more accurately representing this theory would need to take place. With this, the study investigated how awareness of risks involved with energy drink consumption (with and without alcohol) was related to intent to consume the beverages. This chapter presents the conclusions and implications.

### **Conclusions**

1. A total of 59.2% of participants reported using energy drinks (without alcohol) at least once within the past year, and 66.4% reported ever trying an energy drink. A total of 26.7% of participants consumed an energy drink with alcohol at least once within the past year, while 38.2% reported having ever tried the mixture.
2. This study found that energy drink users exhibited a significantly higher participation in other risky behaviors as compared to non-energy drink users ( $p=0.001$ ). Among energy drink users, 50.9% had a high risky behavior score, while just 30.8% of non-users had a high risky behavior score. The greatest

differences seen between energy drink users and non-users were with tobacco, alcohol, and marijuana use.

3. Regarding risk awareness of energy drinks alone, 63.9% of energy drink users exhibited a high awareness level of assumed risks, as compared to 26.1% of non-energy drink users ( $p=0.000$ ). For energy drinks with alcohol, this trend continued, with a total of 62.8% of energy drink users being highly aware of these specific risks, as compared to 22.0% of non-users ( $p=0.000$ ).
4. Almost two-thirds (65.0%) of those who reported intent to consume energy drinks within the next 30 days also exhibited a high awareness of associated health risks. Only 35.2% of those who did not intend to consume energy drinks had high risk awareness. This difference was found to be statistically significant ( $p=0.001$ ). For energy drinks with alcohol, 73.6% of those with intent to consume the beverages had high risk awareness, compared to 33.3% of those who did not intend to consume the beverages ( $p=0.001$ ).

### **Implications**

To the researcher's knowledge, there are few studies examining energy drink consumption among college students. Furthermore, there is only one study available which looks specifically at energy drinks related to participation in other risky behaviors (Miller, 2008). The current study shows that energy drink use is associated with participation in other risky behaviors, but does not indicate whether energy drink use (with or without alcohol) causes other risky behaviors to occur (or vice versa). It would be important for future studies to look more into this, in addition to whether certain risky behaviors co-occur more often with energy drink consumption, or what the risk factors

are for energy drink consumption/addiction. Gaining more insight into these topics would further guide health promotion prevention and programming strategies, which may need to target multiple risk factors. In addition, utilizing effective programming strategies for other substance abuse programs for adolescents could prove beneficial. These strategies would include focusing on decision making and refusal skills, especially if peer influence is found to be a predictor for energy drink usage (Centers for Disease Control, 2011).

Many students mentioned they consumed energy drinks for reasons such as lack of sleep, or to stay awake to study or work on a project. There is a possibility that these reasons directly result from poor time management. Studies have shown that time management skills help students cope with the various stressors of college life (Macan, 1990). Therefore, this may be an effective strategy to implement for future energy drink prevention initiatives at the University of Kentucky. When the intent is to decrease or prevent energy drink consumption among college students, health educators may look to host time management workshops or webinars, or give out planners to students to aid in these efforts.

Since there are different health risks involved when comparing energy drink versus energy drink with alcohol consumption, it was important to examine the behaviors separately (Thombs et al., 2008; Traue & Stahlman, n.d.). Consumption of energy drinks with alcohol includes risks such as severe dehydration (Traue & Stahlman, n.d.) and a perception that one is less drunk than he or she really is (Thombs et al., 2008). Although in the current study only about a quarter of participants used energy drinks with alcohol within the past year, 87.5% of energy drink users also reported using alcohol within the past year. This shows that because most of the energy drink users are also using alcohol,

there is the possibility that at some point they may mix the two substances together (which poses the greatest health risk). It is important that college administrators realize this potential threat to students, and work to create environmental change on and around campus. Some strategies already used in some communities have worked to regulate the product or point of sale. According to one source, “one community has enacted an ordinance requiring retailers to post signs warning of the risks of caffeinated alcoholic beverages. Because cans of non-alcoholic energy drinks and [alcoholic energy drinks] are so similar, the Virginia Department of Alcoholic Beverage Control has developed a poster to educate the public on how to tell the difference (U.S. Department of Education, 2010, p.2).” College administrators should work to ban the marketing and sale of all energy drinks on campus, as well as work to reduce or restrict the sale of alcoholic energy drinks at local establishments. Changing the environment and availability of energy drinks for students may enhance their behavioral control, and thus reduce their intention to consume the beverages.

Previous studies have more specifically targeted the attitudes, perceptions, and knowledge about energy drinks alone. However, by examining energy drinks mixed with alcohol separately, this study allowed for more insight to be gained into this fairly new trend. Interestingly, this study shows that college students are very aware of the health risks involved. Therefore, it may be necessary for future prevention initiatives to focus on why students are consuming the beverages (this study pointed toward reasons such as taste, peer influence, stronger effect of the alcohol, alcohol content, and price). Once a clearer understanding is reached about the reasons for consuming alcoholic energy

drinks, more emphasis can be placed on educating students of alternatives to the beverages (ways to safely obtain similar effects without the same health threat).

As was previously mentioned, the present study incorporated an evaluation of how aware college students were of the health risks associated with consuming the energy drinks with and without alcohol. Overall, students were more aware of the health risks involved than expected, but were still consuming (and intended to consume in the future) the beverages. Therefore, it is important that college health educators understand that knowledge of risk may not lead to prevention of this behavior specifically. In addition, this study uncovered that energy drink users also partake in tobacco use, alcohol use, and marijuana use at a much higher rate than non-users. It may be helpful for educators to also incorporate energy drink prevention strategies with those already established for alcohol and drug prevention.

Using the Theory of Planned Behavior to build the conceptual framework for the current study gives some insight into factors influencing energy drink consumption among college students. Future studies should operationally define each of the constructs to further investigate predictors of intention to consume and actual consumption rates of energy drinks (both with and without alcohol) among college students. This information would be helpful in developing health promotion programming strategies to be used on college campuses. In addition, future studies should develop validated measures using these operationally defined constructs of the Theory of Planned Behavior. Researchers could then collect and examine longitudinal data to determine the appropriateness of using this theory as a predictor of energy drink consumption among college students,



Building on relevant findings, it would be beneficial to develop and implement energy drink prevention programs using the Theory of Planned Behavior as a guideline.

In all, this study provided beneficial insight into the consumption of energy drinks (with and without alcohol) among college students. Through analysis of the data collected, many conclusions were made which pointed toward possible factors influencing consumption of these beverages, as well as what relationships existed between energy drink consumption and participation in other risky behaviors, awareness of the health risks involved, and behavioral intention to consume the beverages. Results from this study uncovered a need for future research on these topics. In addition, there is a need for various intervention strategies to be implemented and tested, so that health educators may work to effectively reduce energy drink consumption (with and without alcohol) among college students.

## Appendix A: Survey

### Energy Drink and Risky Behavior Survey

#### Demographics

The following will tell us a little more about you. Remember, the information provided is confidential, and you may skip any questions you do not feel comfortable answering.

1. What is your current student status?
  - a. Freshman
  - b. Sophomore
  - c. Junior
  - d. Senior
  - e. Grad/Professional
  - f. Not Seeking a degree
  - g. Other
  
2. What is your age (in years)? \_\_\_\_\_
  
3. How do you usually describe yourself?
  - a. American Indian/Alaskan Native
  - b. Hispanic
  - c. Asian/Pacific Islander
  - d. White (non-Hispanic)
  - e. Black (non-Hispanic)
  - f. Biracial or Multiracial
  - g. Other
  
4. What is your current marital status?
  - a. Single
  - b. Married
  - c. Separated
  - d. Divorced
  - e. Widowed
  
5. What is your gender?
  - a. Male
  - b. Female
  
6. What is your current primary housing?
  - a. On-campus
  - b. Off-campus
  
7. What are your current living arrangements (where)?

- a. House/apartment/etc.
  - b. Residence hall
  - c. Fraternity or sorority
  - d. Other
8. What are your current living arrangements (with whom)? Please mark all that apply
- a. With roommate(s)
  - b. Alone
  - c. With parent(s)
  - d. With spouse
  - e. With children
  - f. Other
9. Are you currently working?
- a. Yes, full-time
  - b. Yes, part-time
  - c. No
10. What is your academic major? \_\_\_\_\_
11. On average, I spend about \_\_\_\_ hours per week studying.
- a. 0
  - b. 1-3
  - c. 4-5
  - d. 6-7
  - e. 8-10
  - f. More than 10
12. On average, I get \_\_\_\_ hours of sleep per night.
- a. 4 or less
  - b. 5-6
  - c. 7-8
  - d. 8 or more
13. Approximate cumulative grade point average: (choose one)
- a. A (4.00)
  - b. A- (3.70)
  - c. B+ (3.30)
  - d. B (3.00)
  - e. B- (2.70)
  - f. C+ (2.30)
  - g. C (2.00)
  - h. C- (1.70)
  - i. D+ (1.30)
  - j. D (1.00)

- k. D- (0.70)
- l. F (0.00)

14. What is your current student status?
- a. Full-time undergraduate (12+ credits)
  - b. Part-time (1-11 credits)
  - c. Full-time graduate (1-9 credits)
  - d. Part-time graduate (less than 9 credits)

#### Behaviors and Attitudes

The following questions ask about your behaviors and attitudes related to energy drink consumption and other health behaviors. Please select one response per item unless indicated otherwise.

15. Think back over the last two weeks. How many times have you had five or more alcoholic drinks (a drink is a bottle of beer, a glass of wine, a wine-cooler, a shot-glass of liquor, or a mixed drink) at a sitting?
- a. None
  - b. Once
  - c. Twice
  - d. 3 to 5 times
  - e. 6 to 9 times
  - f. 10 or more times
16. Average number of drinks you consume per week: \_\_\_\_\_
17. Average number of energy drinks (without alcohol) you consume per week:  
\_\_\_\_\_
18. Average number of energy drinks with alcohol you consume per week: \_\_\_\_\_
19. At what age did you first use the following (choices are did not use, under 10, 10-11, 12-13, 14-15, 16-17, 18-20, 21-25, and 26+):
- a. Tobacco (smoke, chew, snuff)
  - b. Alcohol (beer, wine, liquor)
  - c. Marijuana (pot, hash, hash oil)
  - d. Cocaine (crack, rock, freebase)
  - e. Amphetamines (diet pills, speed)
  - f. Sedatives (downers, ludes)
  - g. Hallucinogens (LSD, PCP)
  - h. Opiates (heroin, smack, horse)
  - i. Inhalants (glue, solvents, gas)
  - j. Designer drugs (ecstasy, MDMA)
  - k. Steroids
  - l. Other illegal drugs

- m. Energy drinks
  - n. Energy drinks with alcohol
20. Within the last year, about how often have you used (choices are did not use, once/year, 6 times/year, once/month, twice/month, once/week, 3 times/week, 5 times/week, every day):
- a. Tobacco (smoke, chew, snuff)
  - b. Alcohol (beer, wine, liquor)
  - c. Marijuana (pot, hash, hash oil)
  - d. Cocaine (crack, rock, freebase)
  - e. Amphetamines (diet pills, speed)
  - f. Sedatives (downers, ludes)
  - g. Hallucinogens (LSD, PCP)
  - h. Opiates (heroin, smack, horse)
  - i. Inhalants (glue, solvents, gas)
  - j. Designer drugs (ecstasy, MDMA)
  - k. Steroids
  - l. Other illegal drugs
21. Within the last year, about how often have you used (choices are did not use, once/year, 6 times/year, once/month, twice/month, once/week, 3 times/week, 5 times/week, every day):
- a. Energy drinks
  - b. Energy drinks with alcohol
22. During the past 30 days, on how many days did you have (choices are 0 days, 1-2 days, 3-5 days, 6-9 days, 10-19 days, 20-29 days, all 30 days):
- a. Tobacco (smoke, chew, snuff)
  - b. Alcohol (beer, wine, liquor)
  - c. Marijuana (pot, hash, hash oil)
  - d. Cocaine (crack, rock, freebase)
  - e. Amphetamines (diet pills, speed)
  - f. Sedatives (downers, ludes)
  - g. Hallucinogens (LSD, PCP)
  - h. Opiates (heroin, smack, horse)
  - i. Inhalants (glue, solvents, gas)
  - j. Designer drugs (ecstasy, MDMA)
  - k. Steroids
  - l. Other illegal drugs
23. During the past 30 days, on how many days did you have (choices are 0 days, 1-2 days, 3-5 days, 6-9 days, 10-19 days, 20-29 days, all 30 days):
- a. Energy drinks
  - b. Energy drinks with alcohol

24. Where have you used (choices are never use, on-campus events, residence hall, frat/sorority, bar/restaurant, where you live, in a car, private parties, other):
- Tobacco (smoke, chew, snuff)
  - Alcohol (beer, wine, liquor)
  - Marijuana (pot, hash, hash oil)
  - Cocaine (crack, rock, freebase)
  - Amphetamines (diet pills, speed)
  - Sedatives (downers, ludes)
  - Hallucinogens (LSD, PCP)
  - Opiates (heroin, smack, horse)
  - Inhalants (glue, solvents, gas)
  - Designer drugs (ecstasy, MDMA)
  - Steroids
  - Other illegal drugs
  - Energy drinks
  - Energy drinks with alcohol
  - Other (please specify) \_\_\_\_\_
25. Please indicate how often you have experienced or have done the following during the last year (choices are never, once, twice, 3-5 times, 6-9 times, 10 or more times):
- Performed poorly on a test or important project
  - Been in trouble with police, residence hall, or other college authorities
  - Damaged property, pulled fire alarm, etc.
  - Got into an argument or fight
  - Driven a car while under the influence
  - Rode in a car with someone who was driving under the influence
  - Not worn a seatbelt while in a car
  - Experienced signs/symptoms of an eating disorder
  - Missed a class
  - Done something I later regretted
  - Been arrested for DWI/DUI
  - Have been taken advantage of sexually
  - Have taken advantage of another sexually
  - Tried unsuccessfully to stop using drugs or alcohol
  - Seriously thought about suicide
  - Tried to commit suicide
  - Been hurt or injured
  - Participated in an extreme sport
26. How do you think those who are important to you feel (or would feel) about you (choices are strongly approve, approve, neutral, disapprove, strongly disapprove):
- Consuming energy drinks (without alcohol) regularly
  - Consuming energy drinks with alcohol regularly

27. How much do you think people risk harming themselves (physically or in other ways) if they (choices are no risk, slight risk, moderate risk, great risk, can't say):
- a. Try marijuana once or twice
  - b. Smoke marijuana occasionally
  - c. Smoke marijuana regularly
  - d. Try cocaine once or twice
  - e. Take cocaine regularly
  - f. Try LSD once or twice
  - g. Take LSD regularly
  - h. Try amphetamines once or twice
  - i. Take amphetamines regularly.
  - j. Take one or two drinks of an alcoholic beverage (beer, wine, liquor) nearly every day
  - k. Take four or five drinks nearly every day
  - l. Have five or more drinks in one sitting.
  - m. Take steroids for body building or improved athletic performance
  - n. Consume alcohol prior to being sexually active
  - o. Regularly engage in unprotected sexual activity with a single partner
  - p. Regularly engage in unprotected sexual activity with multiple partners
  - q. Regularly consume energy drinks
  - r. Regularly consume energy drinks with alcohol
28. Mark one answer for each line (choices are yes or no):
- a. Did you have sexual intercourse within the last year?
    - i. If yes, answer b-e below.
  - b. Did you drink alcohol the last time you had sexual intercourse?
  - c. Did you use other drugs the last time you had sexual intercourse?
  - d. Did you consume energy drinks the last time you had sexual intercourse?
  - e. Did you consume energy drinks with alcohol the last time you had sexual intercourse?
29. If you have consumed at least one energy drink (without alcohol) in the past year, what was your reasoning for doing so? Check all that apply.
- a. Did not use energy drinks within the past year
  - b. Feeling tired from insufficient sleep
  - c. Increase overall energy
  - d. Drink with alcohol while partying
  - e. To stay awake to study/finish a project
  - f. Stay awake to drive a car for long periods of time
  - g. To deal with stress
  - h. To treat a hangover
  - i. To supplement an exercise routine
  - j. To stay awake for class
  - k. To stay awake for work
  - l. Other (please specify): \_\_\_\_\_

30. Have you experienced any of the symptoms listed below AFTER consuming an energy drink (without alcohol)? Check all that apply.
- a. Have not used energy drinks (without alcohol)
  - b. Jolt/crash episode
  - c. Headache
  - d. Heart palpation
  - e. Stomach ache
  - f. Nausea
  - g. Difficulty sleeping
  - h. Restlessness
  - i. Muscle twitching
  - j. Anxious/irritated
  - k. Lack of concentration
  - l. Panic attack
  - m. Increased ability to focus mentally
  - n. More energy to go about activities of daily living
  - o. Better performance during exercise
  - p. Other (please specify): \_\_\_\_\_
31. In general, do energy drinks (without alcohol) cause these and other symptoms (choices are yes and no)?
- a. Jolt/crash episode
  - b. Headache
  - c. Heart palpation
  - d. Stomach ache
  - e. Nausea
  - f. Difficulty sleeping
  - g. Restlessness
  - h. Muscle twitching
  - i. Anxious/irritated
  - j. Lack of concentration
  - k. Panic attack
  - l. Increased ability to focus mentally
  - m. More energy to go about activities of daily living
  - n. Better performance during exercise
  - o. Other (please specify): \_\_\_\_\_
32. Why did you choose the energy drink over an alternative beverage? Check all that apply.
- a. Have not consumed an energy drink
  - b. Friend influenced you
  - c. Taste
  - d. Alcohol content
  - e. Price
  - f. Wanted to stay awake for an extended period of time



- g. Felt tired
- h. Easily available
- i. Other (please specify): \_\_\_\_\_

33. Where do you most often purchase energy drinks?

- a. Do not purchase energy drinks
- b. Gas station/convenience store
- c. Grocery store
- d. Vending Machine
- e. Other (please specify): \_\_\_\_\_

34. Have you ever bought energy drinks (without alcohol) on campus?

- a. Yes
- b. No

35. If yes, where did you purchase the energy drink?

- a. I have not bought an energy drink on campus
- b. Vending machine
- c. Blazer Express
- d. Corner Store
- e. Quick Shop
- f. Other (please specify): \_\_\_\_\_

36. Please rate how easy you believe it is to obtain an energy drink:

- a. Very easy
- b. Easy
- c. Difficult
- d. Very difficult

37. How many of your friends consume energy drinks (without alcohol)?

- a. 0
- b. 1-3
- c. 4-5
- d. 6-7
- e. 8 or more

38. How many of your friends consume energy drinks with alcohol?

- a. 0
- b. 1-3
- c. 4-5
- d. 6-7
- e. 8 or more

39. Please rate how strongly you agree with the following statements (choices are strongly disagree, disagree, neutral, agree, strongly agree):

- a. Energy drinks are harmful to my health

- b. I can become addicted to energy drinks
  - c. Energy drinks with alcohol are harmful to my health
  - d. I can become addicted to energy drinks with alcohol
40. If you have consumed an energy drink with alcohol, what is your reasoning for doing so? Check all that apply.
- a. Have not consumed an energy drink with alcohol
  - b. To get drunk
  - c. A friend offered it to you
  - d. To impress a girl/guy
  - e. Drink prior to going to bars
  - f. To increase ability to focus mentally
  - g. To stay awake longer for partying
  - h. To see what would happen/effects
  - i. Other (please specify): \_\_\_\_\_
41. Where/how do you normally get the energy drink with alcohol?
- a. Have not consumed an energy drink with alcohol
  - b. Friend
  - c. Liquor store/gas station/convenience store
  - d. At a party
  - e. At a bar
  - f. Other (please specify): \_\_\_\_\_
42. Please rate how easy you feel it is to obtain an energy drink with alcohol:
- a. Very easy
  - b. Easy
  - c. Difficult
  - d. Very difficult
43. Have you experienced any of the symptoms listed below after consuming an energy drink with alcohol? Check all that apply.
- a. I have not consumed an energy drink with alcohol
  - b. Jolt/crash episode
  - c. Dry mouth
  - d. Headache
  - e. Heart palpation
  - f. Stomach ache
  - g. Impaired motor control (loss of balance and coordination)
  - h. Nausea
  - i. Difficulty sleeping
  - j. Restlessness
  - k. Muscle twitching
  - l. Anxious/irritated
  - m. Lack of concentration
  - n. Panic attack

- o. Got drunk quickly
- p. Did not feel drowsy effects of the alcohol
- q. Felt less drunk than I really was
- r. Other (please specify): \_\_\_\_\_

44. Do energy drinks with alcohol cause these and other symptoms (choices are yes and no)?

- a. Jolt/crash episode
- b. Dry mouth
- c. Headache
- d. Heart palpation
- e. Stomach ache
- f. Impaired motor control (loss of balance and coordination)
- g. Nausea
- h. Difficulty sleeping
- i. Restlessness
- j. Muscle twitching
- k. Anxious/irritated
- l. Lack of concentration
- m. Panic attack
- n. Got drunk quickly
- o. Did not feel drowsy effects of the alcohol
- p. Felt less drunk than I really was
- q. Other (please specify): \_\_\_\_\_

45. Why did you consume this over another alcoholic beverage? Check all that apply.

- a. Did not consume an energy drink with alcohol
- b. Alcohol content
- c. Friend influenced you
- d. Taste
- e. Price
- f. Stronger effect of alcohol
- g. Other (please specify): \_\_\_\_\_

46. If you have consumed alcoholic energy drinks, please rate how likely you were to do the following (compared with regular alcoholic beverages): (choices are less likely, somewhat less likely, neither more or less likely, somewhat more likely, more likely)

- a. Drive a car
- b. Ride in a car with someone who was driving under the influence
- c. Engage in sexual activity
- d. Try other drugs
- e. Drink more than usual

47. How much do you intend on consuming energy drinks (without alcohol) in the next 30 days?
- Definitely will consume
  - Probably will consume
  - Probably will not consume
  - Definitely will not consume
  - Undecided
48. Consuming energy drinks (without alcohol) in the next month would be (please mark your answer somewhere along each scale): (Scale ranges from 1 (more negative) to 5 (more positive))
- Bad...Good
  - Harmful...Beneficial
  - Foolish...Wise
  - Unenjoyable...Enjoyable
  - Unpleasant...Pleasant
49. If I wanted to, consuming energy drinks (without alcohol) over the next 30 days would be:
- Very easy
  - Easy
  - Neutral
  - Difficult
  - Very difficult
50. Please rate your level of control in consuming energy drinks (without alcohol) over the next 30 days:
- I feel that I am in complete control
  - I feel that I am somewhat in control
  - I feel that I am somewhat not in control
  - I feel that I am completely not in control
51. How much do you intend on consuming energy drinks with alcohol in the next 30 days?
- Definitely will consume
  - Probably will consume
  - Probably will not consume
  - Definitely will not consume
  - Undecided
52. Consuming energy drinks with alcohol in the next month would be (please mark your answer somewhere along each scale): Scale ranges from 1 (more negative) to 5 (more positive).
- Bad...Good
  - Harmful...Beneficial
  - Foolish...Wise

- d. Unenjoyable...Enjoyable
- e. Unpleasant...Pleasant

53. If I wanted to, consuming energy drinks with alcohol over the next 30 days would be:

- a. Very easy
- b. Easy
- c. Neutral
- d. Difficult
- e. Very difficult

54. Please rate your level of control in consuming energy drinks with alcohol over the next 30 days:

- a. I feel that I am in complete control
- b. I feel that I am somewhat in control
- c. I feel that I am somewhat not in control
- d. I feel that I am completely not in control

Thank you for your time in completing this survey! If you would like to enter a drawing for a chance to win one of two \$25 VISA gift cards, please right click the link below (reads "Click here to take survey), and open in a new window. Then please select "Done" on this survey. Please know that your survey answers will remain confidential. [Click here to take survey](#)

## Appendix B: IRB Approval Letter



Office of Research Integrity  
IRB, IACUC, RDRC  
315 Kinkead Hall  
Lexington, KY 40506-0057  
859 257-9428  
fax 859 257-8995  
[www.research.uky.edu/ori/](http://www.research.uky.edu/ori/)

Initial Review

Approval Ends  
January 21, 2013

IRB Number  
11-1005-P4S

TO: Julia Buchanan, B.S.  
Kinesiology - Health Promotion  
177 Johnson Center  
0220  
PI phone #: (859) 257-9283

FROM: Chairperson/Vice Chairperson  
Non-medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol Number 11-1005-P4S

DATE: January 25, 2012

On January 23, 2012, the Non-medical Institutional Review Board approved your protocol entitled:

*Relationship Between Energy Drink Consumption with and without Alcohol and Risky Behavior in College Students*

Approval is effective from January 23, 2012 until January 21, 2013 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, attached is the IRB approved consent/assent document(s) to be used when enrolling subjects. [Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.] Prior to the end of this period, you will be sent a Continuation Review Report Form which must be completed and returned to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigators responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

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

Chairperson/Vice Chairperson

## **Appendix C: E-mail Request for Instructor's Assistance with Student Recruitment**

Hello,

My name is Julia Buchanan and I am a graduate student in the Department of Kinesiology and Health Promotion. For my Master's thesis research, I will be examining any relationship between energy drink consumption (with and without alcohol) and risky behavior among college students. We will be asking questions such as: students' recent and past histories with energy drink consumption (with and without alcohol), alcohol and drug use, and involvement in certain risky behaviors. In addition, some questions will ask about the students' attitudes and beliefs toward energy drink consumption and risky behaviors. The ultimate goal will be to use this information to guide future programming strategies which will best meet college students' needs.

We are requesting your permission to recruit participants for this research study from your academic courses. We are recruiting participants for an online survey, which will last approximately 10-15 minutes. We would sincerely appreciate your help in these recruitment efforts by passing along the e-mail listed below to students enrolled in your academic courses.

Student participation is voluntary and it will be reinforced that all of their responses will remain confidential. Only the researcher will know who participated, and data will be summarized, not connecting individuals to their responses. Students may also choose to withdraw from the study at any time if they are uncomfortable.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about the research, you may contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 866-400-9428.

Thank you in advance for your assistance in this important project.

**Internet link to complete the survey:** <https://www.surveymonkey.com/s/ZV7MXRH>

Sincerely,  
Julia Buchanan, B.S.  
Graduate Student  
Department of Kinesiology and Health Promotion  
[julia.buchanan@uky.edu](mailto:julia.buchanan@uky.edu)

## Appendix D: E-mail Request for Student Participation

Dear student,

The purpose of this letter is to invite you to participate in a research study to examine if there is a relationship between energy drink consumption (with and without alcohol) and risky behavior among college students. You were selected from a convenience sample of all students enrolled in Life Fitness and General Education courses during Spring 2012 at the University of Kentucky. **The link for the survey is below.**

**Internet link to complete the survey:** <https://www.surveymonkey.com/s/ZV7MXRH>

Although you will not get personal benefit from taking part in this research study, your responses may help us understand more about the energy drink consumption (with and without alcohol) of UK students.

We are sending the survey out to approximately 1,400 students and hope to receive completed questionnaires from about 380 students, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey, but if you do participate, you are free to skip any questions or discontinue at any time. Your consent to participate in the study is determined by the completion and submission of the survey.

The survey/questionnaire will take about 10-15 minutes to complete. A link at the end of the survey will lead participants to a different survey page, where you may enter your e-mail address to gain entry into the incentive drawing for one of two \$25 VISA gift cards. It will not be possible to tie your responses to this entry into the drawing, thus your responses are confidential.

Although we have tried to minimize this, some questions may make you upset or feel uncomfortable and you may choose not to answer them. If some questions do upset you, you can contact the UK Counseling Center at 257-8701 to discuss these feelings.

Your responses to the survey will be kept confidential which means no names will appear or be used on research documents, or be used in presentations or publications. We will keep private all research records that identify you to the extent allowed by law. However, there are some circumstances in which we may have to show your information to other people. We may be required to show information which identifies you to people who need to be sure we have done the research correctly; these would be people from such organizations as the University of Kentucky.

Please be aware that while we make every effort to safeguard your data once received from the online survey company, given the nature of online surveys, as with anything involving the Internet, we can never guarantee the confidentiality of the data while still on the survey company's servers, or while en route to either them or us. It is also possible the raw data collected for research purposes may be used for making or reporting



purposes by the survey company after the research is concluded, depending on the survey company's Terms of Service and Privacy policies.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 866-400-9428.

Thank you in advance for your assistance in this important project.

Sincerely,

Julia Buchanan, B.S.  
Graduate Student  
Department of Kinesiology and Health Promotion  
[julia.buchanan@uky.edu](mailto:julia.buchanan@uky.edu)

Faculty Advisor:  
Melinda Ickes, Ph.D.  
Assistant Professor  
Department of Kinesiology and Health Promotion  
[melinda.ickes@uky.edu](mailto:melinda.ickes@uky.edu)

## **Appendix E: Reminder E-mail Request for Instructor's Assistance with Student**

### **Recruitment**

Faculty members,

This is a reminder e-mail about my Master's thesis research, as I will be examining any relationship between energy drink consumption (with and without alcohol) and risky behavior among college students. We will be asking questions such as: students' recent and past histories with energy drink consumption (with and without alcohol), alcohol and drug use, and involvement in certain risky behaviors. In addition, some questions will ask about the students' attitudes and beliefs toward energy drink consumption and risky behaviors. The ultimate goal will be to use this information to guide future programming strategies which will best meet college students' needs.

If you haven't sent the survey out already, we would like to request your permission to recruit participants for this research study from your academic courses. The online survey will last approximately 10-15 minutes. We would sincerely appreciate your help in these recruitment efforts by passing along the e-mail listed below to students enrolled in your academic courses.

Student participation is voluntary and it will be reinforced that all of their responses will remain confidential. Only the researcher will know who participated, and data will be summarized, not connecting individuals to their responses. Students may also choose to withdraw from the study at any time if they are uncomfortable.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about the research, you may contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 866-400-9428.

Thank you in advance for your assistance in this important project.

**Internet link to complete the survey:** <https://www.surveymonkey.com/s/ZV7MXRH>

Sincerely,  
Julia Buchanan, B.S.  
Graduate Student  
Department of Kinesiology and Health Promotion  
[julia.buchanan@uky.edu](mailto:julia.buchanan@uky.edu)

## **Appendix F: Waiver of Informed Consent**

### Energy Drink Consumption and Risky Behavior Survey

This survey asks you questions about various aspects of your health, particularly related to energy drink consumption (with and without alcohol). Please answer the questions honestly. This survey is confidential and voluntary. You may choose not to participate, or skip any questions which you are not comfortable answering. By completing the survey, you are giving your permission to participate in this study. It should take you 10-15 minutes.

## **Appendix G: Drawing Winners E-mail Notification**

Dear (winner):

In the past few months you completed a survey examining energy drink consumption and risky behaviors in college students. For completing the survey you had the option to enter your e-mail address into a drawing for a \$25 VISA gift card. Congratulations, your name was selected as one of the winners!

In order to receive your gift card, please contact Julia Buchanan at 859-257-9283 or e-mail me at [julia.buchanan@uky.edu](mailto:julia.buchanan@uky.edu)

Your time is greatly appreciated for taking the time to complete the survey.

Sincerely,

Julia Buchanan  
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(859) 257-9283  
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Vita

Julia Kristine Buchanan

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Education

Bachelor of Science, Physical Education with a Specialization in Exercise Science, May 2010  
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Professional Positions Held

2010-Present  
Fitness Graduate Assistant, University of Kentucky Campus Recreation

2006-2010  
Group Fitness Supervisor, University of South Florida Campus Recreation

Scholastic and Professional Honors

2012-Present  
National Intramural and Recreational Sports Association (NIRSA)  
Appointed Assembly Member

2010-Present  
American College of Sports Medicine (ACSM)  
Certified Health Fitness Specialist

2010  
University of South Florida Exercise Science  
Outstanding Service Award

2010  
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2006-2010  
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