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ENERGY DRINKS: FACTORS THAT INFLUNCE COLLEGE STUDENTS' CONSUMPTION

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by

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Approved by:

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AN ABSTRACT OF THE THESIS

ENERGY DRINKS: FACTORS THAT INFLUENCE COLLEGE STUDENTS' CONSUMPTION

Nameer Nassir Faris, for the Master degree in PUBLIC HEALTH, presented on December 20, 2013, at Southern Illinois University Carbondale.

TITLE: ENERGY DRINKS: FACTORS THAT INFLUNCE COLLEGE STUDENTS' CONSUMPTION

MAJOR PROFESSOR: Dr. Kathleen J. Welshimer

The purposes of this study were: To assess factors that influence energy drink consumptions among college students. Next, to analyze the reasons behind consuming energy drinks as well as the reasons for not consuming them. And to evaluate the participants' knowledge regarding energy drinks' ingredients, safety, and side effects. A total of 417 undergraduate students who registered in 101 general education classes during the Fall 2013 semester at the departments of Health Education, Kinesiology, and Nutrition at Southern Illinois University at Carbondale participated in the study.

Energy drink use was associated with the number of the paid employment hours (p= .000). Gender also played a significant role, with a larger proportion of females than males drinking them mixed with alcohol (p= .005). Of students who consumed energy drinks, a substantial number drank them without alcohol before age 17 (32.8 percent; n= 39) and 82.4 percent (n= 96) before age 19 drank them with alcohol. Energy drink consumers were more

likely to engage in risky behaviors such as smoking and drinking alcohol (p =.000). Also, the consumers perceived them as safer than those who did not use them (p= .000), and were less knowledgeable about side effects (p= .000). The study's findings suggest directions for health education and policymaking regarding energy drinks.

Key words: Energy drinks, Energy drinks' safety, and energy drinks risk awareness

DEDICATION

TO

MY BELOVED COUNTRY, IRAQ,

TO MY PARENTS, MY BROTHERS & SISTERS, AND MY FRIENDS

TO MY LOVE, MY CHILDREN.

FOR ALL, NOW I CAN SAY

WE HAVE ACCOMPLISHED THE TASK!

THANKS FOR BELIEVING IN ME!

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INTRODUCTION

1.1 Background

Energy drinks a term that is used to describe a wide variety of beverages that are containing "caffeine, taurine, guarana, sugar, vitamins, herbal supplements, and other ingredients" (Seifert, Schaechter, Hershorin, & Lipshultz, 2011) These beverages are being marketed as energy improving beverages. They have a history that goes back to the 1960s of the 20th century and they are well known in the Asian and European markets; however, they found their way to the USA only after 1996 (Heckman, Sherry, & Gonzalez De Mjia, 2010; Johnson, 2006; Reissig, Strain, & Griffiths, 2008). These products are being used to boost their consumers' energy, which makes energy drinks a fast growing market in a few years (Heckman et al., 2010). Clear evidence about that fast growing is their market sales size and the amount of dollars that the companies have made around the globe. For instance BCC Research (2012) states that the worldwide sales in 2010 of both energy drinks and energy food were more than 115 billion dollars.

Then, in 2011 sales jumped to reach more than 123 billion dollars. Next, BCC Research (2012) estimates that the global growth for energy drinks alone in 2016 will be more than 79 billion dollars, which represents a Compound Annual Growth Rate (CAGR) that will exceed 9.2 percent. The CAGR means "The year-over-year growth rate of an investment over a specified period of time" (Investopedia, 2013).

In the US the story of energy drinks reveals some interesting findings. A rapid growth of the energy drinks market in the US has reached almost 240 percent from 2004 to 2009 (Heckman et al., 2010). Woolsey (2010) states that energy drinks market sales were between $199- 200

million dollars during 2002 in the U.S. Then, Ressig et al. (2008) state that the energy drink market experienced a meteoric jump in its profit, which made more than 5.4 billion dollars for the year 2006. Moreover, the market has seen another astronomical jump in profit by making 8.6 billion dollars during 2011-2012 (Cernivec, 2013). However, it will not be the last astronomical selling boom because the anticipated sales for 2013 might hit 19.7 billion dollars or higher in the U.S. alone (Heckman et al., 2010).

Energy drink producing companies are working hard to get the full advantage of that fast growing market. For instance, "Red Bull Inc."- a major energy drink manufacturing company- started launching many types of energy drinks. Red Bull, Inc. alone had released over 500 types of products by 2006 (Johnson, 2006), in its global market, which covers more than 164 countries (Red Bull, 2013). There are more than 300 kinds of energy drinks holding two hundred names or registered trademarks around the world (Heckman et al., 2010).

The Red Bull GmbH, an Austrian company, is controlling almost 43 percent of the energy drink market followed by Monster Beverage Co, which covers nearly 40 percent in 2013 (EnergyFiend, 2013). The remaining market share is covered by "Amp, Full Throttle, RockStar, and NOS" and these products are made by well known companies such as PepsiCo, Coca-Cola Co., and RockStar Inc, respectively (EnergyFiend, 2013a; Heckman et al., 2010; Kapner, 2008). However, that did not mean the market is limited to these companies because the number of energy drinks companies is still growing (Kapner, 2008). Thus, we can see other popular companies such as Miller Brewing Co., and Cadbury Schweppes have launched many other different energy drinks on the market (Beverage Spectrum, 2008; Kapner, 2008).

In a new turn in the energy drinks race, the producing companies started marketing "alcoholic energy drinks", which means marketing cocktails of alcohol, mainly vodka, mixed

with energy drinks, and their targeted age group is the youth (Heckman et al., 2010; Kapner, 2008; Miller, 2008a).Kapner, 2008). For example, some of the popular brands of these products are "Rock Star 21, Joose, and Steel Reserve" (Weldy, 2010). Moreover, these companies are working to add more flavors to their products like Berry Blast, Lemon lime, Blueberry,… etc. Also, offering a broad spectrum of products like diet, sugar free, and zero calorie like Red Bull Total Zero". This variation in products helps producing companies entice new consumers. In details, some of the consumers are not able to drink energy drinks for certain reasons such as illness like diabetes, or fear of weight gain due to high calories in energy drinks. This also enables energy drinks to be marketed to a broader range of consumers with different age groups not only to youth. The low calories versions are designed to attract consumers who cannot drink the original versions due to sickness or the fair of weight gain (Cernivec, 2013).

1.2 The Consumers

The prime target for the energy drinks is the youth such as athletes and school students (Heckman et al., 2010; Miller, 2008a). Energy drinks companies are targeting consumers who are within the age group of 18+ years old. The appeal to the consumers is that they are living busy lives, and want products that will help them to stay focused, alert, and productive while doing their tasks during the day (Heckman et al., 2010, Woolsey, 2010). O'Brien, Rhodes, Wagoner, Wolfson, & McCoy, (As cited in Heckman et al., 2010, p. 305) have found that high demand of energy drinks among the population of young students is very clear. The researchers have found that more than 33 percent of young persons with 18-24 years old are drinking energy drinks almost every day (O'Brien et al., 2008), while a recent study claims that the energy drink consumption within the last 30 days among college students is ranging from 39 percent to more than 57 percent (Arria, Cadeira, Kasperski, Vincent, Griffiths, & O'Grady, 2010). Malinauskas

et al. (2007) have conducted a study on energy drink consumptions among college students. The authors stated that they found 51 percent of their study sample mentioned that they drank one energy drink or more during the last (30) days prior to the study. Also, more than 73 percent of the students in the study tried a cocktail of energy drinks mixed with alcohol during the last (30) days (Malinauskas et al., 2007).

1.3 The scope of the issue

The increase of ER cases among youth has been attributed to marketing strategies of targeting youth (the Substance Abuse and Mental Health Services Administration (SAMHSA), 2013), especially college students (Malinauskas et al., 2007, Snipes & Benotsch, 2013, Woolsey, 2010). A recent study points out that energy drinks are heavily marketed for youth who are seeking a high performance physically and mentally. Thus, buying energy drinks sound appealing for them to enhance their abilities (Miller, 2008a; Woolsey, 2010).

Energy drink consumption has become a global concern that begins to worry researchers around the globe because of the un reasonable use; therefore, they have started following the patterns of consumption of energy drinks among the youth. In Europe a study that involved more than 52,000 participants in 2012 stated that adolescents' consumption prevalence rate was 68 percent out of 32,000 adolescents who participated in the study. Moreover, the same study pointed out that the prevalence rate for adults and children was thirty percent out of 14,500 adults and eighteen percent of 5,500 children (Zucconia, Volpatoa, Adinolfia, Gandinia, Gentileb, Loi, & Fioritib, 2013). Then, Zucconia et al. (2013) state that they found 12 percent of the adolescents were "High Chronic" users because they consumed almost seven liters of energy drinks over a 30 day period with four to five times during the week.

In Germany, a recent study focused on the adolescents states that more than 52% of the adolescents have mixed energy drinks with alcohol and more than 25 percent are using these drinks (without alcohol) as their daily drinks (Pomeranz et al., 2013). In general, Thailand took the first place out of seven countries in energy drink consumption, followed by the US, Austria, Ireland, New Zealand, Slovenia, and finally Kuwait. These statistics did not include mixing energy drink with alcohol (Pomeranz et al., 2013).

In the US, a recent study claims that energy drinks constituted more than 8.8% of what the US high school students consumed of "Sugar- Sweetened beverages". Also, the study points out that energy drinks represented greater than 10% of the beverages that are consumed by males and Hispanic students (Pomeranz, Munsell, & Harris, 2013). Recent studies have found that energy drinks, which are being consumed on a regular basis among those who are 12-17 years old represent more than 31% of the adolescents in the US (Simon, & Mosher, 2007; Pomeranz et al., 2013).

Therefore, energy drinks have become a new surging public health concern. And in the US many papers are now being published to explain energy drinks effects and side effects on human health. These products could lead to serious health issues that may either affect the person physically or mentally (Substance Abuse and Mental Health Services Administration, 2013). For example, the Substance Abuse and Mental Health Services Administration (SAMHSA) states that the number of patients who visited the ER around the States in 2007 was over 10,000 cases due to problems related to energy drink consumption. However, in 2011 the number of ER cases was doubled the 2007 figure; more than 20,500 visits because of excessive amounts of caffeine in energy drinks (SAMHSA, 2013).

Also, the SAMHSA points out that ER cases- in the US- have mostly been among certain age groups, which were from 18 to 25 years old and 26-39 years old during the time duration from 2007 to 2011. In addition, the increase in ER visits included those who were over 40 years old too. For instance, from 1382 ER patients in 2007 for patients who were 40+ years old, the number has reached more than 5,230 cases in 2011, or a 279% increase. That jump in cases among ages 40+ articulated to the energy shots like "5- Hour Energy" (SAMHSA, 2013). In 2011, the ER visits included more than 58 percent related to consuming energy drinks alone, while 42 percent were related to consuming energy drinks with other substances. For example, in 2007 there were over 3,000 visits to ER due to energy drinks plus other drugs related factors such as " Drug misuse or abuse". By 2011 the number of multi issue cases has multiplied by 2 to reach more than 6,000 ER visits (SAMHSA, 2013).

1.4 Reasons for energy drink consumptions

The intensive marketing strategies of energy drink companies are very successfully attracting young consumer to consume energy drinks (Woolsey, 2010). For examples, the commercials that say energy drinks are the best tools to fight tiredness and to improve intellectual and physical performance are major reasons to consume energy drinks among youth (Buxton, & Hagan, 2012; Miller, 2008a; Woolsey, 2010). Malinauskas et al. (2007) found that 67 percent out of almost 500 students -at East Carolina University- reported that they drink energy drinks to get a boost of energy. Also, the name "Energy drinks" seems attractive to young people, especially athletes, because they think these products energize their bodies as well as let them use less amount of foods, fluids, and less time consuming. So, They think that they are able to replace other foods and fluids with energy drinks and spend less time in drinking and eating (Bonci, 2002).

Buxton, & Hagan (2012) state that almost 54 per out of 180 participants reported that they use energy drink to restore their energy after working out. A recent study on football players in India states that 30 percent of the participants mentioned that they consumed at least one energy drink during the last seven days for several reasons: First, 37.77 percent mentioned they are able to gain more energy after competition or exercise; 33.33 percent used them to hydrate their bodies. In addition, 22.22 percent said that energy drinks increased their abilities; while 6.66 percent said energy drinks helped them to reduce tiredness (Badaam, & Masroor, 2013).

Another reason to drink energy drink is to relieve the effect of not getting enough sleep. Malinauskas et al (2007) stated that 67 percent of the students who participated in their survey mentioned that they used energy drinks to prevent them from falling asleep. Pettit, & DeBarr's (2011) claim that the level of stress plays a role in energy drink consumptions among students at colleges. In details, the higher the stress level, the more energy drinks are being consumed by the students. The third reason for consuming energy drink is mixing them with alcohol for having fun during parties. Malinauskas et al. (2007) reveal that 54 percent of the study participants reported that they mix both alcohol and energy drinks they are partying. Ishak, Ugochkwu, Bagot, & Khalili, (2012) point out that number one reason to mix both is to make alcohol taste better. Students who consumed the mixture of both, energy drinks and alcohol, may suffer less intoxication symptoms such as headache, fatigue, and losing the ability to coordinate, but they are still visually impaired (Babu et al., 2008).

1.5 Students' risky behaviors

Risk taking behaviors in students' lives become significant concerns of health agencies, schools, and parents. Therefore, many health agencies and researchers are studying why students

do some risk taking behaviors such as binge drinking in order to find ways to intervene these behaviors. Generally speaking students' lives mainly focus on school, classes, and homework, which means study pressure will make nutritional safety the last item in their daily lives to be concerned about it (United States Department of Agriculture Food Safety and Inspection Service, n.d.). Next, the Centers for Diseases Control and Prevention (CDC), (1997) in its *Youth Risk Behavior Surveillance: National College Health Risk Behavior* states that only 30 percent of college students have even "a little" knowledge about what is healthy to be consumed- as a diet or drink- and what is not. Then, living with roommates who share the same interests and same apartment without knowing what is healthy and what is not healthy to be ingested might lead to serious risk taking behaviors under peer pressure (Wallner, & Schroeder, 2005).

In 2003, a study that has been done by Morrone and Rathbun in Ohio State University claims that 17 percent of the students had diarrhea, which is a sign of using unsafe food or drink. Also, the study says that only 26.4 percent of the students read the labels of products they buy and only 6.5 percent of the school students pay attention to the product labels (Morrone, & Rathbun, 2003). Another risky behavior is alcohol abuse among college students in the US. In fact, results of a national survey about alcohol consumption shows more than 28.5 percent of the 12 grade students and more than 40 percent of college students have reported that they consumed 5-6 alcoholic beverages during the 14 days of the survey period (Johanson, O'Malley, & Bachman, 2003). In 2009 a very thorough study that has been conducted by Hingson, Edwards, Heeren, & Rosenbloomin which they stated that 3,360,000 students drove while they were drunk. It is a huge problem because alcohol abuse leads to more than 1,824 deaths each year among college students who are 18-24 years old as direct results from intoxication or indirect results like drunk driving. Also, it leads to more than 600,00, severe unintentional injuries among

college students such as falling (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). Further, up to 696,000 college students face some sort of assault by a drunk student (National Institute On Alcohol Abuse and Alcoholism, [NIAAA], 2013).

Furthermore, almost 100,000 cases of sexual abuse as a result of alcohol intoxication are reported among the US college students annually (Hingson et al., 2009). Unsafe sex is another major concern of health agencies, which is resulting from having sex while being under the influence (Hingson et al., 2002). Moreover, 400,000 students in that studyc reported having unsafe sex while they were intoxicated. Additionally, 100,000 students did not know if they practiced safe sex or not during their encounter. Finally, another serious issue is the "academic flounders". For instance, more than 25 percent of college students have many academic difficulties during their studies because of alcohol abuse (NIAAA, 2013).

When tracking energy drink consumption patterns we can find links to risk taking behaviors of college students. For instance, Miller (2008b) states the more students drink energy drinks, the higher chance they get involved in "risk taking behaviors", such as drug abuse like "marijuana", problems of non-compliance with aversion of law such as "Fighting, seat belt omission, taking a risk on a dare, smoking, alcohol problems, and sexual risk taking" (Miller, 2008b).

Further, consuming mixtures of energy drinks with alcohol could lead to similar risk taking behaviors. For instance, Ishak et al. (2013) states that consuming a cocktail of energy drinks and alcohol will raise the "Risk taking behaviors" like drunk driving. One of many theories that explains this phenomenon states the high amounts of caffeine in energy drinks work to inhibit the effect of alcohol for a certain period of time. That mixture gives the person's

feelings of false control on his/her behavior because energy drinks work to reduce the feeling of the "physical and mental impairment", from the alcohol (Ishak et a., 2013). Mixing of a depressant (alcohol) with a stimulant (energy drink) could lead students to feel less intoxicated; therefore, they drink more till they reach "binge drinking" state (Ishak et al., 2013; Malinauskas et al., 2007).

A recent study looked at energy drink consumption among college students during the last 7 days, 14 days, and the last 30 days (Velazquez, Poulos, Latimer, & Pasch, 2012). The researchers found that 40 percent out of 585 students reported that they consumed energy drinks in the last thirty days. Within that 40 percent; 3.5 percent reported that they drink energy drinks only with, and eleven percent reported consuming energy drinks with and without alcohol during the last 30 days Additionally, the study found that 46.7 percent of the participants had alcohol during the last four weeks, 38.6 percent had alcohol during the last 14 days, and almost 23 percent had "episodes of heavy drinking" during the last 14 days. Thus they claimed claim that energy drinks are correlated positively to alcohol drinking. The study revealed that more than 50 percent of those who had alcohol during the last thirty days had energy drinks too.

The study concluded, the more students were exposed- either by the number of drinks or the number of days- to energy drinks during the last (30) days, the more alcohol they drank. Those who reported both high consumption of energy drinks and alcohol represented 80 percent of those who do drink energy drinks. The pattern of alcohol intake was "Heavy drinking episodes". The patterns was seen stronger among those of whom 90% were also study reveals that "Heavy drinkers" (Velazquez et al., 2012). Finally, there are other types of energy drinks that are available in the markets, which are called "Energy Drinks Mixed with Alcohol"

(AmEDs). Miller (2012) reveals that consuming these products could lead to sexually risk behaviors such as “Casual sex” or having intercourse while being drunk.

1.6 Statement of problem and need for the study

Students at colleges are living stressful lives often times and that is related to many reasons such as study load, being away from family and home, the pressure of competition, lack of or adequate resources, and the influence of social environment like peers, media, and exposure to violence (Kadhiravan & Kumar, 2012). Lacking proper education, lacking experience about stress management, and poor skills to cope with stress lead the students to use unhealthy or risky ways to relieve stress such as drinking alcohol, drug abuse, and smoking. Moreover, stress, sleep disturbances, anxiety, and depression are among the top five factors that impact students’ academic performance in the US (The American College Health Association National College Health Assessment, 2010; The Centers for Disease Control and Prevention, 2009). It has been suggested that energy drink consumption is an emerging issue, which is related to stress management among college students (Malinauskas et al., 2007).

While consumption of energy drinks among college students is common, and increasing, it is unclear how aware the students are about actual effects or potential risks of energy drinks. Moreover, most studies have focused on reasons for using energy drinks or association between their consumption and risk taking behaviors such as sexual abuse/ assault, substance abuse, smoking, and alcohol related problems. However, there is no one has looked at the non-consumers of energy drinks to investigate why they did not consume them. Also, there is a big gap in analyzing the factors that influence the consumption of energy drinks such as the social environment like family and friends as well as the effects of marketing strategies. Therefore, this

study was aiming to find some missing pieces of the chain to get a better understanding about energy drink consumption among college students. Also, to evaluate the students awareness about energy drinks ingredient, safety, and side effects..

1.7 Purpose of the study

The purpose of this study was to assess energy drink consumption among college students. Also, the study is investigating students knowledge about energy drinks ingredients, safety, and possible side effects. Finally, the possible relationships between students' consumption patterns and their social environment such as friends, family members, and media are explored.

1.8 Research Question

In fact, in order to achieve the study aims, the study will seek out answers for the some following questions:

1. What are the demographic characteristics of the participants in the study?

2. How many participants in the study sample are energy drink consumers?

3. a- What are the numbers of energy drink (with and without alcohol) that have been consumed over the last seven days and over the last 15 days?

b- Is there any difference between the groups regarding the patterns of energy drink consumptions?

4. a- What are the energy drink consumers' age and gender distributions?

b- Is there any relationship between gender and energy drink consumption?

5. Is there any relationship between drinking energy drink and employment hours, credit hours, or hours of studying for the consumers?

6. Is there any relationship between using energy drinks and sport practices?

7. a- Is there any unhealthy/risky behaviors among the study participants like smoking and recreational drug usage?

b- Is there any relationship between energy drink consumption and unhealthy/ risky behaviors?

8. a- For those who use energy drinks, what were their reasons?

b- For those who do not use energy drinks, what were their reasons?

9. What are the most often used energy drink?

10. What are the most frequent points of purchasing for energy drinks?

11. What are the effects, side effects, and the feelings experienced after the consumption of energy drinks (with or without alcohol)?

12. a- How does the social environment influences the participants' ways of perceiving energy drinks?

b- Do the participants think that energy drinks are safe to be used because energy drinks are being advertized

c- Is there any relation between the participants' beliefs regarding energy drinks and energy drink consumption?

13. a- Is there any difference between consumers' and non-consumers' knowledge of energy drinks' safety?

b- Is there any difference between consumers' and non-consumers' knowledge of energy drinks' ingredients?

c- Is there any difference between consumers'(regular and MDO) and non-consumers' knowledge regarding energy drinks' side effects?

In fact, the answers will be helpful for public health expertise to plan programs in the future to prevent the consequences of an emerging public health problem. This information should be useful in developing health education intervention programs that will focus on the side effects of energy drinks on the youth especially college students.

1.9 Research design

This study utilized a cross-sectional, descriptive design in which data were collected through using a self-report, paper and pencil survey instrument. The survey was developed from topics in the available literature review, as well as previously developed -to collect information about alcohol drinking or about energy drinks. The survey instrument was submitted for approval by Southern Illinois University at Carbondale Human Subject Committee. The study sample was a convenience sample of undergraduate students who enrolled in Health education, Kinesiology, and Nutrition general education classes at Southern Illinois University at Carbondale during late the Fall semester of 2013. The survey was administered by the researcher during the class time.

1.10 Limitations

The limitations of this study were:

1- This study was conducted among a convenience sample of undergraduate students at Southern Illinois University at Carbondale, which means caution must be used when some generalized the findings to other students or to other schools.

2- The survey instrument was a self-report, which may produce some bias due to social desirability. Moreover, all the participants may not have the same understanding and interpretation of the survey questions (Miller, 2011). Finally, respondents may not recall information accurately (Brener, Billy, & Grady, 2003).

1.11 Delimitations

The delimitation of the study was:

1- The participants were undergraduate students, most of them between ages 18-25 years old.

1.12 Assumption of the study

The assumptions of the study were:

1- All the participants answered the questions truthfully.

2- All the students who got the survey were able to answer the questions of the survey easily in a short time.

1.13 Definition of terms

There are some specific terms that this study used. Therefore, they needed to be explained, so the reader will have no problem understanding their meanings and what they stand for.

- Blood–brain barrier: "A filtering mechanism of the capillaries that carry blood to the brain and spinal cord tissue, blocking the passage of certain substances"(Oxford Dictionaries, 2013).
- Corticotropin: "A hormone of the anterior pituitary that stimulates the production of steroids in the cortex of the adrenal glands. Also called adrenocorticotropic hormone" (Freedictionary.com, 2013a)
- Diuretics: A substance- sometimes a medication- that is working to increase the amount of urine (Dictionary.com, 2013)
- Dopamine: It is a chemical substance that is mainly available in the brain, which works as a "Neurotransmitter" that affects, inhibit or stimulate, the nerves activities (Pednealt, 2008).
- Ergogenic: A chemical substance tends to enhance body performance or " A tendency to increase work output (Freedictionary.com, 2013b).
- Energy drinks: A term that is used to describe a wide variety of beverages that are containing "caffeine, taurine, guarana, sugar, vitamins, herbal supplements, and other ingredients" (Seifert, Schaechter, Hershorin, & Lipshultz, 2011)
- Guarana: "A dried paste that is made from the seeds of a South American climbing shrub (*Paullinia cupana*) of the soapberry family, that contains caffeine and tannin, and that is used as a stimulant" (Merriam-Webster Inc., 2013).

- Mixed – drink- only consumers ("MDO"): Are individuals who drink energy drinks only as mixed drinks with alcohol. They will be referred to as "MDO" throughout the thesis.
- Neurotransmitter: "A chemical substance, such as acetylcholine or dopamine, that transmits nerve impulses across a synapse" (Freedictionary.com, 2013c)
- Neurogenesis: The developing of "nervous tissues" (Persad, 2011).
- Regular consumers: Individuals who drink energy drinks by themselves and in mixed drinks. These individuals are called "regular consumers" throughout the thesis.
- Satiety: It refers to the feelings of fullness while eating, which happens after eating much less food than normal (Zieve, Eisner, & Raton, 2011).
- Taurine: "A colorless crystalline substance formed by the hydrolysis of taurocholic acid and found in the fluids of the muscles and lungs of many animals" (Freedictionary.com, 2013d).
- Teratogenic: "Causing malformations of an embryo or fetus" (Freedictionary.com, 2013e)

1.14 Summary

This chapter explained several topics such as energy drink sales size, the scope of the issue, and the reasons why college students consume energy drinks. According to the available litterateur this chapter described types of risky behaviors that college students engaged in and their relationships with alcohol use and the possible extension to the use of energy drinks, especially the mixed once. Then, the chapter described the purpose of the study, research design, and laid out limitations, delimitations and definitions.

CHAPTER TWO

LITERATURE REVIEW

This chapter is viewing some researches that are related to (1) Energy drink ingredients, (2) Effects of energy drinks on college students, (3) Marketing strategies (4) The theoretical framework of my study.

2.1 What is the meaning of energy drinks?

All the beverages that fall under the category of energy drink consist of high levels of caffeine mixed with additional ingredients that are not found in other regular drinks such as juice. The energy drinks came in two different types of products, which are they: First, energy drinks, which are sold in 8-32oz. cans while the second type called energy shots, which are available in 2-2.5 oz. (Harris et al., 2010, Heckman et al., 2010). In fact, many products are available in markets from different companies, which they stated the ingredients of their products on the cans. The labeling issue is still an ongoing problem due to the fact that some companies do not put consistent labels in case of serving sizes (Harris et al., 2010), or unlabeled ingredients such as caffeine or other materials that have been some health side effects on the human health (Harris et al., 2010; Pomeranz et al., 2013).

Looking at the different types of energy drinks will let you see that all of them contain caffeine mixed with one or several of the following ingredients: “Taurine, Guarana, B Vitamins, ginseng, ginkgo biloba, L-Carnitine, Sugars, Antioxidants, Glucuronolactone, Yerba mate, creatine, milk thistle, L-theanine, Artificial Sweeteners” (EnergyFiend, 2013c; Higgins, Tuttle, &

Higgins, 2010; Ishak et al., 2012; Walker & Woolsey, 2009; Woolsey 2010). And the following pages will explain in details the five major ingredients of energy drinks.

Caffeine. Energy drinks are providing the consumers an extra burst of energy, which is particularly coming from the large amount of caffeine that they contain (Higgins, Tuttle, & Higgins, 2010; Reissig et al., 2008, Woolsey, 2010). When caffeine is taken orally, 99 percent will be absorbed totally by the gastrointestinal tract within 45-90 minutes (Magokos & Kavouras, 2005; Julien, 2008). Furthermore, the studies reveal that The human liver is the major place in which caffeine get metabolized and then excreted out the body by the kidneys with urine (Fredholm, Battig, Holmen, Nehlig, & Zvartau, 1999; Magokos & Kavouras, 2005; Julien, 2008). The liver metabolizes caffeine to many metabolites, but the major ones are "paraxanthine" , which represents more than 83 percent, "theobromine" and "theophylline" are they equal to less than 17 percent. Paraxanthine and theophylline are the biologically active metabolites, which are similar to the caffeine in its effects and mechanism of action (Fredholm, Battig, Holmen, Nehlig, & Zvartau, 1999; Heckman et al., 2010, Julien, 2008).

Further, it's "Water Soluble" nature is a big advantage that allows it to be distributed easily into the body tissues and helps it to pass the "blood-brain barriers" to start the physiological changes (Magokos & Kavouras, 2005; International Food Information Council Foundation, 2008; Julien, 2008). Then, the highest concentration in the plasma will be in about 1.5- 2 hours after the caffeine intake and then it will gradually vanish. Caffeine works as an adenosine receptor antagonist, which works to suppress the inhibitory effects of the "adenosine" on the nervous system – both central and peripheral- which makes it a good stimulant (Mandel, 2002; Ribeiro & Sebastiao, 2010).

The mechanism of action for the caffeine is still not that clear and remains to be ongoing study there are many studies have been done to explore its effects. So far caffeine is a well known compound for its ergogenic effect, which has very broad spectrum of "Metabolic, hormonal, and psychological" effects (Higgins et al., 2010; Heckman et al., 2010). Ergogenic are chemical substance tends to enhance body performance (Freedictionary.com, 2013b). So, its metabolic effects starts by mobilizing fat stores and acts as stimulating agent to make the muscles depleted the fat inside them during the work out and spare the glycogen for later, which helps to increase the exercise time (Higgins et al., 2010; Laurent et al., 2000). Studying the caffeine effects in vitro shows that even six mg for each kg for body weight enhanced the body performances during exercise and that effect can last from one minute to one hour and 20 minutes (Graham, 2001). Thus, caffeine is banned by the International Olympic Committee (IOC) for its ergogenic effects in 1962, then the IOC removed the ban a decade later, but recently the IOC considers it as a restricted drug (Hawley, 1998).

The hormonal and psychological effects start when caffeine occupies the adenosine receptor sites-A1 and A2a- because it has a similar molecular design (Heckman et al., 2010; Woolsey, 2010). Woolsey (2010) state that both of A1 and A2a work to control the releasing of other important neurotransmitters that may work with "Dopamine" and "Non- epinephrine". In fact, A2a receptors can be found in the dopamine highly saturated areas, or what they called "Dopamine rich pleasure-reward places" while A1 can be found everywhere in the brain (Fredholm et al., 1999; Woolsey, 2010).

In fact, caffeine does not work to affect the dopamine releasing mechanism. It instead works in an indirect way to stimulate dopamine activity through blocking out of the adverse effects of adenosine from affecting receptors of the dopamine. Then, that gives a clear

explanation for the well-being feelings after consuming caffeinated beverages (Julien, 2008). Next, Small amounts of caffeine (12 to 99 mg) have shown some effectiveness in improving the cognitive performance and the mood (Fredholm et al., 1999; Giles, Mahoney, Brunye, Gardoney, Tylor, & Kanaraek, 2012; Heckman et al., 2010). In addition, caffeine works to increase the amount of epinephrine, which causes several metabolic changes in the body. Although these changes are considered secondary changes, they can improve the person's feelings physically and mentally (Graham, 2001). A recent study states energy drinks when compared to placebo, had energy boosting effect. In details, the researchers have found that the study participants, who were 18- 55 years old, felt that they are stronger from 18- 60 minutes after caffeine intake and they sustained that at least for another 90 minutes (Heckman et al., 2010). That is a big motive to make young generations buy and to consume energy drinks.

As an "Ergogenic compound", caffeine has many serious side effects. For example, it produces unwanted side effects like anxiety, agitation, insomnia, and mood changes (Julien, 2008). It raises the heart rate and blood pressure, and consuming large doses of caffeine (more than 200 mg) could lead to serious adverse effects that are related to the disturbances in nervous system functions. In fact, that is due to the hormonal changes in the body, so it might lead to stress, sleep disturbance, migraines. Moreover, it affects the heart functionality too such as irritability in the heart functions "Arrhythmia, tachycardia" (Higgins et al., 2010; Julien, 2008). The effects on blood pressure and peripheral vascular resistance are coming from the sympathetic stimulation such impact discovered by a recent study, which suggests that drinking caffeinated coffee shows clear effects on arterial elasticity and function. In details, caffeine raises the arterial tension or "Stiffness", plus strong effects on systolic and diastolic pressure of the aorta more than on the "Brachial artery" (Higgins et al., 2010).

Moreover, caffeine is considered a diuretic agent, which increases the amount of fluids that go out the body. And the amount of urine produces depends on the ingested amount, which means more caffeine intake leads to more urine released from the body (Maughan & Griffin, 2003). In addition, caffeine abuse can lead to some serious issues such as caffeine dependency cases among heavily consumers (Babu, Church, & Lewander, 2008; Reissig et al., 2008). In details, researchers have found signs of caffeine dependency on adolescents and adults who showed some difficulties of quitting caffeine intake (Reissig et al., 2008). Hughes et al., in 1998 have found that more than 30 percent out of the 162 who responded to their survey fall under substance abuse and is considered caffeine abusers. Second of all, consuming high caffeine doses found to be associated with risk taking behaviors. Researchers have found that there are some indicators that say when consuming large amounts of caffeine could affect the brain function leading to intersect with the "Neuronal systems", which makes the person willing to consume alcohol or drugs (Griffiths et al., 2003; Woolsey, 2010). Also, high consumption of energy drinks has been linked to risky behaviors -as we stated in chapter one- such as drug abuse or drunk driving (Miller, 2008b; Ishak et al., 2013).

Although that many studies pointed out that high doses of caffeine within energy drinks may cause serious health issues (Griffiths & Woodson, 1998; James, 1997), lacking of proper labeling of energy drinks ingredients is a serious issue that still exists, which needs to be addressed (Pomeranz et al., 2013). In fact, energy drinks are not under the United States Food and Drug Administration (FDA) regulations because energy drinks consider dietary supplement products. However, energy drinks producing companies are falling under the regulation of Nutrition Labeling and Education Act, which is not requiring them to mention all the product ingredients. Therefore, it might not be that difficult to consume amounts of caffeine that are

more than the daily allowance (Pomeranz et al., 2013). It is a very controversial issue, which might affect large segments of the population especially when we know that more than 80 percent of the population in the US consumes caffeine every day with an average daily consuming of "280 mg" for adults 34+ years old (Striley, Griffiths, & Cottler, 2011). And the daily allowance of caffeine equivalents to 300 mg a day (FDA, 2012). Table (1) explains the amounts of caffeine in some energy drinks.

Taurine. An important amino acid, which is called "2-aminoethyl sulfonic acid". It consists of a molecule of "Sulfur" that has an amino acid, which is available in plenty amounts in the body. It is normally available in our bodies, we initially can find it in very high concentrations in the eyes- retina-, skeleton, and the heart muscles (Heckman et al., 2010; Lourenco, & Camilo, 2002).

In fact, after the metabolizing process of methionine and cysteine, taurine is produced (Heckman et al., 2010; Lourenco, & Camilo, 2002). Furthermore, it can be found in some types of food such as red meat and fish. Therefore, its amount in the body is depending on the types of diet that the person consume (Higgins et al., 2010; Lourenco, & Camilo, 2002). The anticipated amount of daily intake of taurine ranged from 40 to 400 mg (Heckman et al, 2010; Woolsey, 2010). The main producing places for the taurine are the liver and the brain, which means its producing might be affected by the diseases or any medications that affects these parts or inhibit the process of production (Lourenco, & Camilo, 2002). Then, excretion of it goes through two ways: First, by the kidneys with the urine, and secondly, with the bile pigment (Lourenco, & Camilo, 2002).

Taurine is being incorporated within high energy drinks because it has so many effects on the body in different ways like increasing body hormones, enhancing physical activities

especially the enchantment of the workout abilities, and showing some biological effects (Giles et al., 2012; Heckman et al, 2012; Higgins et al., 2010; Lourenco, & Camilo, 2002; Woolsey, 2010). Giles et al. (2012) point out that taurine increases both the cognitive abilities and physical functions of mice in vitro.

Table 1

Caffeine, calorie, sugar, and sodium content of common sugar-sweetened energy drinks[a] *(Pomernanz,et al., 2013).*

Product[b]	Additional varsities[c]	company	American Bev. Association member company	can size (oz)	Caffeine per can (mg)	Calories per can (mg)	Sugar per can (mg)	Sodium per can (mg)
Amp Energy	4	PepsiCo	X	16	142	220	58	140
AZ Energy	3	Arizona	-	15	188	188	49	20
Full Throttle (Red Berry)	2	Coca-Cola	X	16	200	230	58	160
Monster Energy	24	Hansen Bev. Co.	-	16	160	200	54	180
Monster Energy	24	Hansen Bev. Co.	-	24	240	300	81	270
Monster Energy	24	Hansen Bev. Co.	-	32	320	400	108	360
NOS	4	Coca-Cola	X	16	260	210	54	410
Red Bull	0	Red Bull	X	8.4	80	110	27	99
Red Bull	0	Red Bull	X	12	114	160	39	142
Red Bull	0	Red Bull	X	16	154	220	54	189

Table 2

Caffeine, calorie, sugar, and sodium content of common sugar-sweetened energy drinks[a] *(Pomernanz,et al., 2013).*

Product[b]	Additional varsities[c]	company	American Bev. Association member company	can size (oz)	Caffeine per can (mg)	Calories per can (mg)	Sugar per can (mg)	Sodium per can (mg)
Red Bull	0	Red Bull	X	20	192	275	68	237
RockStar	II	RockStar	-	8	80	140	31	40
RockStar	II	RockStar	-	16	160	280	62	80
RockStar	II	RockStar	-	24	240	420	93	120
Venom Energy (Black Mamba)	3	Dr. Pepper Snapple	X	16.9	170	250	27	320

a= Nutrition information as of September 2012 for each available can size for nationally advertised energy drink brands identified in the 2011 Sugary

Drink FACTS report from the Rudd Center for Food Policy & Obesity.

b= Information given for original variety of drink brand. For those brands that do not have an original variety, the flavor is specified.

c= Number includes additional sugar-sweetened unique flavor varieties within each listed brand, not including multiple can sizes.

Woolsey (2010) states that taurine works as a neurotransmitter, helps to increase dopamine production, decreases the adverse effects of alcohol on the liver, and relives the intoxication side effects on the liver. Moreover, taurine works to enhance the retina in both the function and growth, enhances the bile's work such as improving acids conjugating process, and prevents the bile calculus that or "cholestasis" (Higgins et al., 2010; Lourenco, & Camilo, 2002). Further, Lourenco, & Camilo (2002) pointed out that taurine works to protect cells membranes; however, it is not clear how till now, which might happen either by taurine eliminates toxicants, or through controlling the osmosis process (Lourenco, & Camilo, 2002). In 1985, Azuma and his colleagues studied the effects of taurine in a study, which included following fourteen congestive heart failure patients for 30 days and the result was the taurine has positive effects to those patients compared to the placebo. Also, it has no side effects on the patients; hence, it prevents deterioration among patients (Azuma et al., 1985).

Energy drinks contain taurine, which is a synthetic product. Actually, the synthetic taurine is made by the mixing of "Ethylene oxide and sodium bisulphate, which is followed by the mix of ammonia as a liquid and suluphuric acid" (European Food Safety Authority, 2012). Next, the product will undergo a series of processes such as decolonization, purification, and crystallization; moreover, it goes to the drying part and it will be blended with a carrying substance to ensure its additively (European Food Safety Authority, 2012). Heckman et al. (2010) states that almost 80 types of energy drinks had high concentrations of taurine mostly were equivalent to 753 mg for each eight ounces. With all the studies about the taurine and its effects, there is no single study that has reached, or discovered to any side effects of it (Heckman et al., 2010).

On the other hand, there are some studies that suggested that we should track patients who are suffering from critical issues to prevent taurine deficiency like persons with heart failure (Azuma et al., 1985), renal failure, liver diseases especially liver dysfunction, and some other devastating health problems (Lourenco, & Camilo, 2002). Finally, even when the world famous agencies such as the European Food Safety Authority (EFSA) declared in 2012 that taurine is a safe compound and is not toxic, can not cause any side effects to neonates- teratogenic, and is not a substance that may cause cancer, it is not that clear about its future side effects. Thus, it would be safer to do more research in the soon future to explore its possible side effects; additionally, to that ESFA (2012) claims that regarding to the available studies on taurine effects, ESFA has reached a conclusion, which is no adverse effects of ingesting six grams, which equals six thousands milligram, per person/day of taurine for 265 days, which resembles 100 milligrams/kilograms of body weight/day for an individual weighted 60 kilograms (European Food Safety Authority, 2012).

Guarana. A compound that is extracted from a plant called *Paullinia cupana*, which South America is its origin (Babu et al., 2008; EnergyFiend, 2013c; Heckman et al., 2010; Higgins et al, 2010). It is produced in Brazil, specifically in the amazons (EnergyFiend, 2013c; Heckman et al., 2010; Higgins et al, 2010). Guarana is a well know plant for its distinguish seeds that looks like "Berry fruit", and the whole plant contains one to three seeds, which are the only parts that could be eaten (Heckman et al, 2010). These seeds contain huge amounts of caffeine, which made it the first source of caffeine in the world (EnergyFiend, 2013c; Higgins et al., 2010). In details, the actual percentage for the caffeine from the coffee beans equals one to two percent while guarana seeds provide Three-Four percents. Babu et al. (2008) claim that it might reach to 8 percent. Then, guarana could produce more than 40 milligram of caffeine from one

gram of it (Heckman et al., 2010). Even though guarana has the highest caffeine concentration, it is not considered as caffeine (EnergyFiend, 2013c), because it contains other compounds in addition to the caffeine. For instance, it contains theobromine and theophylline, but their amounts are less than what we can find in caffeine (Babu et al., 2008; EnergyFiend, 2013c; Heckman et al., 2010; Higgins et al, 2010). Additionally, it contains tremendous amounts of "Saponins, flavonoids, and tannins", which are considered very active compounds due to their bioactivity and antioxidant characteristics (Heckman et al., 2010; Higgins et al., 2010).

Guarana is a very well known compound and is used for a long time for its effects such as helping to improve cognitive abilities like concentration, altering the mood, fighting, mental tiredness, enhancing the physical performance (Babu et al., 2008; EnergyFiend, 2013c; Heckman et al., 2010; Higgins et al, 2010). Meyer, & Ball (2004) states that guarana improves the cognitive functions; however, it raises the systolic blood pressure. The study observed 71 participants by closely monitoring the effects of guarana, coffee, and yerba mate, and the study concluded that coffee and guarana found to be helpful to improve mental functions (Meyer, & Ball 2004). In fact, these effects are happening because it has a high caffeine content plus containing saponins, flavonoids, and tannins, make it a lipid phase compound, which means it gets released and absorbed very slowly; therefore, its effects last longer (Babu, et al., 2008; EnergyFiend, 2013c; Heckman et al., 2010; Meyer, & Ball 2004). Another study found that consuming 75 milligrams of guarana led to improve memory functions and increase concentration (Haskell, Kennedy, Wesnes, Milne, & Scholey, 2007).

Finally, there is no single study that has proven the side effects of guarana yet even when consumed in large amounts for a short time or small amounts in long durations (Heckman et al., 2010). Higgins and his colleagues (2010) argue that there are some caffeine intoxication cases

have been reported by the ERs in the States due to guarana caffeine. While the inconsistent labeling should be taken into consideration because energy drinks companies did not add the caffeine in guarana to the total amount of caffeine the energy drinks, which may lead to serious caffeine overdose issues (Babu et al., 2008).

Ginseng. A worldwide well distinguished herb, which is called as “Panax ginseng” , which is used by the Asian countries like China, Korea, ... etc. The Asian people have been dealing with ginseng for more than two thousand years (Harrison, Parke, Oelke, Kaminski, Hudelson, Martin, Kelling, & Binning, 2013; Heckman et al., 2010; Sünram-Lea, Birchall, Wesnes, & Petrini, 2004). It was used by ancient people in different ways like to help in preventing illnesses, to cure some diseases, to reduce tiredness signs, or to enhance the quality of life (Babu et al., 2008; Harrison et al., 2013; Heckman et al., 2010; Sünram-Lea et al., 2004). In fact, ginseng as a herb has so many benefits and uses, but the major important part is its root, which should be implanted and farmed for five to six years before reaping (Harrison et al., 2013; Heckman et al., 2010).

The herb will go through several processes in order to get two different products out of it. For instance, after cleaning it from the soil, it should be dried then either be bleached by ”Sulfur dioxide” to get the “White ginseng”, or to be treated by steam and then to be sent to be dried by air to get the “Red ginseng”; however, during all these manufacturing process the plant should not be overheated to protect its color and its texture (Harrison et al., 2013; Heckman et al., 2010). Actually, the market of ginseng is growing fast, which has almost reached $3.5 billion, and because the ginseng has entered in many products as an important ingredient, especially for energy drinks, for its pharmaceutical importance (Babu et al., 2008; Harrison et al., 2013; Heckman et al., 2010).

There are many studies have been studying ginseng and its effects on animals or on the human (Babu et al., 2008; Harrison et al., 2013; Heckman et al., 2010). Heckman et al. (2010) state that ginseng effects are coming from its metabolites, which called the "Ginsenosides" that represent almost 3 percent of the ginseng and they consider the active part of the ginseng. These ginsenosides are known as "Triterpene saponins" -their number may exceed 40 different metabolites (Heckman et al., 2010), which are belong to steroids and entered as part of many hormones that are derived from steroids such as "Progesterone and pregnanolone" (Attele, Wu, & Yuan, 1999). Also, each one of them has its own structure; therefore, being part of steroids with significantly different structures means that ginseng has various biological and physiological effects with different ways of action (Attele et al., 1999; Heckman et al., 2010, Kang, & Min, 2012). Attele et al., (1999) argue that these metabolites work through interacting with plasma membrane by being "Amphipilic" and intercalating to the membrane, they can affect the functionality of it like fluids movements and cells response and action.

According to a recent study that states ginseng works to enhance the immunity by provoking the immune system through various ways such as: increases the ability of the immune system to fight infectious microbes, viruses and bacteria. Second, works to improve the immune system cells work depending on the natural function of each cell like "Macrophages, natural killer cells, dendritic cells, T cells, and B cells", and by enhancing the "T cells and NK cells" works as anti-carcinogenic agent (Kang, & Min, 2012). Moreover, it works to improve the central nervous system by working as a neurotransmitter (atelier et al., 1999; Heckman et al., 2010). In details, it helps to stimulate the hypothalamus and the pituitary glands, which increases their secretions especially "Corticotropin" (Attele et al., 1999; Higgins et al., 2010).

Moreover, affecting the hypothalamus and the pituitary glands, gives ginseng a very crucial effect on the CNS, which is improving the cognitive functionality by enhancing the memory, working as anti-tiredness compound, and antidepressant (Attele et al., 1999; EnergyFiend, 2013c, Higgins et al., 2010; Heckman et al, 2010). For instance, Sünram-Lea, et al. (2005) state that ginseng able to improve the psychological functions like high concentration during performing a specific task. The researchers followed 30 young healthy participants over 2 weeks who asked to ingest 400 mg of ginseng and then testing the participants within certain time periods, which led them to a conclusion that ginseng can improve some of the cognitive activities (Sünram-Lea et al., 2005). Furthermore, Woolsey (2010) claims that ginseng in vitro found to be working to decrease alcohol concentrations in the blood. At the last, even when there are many studies about the ginseng positive effect on the human, which consider it safe, ginseng effects still uncertain with a lot of questions about their accuracy (Heckman et al., 2010). The safe allowance amount of ginseng is 200 milligram per day, but it can be up to 2700 milligram (EnergyFiend, 2013c).

On the other hand, the story of ginseng has a negative side, which can be summarized as using excessive amount of it may cause many adverse effects like "low blood pressure, diarrhea, sleep apnea, vaginal bleeding, disturbance in body temperature, pruritus, appetite suppression, cholestatic hepatitis, palpitations, tachycardia, miscarriage, mastalgia, euphoria, and in severe cases we can see Steven-Jonson Syndrome, and anaphylaxis" (Babu et al., 2008;EnergyFiend, 2013c; Heckman et al., 2010; Higgins et al., 2010). A recent study shows that there are some serious side effects of ginseng especially if ingested in products that has one or more that one of these ingredients "vitamins, minerals, fenugreek, gingko, and/or *Ophiopogon japonicas*". The side effects could range from swallowing problems, euphoria, nervousness, elevated blood

pressure, to liver dysfunction and altered ejaculation" (Charrois, Hrudey, & Vohra, 2006). Finally, Charrois et al. (2006) state there is some evidence that ginseng may intervene with some medication, as seen in Table 2.

Sugar and sugar substitute. Sugar is a basic content of the energy drinks, which also is a major source of energy for the human body that can be used by the muscles through the oxidation process to get the needed energy (Higgins et al., 2010). Energy drinks may contain sugar in the form of "Corn syrup", which is fructose, sucrose (Higgins et al., 2010), glucose, or an artificial type of sugar that called "glucuronolactone" (Woolsey, 2010). Many studies state that ingestion sugar or one of its derivatives has many effects on the human body like increase the intellectual and physical performance (EnergyFiend, 2013c; Giles et al., 2012; Higgins et al., 2010). Giles et al. (2012) state that glucose works synergistically with caffeine and taurine. In details, sugar works with caffeine to improve the memory and concentration, reduces the time that is needed for interaction or reaction, and sparks the intellectual activities in indolence during the fatigue time (Giles et al., 2012).

In order to understand the effects of sugar, Giles et al. (2012) claim that it might work to stimulate the process of producing neurotransmitters such as "acetylcholine, glumate, and gamma-aminobutyric acid", which is a clear evidence about the effect of sugar on the memory, which is known as "glucose-mediated hippocamal". Another study that has done by NASA reveals that glucose doesn't only work to improve the memory, but it also affected many other activities. For example, it enhances abilities of communication, speaking, reading, and makes decision making abilities work better (Elias, Elias, D'agostino, Cupples, Wilson, Silbershatz,

Table 3

Drug interactions associated with ginseng (Charrois, Hrudey, & Vohra, 2006).

Drug	Evidence	Findings	Recommendations
Phenelzine, other MAOIs	Case reports	Patients experience headache, tremulousness, manic symptoms. Interaction may be due to psychoactive central effect of ginseng.	Counsel on symptoms to monitor.
Warfarin	Case reports	Decreased INR.	Counsel patients to discuss ginseng use with physician. Recommend increasing the frequency of monitoring INR at the start of ginseng therapy until the patient is stabilized, and also increase monitoring if patient discontinues ginseng therapy. Dose may need to be increased based on INR
	Pharmacokinetic study (RCT)	Decreased Cmax and AUC of warfarin in healthy volunteers. Interaction may be due to effect on CYP 2C9.	
Furosemide, other loop-diuretics	Case reports	Ginseng decreases the effect of furosemide. Mechanism of interaction is unknown.	Monitor patients for signs of edema, fluid overload, or increase in heart failure symptoms (increased dyspnea, cough, peripheral edema).

MAOIs: monoamine oxidase inhibitors; INR: international normalized ratio; Cmax: maximum concentration; AUC: area under the curve.

& Wolf, 1997). Higgins et al. (2010) state that consuming sugar or any kind or carbohydrate within the period of exam- pre, during, and post- helps to delay the effect of working out especially tiredness, spares of the glycogen inside the muscles, which prolong the time of working out and enhances physical activity. Also, consuming reasonable amounts of carbohydrate fluids, which has 4 percent to 8 percent helps to maximize the energy and fluids distribution in the body without side effects (EnergyFiend, 2013c; Higgins et al., 2010).

However, sugar is not a friendly material if large amount of it is used for a long durations of time. It actually has been proven that sugar causes obesity and diabetes (EnergyFiend, 2013c; Higgins et al., 2010; Lustig, Schmidt, & Brindis, 2012; Pomeranz et al., 2013). Then, too much sugar can stimulate insulin releasing from pancreatic beta cells, which with long duration seems to be exhausted and are not capable to produce more insulin, which leads to diabetes (Higgins et al., 2010), and for short duration, consuming high levels of sugar after stimulating insulin secretion it might cause to can cause "crash", which happens after 60 minutes of sugar intake (EnergyFiend, 2013c).

Moreover, Elias et al. (1997) indicate that sugar is the major reason of many chronic illnesses such as: Hypertension- "fructose spikes uric acid that leads to increase blood pressure", high triglycerides. Also, it has side effects similar to what alcohol can cause like liver toxicity because alcohol is made after sugar is being fermented. Furthermore, sugar is correlated to tobacco and alcohol abuse though affecting the brain, which lead to substance abuse (Elias et al., 1997). Further, it works to affect some hormones inside the body. In details, sugar inhibited "ghrelin", which is the responsible about hunger sensation inside the brain, affects "leptin", which is responsible about glut or "satiety" sensation, and suppresses dopamine, which reducing

the feeling of enjoyment while eating the food that leads to make the person ingest more high sugary content products (Elias et al., 1997). Finally, going back to energy drinks, Pomeranz et al. (2013) state that almost all energy drinks contain high sugar concentrations, which leads to high calories. Also, more than 96% of energy drink were found to be containing "artificial sweeteners" as major sweeteners or used as additional sweeteners to sugar, and over than 50 percent of these products did not show these sweeteners as part of their ingredients (Pomeranz et al., 2013). See table (1).

B Vitamins. A set of "Water soluble" vitamins are collected together under main name called "B complex", which play very crucial roles in the cell functions. For example, they are important in the mitochondria functions and interactions, which works to produce the needed energy. And their water phase helps the body to get the extra amounts after getting its need (Heckman et al., 2010; Higgins et al., 2010). The group of B vitamins consists of "Thiamine (B_1), riboflavin (B_2), niacin (B_3), pantothenic acid (B_5), pyridoxine hydrochloride (B_6), biotin (B_7), insoitol, and cyanocobalamin (B_{12})" (EnergyFiend, 2013c; Heckman et al., 2010; Higgins et al., 2010). In fact, these vitamins are found in many types of food like vegetables, meat, fruit, or diet products. For example, we can find them in "bannana, tuna, turkey, and potatoes (Heckman et al., 2010).

Energy drinks companies explain why to include Vitamin B complex in huge amounts and that because energy drinks contain sugar to produce energy. Therefore, to extract this energy the human body needs Vit.B complex in the energy production process and the extra amounts will be released out the body with the urine (Heckman et al., 2010; Higgins et al., 2010). For example, some energy drinks contain very high levels of these vitamins like a can of 250 milliliters might contain: First, More than 360 percent of recommended daily allowance

(RDA) of B_6. Second, greater than 120 percent of B_{12}, and over than 120 percent of B_3. Moreover, energy shots like "5-Hours Energy" contain more than 8330 percent of the (RDA) of B_{12} and over than 2000 percent of B_6 (Heckman et al., 2010). Then, the producing companies claim that these high levels of vitamins- which are more than what the actual daily need- are very useful in enhancing the cognitive performance and improve vigilance (Heckman et al., 2010; Higgins et al., 2010).

The major B vitamins that are included in energy drinks are: B_2, B_3, B_6, and B_{12} (Heckman et al., 2010; Higgins et al., 2010). Each one of these four vitamins has a certain role in the body. In details, Vit.B_2 works as a coenzyme in the carbohydrates metabolizing process, Vit.B_3 has a crucial job as a coenzyme in the metabolizing process of energy, lipid production, and fat analysis. While, Vit.B_6, which is formed through the combination of 3 identical compositions, which turned to B6 that works as a coenzyme, which helps in the process of utilizing of carbohydrate, fats, and proteins. Finally, Vit.B_{12} helps in the folic acid metabolizing process and helps in nerve functions (Heckman et al., 2010; Higgins et al., 2010). On the other side, Vit.B3 can cause redness of the skin if more than thirty five mg is ingested and it can cause hepatic toxicity if greater than 3 grams has been ingested. Further, B6 may cause nerve problems especially in sensation functionality "burning sensation" or skin illnesses if 100 milligrams have been consumed (EnergyFiend, 2013c).

2.2 Side effects of energy drinks

Energy drinks are attracting young generations to boost their energy; however, not all the consumers are aware of these drink side effects. According to Ressig et al. (2008) state that consumers' bodies may develop a tolerance toward the energy drinks, which means as the time

goes by the body will need more amounts of these products to overcome the body tolerance. Energy drink abuse can lead to several risky health effects which may include:

Physiological effects. Energy drinks work to increase cognitive activities and enhance the mood if they consumed in a reasonable way (EnergyFiend, 2013b; Heckman et al., 2010; Higgins et al., 2010; Ishak, et al., 2013). Heneman, & Zidenberg-Cherr, (2007) state that drinking around Four hundred milligrams of caffeine everyday will not have adverse effects on a healthy person. In fact, 400 milligrams equal to 3-4 coffee cups (Sefcik, 2010), this amount could be added up from different sources such as tea, soda, coffee, and energy drinks.. As we read in the energy drinks ingredients section that these products contain high concentrations of caffeine. These intensive amounts are not only from caffeine, but also from other ingredients especially Guarana (Heneman, & Zidenberg-Cherr, 2007). Many studies have listed the negative side effects of energy drinks including headache, dizziness, sleep deprivation, nervousness, irritability, insomnia, agitation (EnergyFiend, 2013d; Ishak, et al., 2013; Heneman, & Zidenberg-Cherr, 2007). In addition, drinking the same amounts of caffeine while being under stress can lead to "anxiety"(Persad, 2011). The following paragraphs will explain some major physiological effects of energy drinks on the human body.

a. Sleep disturbance. The National Foundation of Sleep (2009) states that energy drinks might work to improve the cognitive performance for a short time duration, but a major down side for them is sleeping deprivation. Ishak et al. (2013) state that energy drinks could lead to sleep disturbances at night combined with daytime sleeping, which might impose serious issues for students like absence from school or sleeping while driving. A recent study that has been conducted on the military members in Afghanistan who consumed energy drinks found out that persons who consumed 3 or

more energy drinks have reported sleeping problems, fatigue, illnesses, stress, and falling asleep during the day hours while they are on call or in duty hours (Centers for Diseases Control and Prevention, 2012). That makes us think about the consequences of energy drink on the students who are not trained in a professional to deal with stress and sleep apnea like the US military soldiers who are impacted by the side effects of these products.

b. Anxiety and depression. Energy drinks could affect the brain directly through the fact that energy drinks contain many ingredients that works as "Neurotransmitters" such as caffeine (Graham, 2001; Juline, 2008), Guarana (Babu et al., 2008; Higgins et al, 2010), and Taurine (Woolsey, 2010). Woolsey (2010) argues that long use of energy drinks could lead to "Neurotransmitter" disturbances in the consumer minds. The author states that energy drinks will surge the likelihood of happening of "anxiety" depression related problems due to their neurological effects (Woolsey, 2010). In details, some of these ingredients like caffeine, ginseng, and other components have stimulating effects on the brain. Therefore, when they work together in a synergic way they will exhibit some changes in the brain functionality. For instance, they either increase the amount of "pleasure reward or neurotransmitters" or prolong their action such as "dopamine and serotonin". Also, they do the same for hormones that are working in stressful conditions like "nor-adrenaline and adrenaline"(Woolsey, 2010).

In fact, these ingredients will cause a sharp increase of the amount of these neurotransmitters then they seek to diminish slowly. These repeated changes that occur each time after exposure to these ingredients will cause malformation inside

"pleasure- reward receptors" locations (Woolsey, 2010). Then, that will increase the tolerance limits "thresholds" of these "neurotransmitters", which drives consumers to seek more amounts of these ingredients to give their brains what they need to stay functional. Next, that change in the brain neurology makes the consumers feel exhausted and in the future this situation will lead them to start showing "Anxiety and depression" (Woolsey, 2010). The researcher states that these changes in the brain and its functionality happened among those who are younger than twenty five years old. Their brains are still in the developing stages especially their "memories, stress, and pleasure-reward systems" (Woolsey, 2010).

c. Mental issues. A recent study shows administering twenty- thirty milligrams of caffeine to "adult mice" impacted the normal growth of nerve cells and causes depression in "hippocomal" "neurogenesis". The same study finds that during stressful situations, caffeine consuming rate raises inside the body. Then, because it works to raise the secretion of "Cortisol"- hydrocortisone- through stimulating effects on the "Central Nervous Systems", which causes "blood pressure" to be increased (Persad, 2011). Also, high doses of caffeine- more than three hundred milligrams- that can come from coffee, tea, energy drinks, or other caffeinated beverages believed to cause other mental problems such as "hallucinations". Persad (2011) argues that this effect might be a result of Hydrocortisone high levels, which are released during stressful moments while ingesting large amount of caffeine.

d. Cardiovascular problems. The intensive amounts of caffeine in energy drinks are able to cause some side effects on the functionality of the heart, blood vessels, and can even cause death (American Heart Association, 2013; Babu et al. 2008; Higgins

et al., 2010; Seifert, Schaechter, Hershorin, & Lipshultz, 2011). Higgins et al. (2010) state after using energy drinks -2 containers of five hundred milligram for seven days- by fifteen healthy adults the results were: First, after Four hours of energy drinks consumption, "systolic blood pressure" increased by18 percent during the first day. Then, it jumped to ten percent during the seventh day of the study. Second, two hours after energy drink ingestion, "Diastolic blood pressure" elevated by 7 percent on the first day and by 8 percent on day seven. Next, "heart rate" raised by 8 percent on the first day and by eleven percent on the seventh day of the study (Higgins et al., 2010). Then author claims that Red Bull affects the heart function by increasing the "cardiac contractility" (Higgins et al. 2010).

Babu et al. (2008) state that all energy drinks effects are related to "Caffeine toxicity", which can cause "tachyarrhythmias". That includes "atrial and ventricular ectopy, atrial fibrillation, ventricular tachycardia, and ventricular fibrillation" (Babu et al., 2008). Also, Taurine in energy drinks increases the "stroke volume" due to its effects, which suppresses the "Sympathetic Nervous System" from being stimulated. Additionally, it influences Calcium amounts that are stored in the heart muscle tissues (Seifert et al., 2011). A recent alarming statement that released from the American Heart Association states that energy drinks might affect the "blood pressure" and cause arrhythmias after studying some clear facts that linked energy drinks to these health problems (American Heart Association, 2013).

Finally, energy drinks in severe cases severe cases of "Seizures" and led to death and because of cardiac problems due to excessive amounts of caffeine (Babu et al., 2008; Higgins et al., 2010). For instance, one case of death was linked to "Myocardial

infarction" to a young lady after ingestion energy drinks (Babu et al., 2008). Another 18 year old young man reported dead after practicing basketball directly after consuming two cans of "Red Bull". Also, there are five cases of seizures and 4 cases of "psychiatric effects" on people with a history of mental illness (Higgins et al., 2010).

e. Caffeine poisoning and caffeine withdraw. Substance Abuse and Mental Health Services Administration (SAMHSA) states that the number of patients who visited the ER around the States in 2007 was over 10,000 cases due to problems related to energy consumption. However, in 2011 the number of ER cases became twofold 2007 cases, which reached more than 20,500 patients because of large amounts of caffeine in energy drinks (SAMHSA, 2013). A recent study reveals that caffeine can lead to Caffeine independence and later if the consumer tried to cut off caffeine intake, a new problem will surge, which is caffeine withdrawal (Reissig et al., 2008).

In fact, caffeine withdrawal can be characterized by: "Headache", which starts after a day or two days from the last time the person has had caffeine. The authors state that more than fifty percent of individuals who participated in a study have reported that they had an intense headache (Reissig et al., 2008). Other symptoms could range from mood changes to physical pain such as losing the ability to concentrate, "vomiting, depression, and muscle pain" (Babu et al., 2008; Reissig et al., 2008).

f. The digestive system problems. The excessive concentrations of caffeine could impact the Gastrointestinal Tract because 90 percent of the caffeine will be absorbed by the digestive system (Juline, 2008; Rath, 2010). Therefore, caffeine can cause "Hyperstimulalion" of this system; additionally, "Nausea, diarrhea, vomiting, pain, anorexia, and gastroesophageal reflux" due to "Esophageal lower sphincter losses its contractility" (Rath, 2010). Then, all these side effects could lead to eating problems among children and youth (Seifert et al., 2011). Moreover, many energy drinks include carbohydrate, which is mainly sugar or one of its derivatives, as one of their ingredients and it's amounts range from Eighteen gram per Oz to more than Twenty Five grams per Oz often times. This amount will be slowing down fluid absorption inside the "Intestine", which reduces the amount of fluids that should go into the blood, which will lead to dehydration (Bonci, 2002).

Behavioral effects. Energy drinks work to increase the mental activities and improve vigilance with a noticeable improvement in physical activities if they consumed in a reasonable way (Babu et al., 2008; Heckman et al., 2010; Ishak et al., 2013, EnergyFiend, 2013a; Reissig et al., 2008; Miller, 2008a; Woolsey, 2010). However, consuming energy drinks in large amounts could lead to problems in the ability of making decisions, substance abuse, and risk taking behavior such as sexual risk taking behavior (Heckman et al., 2010; Ishak et al., 2013; Miller, 2008a; 2008b; 2012; Reissig et al., 2008; Velazquez et al., 2012; Woolsey, 2010). Miller (2008a) states that energy drink consumptions are strongly related to drug abuse like "Marijuana". Also, it leads to "Sexual risky behavior" and on-compliance with the law such violation of seat belt law, physical fight, and drunk driving.

In addition, a new risky behavior appears during the last few years, which is mixing alcohol with energy drinks or buy them pre-mixed that starts to concern researchers (Heckman et al., 2010; Ishak et al., 2013; Miller, 2008a; 2008b; 2012; O'Brien et al., 2008; Reissig et al., 2008; Snipes & Benotsch, 2013; Velazquez et al., 2012; Woolsey, 2010). Malinauskas et al., (2007) stated that 54 percent of their study sample drank energy drinks mixed with alcohol. A recent study shows that 40 percent out of 585 students reported that they consumed energy drinks mixed with alcohol in the last thirty days. In details, out of that forty percent, 3.5 percent reported they consumed energy drinks alone. Another eleven percent reported consuming energy drinks with and without alcohol out during the last 30 days (Velazquez et al., 2012).

Further, the Substance Abuse and Mental Health Services Administration (2013) states that ER cases due to energy drinks in 2011 were over than 20,500 visits. And these cases included more than 58% were related to consuming energy drinks only while forty two percent were related to consuming energy drinks and other substances. The pharmacokinetics of alcoholic energy drinks are still controversial as so as their side effects (Heckman et al., 2010). However, there are many studies that focused on the short effects of this phenomenon, which came out with some explanations (Heckman et al., 2010; Ishak et al., 2013; Miller, 2008a; 2008b; 2012; O'Brien et al., 2008; Reissig et al., 2008; Snipes & Benotsch, 2013; Velazquez et al., 2012; Woolsey, 2010). For example, the major concern is coming from mixing a depressant- Alcohol- with a stimulant- energy drinks, which will lead to decrease the intoxication symptoms (Heckman et al., 2010; Ishak et al., 2013, Reissig, et al., 2008). Heckman et al. (2010) argues that energy drinks "Masking" alcohol side effects, which lessens the person's feelings of being intoxicated.

Ishak et al. (2013) believe that mixing energy drinks with alcohol could increase the likelihood that the consumer will participate in "risk taking behavior" especially at night time like drunk driving, sexual assault, or substance abuse. Also, combining energy drinks and alcohol could lead the consumer to drink more alcohol till hitting the binge drinking stage and that due to energy drinks impaired the "Self awareness". In fact, that will lead to a false feeling of control and increases conception of being less intoxicated, which affects the decision making process of the consumers (Heckman et al., 2010; Ishak et al., 2013).

O'Brien et al. (2008) state consuming cocktails of energy drinks and alcohol put the students in danger of intoxication complications. For example, due to impaired decision making and problems solving skills, the students might become a victim of sexual abuse, or assaulting another student sexually. Moreover, the student might drive drunk, taking a ride with intoxicated student, or suffering from unintentional injuries and visiting the ERs (O'Brien et al., 2008). Finally, consuming "Energy Drinks Mixed with Alcohol" (AmEDs) could lead to risk behaviors. Miller (2012) reveals that consuming these products could lead to sexually risk behaviors such as "Casual sex" or having intercourse while being drunk. At the last, all the literature review talked about short term exposure only. In fact, there are not long term assessment studies regarding to energy drinks alone, energy drinks with alcohol, or pre- mixed energy drinks. Therefore, public health is in need for more researches regarding to energy drink consumptions in order to gain more understanding about these emerging public health issues. Also, to know what are their effects, side effects, and factors influencing their use in order to plan public health intervention programs in the future.

2.3 Marketing strategies

There are so many ways of making energy drinks to look attractive to the consumers. First, by using advertising campaigns on TV, companies' websites, social media, or even during sponsoring popular sport events like rallies (Pomeranz et al., 2013). Researchers state that commercial campaigns are successful sending a message that claims “Energy Drinks” work to improve the overall body activity and to increase the person intellectual performance. In fact, to support that we can see the sharp increase in energy drink consumption rates among youth (Miller, 2008a; 2008b; Ressig et al., 2008; Woolsey, 2010). Next, using athletics images in the commercials is another way to attract young people to buy the energy drinks through the enticing marketing ploys, which mostly focuses on the lifestyle that is based on sport, fun, and adventure. Also, customizing the energy drinks cans to hold Athletes pictures to target specific segments of the population, mainly young persons, in order to attract them is a good marketing ploy (Miller, 2008a).

Next, giving trial products to the students at universities during certain occasions such as exams period to show them that these products work on reducing fatigue, help to fight stress, and improve their cognitive performance (Woolsey, 2010). Then, offering consumers review on products that say these products do work and the consumers felt amazing while drinking them, could be one of the advertising agenda that works to attract people to use these products (EnergyFiend, 2013a). In details, by taking a look at RockStar’s advertising campaign, we can see it focuses on the young generations -who are 18+ years old- through trying to prove that their products help the consumers to get the needed energy to cope with their lives challenge like school in fashionable ways, which mainly based on speed and adventure (Burke, Caracci, Cheng, Marigliano, 2009).

Targeting a new segment of the population is a new way of marketing. For instance, most of the energy drinks companies work to attract young males and did not mention women; however, new companies such as Cougar Energy, which released its own energy shot that is made for women (Cougar, 2013). The product is available in different colors like pink and purple, and it comes with many different flavors such as "Raspberry, pomegranate, and noni " to meet the desires of the women. In addition, the company claims that this product works to help women relax, controls their hormone level, and gives them the extra needed energy. Also, the company states that their product can be mixed with alcohol (Cougar, 2013). Further, releasing energy shots such as "5 Hour Energy" increases the market size horizontally through targeting more age groups- mainly older generations- who are working throughout the day behind the offices and they need a small size drink that is capable to boost their energy to do more duties during their days; however, that did not mean that these shots will not be attractive to young generations. Moreover, "5 Hour Energy" has increased the market size vertically by booming the seals for energy drinks, which raised the sells in 2011-2012 by 18% that equals to $1.5 billion (Cernivec, 2013)

2.4 The theoretical concept

When we think about any behavior that people always do, certainly it comes to our minds why people do that? And what influences them to do that? What factors are standing behind motivated them to keep doing that? In fact, to understand any behavior we need to investigate the whole picture of the community to get out with a clear understanding about why do people adopt that behavior. Therefore, to understand why college students drink energy drinks and what are the factors that stand behind that behavior, at this point it is critical to use a theoretical framework to justify the study results and findings. Thus, for that reason this study is using the

Social Cognitive Theory (SCT), in particular The Reciprocal Triadic Causation as a base to understand why college students consume energy drinks.

Social Cognitive Theory (SCT): is one of the most comprehensive health behavior theories, which was born in 1941 as Theory of Social Learning by Miller and Dollard. However, in 1963 remolded and introduced to the world by Bandura, and Walters as the Social Cognitive Theory (DiClement et al., 2011/2013; Glanz et al., 2008). This theory tends to explain why and how people behave in a certain way. Also, it helps to understand why they keep behaving in that way. Also, it provides the foundations for public health programs to intervene that behavior.

This theory built on a basic idea that says: People as individuals get affected by their "Social environment" (DiClement et al., 2011/2013). Therefore, observations for the medium that the persons live in such as parents, friends, and celebrities is the major factor that makes them behave in the way they do (DiClement et al., 2011/2013; Glanz et al., 2008). In details, persons tend to adopt what they think it's a good behavior- out of their parents, friends and famous persons- to be part of who we are and how we do things. For example, some people like to buy what the celebrities – like Hollywood stars- wear or drink (DiClement et al., 2011/2013; Glanz et al., 2008).

Social Cognitive Theory (SCT) has five constructs, which they are: Knowledge, perceived self-efficacy, outcome expectations, goal formation, and Sociostructural factors (DiClement et al., 2011/2013). And because this theory is so comprehensive this study is going to focus only one part of it, which is the most critical side of it that is the "Reciprocal Triadic Causation". This aspect contains three parts, which are: They the environment- social and

physical, personal behavior, and personal factors in an equilateral triangle. A diagram of the "Reciprocal Triadic Causation" is displayed in Figure 1.

This construct shows that each one of these concepts affects and get affected by the other two factors. In fact, it is very useful in health education and health promotion fields. This construct involves these three concepts because each one refers to certain factors and plays a specific in adopting a behavior (DiClement et al., 2011/2013). For example, the environment might be the "Social, legal, physical or even economic" which can affect the students' behavior (DiClement et al., 2011/2013). For instance, social environment includes: Friends, parents, classmates, or coworkers. It could play many roles like a hinder to perform a behavior or works to help adopt a behavior (DiClement et al., 2011/2013).

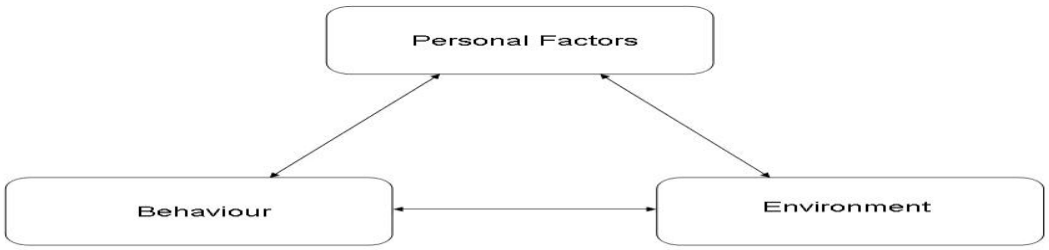

Figure 1. Reciprocal Triadic Causation

For the purpose of this study, social environment effects might be resulting from friends, peers, and classmates who drink energy drinks and have recommended them to the students. Also, it might be from the perspective of regulations and laws as we know there are no regulations that prevent acquiring energy drinks. Moreover, the physical environment did not prevent buying them such as prices, health education programs about their side effects, or age restriction laws. On the contrary, the commercials and ad campaigns showing that using energy

drinks is a beneficial behavior. On the other hand, the student him/herself could affect his/her environment through recommending energy drinks for their friends depending on the past experiences, which was a positive one with good outcome. Sometimes it works in the reverse direction, which means students could change their environment by telling their friends and families that energy drinks are not side effects free products. Simply individuals change our environment and the environment works to change us, which means the process of change is a bidirectional process (DiClement et al., 2011/2013).

The second construct is the "Personal factors", which represents "Sum of all cognitive attributes" DiClement et al., 2011/2013). In details, that the personal factors stand for " Self-efficacy, outcome expectations, and outcome experiences" (DiClement et al., 2011/2013). In this study that could be the students like to drink energy drinks because he/she had a very good experience such as their taste was good. Also, the outcome was positive because he/she felt stronger after consuming energy drinks. That's why they like to buy, to drink them and to recommend them to friends.

The third concept is the "Behavior", which stands for all the behavior that individuals do, which they might be planned or not with good outcomes or bad (DiClement et al., 2011/2013). If the behavior planned and led to good outcomes, the person will try to find ways to keep doing it like buying products or telling friends about certain service. In the case of this study it could keep buying energy drinks and trying to let friends buy them regarding the past experience.

Finally, because the theoretical framework is useful in explaining why people have the way they do and very important in explaining the factors that lay behind their behaviors. Further, it will give a technical pathway to plan health education programs in the future (DiClement et al., 2011/2013), this study is using the "Reciprocal Triadic Causation*"* concept of the Social Cognitive Theory (SCT) as its theoretical framework. It may help to gain more understanding

about why college students drink energy drinks- alone or mixed with alcohol. Also, it may point out the influential factors that motivate students to consume these products. Furthermore, the study may get out with good results. These results might be helpful in the future for public health researchers to investigate this issue in more depth and to plan new programs to intervene energy drink consumptions among college students or even among the community members.

2.5 Summary

In this chapter we have read literature reviews about what are energy drinks. Then, we traveled through the literature reviews to visit some popular ingredients, which used in making energy drinks. Also, also we have gained some understanding about their pharmacokinetics and biological effects on the human body with their side effects. Moreover, we examined more reviews about the side effects of energy drinks, marketing strategies, and the theoretical concept. The trip was interesting hopefully one day it may help someone in the public health field to start an effort to understand this issue from the same or another perspective, which might be helpful to prevent any harm for the youth and college students because they are our future.

CHAPTER THREE

METHODOLOGY

This chapter will address the study design, sampling, the instrument, the participants, and procedures of data collections and analysis. Also, it will describe the statistical measures that will be used during the data analysis process.

The purpose of this study is to assess energy drink consumption among college students. Also, the study is investigating students knowledge about energy drinks ingredients, safety, and possible side effects. Finally, the possible relationships between students' consumption patterns and their social environment such as friends, family members, and media are explored.

3.1 Research design

A cross-sectional research methodology with a descriptive research design was used for this study. A descriptive design can be used to analyze the characteristics of a given population in a systematic and accurate way. A descriptive design is a common way to gather information about either the whole community or part of it through a survey (Olsen & St George, 2004). Descriptive research most often uses a "cross sectional" approach, in which refer to a "slice of time" certain situation in a specific community at specific period of time (Olsen & St George, 2004). These types of studies are not suitable to test hypotheses; however, their goals are to give description about a given subgroup of the community (Levin, 2006). Descriptive designs are often used to document the prevalence of behaviors, healthy or risky, and outcomes of particular behavior (CDC, 2012).

A survey was used in this study to collect the needed information. The term 'survey' refers to a systematic way of collecting information from a group of individuals through asking them an identical set or sets of questions to be most valid, the group should be representative of the whole community that it came from it (Aday & Cornelius, 2006). Using a survey to collect information about any community or a subgroup from that community has some positive points. First, it helps collect data from a large number of people in a short time. Next, it can be a cost effective way to collect data (Blackstone, 2012). Also, the survey approach helps the participants stay anonymous, especially if sensitive information is being collected. The survey also can help to prevent the researcher effect, which reduces bias by giving a standardized set of questions paper, which everyone can answer privately without (Yount, 2006).

3.2 Sample

For this study, a convenience sample of the university students was surveyed. The sample was drawn from undergraduate students enrolled in general education classes Health Education and Recreation, Kinesiology, and Nutrition during the Fall semester 2013. This sampling frame provided different majors, race/ethnicity, age, and gender, although the majority were expected to be freshmen and sophomores. Although this was not a random sample, a power analysis was run to estimate a desirable sample size based on the total number of the undergraduate students (13,306). The desirable sample size was estimated to be 373 participants with a confidence level of 95 percent and α of 0.05 (MaCorr Research, 2003-2013).

3.3 Instrument

The study instrument, the Energy Drinks Survey (Appendix A), was constructed and often the wording of the items were drawn from the available literature and it adopted some items from

online surveys such as the Core Institute survey. The Core institute survey was developed during the 1980s. Even the core survey was not devoted to be used in topics that are related to energy drinks, it was s useful to be used for this purpose of this study because it used by many schools to investigate and to study factors influenced the alcohol intake and drug abuse among college students (the Core institute, 2013). Table 3 shows the items of the Energy Drink Survey items and whether they were adopted or new; additionally, the table explains where they were adopted from. The Energy Drinks Survey was revised several times in order to keep it as simple as possible and to decrease misunderstanding, and the final version of the survey had 36 items. Table 3 shows more details about the survey items.

Table 4

Energy Drink Survey items

Item number	Type	Where it came from and who developed it
Item one	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item two	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item three	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item four	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item five	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item six	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item seven	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item eight	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item nine	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item ten	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 11	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 12	New	
Item 13	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item14	New	
Item 15	New	

Table 4

Energy Drink Survey items

Item number	Type	Where it came from and who developed it
Item 16	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 17	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item18	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item 19	New	
Item 20	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item 21	Adopted with modification	"Alcohol and Drug Surveys" the long form (Core institute, 2013)
Item 22	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 23	New	
Item 24	New	
Item 25	New	
Item 26	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 27	New	
Item 28	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 29	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).
Item 30	New	

Table 4

Energy Drink Survey items

Item number	Type	Where it came from and who developed it
Item 31	New	
Item 32	New	
Item 33	New	
Item 34	New	
Item 35	New	
Item 36	Adopted with modification	"Energy Drink and Risky Behavior Survey" (Buchanan, 2012).

3.4 Pilot test

The “Energy Drinks Survey” (Appendix A) was piloted by 18 students in a health education class for undergraduate majors. They evaluated sequencing, clarity, and made useful suggestions for revising the survey formatting. They also established that average time that was needed to complete the survey was about eight minutes.

3.5 Data Collection

Before administering the survey, the Committee for the protection of human subjects at SIUC (IRB) approved the instrument and procedures to ensure that there were no ethical concerns. After getting the IRB approval, an email sent out to departmental supervisors for 101 instructors in Health Education, Kinesiology, and Nutrition departments asking for their permission to approach the 101 instructors (Appendix B). These gatekeepers approved the process and they asked their 101 instructors to allow the survey to be administered in their classes. A copy of the survey and the IRB approval were sent to all the 101 instructors seven days prior to when it was hopped the survey could be administered.

Next, when the instructors agreed to participate, the researcher handed out paper copies of the survey. With each copy of the survey there was: A cover letter (Appendix C), which gave the students information about the study and the investigator contact details. And assured the participants that their participation would be kept confidential. A consent form was attached to the survey (Appendix D), which stated that the participation was voluntary. And described the numbers of items and the time that was required to fill out the survey (eight to ten minutes). It also described provisions for confidentiality.

Participants were asked to write their emails on a separate page (submitted separately) if they wanted to be a part of a final drawing to win $15 gift card/ or cash. Ten students were chosen through a final drawing and the winners were contacted by email to receive their reward (Appendix E).

3.6 Data analysis

The survey data were coded and analyzed by using the software SPSS. 18.0 (IBM, 2010). First, any participant who did not provide information their actual energy drinks usage were dropped out of the study. In addition, any participant left 20% or more (equals to seven questions or more) of the survey items blank, was dropped out the study. Next, frequencies and percentages were calculated along with the demographic data. If the participants reported that they had drunk an energy drink (with or without alcohol) during the past seven days or during the past 15 day, they were considered "consumers". For some analysis, the data for energy drink consumers vs. non-consumers were compared. For other analysis the consumers were sorted into "regular consumers" vs. "mixed- drink- only consumers (MDO)" based on their responses to question 14 in the survey. Another analysis strategy was to examine both seven days and 15 days usage since Velazquez et al., 2012 found different characteristics and patterns of usage in the two groups.

To analyze "is there any relationship between energy drink consumption and unhealthy/ risky behaviors?", was necessary to create "high" and "low" categories of risky behavior scores. The mean score was estimated to be 4.9 (*SD*= 4.8), so any respondent who scored less than the mean was considered as having a low score in unhealthy behavior. On the other hand,

any participants scored above the mean was considered as having a high score in unhealthy behavior.

Table 5

Instrument Items, and Data Analysis Procedures

NO	Question	Variables		Instrument items	Data analysis
		Independent	Dependent		
1.	What are the demographic characteristics of the participants in the study?	----------	----------	1-13	Frequencies & percentages
2.	How many participants in the study sample are energy drink consumers?	----------	----------	14, 17-18, 20-21	Frequencies & percentages
3.	a- What are the numbers of energy drink (with and without alcohol) that have been consumed over the last seven days and over the last 15 days?	----------	----------	17-18, 20-21	Frequencies & percentages
	b- Is there any difference between the groups regarding the patterns of energy drink consumptions?	Consumption of energy drinks	Amount of consumed energy drinks		An independent t-test
4.	a- What are the energy drink consumers' age and gender distributions	----------	----------	2, 5 and 27	Frequencies & percentages

Table 5

Instrument Items, and Data Analysis Procedures

NO	Question	Variables		Instrument items	Data analysis
		Independent	Dependent		
4.	b- Is there any relationship between gender and energy drink consumption?	Gender & age	Amount consumed	2, 5 and 27	An independent t-test
5.	Is there any relationship between drinking energy drink and employment hours, credit hours, or studying hours for the consumer participants in the study?	Employment, credit, & studying hours	Amount consumed	9-11, and 14	Frequencies & percentages & An independent t-test
6.	Is there any relationship between using energy drinks and sport practices?	Sport activities	Amount consumed	12 and 14	An independent t-test
7.	a- Is there any unhealthy/ risky behaviors among the study participants (like smoking or alcohol intake)?	Specific risky behaviors	Consumers vs. non-consumers	13 &14	Frequencies & percentages & Chi-square & An independent t-test

Table 5

Instrument Items, and Data Analysis Procedures

NO	Question	Variables		Instrument items	Data analysis
		Independent	Dependent		
7.	b- Is there any relationship between energy drink consumption and unhealthy/risky behaviors?	Specific risky behaviors	Energy drink consumption	13 &14	independent t-test
8.	a- For those who use energy drinks, what were their reasons?	----------	----------	16, 22, 26, 31	Frequencies & percentages
	b- For those who use energy drinks, what were their reasons?	----------	----------		
9.	What are the most often used energy drinks?	----------	----------	25	Frequencies & percentages
10.	What are the most frequent points of purchasing for energy drinks?	----------	----------	14 & 30	Frequencies & percentages
11.	What are the effects, side effects, and the feelings experienced after the consumption of energy drinks?	----------	----------	26 &28	Frequencies & percentages

Table 5

Instrument Items, and Data Analysis Procedures

NO	Question	Variables		Instrument items	Data analysis
		Independent	Dependent		
12.	a- How does the social environment influences ways of perceiving energy drinks?	----------	----------	29	Frequencies & percentages
	b- Do the participants think that energy drinks are safe?	Beliefs about energy drinks	Energy drinks consumption	34	Frequencies & percentages & independent t-test
	c- Is there any relationship between the participants' beliefs regarding energy drinks and energy drink consumption?	----------	----------	14 & 34	Chi-square test
13.	a- Is there any difference between the consumer's and non-consumers' knowledge regarding energy drinks' safety?	Knowledge regarding safety	Consumption of energy drinks	14 & 33	Frequencies & percentages & t-test
	b- Is there any difference between consumers' and non-consumers' knowledge of energy drink ingredients?	Knowledge regarding ingredients	Energy drink consumption	14 & 32	Frequencies & percentages & t-test

Table 5

Instrument Items, and Data Analysis Procedures

NO	Question	Variables		Instrument items	Data analysis
		Independent	Dependent		
13.	c- Is there any difference between consumers'(regular and MDO) and non-consumers' knowledge regarding energy drinks' side effects?	Knowledge about energy drinks side effects	Energy drink consumption	14 & 36	Frequencies & percentages & ANOVA

3.7 Summary

This chapter introduced to you the methodology of the study passing through the research design, visiting research questions, aims of the study, stopping to take a look at the population and sampling. Then, going through the instrument, its strengths and weakness, how its piloted ending at the procedures. The procedures walked you through the lines to get a vivid vision about protection of the participants' rights, data collection and analysis with an explanation of the study questions. Finally, after reading all the chapter I hope that you like what you have read.

CHAPTER FOUR

RESULTS

The purpose of this study was to assess energy drink consumption among college students. Also, the study is investigating students knowledge about energy drinks ingredients, safety, and possible side effects. Finally, the possible relationships between students' consumption patterns and their social environment such as friends, family members, and media are explored. The study was focusing on studying undergraduate students at Southern Illinois University at Carbondale. This chapter will explain the results of the study regarding demographic characteristics of the sample, how many students are consuming energy drinks, differences between students who do drink energy drinks and those who did not drink them, and students' knowledge regarding energy drink ingredients and side effects. In addition, the response of the students regarding the safety of the energy drinks, the effects of social environment on the consumption of energy drinks, and the places of purchasing energy drinks are described.

The Energy Drink Survey (Appendix A) was administered to students in class during the Fall 2013 semester at the Southern Illinois University at Carbondale. In sum there were 510 respondents; however, 93 of them were excluded because any participants left 20 percent or more (equals to 7 questions or more) unanswered dropped out the study. any In fact, 32 of the excluded surveys were from energy drink consumers, while 61 were non- consumers. The final number of the respondents was 417.

4.1 Statistical analysis of Research Questions

Research Question 1: What are the demographic characteristics of the participants in the study?

The demographic characteristics of the respondents are presented as the academic majors, age, gender, race, credit hours during this semester, hours spent studying per week, hours of paid employment during the week, if they were single parents or not, current classification, their sport practices, and living arrangement. First of all, the respondents of the study came from 62 different academic major at the school and there were 22 undecided students. The most frequent majors were: Criminal Justice 6.5% (n=28), Kinesiology/ Exercise Science 4.8% (n=20), Education 4.6% (n=19), Business 4.3% (n=18), Architecture 3.6% (n=15), Animal Science 3.4% (n=14), and Psychology 3.4% (n=14).

A total of 44.1% (n=184) of respondents from the study sample were males and a total of 55.9% (n=233) participants of the study sample were females. Respondents ranged in ages between 16- 40 years old; however, a total of 90.2% (n=379) of participants of the study sample fell in the "traditional" college age group 18-22 years old. The mean of the age of the study respondents was 19.96 years (*SD*= 2.48486). Table 6 shows more details about the study respondent ages.

Table 6

Respondents' age distribution frequencies & percentages (n= 417)

Age	Frequency	Percent
16.00	1	0.2
17.00	2	0.5
18.00	101	24.2
19.00	125	30.0
20.00	77	18.5
21.00	46	11.0
22.00	30	7.2
23.00	9	2.2
24.00	6	1.4
25.00	1	0.2
26.00	5	1.2
27.00	6	1.4
28.00	3	0.7
29.00	2	0.5
31.00	1	0.2
37.00	1	0.2
40.00	1	0.2
Total	417	100

In regards to the ethnicity, a total of 58.5% (n=244) of respondents from the study sample identified their ethnicity as White (None Hispanic). Table 7 shows more details about the study sample ethnicity distributions. In regards to being single parents or not, a total of 94% (n=392) of respondents in the study sample reported they were not single parents, while a total of 6% (n=25) of respondents were single parents.

Table 7

Ethnic origin distribution of the study's population (n= 417)

Ethnic origin	Frequency	Percent
White (None Hispanic)	244	58.5
African American	113	27.1
Hispanic/ Latino	40	9.6
Asian	11	2.6
Native American	5	1.2
African	3	0.7
Other	1	0.2
Total	417	100.0

In association with the demographic data, the respondents were asked to report their current academic classification, their sport practices, and what risky or unhealthy behaviors they did during the last 15 days (Table 8). In details, a total of 40% (n= 167) of participants of the study sample were Freshmen, a total of 29.7% (n= 124) of participants were Sophomores, a total of 20.1% (n=84) of respondents were Juniors, and a total of 9.8% (n= 41) of participants were

Seniors. The participants' sport practices were: a total of 6% (n= 25) of participants were school athletes, while a total of 25.2% (n= 105) of respondents of the study sample were not practicing any kind of sport. For living arrangement, a total of 54.2% (n= 226) of respondents of the study participants were living at the school dorms and a total of 5.3% (n= 22) of respondents of the study sample were living off campus. Also, a total of 65% (n= 271) of participant reported they were living with roommates, while a total of 13.4% (n= 56) of respondents were living alone.

Table 8

Demographics of classifications, sport practices, living arrangement (n=417).

Demographics	Frequency	Percentage
Classification		
Freshman	167	40.0
Sophomore	124	29.7
Junior	84	20.1
Senior	41	9.8
Other		
Sport practices		
I go to the gym, but not regularly	150	36.0
I work out regularly	137	32.9
I am too busy for working out	105	25.2
School athlete	25	6.0

Table 8

Demographics of classifications, sport practices, living arrangement (n=417).

Demographics	Frequency	Percentage
Living arrangements		
School dorms	226	54.2
School housing	226	54.2
House/Apartment	155	37.2
Off campus with my parents/children	22	5.3
Fraternity or sorority	5	1.2
Living arrangements		
With roommates	271	65.0
With my parents	71	17.0
Alone	56	13.4
With my spouse/partner	16	3.8
With my children	2	5

In addition, the respondents reported the numbers of hours they worked (Table 9). For instance, a total of 62.4% (n=260) of respondents of the study participants reported they were not employed during the time of the study, while a total of 42.5% (n= 61) of participants of the study sample reported they were working 20 hours per week or more. Table 9 shows more details about the employment hours.

Table 9

Students' employment hours per week frequencies & percentages (n= 417).

Job hours	Frequency	Percent
Not working	260	62.4
2	2	0.5
3	3	0.7
4	3	0.7
5	4	1.0
6	4	1.0
7	2	0.5
8	5	1.2
9	4	1.0
10	12	2.9
11	1	0.2
12	10	2.4
13	3	0.7
14	2	0.5
15	16	3.8
16	9	2.2
17	1	0.2
18	3	0.7
20	37	8.9

Table 9

Students' employment hours frequencies & percentages (n= 417)

Job hours	Frequency	Percent
22	1	0.2
25	6	1.4
26	1	0.2
27	2	0.5
28	2	0.5
29	1	0.2
30	7	1.7

Then, the participants reported the number of credit hours that they were taking for the current semester (Table 10). Table 10 shows more details about the student credit hours during this semester.

Table 10

Respondents' credit hours frequencies & percentages (n= 417).

Credit hours	Frequency	Percent
4	3	0.7
5	1	0.2
6	9	2.2
8	14	3.4
9	1	0.2
10	38	9.1
11	3	0.7
12	61	14.6

Table 10

Respondents' credit hours frequencies & percentages (n= 417)

Credit hours	Frequency	Percent
13	2	0.5
14	107	25.7
15	67	16.1
16	68	16.3
17	16	3.8
18	5	1.2

The respondents reported the number of hours that they spent studying weekly during the semester (Table 11) . Table 11 shows more details about hours of studying.

Table 11

Students' weekly hours of study frequencies & percentages (n= 417)

Hrs/week	Frequency	Percent
1	3	0.7
2	25	6.0
3	26	6.2
4	41	9.8
5	53	12.7
6	40	9.6
7	9	2.2

Table 11

Students' weekly hours of study frequencies & percentages (n= 417)

Hrs/week	Frequency	Percent
8	46	11.0
9	5	1.2
10	62	14.9
12	21	5.0
12	61	14.6
13	4	1.0
14	3	0.7
15	17	4.1
16	5	1.2
18	3	0.7
20	22	5.3
24	2	0.5
25	3	0.7
26	1	0.2
30	11	2.6
35	1	0.2
36	1	0.2
38	1	0.2
40	5	1.2

Research Question 2: How many participants in the study sample are energy drink consumers?

The respondents were asked to answer questions that were related to their energy drink consumption (Table 12). Therefore, a total of 28.5% (n=119) of respondents of the study participants were identified as energy drink consumers. And a total of 71.5% (n=298) of participants of the study sample were classified as non-consumers. Table 12 shows more details about the consumers' group and non- consumers' group.

Table 12

Respondents' energy drink classifications (n= 417)

Classification	Frequency	Percent
Energy drink Consumers	119	28.5
Non-consumer	298	71.5
Total	417	100.0

Also, the consumer group was divided into two subgroups depending on the participants' energy drink consumption patterns (Table 13). The subgroups consisted of: A total of 38.7% (n= 46) of participants from the consumer group identified themselves as regular consumers who drink energy drink on a regular basis with and without alcohol. A total of 61.3% (n= 73) of participants of the study respondents identified as Mixed-drinks only consumers (MDO)- who consume energy drinks mixed with alcohol only. Table 13 shows more details about energy drink usage.

Table 13

Energy drink consumers' classification (n=119).

Classification of Energy drink Consumers	Frequency	Percent
Regular consumers	46	38.7
Mixed – drink- only consumers (MDO)	73	61.3
Total	119	100.0

Research Question 3:

a- What are the numbers of energy drink (with and without alcohol) that have been consumed over the last seven days and over the last 15 days?

b- Is there any difference between the groups regarding the patterns of energy drink consumptions?

To answer this question first, the regular consumers in the study were asked to answer questions that were related to the number of energy drinks (without alcohol) that they had during the last seven days in comparison to the number of energy drinks that they had during the last two weeks. For the seven days, the estimated mean for the group was (Mean= 4.1). In contrast, for consuming energy drinks during the last 15 days, the estimated mean for the group was (Mean= 7.65). Table 14 presents more details about drink consumption numbers during the last week vs. during the last 15 days.

Table 14

Comparing the consumption of Energy drink (without alcohol) during the last week vs. during the last 15 days among the regular consumer group (n= 46).

During the last week			During the last 15 days		
No. of drinks	Frequency	Percent	No. of drinks	Frequency	Percent
.00	6	13.0	1	2	4.3
1	10	21.7	2	5	10.9
2	7	15.2	3	8	17.4
3	4	8.7	4	1	2.2
4	1	2.2	5	7	15.2
5	7	15.2	7	3	6.5
6	1	2.2	8	4	8.7
7	5	10.9	9	3	6.5
8	1	2.2	10	3	6.5
12	1	2.2	11	2	4.3
15	1	2.2	12	2	4.3
20	1	2.2	15	1	2.2
22	1	2.2	16	1	2.2
			20	3	6.5
			30	1	2.2

Next, the study was asking the both groups of consumers –regular and MDO consumers- to report how many energy drinks mixed with alcohol they had during the last seven days and during the last 15 days prior to the study. A comparison between the groups consumption patterns can be seen in (Table 15 & 16). First, for the consumption of energy drinks mixed with alcohol during the last seven days, the calculated mean for the regular consumer group was (Mean= 1.15). And the estimated mean of the mixed- drinks only consumer group (MDO) was (Mean= 2.0). Table 15 shows more details regarding the number of the consumed mixed drinks during the last week.

Second, for the consumption of energy drinks mixed with alcohol during the last 15 days, the estimated mean for the regular consumer group was (Mean= 2.1) and the calculated mean for the MDO group was (Mean= 5.5). Table 16 shows the comparison between the regular consumers vs. the MDO consumers group.

Table 15

Comparing energy drinks mixed with alcohol consumption patterns between regular consumers (n= 46) vs. MDO consumers (n=73) during the last seven days.

Regular consumer			MDO consumer		
No. of drinks	Frequency	Percent	No. of drinks	Frequency	percent
.00	32	69.5	.00	30	41.1
1.00	2	4.3	1.00	11	15.1
2.00	5	10.9	2.00	14	19.2
3.00	3	6.5	3.00	6	8.2
4.00	1	2.2	4.00	3	4.1
6.00	1	2.2	5.00	3	4.1
7.00	1	2.2	6.00	1	1.4
15.00	1	2.2	8.00	1	1.4
			10.00	2	2.7
			12.00	1	1.4
			20.00	1	1.4
Total	46	100.0	Total	73	100.0

Table 16

Comparing drinks mixed with alcohol consumption patterns among regular consumers (n= 46) vs. MDO (n=73) consumers during the last 15 days.

Regular consumers			MDO consumers		
No. of drinks	Frequency	Percent	No. of drinks	Frequency	Percent
.00	22	47.8	.00	2	2.7
1.00	3	6.5	1.00	8	11.0
2.00	4	8.7	2.00	9	12.3
3.00	4	8.7	3.00	17	23.3
4.00	3	6.5	4.00	6	8.2
5.00	4	8.7	5.00	8	11.0
6.00	2	4.3	6.00	5	6.8
7.00	1	2.2	7.00	3	4.1
8.00	1	2.2	8.00	2	2.7
9.00	1	2.2	9.00	5	6.8
10.00	1	2.2	10.00	3	4.1
			11.00	1	1.4
			12.00	1	1.4
			15.00	1	1.4
			20.00	1	1.4
			60.00	1	1.4
Total	46	100.0	Total	73	100.0

It was found that MDOs drank more energy drinks than those who drank them (both) with/ or without alcohol especially, during the past 15 days the difference was particularly notable between the two groups. An Independent Samples t-test was run to see whether the observed difference was statistically significant or not.

First, an Independent Samples t-test was run to compare energy drink consumption in the two groups (regular and MDO) for the past week. The t-test value was calculated to be (t= 6.789), (df= 117) and the p value was estimated to be (p= .000). The results indicate that there was a statistically significant evidence to support that the MDO consumers had more energy drinks than the regular consumers. Second, another t-test was run to compare both groups regarding the number of energy drinks (mixed with alcohol) that have been consumed over the last 15 days prior to the study. Again the t-test value was estimated to be (t= 6.758), (df= 117) and the calculated p value was (p= .000). The results mean there was a significant difference in the two groups, with the MDO consumers were drinking more energy drinks than the regular consumers.

Next, the respondents were asked whether they have had pre-mixed energy drinks or not during the last 15 days (Table 17). A total of 50% (n= 23) participants of the regular consumers had pre-mixed energy drinks during the last two weeks, a total of 60.3% (n= 44) respondents of the MDO had pre-mixed alcoholic energy drinks during the last two weeks.

Table 17

Pre-mixed alcoholic energy drinks during the last 15 days (n= 46) regular consumers vs. (n= 73) MDO consumers.

Consumers	Frequency	Percent.
Regular consumers	23	50.0
MDO	44	60.3

Also, both groups were asked to report the number of pre-mixed drinks that they had during the last 15 days (Table 18). The study results showed that a total of 8.7% (n= 4) of participants of the regular consumer groups had one pre-mixed energy drinks during the last 15 days. And a total of 11% (n= 8) of respondents of the MDO had one pre-mixed alcoholic energy drinks. Table 18 shows the details of the consumption patterns.

Table 18

Comparing the number of pre-mix alcoholic energy drinks between regular consumers (n= 46) vs. MDO (n= 73) during the last 15 days.

Regular consumers			MDO		
No. of drinks	Frequency	Percent	No. of drinks	Frequency	Percent
I do not drink them	23	50.0	I do not drink them	28	38.4
.00	6	13.0	.00	10	13.7
1.00	4	8.7	1.00	8	11.0
2.00	4	8.7	2.00	7	9.6
3.00	6	13.0	3.00	7	9.6
4.00	1	2.2	4.00	5	6.8
5.00	1	2.2	5.00	1	1.4
10.00	1	2.2	6.00	3	4.1
			10.00	3	4.1
			20.00	1	1.4
Total	46	100.0	Total	73	100.0

Research Question 4:

a- What are the energy drink consumers' age and gender distributions?

b- Is there any relationship between gender and energy drink consumption?

Those who reported using energy drinks were asked to report their age at which they had their first energy drink (Table 19). The results were: A total of 1.7% (n= 2) of respondents in the study sample had their first energy drinks while they were 5 years old. And a total of 10.1% (n= 12) of respondents in the study sample reported that they had their first non-alcoholic energy drink at age 13 years old. By looking at Table 19, a substantial number of the respondents, who consumed non-alcoholic energy drinks, drank energy drinks before age 17 (32.8 percent; n= 39). Table 19 presents more details about the non-alcoholic energy drink consumption patterns .

Table 19

Age at first energy drink without alcohol consumption started (n= 119).

Energy drinks without alcohol for the first time		
Age	Frequency	Percent
5.00	2	1.7
8.00	2	1.7
10.00	2	1.7
11.00	2	1.7
12.00	6	5.0
13.00	12	10.1
14.00	6	5.0
15.00	2	1.7
16.00	3	2.5
17.00	2	1.7
18.00	5	4.2
19.00	2	1.7

The first age at which alcoholic energy drinks used seems to be somewhat older, with 10 years a total of 2.5% (n= 3) of respondents of the study sample reported having their first alcoholic energy drink. And by adding the number of the participants we can conclude, of students who consumed alcoholic energy drinks, a substantial number drank them before age 17 (32.8 percent; n= 39) and 80.4 percent (n= 96) before age 19. Table 20 shows more details about the age distribution of the energy drink consumers (with and without alcohol).

Table 20

Age at first alcoholic energy drinks consumption started regular consumers (n= 119)

Alcoholic energy drinks for the first time		
Age	Frequency	Percent
10.00	3	2.5
12.00	3	2.5
13.00	2	1.7
14.00	14	11.8
15.00	11	9.2
16.00	20	16.8
17.00	14	11.8
18.00	19	16.0
19.00	10	8.4
20.00	2	1.7
21.00	7	5.9
22.00	3	2.5
23.00	1	0.8
25.00	1	0.8

The study respondents (consumers and non-consumers) were asked to report their gender as it was explained in research question one -under the demographic characteristics of the study respondents . However, this study was looking to see if there was any relationship between the consumer's gender and energy drink consumption patterns. The consumers' gender distribution explained in Table 21. A total of 63.0% (n= 29) of respondents of the regular consumer group were males, while 37% (n= 17) of participants from the group were females. In contrast, a total of 37% (n=27) of participants of the MDO were males, while of 63% (n=73) for the group respondents were females. Table 21 shows the gender distribution details for the consumer population.

Table 21

Comparing gender distribution among the regular consumers (n= 46) vs. MDO (n= 73).

Regular consumers			MDO		
Gender	Frequency	Percent	Gender	Frequency	Percent
Male	29	63.0	Male	27	37.0
Female	17	37.0	Female	46	63.0
Total	46	100.0	Total	73	100.0

Next, by considering the results in Table 21, the percentage of the male respondents in the regular group was higher than females. On the other hand, the number of female respondents was higher than males in the MDO group. Therefore, t-tests were run to see if the relationships were significant. First, for the regular consumer group the results were: The estimated t value was (t= .207), (df= 117) and the calculated p value was (p= .837). The results did not support that there was a relationship between gender and energy drink consumption regarding the usage of energy drinks without alcohol. On the other hand, the t-test results were: The calculated t value was (t= -2.843), (df= 117), and the calculated p value was (p =.005). The results mean there was a strong evidence to support that females in the MDO group had more energy drinks than the males did.

Research Question 5: Is there any relationship between drinking energy drinks and employment hours, credit hours, or hours of studying for the consumers?

First, all the participants of the study were asked to report the number of hours that they spent at a paid employment. It was explained previously under the demographic section (research question number one). For more details the respondents' responses were classified into two groups (non-consumers and consumers) regarding their energy drink consumption (Table 22). Table 22 shows the details about respondents' employment hours.

Table 22

Comparison of respondents' hours of employment between non-consumers (n=298) vs. consumers (n=119).

Non-consumers			Consumers		
Employment hours	Frequency	Percent	Employment hours	Frequency	Percent
184	61.7		.00	76	63.9
2	0.7		3.00	1	0.8
2	0.7		6.00	1	0.8
3	1.0		9.00	1	0.8
4	1.3		10.00	1	0.8
3	1.0		11.00	1	0.8
2	0.7		12.00	2	1.7
4	1.3		14.00	1	0.8

Table 22

Comparison of respondents' hours of employment between Non-consumers (n=298) vs. Consumers (n=119).

Non-consumers			Consumers		
Employment hours	Frequency	Percent	Employment hours	Frequency	Percent
3	1.0		15.00	4	3.4
11	3.7		16.00	1	0.8
8	2.7		18.00	1	0.8
3	1.0		20.00	16	13.4
1	0.3		26.00	1	0.8
12	4.0		29.00	1	0.8
8	2.7		30.00	4	3.4
1	0.3		32.00	1	0.8
2	0.7		40.00	4	3.4
21	7.0		60.00	1	0.8
1	0.3				
6	2.0				
2	0.7				
2	0.7				
3	1.3				
4	1.3				

To see if there was any difference between groups (consumers and non-consumers) in regard to energy drink consumption, an Independent Sample t-test was run. The test results were: The calculated t value was (t= 1.762), (df=409), and the calculated p value was (p=.079). These findings were suggestive that there was evidence that supports an association between employment hours and drinking energy drinks.

Second, to see if there was any relationship between the respondents' credit hours during the study semester and energy drinks consumption (Table 23). The groups (Non-consumers and consumers) credit hours illustrated in (Table 23).

Table 23

Participants' credit hours frequencies and percentages, non-consumers (n= 298) vs. (consumers (n= 119).

Non-consumers			Consumers		
Credit hours	Frequency	Percent	Credit hours	Frequency	Percent
4.00	2	0.7	4.00	1	0.8
5.00	1	0.3	6.00	3	2.5
6.00	6	2.0	8.00	4	3.4
8.00	10	3.4	10.00	10	8.4
9.00	1	0.3	12.00	24	20.2
10.00	28	9.4	13.00	1	0.8
11.00	3	1.0	14.00	29	24.4
12.00	37	12.4	15.00	21	17.6

Table 23
Participants' credit hours frequencies and percentages, non-consumers (n= 298) vs. (consumers (n= 119).

Non-consumers			consumers		
Credit hours	Frequency	Percent	Credit hours	Frequency	Percent
14.00	78	26.2	16.00	19	16.0
15.00	46	15.4	17.00	2	1.7
16.00	49	16.4	18.00	1	0.8
17.00	14	4.7			
18.00	4	1.3			

Then, an Independent Samples t-test was conducted to see if there was any relationship between credit hours of the respondents and energy drink consumption. The t value was calculated to be (t= -0.650), (df= 393), and the estimated p value was (p= 0.516). The findings mean there was not any association credit hour and energy drink consumption.

Third, the respondents reported the number of hours that they spent studying (Table 24). An Independent Samples t-test was run to see if there was any relationship between the hours of study and energy drink consumption. The t-test calculated value was (t= 0.731), (df= 408), and the estimated p value was (p= 0.465). So, there was not any evidence of an association between the studying time and energy drink use.

Table 24

Studying hours non-consumers (n=298) vs. consumers (n= 119).

Non-consumers			Consumers		
Studying hours	Frequency	Percent	Studying hours	Frequency	Percent
1.00	3	1.0	2.00	5	4.2
2.00	20	6.7	3.00	6	5.0
3.00	20	6.7	4.00	10	8.4
4.00	31	10.4	5.00	15	12.6
5.00	38	12.8	6.00	14	11.8
6.00	26	8.7	7.00	2	1.7
7.00	7	2.3	8.00	15	12.6
8.00	31	10.4	9.00	1	0.8
9.00	4	1.3	10.00	20	16.8
10.00	42	14.1	12.00	5	4.2
12.00	16	5.4	13.00	2	1.7
13.00	2	0.7	14.00	1	0.8
14.00	2	0.7	15.00	8	6.7
15.00	9	3.0	16.00	1	0.8
16.00	4	1.3	18.00	1	0.8
18.00	2	0.7	20.00	4	3.4
20.00	18	6.0	25.00	1	0.8

Table 24

Studying hours non-consumers (n=298) vs. consumers (n= 119).

Non-consumers			Consumers		
Studying hours	Frequency	Percent	Studying hours	Frequency	Percent
24.00	2	0.7	26.00	1	0.8
25.00	2	0.7	30.00	3	2.5
30.00	8	2.7	35.00	1	0.8
36.00	1	0.3	40.00	2	1.7
38.00	1	0.3			
40.00	3	1.0			

Research Question 6: Is there any relationship between using energy drinks and sport practices?

In order to investigate the relationship between energy drink consumptions and sport practice (Table 25), an Independent Samples t- test was completed. The estimated t value was (t=1.152), (df= 415), and the calculated p value was (p=.250), so there was not any evidence to support that sport practice have effects on energy drink consumption in a way could alter their consumption.

Table 25

Respondents' sport classifications, energy drink consumers (n=119) vs. non-consumers (n=298).

Sport	Consumers		Non-consumers	
	Frequency	percent	Frequency	percent
I go to the gym, but not regularly	49	41.2	101	33.9
I work out regularly	36	30.3	101	33.9
I am too busy for working out	30	25.2	75	25.2
School athlete	4	3.4	21	7.0
Total	119	100.0	298	100.0

Research Question 7:

a- Is there any unhealthy/risky behavior among the study participants?

b- Is there any relationship between energy drink consumption and unhealthy/ risky behaviors?

Next, for the engagement in unhealthy/risky behavior, the respondents were asked if they had used tobacco, alcohol, steroids, recreational drugs, or muscle enhancing drugs over the last 15 days (Table 26). Table 26 shows more details about both consumers and non-consumers respondents regarding risky behaviors.

Table 26

Comparing the risky behavior engagement during the last 15 days among energy drinks consumers (n=119) vs. Non-consumers (n=298)

Risky behavior	consumers		Non- consumer	
	Frequency	Percent	Frequency	Percent
Tobacco	43	36.1	49	16.4
Alcohol	85	71.4	143	48.0
Recreational drugs	25	21.0	49	16.4
Steroids	2	1.7	3	1.0
Muscle enhancing drugs	1	0.8	4	1.3

In fact, the study findings (Table 26) showed that there were high percentages of energy drink consumers who have been engaging in unhealthy or risky behaviors such as smoking tobacco and drinking alcohol. Energy drink consumers and non-consumer were compared for

statistical difference regarding engagement in unhealthy/risky behaviors. Participants were given scores depending on the number of the unhealthy behaviors that they reported doing during the last 15 days. The range of the scores was estimated to be from 0.00 to 25.00. The mean score was estimated to be 4.9 (*SD*= 4.8). So, any respondent from either energy drink consumers or non-consumers group got a score that was lower than the mean will be considered as having a low score in unhealthy behavior. On the other hand, any individual from both groups got a score that was higher than the mean will be considered as having a high score in unhealthy behavior. Those with high scores mean that they were engaging in unhealthy behaviors more than those with low scores.

Next, frequencies of low and high scores respondents in both groups were created to make a 2×2 table in order to make it easy to conduct a Chi-square test (Table 27). Then, a Chi square test has conducted in order to examine the relationships between energy drinks and engaging in unhealthy/risky behaviors. The results of the test were: The estimated Chi value was (Chi= 25.026), (dF = 5), and the estimated p value was (p =.000). The results showed that there was a statistically significant evidence support that consuming energy drinks is associated with the likelihood of engaging in unhealthy/ risky behaviors.

Table 27

Risk behavior scores for (n=119) Energy drink consumer Vs. (n=298) Non-consumer.

Scores	Energy drink consumers		Non- consumers	
	Frequency	%N	Frequency	%N
Low unhealthy behavior scores	24	20.2	126	42.3
High unhealthy behavior scores	95	79.8	172	57.7
Total	119	100	298	100

Also, an Independent Samples t-test was run in order to make sure that the results were not coming from a systematic chance. The t- test value was estimated to be (4.626), (df= 415), and the estimated p value was (.000). In fact, the results mean there was a strong evidence that supports drinking energy drinks was associated with more unhealthy behaviors among consumers than the non-consumers.

Research Question 8:

a- For those who use energy drinks, what were their reasons?

b- For those who do not use energy drinks, what were their reasons?

First, participants who had consumed energy drinks (with and without alcohol) during the past 15 days were asked to rate some statements on a Likert scale (Table 28). The reasons of using energy drinks were: "Dinking them to get more energy" rated the highest with (93.5%) followed by "drinking them to stay awake" (82.4%) and "help me drive long distance for more time" (65.5%). Table 28 shows more details about the reasons why the respondents were drinking energy drinks.

Table 28

Reasons for drinking energy drinks among regular consumers (n= 46).

Reason	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	Freq.	%	Freq.	%	Freq	%	Freq	%	Freq	%
Get more energy	20	43.5	23	50	3	6.5	----	-----	----	------
Stay awake	16	34.8	22	47.8	4	8.7	2	1.7	2	4.3
Their taste is so delicious	13	28.3	18	39.1	5	10.9	10	21.7	-----	------
Help me drive long distance for more time	10	21.7	20	43.5	7	15.2	5	4.2	4	8.7
Partying and mix them with alcohol	9	19.6	12	26.1	7	15.2	7	15.2	11	23.9
Improve my mood	7	15.2	10	21.7	18	39.1	7	15.2	4	8.7
I drink them without specific reason	6	13	5	10.9	6	13	5	10.9	24	52.2
Hydrate my body	4	8.7	15	32.6	4	8.7	13	28.3	10	21.7
Athletes and celebrities drink them, so do I	4	8.7	9	19.6	7	15.2	8	17.4	18	39.1
Energy drinks mean youth &strength	3	6.5	12	26.1	8	17.4	15	32.6	8	17.4

Table 28

Reasons for drinking energy drinks among regular consumers (n= 46).

Reason	Strongly agree		agree		Neutral		disagree		Strongly disagree	
Their price is cheap	2	4.3	7	15.2	11	23.9	13	28.3	13	28.3
I can't function without them	2	4.3	3	6.5	3	6.5	8	17.4	29	63
The commercials say: "Energy drinks boost my energy" So, I drink them.	1	2.2	4	8.7	6	13	20	43.5	15	32.6
My friends influenced me	1	2.2	3	6.5	3	6.5	13	28.3	25	54.3

Next, the study participants (regular consumers and MDO) were asked about the reasons for consuming energy drinks mixed with alcohol during the last 15 days (Table 29). The three most often answers were: "To make the alcohol taste better" 78.2% (n= 93), "mixing them to party longer" 37% (n= 44), and "mixing them to be able to drink more alcohol" 29.4% (n= 35). Table 29 shows more details about the other reasons.

Table 29

Reasons for mixing energy drinks with alcohol (n= 119)

Reason	Frequency	Percent
Make alcohol taste better	93	78.2
To party longer	44	37.0
To be able to drink more alcohol	35	29.4
To relieve alcohol effects & fight hangover effects.	20	16.8
To be able to have sex after partying.	13	10.9
So I can drive home after partying.	9	7.6

Furthermore, those who do not consume energy drinks, non-consumer, were asked why they did not consume energy drinks (Table 30). The most often answers were: "I am just not interested in them" 58.7% (n= 175) and a total of 51.3% (n= 153) respondents reported that "energy drinks might not be healthy". Table 30 shows more details about the reasons for not using energy drinks.

Table 30

Reasons for why not drinking energy drink among the non-consumers (n= 298).

Feelings	Frequency	%N
I am just not interested	175	58.7
They might not be healthy	153	51.3
They do not taste good	113	37.9
They are expensive	75	25.2
I do not feel ok when I drink them	75	25.2
Other	5	1.7

Research Question 9: What are the most often used energy drink?

The study participants who drank energy drinks, were asked to indicate at a 6 point scale how often they had drank various energy drinks (Table 31). Table 31 shows more details regarding energy drink and their popularity among the study sample.

Table 31

The most often used energy drinks among energy drink consumers (n=119).

Energy drink	Most often used	
	Frequency	Percent
Red Bull	85	71.4
Monster	66	55.5
5- Hours Energy	24	20.2
RockStar	20	17.8
Amp	15	12.6
Full-Throttle	4	3.3

Research Question 10: What are the most frequent points of purchasing for energy drinks?

This study devoted a question to address the access to energy drinks, and to determine the most common places from which the respondent get to purchase their energy drinks (Table 32). The most common three places to purchase energy drinks were: Convenience stores/ Gas stations, which got a total of 73.1% (n=87). Followed by Walmart, Sams club, grocery stores,...etc, which got a total of 68.1% (n= 81). On the campus/ vending machines got a total of 57.1% (n=68). Table 32 shows more details about other places of purchasing energy drinks.

Table 32

Frequencies and percentages of points of purchase for energy drinks (n=119).

Places of access	Freq.	%N
Convenience stores/ Gas stations	87	73.1
Walmart, Sams club, grocery stores,...Etc.	81	68.1
On campus/ vending machines	68	57.1
Bars	67	56.3
Pharmacies like Walgreens	31	26.1
Liquor stores	30	25.2
Other	1	0.8

Next, to be more specific about the access of each group of the consumers, Tables 33 and 34 were created to show the common places of purchasing energy drinks for each group of the consumers (regular and MDO).

Table 33

Places of purchasing energy drinks for regular consumers (n= 46).

Places of access	Regular consumers	
	Frequency	percent
Convenience stores/ Gas stations	38	82.6
Walmart, Sams club, grocery stores,...etc.	33	71.7
On campus/ vending machines	22	47.8
Bars	18	39.1
Pharmacies like Walgreens	13	28.3
Liquor stores	12	26.1
Other	1	1.4

Table 34

Places of purchasing energy drinks for MDO (n= 73).

Places of access	MDO	
	Frequency	Percent
Convenience stores/ Gas stations	49	67.1
Bars	49	67.1
Walmart, Sams club, grocery stores,...etc.	48	65.8
On campus/ vending machines	46	63.0
Pharmacies like Walgreens	18	24.7
Liquor stores	18	24.7
Other	----------	----------

Research Question 11: What are the effects, side effects, and the feelings experienced after the consumption of energy drinks (with or without alcohol)?

This study asked the energy drink consumers about the effects or side effects that they felt after consuming energy drinks. The side effects are shown in (Table 35). The three most frequent answers were: Mentally active (56.3%), My heart beats faster than before (45.4%), and Restless (39.5%). Table 35 shows more details about the effects and side effects among the consumer groups.

Table 35

Responses for effects and side effects of energy drinks among regular consumers (n= 46) and MDO (n= 73).

Effects or Side effects	Frequency	%N
Mentally active	67	56.3
My heart beats faster than before	54	45.4
Restless	47	39.5
Not hungry	43	36.1
Jolt/Crash episode	43	36.1
Agitating	18	15.1
Drowsy	16	13.4
Get insomnia	12	10.1
Nausea	12	10.1
Others	2	1.7

Then, the respondents were asked about how they felt after consuming an energy drink with alcohol (Table 36). The most frequent three results were: To be more aware about things around me (82%), I need to drink more alcohol than usual (48.7%), and I can make accurate decisions (37.8%).

Table 36

Respondents' feelings after consuming energy drinks mixed with alcohol (n=119).

Feelings	Frequency	%N
Be more aware about things around me	82	68.5
I need to drink more alcohol than usual	58	48.7
I can make accurate decisions	45	37.8
I feel that I am not drunk	21	17.6
I want to engage in intimate relation (sex)	21	17.6
I got more courage to do new things like smoking	12	10.1
I can go with a drunk driver to help him/her go home safe	3	2.5
Other	2	1.7

Research Question 12:

a- How does the social environment influence the participants' ways of perceiving energy drinks?

b- Do the participants think that energy drinks are safe to be used because energy drinks are being advertized?

c- Is there any relationship between the participants' beliefs regarding energy drinks and energy drink consumption?

First, starting with how the social environment influences the participants" ways of perceiving energy drinks. Those who reported using energy were asked to evaluate six statements about the effects of the social environment on the consumption of energy drinks (Table 37). A total of 50.4% (n= 60) of participants reported either strongly agreeing or agreeing about "I like trying new products, new things, and I am adventurous, that's why I drink energy drinks". Then, a total of 22.7% (n= 27) of respondents in the study sample reported either strongly agreeing or agreeing regarding "Their cans are colorful and sexy, so they are attractive to me". A total of 21% (n= 25) of participants either strongly agreeing or agreeing about "It seems that everybody around me- my friends and my parents- drink energy drinks". These and other results are shown in Table 37

Table 37

The effects of social environment on energy drink consumers (n= 119).

Statement	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
I like trying new products, new things, and I am adventurous, that's why I drink energy drinks	11	9.2	49	41.2	16	13.4	14	11.8	29	24.4
It seems that everybody around me- my friends and my parents- drink energy drinks	5	4.2	20	16.8	25	21	29	24.4	40	33.6
Energy drinks represent sports, adventure, outdoor, and athletic lifestyle, so I like them	5	4.2	10	8.4	20	16.8	35	29.4	49	41.2
Their cans are colorful and sexy, so they are attractive to me.	3	2.5	24	20.2	28	23.5	25	21	39	32.8
I drink energy drinks because my friends/ roommates recommended them to me	3	2.5	7	5.9	17	14.4	45	37.8	47	39.5
My parents are drinking energy drinks, so do I	2	1.7	10	8.4	11	9.2	34	28.6	62	52.1

Both consumers and non-consumers were asked about the safety of energy drinks. they were asked to evaluate "Energy drinks are advertised, so they must be safe" (Table 38). A total of 28.6% (n=34) of participants who use energy drinks reported strongly agreeing or agreeing, in contrast to 7.7% (n= 23) of respondents of the non-consumer group. Table 38 shows more details about how the participants rate the statement.

Table 38

Respondents' opinions regarding energy drink safety (n=417).

Respondents	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Consumers	3	2.5	31	26.1	24	20.2	41	34.5	20	16.8
Non-consumer	5	1.7	18	6.0	40	13.4	98	32.9	137	46.0

A Chi-square test was run to investigate if there was any difference in perception of safety of energy drinks both consumers vs. non-consumers. The calculated Chi square value was (Chi= 51.091), (df= 4), and the estimated p value was (p = 0.000), indicating a significant difference in the two groups.

Research Question 13:

a- Is there any difference between consumers' and non-consumers' knowledge of energy drinks' safety?

b- Is there any difference between consumers' and non-consumers' knowledge of energy drinks' ingredients?

c- Is there any difference between consumers'(regular and MDO) and non-consumers' knowledge regarding energy drinks' side effects?

one aim of this study was to assess the participants' knowledge regarding energy drinks in terms of being aware about their ingredients, safety, and side effects. And whether any difference was evident in consumers vs. non-consumers.

First, the participants were asked whether they think that energy drinks are tested by a federal agency in order to make sure that they have no side effects on human consumers (Table 39). A total of 54.6% (n= 65) of participants of the consumers reported strongly agreeing or agreeing that energy drink are tested. In contrast, 30.6% (n= 91) of the non-consumer participants reported strongly agreeing or agreeing that they agreed that energy drink were tested. Table 39 shows more details regarding energy drink being tested.

An Independent Samples t-test was run to see if there was any among the groups, the consumer groups. The calculated t value was (t= 4.893), (df= 415), and the estimated p value was (p= .000). These results mean there was a statistically significant evidence to support that energy drink consumers had more confidence that energy drinks are tested for safety.

Table 39

Participants' response regarding energy drinks safety among consumers (n= 119) vs. non-consumers (n= 298).

Participants' responses	Consumers		Non-consumers	
	Frequency	Percent	Frequency	Percent
Strongly agree	5	4.2	10	3.4
Agree	60	50.4	81	27.2
Neutral	36	30.3	102	34.2
Disagree	13	10.9	65	21.8
Strongly disagree	5	4.2	40	13.4
Total				

Second, assessing the participants' knowledge regarding energy drink ingredients. And this part has three sub-parts, which are they:

In order to determine how many participants in the study have read the labels of energy drinks, all the respondents (consumers and non-consumers) were asked "Have you read the ingredients list of the energy drinks?" (Table 40). A total of 62.8% (n = 262) of all respondents in the study sample reported that they did not.

Table 40

Participants' responses reading ingredients lists of energy drinks (n=417).

Answers of all the participants	Frequency	%N
Yes	155	37.2
No	262	62.8
Total	417	100.0

Moreover, the study examined the difference between the consumers and non-consumers regarding reading energy drinks' ingredient labels (Table 41). An Independents Samples t-test was run, with an estimated t value of (.052), (df= 415), and a calculated p value of (p=.958). The results indicated that there was not any difference between the groups regarding reading the labels of energy drinks.

Table 41

Respondents who answered no regarding labels reading consumers (n=119) vs. non-consumer (n=298)

Respondent	Frequency	Percent
Consumers	75	63.0
Non-consumers	187	62.8

Next, the participants were asked to select a number of energy drink ingredients, which were given to them in the question. Then, each participants was given a score depending on the number of ingredients that he/she selected. Each one ingredient was worth five points, to approximate Likert scaling on other items. The range of the scores was calculated to be from 0.00 to 35.00, while the mean was estimated to be 12.9 (*SD*= 11.18). So, any respondent

(consumers and non consumers) got a total score lower than the mean will be considered as having a low level of knowledge regarding energy drink's ingredients (Table 42). On the other side, each participant who got a total scores higher than the mean will be considered as having a high level of knowledge regarding energy drink ingredients. Table 42 shows the scoring details

Table 42

Respondents' knowledge scores regarding energy drink ingredients. (n= 119) Consumers Vs. (n= 298) Non-consumers.

Scores	Consumers		Non- consumers	
	Frequency	percent	Frequency	percent
Low level of knowledge	60	50.4	163	54.7
High level of knowledge	59	49.5	135	45.4
Total	119	100	298	100

An Independent Samples t-test was run in order to investigate if there is any difference among the means of the two groups (consumers and non-consumers). The t value was calculated to be (t= 0.357), (df= 415) and the p value was estimated to be (p= 0.722). indicating no evidence of difference between the groups.

Then, the study was looking to evaluate the respondents' level of awareness regarding the possible side effects of energy drinks. Therefore, the participants were asked to identify the possible side effects of energy drinks (Table 43). The question was "Which side effects can

energy drinks cause?". A total of 47.8% (n= 22) of participants of the regular consumers group reported that they did not have any idea as did 32.9% (n= 24) of participants of the MDO group consumers. And a total of 30.5% (n= 91) of participants of the non-consumer respondents reported that they did not have any idea regarding energy drinks side effects.

Table 43

Comparison of respondents' answers regarding the possible side effects of energy drinks between regular consumers (n=46) vs. MDOs (n=73) vs. non-consumers (n=298).

Side effects	Regular consumers		MDOs		Non-consumers	
	Freq.	%N	Freq.	%N	Freq.	%N
I have no idea	22	47.8	24	32.9	91	30.5
Itch	4	8.7	8	11.0	35	11.7
Headache	14	30.4	31	42.5	162	54.4
High blood pressure	15	32.6	29	39.7	158	53.0
Sleep disturbances	15	32.6	33	45.2	180	60.4
Addiction	15	32.6	31	42.5	158	53.0
Restlessness	11	23.9	35	47.9	171	57.4
Diarrhea	6	13.0	15	20.5	67	22.5
Seizures	5	10.9	21	28.8	81	27.2
Caffeine related problems	15	32.6	33	45.2	181	60.7
In some cases death	9	19.6	23	31.5	108	36.2

Further, the participants' responses to various side effects were scored depending on the correct side effects that they answered. In fact, each correct side effect has five points and the wrong side effect has no points (Table 44). The range of the scores was estimated to be from 0.00 to 40.00 with a mean of 18.3 (*SD*=15. 4), and each participant fell below the mean will be considered as having a low level of risk awareness regarding energy drinks. On the other side, each respondent who got a score that is above the man will be considered as having a high level of risk awareness regarding energy drinks side effects.

Therefore, a total of 76.2% (n=35) of participants from the regular consumer group were considered as having a low level of risk awareness, and a total of 56.1% (n= 41) of respondents in the MDO group were identified as having a low level of risk awareness, while a total of 41.9% (n= 125) of participants of the non-consumer group were classified as having a low level of risk awareness. Table 44 shows the details.

Table 44

Participant's response risk awareness scores regular consumers(n= 46), MDO (n=73), and Non-consumers (n= 298).

Respondents	Energy drink consumers				Non- consumers	
	Regular consumers		MDO			
	Frequency	percent	Frequency	percent	Frequency	percent
Low level of risk awareness	35	76.2	41	56.1	125	41.9
High level of risk awareness	11	23.8	32	43.9	173	58.1
Total	46	100	73	100	298	100

Moreover, looking at how the awareness score distributed among the groups (regular consumers, MDO, and non-consumers) made it clear that the study should look further to investigate if there was any difference between these three groups of participants. A one way between-subjects ANOVA test was conducted to compare of risk awareness in the 3 groups. There was a significant effect the $p < .05$ level [$F(2,414) = 8.475$, $p = .000$]. A Post hoc comparison using the Tukey HSD test indicated that the mean score for the non-consumer respondents ($M = 18.2886$, $SD = 13.77149$) was significantly different than the regular consumer group ($M = 10.1087$, $SD = 12.97387$) and the MDO group ($M = 14.3836$, $SD = 13.35793$). However, the regular consumer and the MDO groups did not significantly differ from each other. Taken together, these results suggest that the higher level of awareness regarding energy drink side effects is associated with energy drink consumptions. Specifically, the study results suggest that when the participants have a high level of awareness about energy drinks side effects, they less likely drink these beverages.

4.2 Summary

This chapter summarized the results of the study and focused on answering the research questions that were in chapter one. Data from 417 undergraduate students from 62 different majors plus 22 undecided students were divided into three groups- non-consumers, regular consumers, and occasional consumers- were reported. The results were talking about factors affecting energy drink consumption among undergraduate students.

CHAPTER FIVE

SUMMARY, FINDINGS AND DISSCUSSION, CONCLUSION, AND RECOMMENDATION

5.1 Summary

5.1.1 Purpose of the study

The purpose of this study was to assess energy drink consumption among college students. Also, the study is investigating students knowledge about energy drinks ingredients, safety, and possible side effects. Finally, the possible relationships between students' consumption patterns and their social environment such as friends, family members, and media are explored.

5.1.2 Research Question

In fact, in order to achieve the study aims, the study will seek out answers for the some following questions:

1. What are the demographic characteristics of the participants in the study?

2. How many participants in the study sample are energy drink consumers?

3. a- What are the numbers of energy drink (with and without alcohol) that have been consumed over the last seven days and over the last 15 days?

b- Is there any difference between the groups regarding the patterns of energy drink consumptions?

4. a- What are the energy drink consumers' age and gender distributions?

b- Is there any relationship between gender and energy drink consumption?

5. Is there any relationship between drinking energy drink and employment hours, credit hours, or hours of studying for the consumers?

6. Is there any relationship between using energy drinks and sport practices?

7. a- Is there any unhealthy/risky behaviors among the study participants like smoking and recreational drug usage?

b- Is there any relationship between energy drink consumption and unhealthy/ risky behaviors?

8. a- For those who use energy drinks, what were their reasons?

b- For those who do not use energy drinks, what were their reasons?

9. What are the most often used energy drink?

10. What are the most frequent points of purchasing for energy drinks?

11. What are the effects, side effects, and the feelings experienced after the consumption of energy drinks (with or without alcohol)?

12. a- How does the social environment influences the participants' ways of perceiving energy drinks?

b- Do the participants think that energy drinks are safe to be used because energy drinks are being advertized

c- Is there any relation between the participants' beliefs regarding energy drinks and energy drink consumption?

13. a- Is there any difference between consumers' and non-consumers' knowledge of energy drinks' safety?

b- Is there any difference between consumers' and non-consumers' knowledge of energy drinks' ingredients?

c- Is there any difference between consumers'(regular and MDO) and non-consumers' knowledge regarding energy drinks' side effects?

5.1.3 Research design

A cross-sectional research methodology with a descriptive research design was used for this study. A descriptive design can be used to analyze the characteristics of a given population in a systematic and accurate way. A descriptive design is a common way to gather information about either the whole community or part of it through a survey (Olsen & St George, 2004). Descriptive research most often uses a "cross sectional" approach, in which refer to a "slice of time" certain situation in a specific community at specific period of time (Olsen & St George, 2004). These types of studies are not suitable to test hypotheses; however, their goals are to give description about a given subgroup of the community (Levin, 2006). Descriptive designs are often used to document the prevalence of behaviors, healthy or risky, and outcomes of particular behavior (CDC, 2012).

A survey was used in this study to collect the needed information. The term 'survey' refers to a systematic way of collecting information from a group of individuals through asking

them an identical set or sets of questions to be most valid, the group should be representative of the whole community that it came from it (Aday & Cornelius, 2006). Using a survey to collect information about any community or a subgroup from that community has some positive points. First, it helps collect data from a large number of people in a short time. Next, it can be a cost effective way to collect data (Blackstone, 2012). Also, the survey approach helps the participants stay anonymous, especially if sensitive information is being collected. The survey also can help to prevent the researcher effect, which reduces bias by giving a standardized set of questions paper, which everyone can answer privately without (Yount, 2006).

5.2 Major Findings

The study included students from 62 different academic majors plus 22 undecided students. The major group of the participants classified themselves as Freshmen (40%) and the majority of the study participants were from the age group 18- 20 years old, which represented (72.7%) of the study sample. The sample consisted of 44.1% (n = 184) male respondents and 55.9% (n = 233) female participants. A total of 58.5% (n =244) of respondents were identified as White (None Hispanic). A total of 54.2% (n = 226) of participants were living at the school housing, and a total of 65% (n = 271) of participants were living with roommates. Also, a total of 62.4% (n = 260) respondents were not employed. A total of 8.9% (n = 37) of respondents were working 20 hours a week. A total of 27.7% (n = 107) of respondents of the study participants reported that were taking 14 credit hours this semester. A total of 14.9% (n = 62) of respondents of the study sample were spending 10 hours a week studying.

Regarding energy drink consumption, this study found: A total of 28.5% (n = 119) of respondents were classified as energy drinks consumers and a total of 71.5% (n = 298) were

classified as non- energy drink consumer respondents. The energy drink consumer group consisted of two sub-groups: 38.7% (n = 46) of respondents identified as regular consumers- those who drink energy drinks with and without alcohol. The second group was the MDO, who drink only energy drinks mixed with alcohol. The latter sub-group consisted of 61.3% (n = 73) of respondents those who used energy drinks.

This study analyzed the energy drink usage (with and without alcohol) over the last seven days and then over the last 15 days. Also, the study investigated the usage of premixed-alcoholic energy drinks over the last 15 days. First of all, for energy drinks (without alcohol) usage over the last seven days, this study found a total of 21.7 % (n = 10) of participants of the regular consumers had one energy drink within the last seven days. This finding is higher than the (17.5%) of participants in the Velazquez et al., (2012) study, which might be because the study was done shortly done before final exams.

Next, for of energy drink consumption (without alcohol) during the last 15 days, this study found a total of 4.3% (n = 2) participants of the regular consumer group reported that they consumed one energy drink during the last 15 days. Again there was no similar or a comparable study to evaluate the results of this study with theirs.

Second of all, for the consumption of energy drink mixed with alcohol during the last 7 days and during the last 15 days. The study found that a total of 4.3% (n = 2) of participants of the regular consumer group reported that they drank one energy drink mixed with alcohol during the last week. And a total of 6.5% (n = 3) of respondents from the same group reported having one mixed drinks during the last 15 days prior to the study. Then, the study found, a total of 15.1% (n = 11) of participants of the MDO group reported that they had one energy drink mixed

with alcohol during the last week. And a total of 11% (n = 8) of participants of the same group reported having one mixed drink during the last 15 days. Again there was not any other comparable study to evaluate this study results with their results. In fact, this is a crucial topic that has so much potential, which should be studied carefully in the soon future because its impacted the college students behavior very badly and found to be related to risk taking behaviors (Heckman et al., 2010, Ishak et al., 2013; Miller, 2008a; 2008b; 2012; Reissig et al., 2008; Velazquez et al., 2012; Woolsey, 2010).

The results revealed that the participants who consume energy drinks with alcohol during the last seven days tend to consume energy drinks more than those who consume energy drinks only. Therefore, An Independent Samples t- test was run, the estimated t value was (t = 6.789), (df = 117), and the calculated p value was equal to (p = .000). A significant evidence supports MDO had more energy drinks during the last seven days than the regular consumers.

Next, another t-test was run to see if there was any difference between the two groups regarding the usage of energy drinks (mixed with alcohol) during the last 15 days. The test results were: The estimated t value was (t = 6.75), (df = 117), and the estimated p value was (p = .000), which means that there was a statistically significant evidence that support MDO had more energy drinks mixed with alcohol than the regular consumer group over the last 15 days.

Further, the study found out that a total of 50% (n = 23) of participants of the regular consumers had pre-mixed alcoholic energy drinks during the last 15 days. In contrast, a total of 60.3% (n = 44) of respondents of the MDO had alcoholic energy drinks during the last 2 weeks. There was not any recent study that talked about those pre-mixed alcoholic drinks yet; so, the

results of this study cannot be evaluated. And it means that there are so many sides of the issue did not get covered or studied yet and need to be investigated in the future studies.

This study examined the age distribution of the energy drink consumers (with and without alcohol). Of students who consumed energy drinks, a substantial number drank them before age 17 (32.8 percent; n= 39) without alcohol and 82.4 percent (n= 96) before age 19 (with alcohol). In regards to the consumption of energy drinks without the alcohol, this study this study result is consistent with a recent study that states that (30%) of the energy drink regular consumers in the US who drink them regularly are children and adolescents from 12-17 years old (Pomeranz et al., 2013).

Moreover, this study showed that the youngest age in which energy drinks mixed with alcohol started to be used was 10 years old with a total of 2.5% (n= 3) of participants of the study sample. And because this study is the first one that highlighted the age distribution of the consumers, thus, its results cannot be evaluated because there are not any comparable studies yet. This is another side of the issue that needs to be addressed in the future.

For the gender distribution, the results of this study stated the following findings: The regular consumer group consisted of: A total of 63% (n =29) of the groups were males and a total of 37% (n = 17) of the participants were females. Next, the MDO group consisted of: A total of 37% (n = 27) of the group participants were males and a total of 63% (n = 46) of the group participants were females.

In fact, this study showed that the female participants who tend to consume energy drinks with alcohol drink energy drinks more than men. An Independent Samples t-test was run to investigate if there was any relation between gender and consuming mixed energy drink and its

results were: The estimated t value was (t = 2.853), (df = 117), and the calculated p value was (p = 0.005). That means there is a strong evidence that females who consume energy drinks mixed with alcohol tend to drink more energy drinks than the male. In fact, this side of the issue should be studied in the future for further understanding regarding the trend of mixing energy drink with alcohol between the different genders.

Furthermore, this study found an association between the hours of employment and energy drink consumption. An Independent Samples t-test was conducted with the following results: The calculated t value was (t=25.892), (df= 409), and the calculated p value was (p=.000). These findings strongly support that there was an association between employment hours and drinking energy drinks. So, when the employment hours increased the likelihood of consuming energy drinks might increase too.

Furthermore, this study did not find any association between sport practices and energy drink consumption for now. And an Independent Samples t- test was completed. The results were: The estimated t value was (t=1. 152), (df= 415), and the calculated p value was (p=. 250), which means there was not any evidence to support that sport practice have effects on energy drink consumption in a way could increase their consumption. This study results cannot be evaluated because there was not any comparable study that has results that could be used to be compared to.

With regards to the unhealthy/risky behavior and energy drink consumption among energy drink consumers, a Chi-square test was completed. The results of the test were: The estimated Chi value was (Chi= 25.026), (df = 5), and the estimated p value was (p = .000). The results showed that there was a statistically significant evidence support that consuming energy

is associated with the engagement of unhealthy behaviors. Then, a t-test was run to make sure of the Chi-square results. The estimated t value was (t = 4.590), (df= 415), and the estimated p value was (p= .000). In fact, the results mean there was a strong evidence that supports drinking energy drinks associated with the engagement of unhealthy behaviors more than the non-consumers. This results are consistent with other studies (Ishak et al., 2012; Malinauskas et al., 2007; Miller, 2008a; Velazquez et al., 2012). However, the results might be related to personality reasons or issues among the consumers.

One of the study goals was to examine why some students consume energy drinks and why some other students do not consume them. The study divided the reason of consuming energy drinks into two categories, the first was for energy drinks without alcohol and the second for energy drink mixed with alcohol. For the energy drink with alcohol consumption, a number of reasons got highlighted by the consumers; however, the most frequent reasons among the regular consumers were: To get more energy (93.5%), stay awake (82.4), help me drive long distance for more time (65.5%), partying and mix them with alcohol (45.7%), and hydrate my body (41.3%).

The results of this study are consistent with other studies that were investigating the reasons behind consuming energy drinks. For example, recent studies state that the major reasons to drink energy drinks were to stay awake and not fall asleep, to get more energy, and to mix them with alcohol during partying (Ishak et al., 2012; Malinauskas et al., 2007; Miller, 2008a; Velazquez et al., 2012). In addition, to get more energy, Buxton & Hagan (2012) state that they found another reason to consume an energy drink, which is using them as hydrating drinks after exercise. Pettit & DeBarr (2012) claim that increasing stress in students' lives will increase the likelihood of consuming energy drinks. Therefore, stress management skills could be crucial

factors that will need to be studied in the future as ways of interventions to prevent energy drink abuse among students.

For mixing energy drinks with alcohol, the study found these reasons: To make alcohol taste better (78.2%), to party longer 37%, to be able to drink more alcohol 29.4%, to relieve alcohol effects & fight hangover affects 16.8%, to be able to have sex after partying 10.9%, and so I can drive home after partying 7.6%. This study is consistent with only recent study that points out the reason behind mixing both beverages- energy drinks and alcohol- was to make the alcohol taste better. However, there are not any other similar studies that could be used to evaluate the other reasons in this study results.

Next, this study was investigating the reasons that made some students do not consume energy drinks. The major reasons were: I am just not interested (58.7%), they might not be healthy (51.3%), they do not taste good (37.9%), they are expensive (25.2%), and I do not feel ok when I drink them (1.7%). There were no similar studies to this study; so, the results cannot be evaluated, which means that this side of energy drink consumption still need to be explored in the future that has much potential.

The study was looking to know which energy drinks used most often by the consumers. The results indicated that: 71.4% (n= 85) of participants of the study consumer participants reported they consume Red Bull most often. In fact, this result was higher what was expected by EnergyFiend (2013) websites, which said the Red Bull covers 43% of the energy drinks markets. Then, the study found that Full-Throttle was the very least energy drink in usage with a total of 3.3% (n= 4). These results cannot be evaluated due to the fact that there was not any comparable study yet. By knowing which drink is the most often used by the consumers, the future studies

could go further by asking why this drink is dominant among college students and what are the effects of its marketing campaign on the consumers.

Next, the study was assessing the points of purchasing for energy drinks. This study analyzed each consumer group separately to compare between them. The results showed the following findings: A total of 82.6% (n = 38) of participants of the regular consumer group reported purchasing energy drink from convenience stores/gas stations. While a total of 67.1% (n = 49) of participants of the MDO reported buying energy drinks from bars. In fact, the findings of this study spotlighted differences in places of purchasing energy drinks among consumers depending on their consumption patterns. It might need to be studied more in the future and study the relationship between places of purchasing and energy drink consumption in the future.

Participants were asked about what they feel after consuming an energy drink as effects or side effects. The study found out these results: Mentally active (56.3%), My heart beats faster than before 45.4%, Restless (39.5), Jolt/crash (36.1%), Not hungry (36.1%), Agitating (15.1%), Drowsy (13.4%), Insomnia (10.1%), and Nausea (10.1%). The findings of this study are consistent with other studies that indicated energy drink consumption could lead to increase the cognitive activities and enhance the mood of they consumed in a reasonable way (EnergyFiend, 2013b; Heckman et al., 2010; Higgins et al., 2010; Ishak et al., 2013). On the other hand, energy drinks could cause negative side effects like headache, dizziness, sleep deprivation, insomnia, agitation (EnergyFiend, 2013b; Ishak et al., 2013; Herman et al., 2007), affect the function of the heart (American Heart Association, 2013; Babu et al., 2008; Higgins et al., 2010; Seifert et al., 2011). Then, energy drinks contain high amounts of carbohydrate, mainly sugar, which slow down the absorption process in the “intestine” (Bonci, 2002).

The energy drink consumers were asked to report what did they feel after consuming energy drinks mixed with alcohol. The study found these results: Be more aware about things around me (68.9%), I need to drink alcohol more than usual (48.7%), I can make accurate decisions (37.8%), I feel that I am not drunk (17.6%), I want to engage in intimate relation (sex) (17.6%), I got more courage to do new things like smoking (10.1%). In fact, these findings are consistent with many other studies that highlighted the side effects of mixing energy drink with alcohol.

Consuming energy drinks mixed with alcohol could lead to cover alcohol side effects, which lessens the person's feelings of being intoxicated (Heckman et al., 2010). Also, consuming combination of energy drinks and alcohol could make the consumer drink alcohol more till reaching the binge drinking stage because the impaired "self awareness" (Heckman et al., 2010; Ishak et al., 2013; O'Brien et al., 2008). Moreover, the mixing of energy drink with alcohol could lead to risk taking behaviors like smoking, substance abuse, dirking more alcohol, and risky sexual behaviors (Miller, 2008a; 2008b; 2012). More than 40% of ER visits due to energy drinks in 2011 were related to consuming energy drinks with other substances (SAMHSA, 2013).

Further, this study was working to assess the effects of factors that are related to the social environment on energy drinks consumption among the consumers. To do so the study adopted a theoretical foundation that based on the Social Cognitive Theory to justify its findings, which in future would be very helpful in case of planning health education programs that will intervene with energy drink. The Social Cognitive Theory was built on a basic idea that says: People as individuals get affected by their "Social environment" (DiClement et al., 2011/2013).

This study utilized a set of items, which was devoted to assess the effects of social environment on the consumers. First, assessing what social factors made the consumer drink energy drinks? Also, how the consumers perceive energy drinks due to the effects of the marketing strategies. For this part, the study found these results: I like trying new products, new things, and I am adventures, that why I drink energy drinks (50.4%). There cans are colorful and sexy, so they are attractive to me (22.7%). It seems that everybody around me- my friends and my parents- drink energy drinks (21%). Energy drinks represent sports, adventure, outdoor, and athletic lifestyle, so I like them (12.6%). I drink energy drinks because my friends/ roommates recommended them to me (8.4%). And my parents are drinking energy drinks, so do I (10.1%). Even the results were not that high and that because this study lost more 30 energy drinks participants who did not complete the survey questions. However, these answer still show that there are some effects of the social environment on the consumption patterns among the consumers group.

The results could be explained by: The marketing camping are targeting youth in a way that made energy drinks seen as part of adventure and fast life that's why we got 50.4% for the lifestyle question. And because the consumer start to perceive energy drinks as new thing that are related to adventure. In fact, by examining one marketing camping for RockStar, which was focusing on making energy drink to be part of the youth part (Burke et al., 2009). Further, by analyzing the study sample characters, which are they: a total of 40% of participants were Freshmen, a total of 91.4% of the participants are living in dorms or school housing and apartments, and a total of 65% of participants were living with roommates, which all mean that those participants are affecting and get affected by their friends or roommates even thought they did not feel and did not it answers the questions.

Moreover, by analyzing the age in which the participants started drinking energy drink with alcohol, which was 14 years old that got a total of 11.8% (n = 14) of participant of the MDO respondents. That means energy drinks with alcohol get accessed very easy and lack any low enforcement to control underage drinking. Purchasing energy drinks become easy everyday because they are available everywhere as the study highlighted earlier. That all means the environment that is surrounding consumers is working as an enabler factor in case of purchasing these beverages.

Next, the study was analyzing the effects of the of advertising campaigns on making the respondents (consumers and non-consumers) think that energy drinks are safe to be used or are tested regarding their safety and lacking side effects. And to see whether there is a difference in beliefs between the two groups. A total of 28.6% of participants of the consumer group either strongly agreeing or agreeing about energy dinks are safe to be used because they are advertized. On the other hand, a total of 7.7% of participants of the non-consumer group reported either strongly agreeing or agreeing.

Then, an independent- samples t-test was run to investigate if there was a difference between the means of the two groups. The calculated t value was ($t = 77.441$), ($df = 416$), and the estimated p value was ($p = .000$), which means there is a statistical significant evidence that consumer believed that energy drink are safe because they are being advertised more than the non-consumer participants. This study has no similar or comparable study to evaluate the study results; therefore, this field could be explored in the future to gain more information regarding the effects of social environment on energy drink consumers

The final part of the study was to assess the participants' knowledge regarding energy drink ingredients, energy drink safety, and energy drink side effects. To do so, the participants were asked to answer questions that are dealing with these topics. Their study found the following results: First, for assessing the participants' knowledge, the students were asked to rate the statement that said "energy drink are tested", which means do you think that energy drink are being tested for their side effects. The results came out to be: A total of 54.6% (n = 65) of participant of the consumer group reported either strongly agreeing or agreeing. While a total of 30.6% (n = 91) of participants of the non-consumer group reported either strongly agreeing or agreeing. A t-test was run to determine if there was a difference between the means of the two groups. The t- test results were: The estimated t value was (t = 4.893), (df = 415), and the calculated p value was (p = .000). That means there is a statistically significant evidence to support energy consumers believed that energy drinks are tested more than the non-consumers.

Second, assessing the knowledge of the participants regarding energy drink ingredients. This part has three subparts, which are they: To evaluate the study participants' knowledge regarding the reading of ingredients list of energy drinks. The participants were asked "have you read the ingredients list of energy drinks?" The answers were: A total of 62.8% (n = 262) of participants of the study sample reported that they did not read them before. There was no comparable study to evaluate the study results. However, there was a study that was done regarding reading labels of food and beverages by Morrone and Rathbun (2003), which states that only 26.4% of college students read the labels of food or drinks that they are going to consume. In comparing both studies, it seems that this study higher than the old one and the reason might be because most of the consumer purchases these drinks at bars. So, there is not time to read what is written on the labels of these drinks.

Moreover, the study examined the difference between both groups- the consumers and non-consumers regarding reading energy drinks ingredients and the results were: A total of 63% (n = 75)of participants of the energy consumer group said that they did not. On the other hand, A total of 62.8 % (n = 187) of participants of the non-consumers group reported that they did not read them before. A t-test was completed to check if there was a difference between the means of the groups and its results were: The estimated t value was(.052), (df = 415), and the calculated p value was (p = .958). The results indicated that there was not any difference between the groups regarding reading energy drinks ingredients list.

Second, this study evaluated the students' level of knowledge of the participants regarding energy ingredients. Firstly, the participants were asked if they have any idea about the ingredients of energy drinks. The results indicated that a total of 31.9% (n = 38) of participant of the consumer group reported that they have no idea about the ingredients of energy drinks. A total of 32.6% (n = 97) of respondents of the non-consumer group reported that they have no idea about the ingredients of energy drinks

Moreover, the participants were assigned a score depending on how many ingredients they identified. The range of scores was from 0.00 to 35.00 with a mean of 12.9 (SD = 11.18). A low level of risk awareness score was assigned for those who scored below the mean and a high awareness score for those who score above the mean. The results were: A total of 50.4% (n = 60) of participant of the consumer group has been identified as having a low level of knowledge. While, a total of 54.7% (n =163) of participants of the non-consumer group were classified as having low levels of knowledge regarding energy drink ingredients. A t- test was completed to investigate if there was any difference between the means of the groups. The results were: The calculated t value was (t = -0.90), (df = 415), and the estimated p value was (p = .929). The

results showed that was not any difference between the group regarding energy drink ingredients.

Next, evaluating the participants' (regular, MDO, and non-consumers) level of risk awareness regarding the possible side effects of energy drinks. The participants were asked to answer a question that said “which side effect can energy drinks cause?”. The results were: A total of 38.7% (n = 46) of participants of the consumer group reported that they have no idea. On the other hand, a total of 30.5% (n = 91) of respondents of the non-consumer group reported that they have no idea.

Then, the participants of the study were given a score depending on the number the side effects they identified. The range of scores from 0.00 to 40.00 with a mean of 18.3 (*SD* = 15.4) and each participant falls below that means were identified as having a low level of risk awareness regarding energy drink side effects. On the other hand any respondents who got scores above the mean were identified as having a high level of risk awareness. The results were: A total of 76.2% (n = 35) of participant of the regular consumers was identified as having a low level of risk awareness. A total of 56.1% (n = 41) of participants of the MDO were classified as having low levels of risk awareness. In contrast, a total of 41.9% (n = 125) of respondents of the non-consumer group were identified as having low levels of risk awareness regarding energy drinks side effects.

Moreover, looking at how the awareness score distributed among the groups (regular consumers, MDO, and non-consumers) made it clear that the study should look further to investigate if there was any difference between these three groups of participants. A one way between-subjects ANOVA test was conducted to compare of risk awareness in the 3 groups.

There was a significant effect the p< .05 level [F (2,414) =8. 475, p = .000]. A Post hoc comparison using the Tukey HSD test indicated that the mean score for the non-consumer respondents (M =18.2886, *SD* = 13.77149) was significantly different than the regular consumer group (M =10.1087, *SD* = 12.97387) and the MDO group (M = 14.3836, *SD* = 13.35793). However, the regular consumer and the MDO groups did not significantly differ from each other. Taken together, these results suggest that the higher level of awareness regarding energy drink side effects is associated with energy drink consumptions. Specifically, the study results suggest that when the participants have a high level of awareness about energy drinks side effects, they less likely drink these beverages.

5.3 Limitations

The limitations of this study were:

1. The time limitation, which was so crucial for the study because many students start working on their finals and did not come to classes during the final week of the semester.
2. The survey was administered in class and this process has positive and negative sides. The positive side was being able to collect the data in a short time and a moderate level of response. While the negative effects were: It is a costly process in case of time and money. And lacking the flexibility of time because the time of the class should be respected and that's why most the students who came to class late more than 4 minutes, they did not get to participate in the survey. Lastly, the study lost more than 92 who were energy drink consume and that because some of the students were lazy to answer the question.

3. Administering the survey in class made the school of engineering refusing to be part of the study and the reason was the unreasonable use of the class time even when the survey needed less than 8 minutes to be completed.
4. The laziness of the students, which was very clear because of the high number of uncompleted surveys (93) and that made the studio to drop these uncompleted surveys

5.4 Conclusions

1. More than 1/4th of the study sample was energy drink consumers with a total of 28.5% (n=119) participants.
2. Energy deink use was associated with the number of the paid employment hours (p= .000). The long working hours derived the consumers to drink more energy drinks.
3. Gender also played significant role, with a larger proportion of females than males drinking them mixed with alcohol (p= .005).
4. Of students who consumed energy drinks, a substantial number drank them before age 17 (32.8 percent; n= 39) without alcohol consumption and 82.4 percent (n= 96) before age 19 for with alcohol consumption.
5. Energy drink consumption found to be associated with the engagement in risky behaviors such as smoking and drinking alcohol (p =.000).
6. Energy drink consumers perceived them as safer than those who did not use them (p= .000); also, the consumers were less knowledgeable about side effects (p= .000).

7. The MDO, who consumed energy drinks only mixed with alcohol, tend to drink more energy drinks than the regular consumers during both the last seven days and the past 15 days prior to the study (p= .000)
8. The major reason behind using energy drinks (without alcohol) was to get more energy with a total of (93.5%) of the regular consumer group. While the reason behind using mixed energy drinks with alcohol was "to make alcohol taste better" with a total of 78.2% (n= 93) participants of the study sample.
9. The major reasons behind avoiding energy drinks among non-consumers were "I am interested in them" with a total of 58.7% (n= 175) participants of the non-consumer group. Followed by a total of 51.3% (n= 153) respondents reported that "energy drinks might not be healthy".
10. Red Bull has the highest percentage of usage among the study consumer participants with a total of 71.4% (n= 85) respondents of the consumer group.
11. Bars were the most frequent purchasing point for energy drinks among the MDO with a total of 67.1% (n= 49), while the convenience stores/gas stations were the most frequent purchasing point among the regular consumers with a total of 82.6% (n= 38).
12. The consumers exhibit many side effects after using energy drinks that should be addressed in the future by doing clinical studies.
13. Mixing energy drinks with alcohol made the consumers feel that they were more aware about things around them 68.5% (n= 82) and consuming the mixed drinks made them feel that they need to drink more alcohol than usual 48.7% (n= 58).

5.4 Recommendations

Research:

1. Energy drinks have become the new focus of studies that are public health oriented in order to get more information regarding these beverages especially about their side effects. However, lacking a consolidated and a practical instrument might be a serious obstacle for conducting reliable studies. Many researchers were/are depending on an instrument that has been developed by the Core Institute for alcohol usage, which is not exactly similar to energy drinks. Therefore, it is the best time now to start working on making an instrument that could be used in the future to study energy drinks effects and side effects.
2. This study was conducted in short period of time, which was only for one semester. Therefore, it would be helpful if another studies will be trying on studying energy drink on long period of time like a year or longer. Also, reaching more students would be a good idea for future studies and include the graduate students to get more information regarding energy drink consumption.
3. Starting a new approach that segregates between genders in order to investigate the relationship between gender and energy drinks consumption.

Health education:

1. Energy drinks have ingredients that have therapeutic characteristics that are not being tested regarding their side effects. Therefore, it should be

taken into consideration long term clinical study to investigate their effects and side effect on the human body.

2. This study found an association between energy drink consumption and risk taking behaviors such as smoking and alcohol intake. Therefore, it will be necessary in the future to start health education programs that will target energy drinks as well as tobacco and alcohol intake all together not separately. That's because energy drinks might be working as an enhancing factor for risk taking behaviors.
3. This study found that females tend to drink energy drinks mixed with alcohol more than males; so, it will be very important to study gender roles in the future and investigate why each gender consume energy drinks.
4. Regarding age and energy drink consumption, a partnership between schools of Education, Public Health, Nutrition, and social work is needed to establish long term educational programs for youth, especially, school students regarding energy drink side effects.
5. Age restriction should be established on energy drinks. In details, energy drinks without alcohol should be considered like tobacco and not to be sold for children and people under 18 years old. Also, energy drink with alcohol should be not sold for any person under 21 years old, which is the legal age for alcohol use in the US.
6. Being a child and drinking energy drinks means that families, schools and the communities have low level of risk awareness regarding energy drink risks. Therefore, they need to be more aware about the risks that are

associated with energy drink consumption. Thus, building health education programs that are community based and family oriented could be helpful to give the families more information about the side effects of these beverages.

7. Schools and communities should lobby to the congress in order to make the producing companies put a warning label on their cans to say that these drinks are not for children under 18 years old.
8. Health education programs should highlight the side effects of energy drinks especially when energy drinks got mixed with alcohol. Using interactive ways to make the information easy to understand will be very helpful for both youth and their parents to interact with each other.
9. Advocacy effort is very crucial regarding the issue of inconsistent ingredient lists of energy drinks in order to put more pressure on the producing companies to list all the compositions of these beverages on their cans.
10. Removing energy drinks from vending machines, school student centers or students unions because these drinks are not healthy and schools should not promote selling unhealthy products. Moreover, health education programs may not work if the students see these products being sold at their schools while the health educators are talking about their side effects.

5.6 Summary

This chapter talked about a summary of the study including research design and research questions. Then, it explains the major findings of the study. It also compared some of the major finding regarding other studies. Finally, it ended with recommendations that built based on the study findings.

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APPENDICES

Appendix A: ENERGY DRINKS SURVEY

For the purpose of this study, coffee, soft drinks like soda, tea, and shakes are not considered energy drinks

Demographics

1- How old are you----------
2- Your gender----------
3- Ethnic origin

a White (None Hispanic)

b Hispanic/ Latino

c African American

d Other, please specify----------

4- Classification

a Freshman
b Sophomore
c Junior
d Senior
e Other

*If other, please specify-- ----------

5- Living arrangements: I live at

a Dorms

b House/Apartment

c Fraternity or sorority

d Off campus with my parents/children

e Other----------

6- Living arrangements: I live with

a Alone

b With my parents

c With my children

d With my spouse/partner

e With roommate/s

f Other----------

7- Are you a single parent?

a Yes b No

8- What is your major?----------

9- How many hours per week do you spend studying?----------

10- How many credit hours are you taking this semester?----------

11- How many hours per week are you working at a paid employment (job)?----------

12- Which one applies to you the best----------

a School athlete

b I work out regularly

c I go to the gym, but not regularly

d I am too busy for working out.

e Other----------

Behavior and Attitude

13- Which of these things did you use within the last 30 days? (You can select more than one)

- a None

- b Tobacco

- c Alcohol

- d Steroids

- e Recreational drugs

- f Muscle enhancing drugs

14- Which one applies to you ?

a I drink energy drinks regularly

b I drink energy drinks occasionally (sometimes with alcohol).

c I do not drink them at all.

15- How old were you when you had energy drinks for the first time?----------

16- Do you drink energy drinks to (rate these statement)

Statement	Strongly agree	agree	neutral	disagree	strongly disagree
a- Improve my mood					
b- Stay awake					
c- Help me drive long distance for more time					
d- Partying and mix them with alcohol					
e- Hydrate my body					
f- I drink them without specific reason					
g- Get more energy					
h- Their taste is so delicious					
i- Energy drinks mean youth &strength					
j- Athletes and celebrities drink them, so do I.					
k- I can’t function without them					
l- My friends influenced me.					
m- Their price is cheap					

p- Commercials say: “Energy drinks boost my energy” So, I drink them.

17- Think back over the last 7 days. How many energy drinks did you drink (without alcohol)?

----------.

18- Think back over the last 15 days. About how many energy drinks did you drink (without alcohol) ----------.

19- I mix energy drinks with alcohol?

a Yes b No

20- During the last week. How many energy drink mixed with alcohol did you have?----------

21- During the last 15 days. How many energy drink mixed with alcohol did you have?--------

22- Why do you mix energy drinks with alcohol (Please rate all that apply to you)

Statement	Like me	Not like me
a- To party longer		
b- So I can drive after partying.		
c- To be more aware about things around me.		
d- To relieve alcohol effects & fight hangover effects.		
e- To be able to have sex after partying.		
f- To make alcohol taste better.		

23- Have you had pre-mix alcoholic energy drinks?

a Yes b NO *If yes please answer the next Question

24- How often have you had pre-mixed energy drink and alcohol during the last 15 days?---------

25- Which one do you drink most often? (Rate them from 1-6, in which 1 represents most often and 6 represents I do not drink it)

Red Bull	5-Hour Energy	RockStar	Monster	Full-Throttle	Amp

26- When I drink energy with alcohol drinks, I feel -(Please select all that applicable to you by putting √ **)**

a- I need to drink alcohol more than usual.
b- I get more courage to do new things like smoking
c- I can go with a drunk driver to help him/her go home safe
d- More aware about things around me.
e- I can make accurate decisions
f- I need to drink alcohol more than usual.
g- I want to engage in intimate relation (sex).
h- others

*if you select others, please specify----------

27- How old were you when you had Alcoholic energy drinks for the first time?----------

28- When I drink energy drinks, I feel -------- (Please select all that applicable to you by putting √)

a- Drowsy
b- Restless
c- Get insomnia
d- Nausea
e- Agitating
f- Jolt/Crash episode
g- Not hungry
h- My heart beat faster than before
i- I feel that I am not drunk, if I mix them with alcohol
j- Mentally active
k- All of them
l- others

**If you selected others, please specify----------

29- How do you feel about these statements

Statement	Strongly agree	agree	neutral	disagree	strongly disagree
I drink energy drinks because my friends/ roommates recommended them to me					
My parents are drinking energy drinks, so do I					
Energy drinks represent sports, adventure, outdoor, and athletic life style, so I like them					
Their cans are colorful and sexy, so they are attracting to me					

I like trying new products, new things, and I am adventurous, that's why I drink energy drinks

It seems that everybody around me- my friends and my parents- drink energy drinks

---

Places of purchasing

30- Where do you purchase energy drinks?

a I do not buy them.

b Bars

c On campus/Vending machines

d Walmart, Sams club, grocery store…etc

e Liquor stores

f pharmacies like Walgreens

g Convenience stores/ Gas stations.

h Other----------

31- I do not drink energy drinks (Select the best one that appeals to you). (This question applies only for non drinkers).

a They do not taste good

b They are expensive

c They might be not healthy

d I do not feel ok when I drink them

e I am just not interested

f Other----------

Knowledge regarding energy drinks' ingredients, safety, and side effects.

32- Have you read the ingredients list of the energy drinks?----------

33- Which ingredients are in energy drinks?

a I have no idea

b Guarana

c Taurine

d salt

e Caffeine

f Water

g Vegetable Juice

h Sugar

i Nicotine

j Vitamin E

34- Energy drinks are advertized, so they must be safe**?**

Strongly agree	agree	neutral	disagree	strongly disagree
☐	☐	☐	☐	☐

35- Energy drinks are tested

Strongly agree	agree	neutral	disagree	strongly disagree
☐	☐	☐	☐	☐

36- Which side effect energy drinks can cause? Select all that apply to you by putting (√)
I have no idea
Itch
Headache
High blood pressure
Sleep disturbances
Addiction
Restlessness
Diarrhea
Seizures
caffeine related problems
Death in some cases

Appendix B: EMAILS FOR 101 CLASSES' GATEKEEPERS

Greetings

Dear Dr. …..

I hope that all is well with you. My name is Nameer Faris and I am a graduate student at SIUC and my major is Health Education. Dear Sir/ MS., I am doing a thesis about energy drink consumption patterns among undergraduate students and for the purpose of the study I have to survey students and assess their knowledge regarding to energy drinks. Therefore, I selected three departments to be part of my study, which are they Health Education, Kinesiology, and Nutrition department to be as my convenience sample. Thus, I am emailing you hoping that I can get your permission to reach your undergraduate students and their instructors to administer my survey. By the way, my survey will be administered in class and it will not take more than 10 minutes to be filled. I attached a copy of it with my email if you want to look at it and if you have any question, I will be glad to answer you and if you want me to meet with you that will be ok with me. I hope that I will hear from you soon.

With my gratitude

Nameer Faris
Health Education dept./SIUC

Appendix C: A COVER LETTER

Dear undergraduate student:

I am a graduate student seeking my Master's degree in the Department of Health Education and Recreation at Southern Illinois University Carbondale.

The purpose of the enclosed survey is to gather information about energy drink consumption patterns among college students. In addition, there are a few questions that ask your knowledge regarding to these products.

Undergraduate students who are studying during Fall 2013 at Health Education, Nutrition, and Kinesiology departments will receive a copy of Energy Drink Survey . You were selected to participate in this study because of you are part that group.

The survey will take 5 to 8 minutes to complete. All your responses will be kept confidential within reasonable limits. Only people directly involved with this project will have access to the surveys.

Completion and return of this survey indicate voluntary consent to participate in this study. Please use the return envelope provided.

Questions about this study can be directed to me or to my supervising professor, Dr.

Kathleen J. Welshimer, Department of Health Education, 319 Pulliam Hall, SIUC, Carbondale, IL 62901. Phone (618) 453-2777) & Email: welshime@siu.edu

Thank you for taking the time to assist me in this research.

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

Name: Nameer Faris

Phone number: 618-303-7056

E-mail: nameer@siu.edu

Thank you for taking the time to assist me in this research.

Appendix D: CONSENT FORM

My name is Nameer Faris. I am a graduate student/faculty member at Southern Illinois University-Carbondale.

I am asking you to participate in my research study. The purpose of my study is to investigate energy drink consumption patterns among college students and to assess students' knowledge regarding energy drinks.

Participation is voluntary. If you choose to participate in the study, it will take approximately 8-10 minutes of your time. You will get a copy of a survey that has 36 items to read and answer the application questions for you.

All your responses will be kept confidential within reasonable limits. Only those directly involved with this project will have access to the data.

If you have any questions about the study, please contact me. (Or my advisor if applicable)

(Nameer Faris – 618-303-7056) (Dr. Kathleen Welshimer- 618-453-2777)

Thank you for taking the time to assist me in this research.

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

Appendix E: EMAILS FOR THE FINAL DRAWING WINNERS

Dear students:

In the last weeks of the Fall semester 2013 you were asked to participate in a survey regarding energy drink consumption and undergraduate students. And were asked to enter your email if you wanted to be part of a final drawing to win a $15 gift card for completing the survey. Your name was selected to be one of the winners.

Please contact me Nameer Faris through a text at 618-303-7056 or by email at nameer@siu.edu in order to receive your gift.

Thanks again for your help and your time!

Warmly,

Nameer Faris

Department of Health Education/SIUC

VITA

Graduate School
Southern Illinois University

Nameer Nassir Faris

nameer@siu.edu
nameernassir2000@yahoo.com

College of Medical Technology, Baghdad, Iraq.
Bachelor of Medical Technology, Community Health, July 2004

Thesis Title:

ENERGY DRINKS: FACTORS THAT INFLUNCE COLLEGE STUDENTS' CONSUMPTION.

Major Professor: Dr. Kathleen Welshimer.