UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

RELATIONSHIP BETWEEN ENERGY DRINK CONSUMPTION AND PERCEIVED STRESS AMONG COLLEGE STUDENTS

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

MASTER OF SCIENCE

By

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Norman, Oklahoma
2016

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RELATIONSHIP BETWEEN ENERGY DRINK CONSUMPTION AND PERCIEVED STRESS AMONG COLLEGE STUDENTS

A THESIS APPROVED FOR THE
DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

BY

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Dedication

Martha Palen – Mother

Mary Palen – Aunt

Robert – Uncle

Acknowledgements

I would like to thank Dr. Laurette Taylor, Dr. Paul Branscum, and Dr. Marshall Cheney as members of my thesis committee. Their patience in answering my questions and dedication to helping me succeed has been instrumental in me reaching this point in my life.

I would also like to express my love and gratitude to my mother, Martha, for having endless confidence and continuous support for me. My utmost appreciation to my Aunt Mary and Uncle Robert for the countless favors that helped me to succeed. I would also like to thank my good friend Valerie for helping to put life in perspective when things felt out of control.

Thank you all!

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Abstract

This study explored the relationship between energy drink consumption, reasons for drinking energy drinks, and perceived stress. This study combined the use of an energy drink consumption survey and the revised university student hassles scale (RUSHS) to study the relationship between energy drinks and perceived stress. Four hundred forty-nine university students participated in this study. An energy drink questionnaire containing 21 questions and the RUSHS containing 57 hassle items were used to explore the relationship between energy drinks and stress. The results of this study did not support a relationship between energy drink consumption and stress as measured by level of perceived hassles. However, there were differences in energy drink consumption and hassle scores based on demographic characteristics. The most common reasons reported for consuming energy drinks were energy, sleep, and tired. There were no significant differences found for perceived stress between energy drink consumers and non-consumers.

Chapter 1

Introduction

Energy drinks are beverages designed to provide "energy" to the consumer. This energetic state is attained with differing amounts of caffeine, sugar, and other ingredients. In 2013, Red Bull sold over 5.3 billion cans (Red Bull GmbH 2015). Likewise, Monster energy drinks had $1.39 billion dollars in sales in just the first six months of 2014 (Monsterbevcorp.com), while Rockstar had over 800 million dollars in sales (caffeineinformer.com) in 2013. This indicates the widespread use of the different energy drink brands that are available in grocery stores, corner stores, gas stations, and many other locations where beverages are sold. There are no restrictions on the purchase of these drinks, and as a result, people who are unaware of the possible negative effects may over consume these products.

Energy drink manufacturers market these drinks as providing benefits in areas such as reaction time, rapid visual information processing, and energetic arousal (Smit et al., 2004). Iterations of energy drinks have been around for over 25 years and health concerns about energy drinks have existed for almost as long. Issues begin to arise when negative side effects occur. Because negative reactions can occur after having just a few of these energy drinks, further study of these products should be considered (Toblin, 2012). The United States Food and Drug Administration does not regulate energy drinks because they are classified as a supplement rather than as a food or drug. The Center for Food Safety Adverse Event Reporting System (CAERS) is a monitoring

system that collects data and reports about adverse events related to products. Energy drink consumers have sought emergency treatment due to symptoms that range from minor to severe, with a few deaths occurring in rare cases (FDA n.d.). According to the FDA, adverse effects from energy drinks may include dizziness, dyspnea, blood pressure fluctuation, abnormal heart rate, vomiting, diarrhea, development of kidney and bladder stones, hallucinations, loss of consciousness, heart attack, convulsions, and even death (FDA, n.d.). The American Association of Poison Control Centers reported 5,448 caffeine overdoses in the United States in 2007, of which 46% were among consumers younger than the age of 19. All of these cases were from energy drinks (Seifert et al., 2011).

With identification of all of the detrimental physical side effects of energy drinks consumption, more research is needed to determine if there are also mental or psychophysiological side effects such as stress. While there is no universal definition of stress, it can be defined as the experience of a perceived threat (real or imagined) to one's mental, physical, or spiritual well-being, resulting from a series of physiological responses and adaptations (Seaward, 2015). Stress is a naturally occurring part of everyday life, and is commonly classified as eustress or distress. How an event is perceived can determine whether an event results in eustress or distress. Eustress is defined as *good* stress or any stressor that motivates an individual toward an optimal level of performance or health (Seaward, 2015). If exercise is considered positive and relaxing, then it could be associated with eustress. However, if exercise is perceived as painful or uncomfortable then it may result in distress. Distress is defined as the

unfavorable or negative interpretation of an event (real or imagined) to be threatening that promotes continued feelings of fear or anger; more commonly known simply as stress (Seaward, 2015). People can experience the same events or situations, but due to different factors, one person may not experience negative consequences from exposure to these events while another person may experience negative outcomes from this exposure. This is because a variety of factors influence a person's perception of the stimulus such as health status or experience. In the 2014 College Health Assessment Survey (American College of Health Association, 2014), 30% of respondents reported that stress was the most commonly reported factor that negatively affected her/his academic performance. Other items that may adversely affect a student's academic success are sleep difficulties (21%), anxiety (21.8%) and depression (13.5%) (ACHA, 2014). Chronic or persistent stress is a risk factor for many health issues including cardiovascular disease, ulcers, high blood pressure, and digestive disorders (Lagraauw et al., 2015; Mayer, 2000). Daily hassles has been defined as the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment (Kanner et al., 1981). Daily hassles are a predictor of stress and when compared to scales that use major life events as predictors, the daily hassles have a better correlation (DeLongis et al. 1982). How an individual handles these hassles is considered coping with stress. Positive coping allows a person to have a positive adaptation to a stressor and may be obtained through individual strengths such as personal knowledge, skills, and self-esteem (Lavee et al., 1985). Positive coping may also result because of the availability and access to social support such as friends or an institution that provides a service (Lavee et al., 1985). Negative coping or maladaptive

coping happens when people seek relief from stress with a habit generally considered to have negative consequences like smoking, drinking alcohol, or consuming a greater amount of junk food (Naquin and Gilbert, 1996; Hudd et al., 2000). Since energy drink consumption may increase during stressful times and/or may actually serve as a physiologic stressor, consumption of these drinks may serve as a maladaptive coping mechanism. Because of this, it is important to determine if there is a relationship between energy drink consumption and perceived stress.

Research Problem

The purpose of this study is to investigate the relationship between energy drink consumption and daily hassles (a measure of stress). Stress is a part of everyday life, but emerging research points to a possible relationship between consumption of energy drinks and stress. Daily hassles are a part of everyday transactions with the environment, and as such, hassles may be the type of stressors that induce energy drinks as a coping strategy. It is important to identify signs and symptoms of stress and how those signs and symptoms relate to consumption of energy drinks in order to contribute to the limited body of knowledge available on the topic of stress and energy drink consumption. Stress may come from parental expectations, employment demands, traffic, financial constraints, or other sources. Symptoms of stress manifest themselves in different forms such as muscular (teeth grinding or jaw clenching), parasympathetic (dry mouth), sympathetic (headache), emotional (anger), or cognitive (indecisiveness). Understanding where stress comes from and how people cope with stress may help people to better handle their stress.

Purpose of the Study

The purpose of this study is to better understand the relationship between stress and energy drink consumption in college students. A secondary purpose is to describe patterns of energy drink consumption and reasons for energy drink consumption among college students.

Research Questions

The following research questions will be explored in this study.

RQ1: To what degree are hassle scores related to energy drink consumption in college students?

RQ2: Will there be a difference in total hassle scores and hassle subscale sores based status as an energy drink consumer versus non-consumer?

RQ3: Is there a difference in the total number of energy drinks consumed by college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ4: Are there differences in the number of energy drinks consumed under different conditions by college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ5: Is there a difference in total hassles scores of college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ6: Are there differences in hassles subscale scores of college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ7: Under what conditions (lack of sleep, need for energy, when studying, when driving, when partying, for a hangover, when exercising, and when tired) are energy drinks most commonly consumed by college students?

Null Hypotheses

The following null hypotheses have been formed for this study.

$H_0$1: There will be no association between self-reported hassles and the number of energy drinks consumed.

$H_0$2: There will be no a difference in total hassle scores and hassle subscale sores based on status as an energy drink consumer versus non consumer.

$H_0$3: There will be no difference in the total number of energy drinks consumed based on demographic variables.

$H_0$4: There will be no difference in the number of energy drinks consumed under different conditions based on demographic variables.

$H_0$5: There will be no difference in total hassles scores based on demographic variables.

$H_0$6: There will be no differences in hassles subscale scores based on demographic variables.

$H_0$7: There will be no differences in the number of energy drinks consumed under what conditions (lack of sleep, need for energy, when studying, when driving, when partying, for a hangover, when exercising, and when tired) among college students.

Research Hypotheses

The following alternative hypotheses have been formed for this study.

H_R1: There will be a positive association between self-reported hassles and the number of energy drinks consumed.

H_R2: Energy drink consumers will have higher total hassle scores and hassle subscale sores than non-consumer.

H_R3: There will be a difference in the total number of energy drinks consumed based on demographic variables.

H_R4: There will be differences in the number of energy drinks consumed under different conditions based on demographic variables.

H_R5: There will be a difference in total hassle scores based on demographic variables.

H_R6: There will be differences in hassle subscale scores based on demographic variables.

H_R7: There will be differences in the number of energy drinks consumed under what conditions (lack of sleep, need for energy, when studying, when driving, when

partying, for a hangover, when exercising, and when tired) among college students.

Significance of the Study

College students experience stress and that may lead to a variety of concerns that could be physical, mental, or psychological. It is important to discover what factors may be associated with stress. As the world evolves, new products like energy drinks are introduced to the population. Currently, the United States does not regulate the energy drinks. Because the lack of regulation, heavy marketing, increased sales, and increased consumption across age groups, the effects of consumption of these drinks warrants further study. Individuals who may already be stressed may consume energy drinks to help them focus or to get more energy. Unfortunately, the effects of the ingredients of these drinks may cause result in greater physiologic stress. Reliance on energy drinks may form a feedback loop where consumption leads to more consumption. This could be considered a negative coping mechanism. Those who have studied stress in the past may have interest in this study because energy drinks are relatively new and few studies have examined the relationship between their consumption and stress. This study may be used to further the knowledge of researchers, health practitioners, and consumers by expanding our understanding of the relationship between these variables.

Delimitations

The parameters of this study include:

1. Participants in this study included both men and women.
2. Participants were students at the University of Oklahoma between the ages of 18-45
3. Potential participants were recruited by mass e-mail and distribution of recruitment flyers at various locations on campus.
4. Participants had to be able to read and write in English.
5. Participants had to have an ou.edu email address for email contact.
6. The total number of participants had to be at least 380.
7. This study used the Revised Student Hassles Scale to assess stress levels among participants.

Limitations

Limitations for this study include:

1. This study was limited to a convenience sample of university students, which means that participants may have a different education level than members of the general population.
2. Participation was voluntary. Individuals completing the survey may be different from non-respondents.

3. Since participants self-selected to complete the survey, the number of participants who were energy drink consumers and non-energy drink consumers may not be equal
4. Responses were self-reported, therefore, there is a potential for error as respondents may have provided answers they thought were socially appropriate.
5. This study was conducted at a mid-west public university and may not be generalizable to other populations.

Assumptions

Assumptions for this study include:

1. All participants responded to questions in an honest and accurate manner.
2. Participants understood all survey instructions and questions.

Operational Definitions

Energy Drink: An energy drink is a beverage that typically contains caffeine and other ingredients (i.e. taurine and ginseng) intended to increase the drinker's energy. These drinks may be carbonated or un-carbonated, contain various ingredients, and come in various shapes, sizes, and colors. For the purpose of this study, one energy drink is an 8oz – 9oz can like Red Bull or 1.93oz (57ml) energy shot like 5-hour Energy.

Consumption: Consuming energy drinks at least three (3) times per week.

Stress: The experience of a perceived threat to one's mental, physical, or spiritual well-being (Seaward, 2015).

Hassles: the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment (Kanner et al., 1981).

Chapter 2

Review of Literature

Introduction

The purpose of this investigation was to further the knowledge regarding possible associations between energy drink consumption and stress. A secondary purpose is to describe patterns of energy drink consumption at a Southwestern university campus. Previous studies have investigated the relationship between energy drink consumption and a variety of health-related behaviors including alcohol consumption, participation in risk taking behaviors, anxiety, stress, sleep patterns, physical activity, and others. The first part this review will examine literature related to energy drinks including common ingredients, positive and negative effects, prevalence of use among college students, and reasons for energy drink consumption. The second part of this review will examine literature related to stress such as defining stress, beneficial and adverse effects of stress, stressors common to college students, and the Revised University Student Hassles Scale, which will be used to assess stress in this study. Finally, gaps in the literature will be discussed and related literature will be summarized.

Search Strategy

Energy drinks gained popularity in the late 1990s, therefore, this literature search included only articles published since the year 2000 that were written in English and were peer reviewed. Databases that were searched included SportsDiscus

(EBSCO), Medline (EBSCO), Health and Psychosocial Instruments (Ovid), Biological Science Collection (ProQuest), Web of Science, PubMed (NIH), Springer Protocols, and Google Scholar. Search terms included (Energy drink(s)) and (stress) and (depression) and (anxiety); (Sport drink(s)) and (stress) and (depression) and (anxiety). Few articles were found due to the very specific nature of this inquiry therefore other articles were included to help add additional information and to provide background for this study.

Ingredients of Energy Drinks

Energy drinks are difficult to definitively describe because there a number of different brands and products that come in sizes ranging from 1.93oz (i.e., 5-hour energy) to 24oz (i.e., Monster), containing various levels of caffeine, and contain different ingredients. For the purposes of this paper, an energy drink is a beverage that contains ingredients designed to boost energy, provide energy, or stimulate the consumer by raising levels of physiological or nervous activity. Some common ingredients of energy drinks were reviewed in 2012 and an analysis was provided. This included caffeine, guarana, taurine, ginseng, sugar, and bitter orange. The conclusion suggests that regulation of caffeine be a priority due to the existing requirements that caffeine be labeled on soft drinks and other over-the-counter caffeine products (Rath, 2012). Another review conducted in 2014 reviewed similar ingredients but also several others that were found in energy drinks. Along with the ingredients mentioned above L-theanine, L-arginine, L-tryptophan, Tyrosine, Phenylalanine, Gingko biloba, Theobromine, Creatine, Citicoline, Carnitine, Green Tea, and St. John's Wort were all

systematically reviewed. The researchers concluded that there was a lack of empirical evidence to support beneficial interactions between these many different ingredients and caffeine, which is found in many energy drinks (Childs, 2014).

Ingredients Commonly Found in Energy Drinks

Beneficial Effects of Ingredients commonly found in Energy Drinks. One correspondence in the American Academy of Nurse Practitioners detailed some beneficial effects of the ingredients caffeine, guarana, taurine, sugar, ginseng, and bitter orange (Rath, 2010). Caffeine, one of the main ingredients in most energy drinks, is a known stimulant. Caffeine intensifies dopamine receptors which results in stimulation of the cardiovascular system, respiratory systems, and vasomotor centers of the brain which. This stimulation may result in decreased fatigue, improved concentration, and feelings of alertness (Babu et al., 2008). Guarana (derived from the guarana seed), also a main ingredient of most energy drinks, contains triple the amount of caffeine compared to the coffee bean. As a result, Guarana has similar effects as caffeine such as increased alertness and increasing feelings of energy (Henman, 1982). Taurine is another ingredient found in many energy drinks. Taurine has a role in osmoregulation, anti-oxidation, glycolysis and other metabolic processes (Stapleton et al., 1997). Taurine is currently being marketed as a supplement to improve eye health, and biliary health (Babu et al., 2008). Ginseng is another common ingredient in many energy drinks that is thought to improve feelings overall well-being, resistance of stressors, and improve immune function (Clauson et al., 2008**).** According to the Natural Medicines

Comprehensive Database, bitter orange has been used for nasal congestion, inflammation, and bruises (Clauson et al., 2008). Another systematic review detailed many of the benefits of the ingredients contained in energy drinks (Childs 2014). Some benefits listed were how increased plasma glucose improved immediately and improved scoring on the delayed word memory recall assessment (Meikle, 2001). Consumption of L-theanine is associated with decreases in reaction time and improvement in completion of memory tasks and information processing (Haskell et al., 2008). Ginseng combined with caffeine consumption was associated with a decrease in the number of errors made during working memory tasks (Kennedy et al., 2004). Interestingly, Taurine consumption is associated with weakening the stimulatory effects of caffeine on mood (Giles et al., 2012; Peacock 2013) while Guarana intake was associated with increases in alertness, improved simple reaction time, and choice reaction time (Kennedy et al., 2004) both of which are typically found in many energy drinks. Acute administration of Tyrosine counteracts impairments in attention, mood, and memory (Neri et al., 1995) and one retrospective cohort study showed evidence of long term consumption of Ginko biloba being associated with reduced decline in cognitive function (Amieva et al., 2013). However, Tyrosine studies were not reproduced and Ginko Biloba findings were inconsistent across other studies. In one study, Theobromine produced improvement in reaction times, but controls were not used and the doses were not representative of what is contained in energy drinks (Smit 2004). During high intensity mental or physical exercise, Creatine consumption is associated with improved cognitive performance (Rae et al., 2003) and other studies (McMorris et al., 2006; McMorris et al., 2007) have shown improved cognitive performance, attention, and mood. Consumption of

Citicoline is associated with improved memory in the elderly (Alvarez et al., 1996) but it has not been studied in younger populations or in combination with caffeine, which is in most energy drinks. L-arginine intake has resulted in limited evidence of improved physical performance in untrained individuals (McConell 2007) and in elderly adults struggling with dementia (Ohtsuka & Nakaya 2000). Consumption of green tea has been shown to benefit cardiovascular health by decreasing cholesterol and triglyceride absorption as well as improving enzymatic production that is shown to provide cellular protection (Raederstorff, Schlachter, Elste, & Weber 2003), while Carnitine intake is associated with improvements in mood, and cognitive function (Montgomery, Thal, & Amrein 2003). However, these studies were conducted in impaired individuals and not in healthy persons. One 5-Hydroxytryptophan consumption study (Turner, Loftis, & Blackwell 2006) shows an antidepressant effect, but as dosage increased impairments also increased. St. John's wort is more effective than placebo for mild depression (Linde, Ramirez, & Mulrow 1996).

Adverse Effects of Ingredients commonly found in Energy Drinks. There are many reported negative side effects of energy drink consumption. Negative side effects of caffeine are well documented, however these side effects were revisited in one study pertaining to 7th, 8th, and 9th graders. Side effects reported by this population included nausea, heart palpitations, headache, insomnia, anxiety, irritability, tachycardia and seizure (Pollak & Bright, 2003). Guarana, being similar to caffeine and its effects, has similar side effects which may also include restlessness, dysrhythmia, chest pain, tachycardia, tremors, anxiety, and insomnia (Clauson et al., 2008). Ginseng's side

effects that have been reported via Natural Medicines Comprehensive Database include breast tenderness, vaginal bleedings, edema, headaches, and hypertension but the most common side effect reported for ginseng is insomnia (Clauson et al., 2008). Bitter orange, in one study, was reported to increase heart rate and blood pressure for up to 5 hours following a 900mg dose (the amount in energy drinks varies but the average is 200mg) (Bui, Nguyen, & Ambrose, 2006). Side effects determined from one survey of 496 college students of varied ages, gender, and enrollment status included jolt (increased alertness and energy) and crash (sudden drop in energy) episodes, heart palpitations, and headaches (Malinauskas, et al. 2007). Another review of literature was designed to synthesize information about the effects of energy drink consumption in children, adolescents, and young adults with regard to negative or adverse occurrences. Data was collected using PubMed and Google to search for multiple key terms. Results reported adverse effects across all three groups. Adverse effects included seizures, cardiac abnormalities, disruptive behavior, mood disorders, and diabetes (Reissig, Strain, & Griffiths, 2009; Babu, Church, & Lewander, 2008; Clauson et al., 2008; Broderick & Benjamin, 2004; Hedges, Woon, & Hoopes, 2009). This review reported 5448 caffeine overdoses in 2007, of which 46% were in people younger than 19 years of age (Bronstein et al., 2008). Energy drinks can negatively affect sleep, and cause depression and anxiety. One study looked at energy drink consumption and its association with sleep problems in members of the US armed forces who were on deployment in Afghanistan. Over one thousand (1,249) service personnel were surveyed using a random sample of Army and Marine combatants. No differences in use were identified based on age or rank. Analysis showed 44.8% of personnel

consumed at least one energy drink daily while 13.9% would drink three or more a day. Those who drank three or more a day had significantly more trouble sleeping and, conversely, were more likely to stay awake longer. Approximately fifty percent (50.2%) reported sleeping less than 5 hours and 24.2% slept less than 4 hours (Toblin, 2012). Several other studies reported effects on sleep, depression, and anxiety. One study examined (1) relationships among energy drink use and psychological adjustment and (2) frequency of use in certain subgroups. The participants included 44 male and female athletes, 18 ROTC cadets, and a control group of 45 males and females. The Beck Anxiety Inventory and The Pittsburg Sleep Quality Index surveys were completed by participants. Correlation of survey results with consumption data, which was collected retrospectively over a period of seven days, yielded a positive correlation between energy drink usage, level of anxiety, and quality of sleep. In short, high energy drink consumption was correlated with increased anxiety and increased disturbances in sleep quality (Stasio et al., 2011). Another study had 1,565 participants that were drawn from the Western Australian Pregnancy Cohort Study. This study used a simplified version of the Depression, Anxiety and Stress Scale (DASS). The simplified version contained 21 items with seven items delegated to depression, seven to anxiety, and seven to stress. A univariate analysis revealed consumption of 100mL/day of energy drinks was significantly associated with increased depression in males. Consumption of 100mL/day of energy drinks was significantly associated with increased anxiety in males and females. Consumption of 100mL/day of energy drink was significantly associated with increased stress in males and females. After making adjustments to the data to test for those who consumed greater than 250mL/day, the total sample and male

participants who consumed greater than 250mL/day had higher anxiety and stress scores compared to those who consumed 0 ml/day. Results for females who consumed greater than 250mL/day were not significant when compared to those who consumed 0 ml/day. The author offers one explanation for the results being that the males in this study had higher frequencies of use and when used would have higher quantities consumed (Trapp, et al., 2014).

Even though death is rare, there have been reported cases due to caffeine intoxication. One such case was a female with 192 mg/L caffeine in her blood. The source of caffeine was unknown but the individual had a history of drug use. Caffeine is a known cutting agent for illicit drugs. The second case was a male with a level of 567 mg/L in the blood. The caffeine was determined to be a misuse of a dietary supplement. Fatal reactions have been associated with 80mg/L, which is the amount of caffeine contained in one can of Red Bull, but are very uncommon (Kerrigan, & Lindsey, 2005). Even though these examples represent extreme conditions of caffeine intake that are unrelated to energy drink consumption, they suggest that any source of caffeine when consumed to extreme excess can have dangerous and potentially deadly consequences.

Stress Related Literature

Psychosocial stressors and biogenic stressors are two types of stress events (Girdano, Dusek, & Everly, 2009). Psychosocial stressors are events or conditions that result in the perceived threat (real or imagined) to one's mental, physical, or spiritual well-being that trigger a series of physiological responses and adaptations (Seaward, 2015). For example, if a person were to see a snake, the perceived threat to their

physical well-being would trigger an increase in heart rate and breathing rate. Unlike psychosocial stressors, the biogenic stressor bypasses the perception of threat and causes a response by directly stimulating the neurological nuclei (Everly & Lating, 2012). For example, if a person were to consume coffee, the biogenic response would stimulate the neurons and may cause an increase in heart rate and breathing rate. The stress response begins in the neuron. The neuron's cell body is made up of a nucleus, postsynaptic membranes, dendrites, an axon, presynaptic membranes, telodendria, and a synaptic cleft. Once a stimulus is received at the postsynaptic membrane, the dendrite shuttles the stimulus to the cell body, which then transmits the stimulus to the axon. The stimulus then travels down the axon until the telodendria are reached. The telodendria then transmit the signal the presynaptic membranes and the stimulus bridges the synaptic cleft to reach the postsynaptic membranes of the next neuron (Rizzo, 2015). The human nervous system contains millions of these neurons, which transmit stimuli throughout the body. Even though neurons transmit these stimuli, other systems are in place to determine what type of stimulus is transmitted. The human body has a central nervous system made up of the brain and spinal column. The peripheral nervous system broadly includes everything else within the body. The peripheral system can be broken down into somatic and autonomic systems. The autonomic system can be broken down into sympathetic and parasympathetic nervous systems (Rizzo, 2015). Parasympathetic stimulus and sympathetic stimulus work opposite of each other. For example, when walking outside into bright sunlight parasympathetic stimulus will cause the pupils of the human eye to constrict. Conversely, when entering an area of darkness sympathetic stimulus will cause the pupils of the human eye to dilate (Rizzo, 2015).

Again, this biogenic response does not require a person to think about the situation or to perceive a level of threat. Ingredients in energy drinks may cause this biogenic response. Some examples of those ingredients include caffeine, ginseng, guarana, ginkgo biloba, and theobromine (Everly & Lating, 2012). Without the consumption of these ingredients, the human body's response to stress may vary depending on how a stressor is perceived by the individual. One model of the human stress response describes the stress response in linear stages. The reaction begins with exposure to a stressor. The individual then "interprets" the stressor. If the stressor is perceived as a threat, a physiologic response is triggered, which involves activation of necessary organs and system responses (i.e. increased heart rate or breathing). Depending on how the individual copes with the stressor, this physiologic response could improve their health status, return to homeostasis, or lead to dysfunction or disease (Everly & Lating, 2012). Short-term or acute stress causes a physiologic response by activating the sympathetic, parasympathetic, or neuromuscular nervous systems. Sympathetic responses to stressors may include high blood pressure, dizziness, heart palpitations, increased sweating, clammy hands, and shortness of breath (Miller & Smith, 1982). Parasympathetic responses to stressors may include changes in appetite, nausea, gas, cramping, heartburn, constipation, diarrhea, and dry mouth (Miller & Smith, 1982). Neuromuscular responses to stressors may include muscular aches, nervous tics, shaky voice, frowning, pacing, back pain, trembling, jaw clenching, or teeth grinding (Miller & Smith, 1982). Typically, if an individual is able to cope with the acute stressor, physiologic response will return to normal.

One definition of coping is the behavioral efforts required to manage demands that are appraised as taxing or exceeding the resources of the person (Lazarous & Folkman, 1984). There are positive coping strategies that allow a person, through personal knowledge, skills, or self-esteem to have an adaptive response that can reduce stress. (Lavee et al., 1985) Maladaptive coping or negative coping mechanisms when performed in immediate response to the stressor can reduce stress in the short term (Everly, 1979), however, in the long term, they may cause negative health consequences. This happens when people seek relief from stress with a habit like drug use, smoking, drinking alcohol, or withdrawal from other persons (Naquin and Gilbert, 1996; Hudd et al., 2000; Everly, 1979). Chronic or persistent stress is a risk factor for many health issues. One explanation for how acute stress may transition to chronic stress is described by the General Adaptation Syndrome (GAS). GAS describes three stages of response to stress. The first stage is the "alarm" stage in which the person's body prepares itself to combat the stressor. The second stage is "stage of resistance" in which the person's body has responded to the stressor and attempted to return functions to normal. The third stage occurs when the stressor continues to be present and the person's first and second stage resources have been depleted. The third stage is "stage of exhaustion" and this prolonged duress is when signs or symptoms of disease begin to manifest (Selye, 1976) (i.e. chronic increased heart rate and blood pressure could lead to cardiovascular disease). Chronic stress has been linked to increased glucose production (Selye, 1976), increased urination, gastric irritation (Van Raalte, Ouwens, & Diamant, 2009), an increase in circulating free fatty acids (Macfarlane, Forbes, & Walker, 2008), suppression of immune response (Yuwiler, 1967), appetite suppression, increased

ketone production (Schwarz et al., 2011), and associated feelings of depression (Krishnan & Nestler, 2008; Henry & Stephens, 1977), all of which can help contribute to digestive disorders, high blood pressure, and cardiovascular disease (Lagraauw et al., 2015; Mayer, 2000).

Relationship between hassles and stress

Many different instruments are designed to measures stress. Within the field of psychology, stressors are placed into four categories: major life events, catastrophes, daily hassles, and ambient stressors. Kanner and colleagues developed the original hassles scale in 1981. They sought to predict levels of stress by measuring the accumulation of smaller daily stressors that were termed "hassles". The original 117-item hassle scale was tested against the major life events scale and shown a stronger predictor of stress related outcomes than major life event scales (Delongis et al., 1982; Kanner et al., 1981; Lazarus, 1990). Due to limitations such as redundancy, length, and lack of specificity, the scale was reduced to a 53-item scale in 1988. The 53-item hassles scale focused on a middle-aged population, therefore researchers determined a need for a scale that was designed to measure hassles in a college aged populations. Over the next 15 years, The Brief College Student Hassles Scale (BCSHS), the Inventory of College Students' Recent Life Experiences (ICSRLE), and the Hassles Assessment Scale for Students in College (HASS/Col) were all created in order to address the age and situation specific hassles that impact college students. In early 2000, researchers determined further development of measurements was needed to

more accurately assess the relationship between hassles and college student health outcomes.

Development for the University Student Hassles Scale (USHS) occurred in two phases (Pett & Johnson, 2005). Phase 1 resulted in the development of the original 117-item scale, which was initially tested by 1,076 graduate and undergraduates. Sixty-seven items were eliminated because 75% of the students indicated the hassle did not occur (the original hassles scale was used for middle-aged populations). Other questions were removed due to low structure coefficients (12) or because they were highly correlated with other items (3). With 35 questions remaining the researchers determined there were limitations to the USHS that needed to be addressed such as too few items, lack of gender, ethnicity, religion, and social relationship items. Phase 2 took questions remaining from phase one, questions obtained from students, and questions obtained from an extensive literature review and created the Revised University Student Hassles Scale (RUSHS) a 113 item scale. Principle axis factor analysis, Pearson product-moment correlations, and independent T-tests were used to examine the psychometric characteristics of the scale. Items were again eliminated because 75% of the respondents indicated the hassle did not occur (29). Other items were eliminated due to wording (2), if inter-correlation with other items were greater than .70 (7), and if the item was unable to differentiate between high or low stress resulting in a correlation of less than .40 (18). The remaining 57 items met all of the retention criteria set forth by the researchers, which were strong structure coefficients (>.40), eigenvalues greater than 1.0, and factors containing at least three items. Analysis of subscale count, severity, and average frequency resulted in low inter-

correlations among the constructs. Count of hassles ranged from .10 to .58, frequency resulted in .16 to .52, and severity ranged from .17 to .58. The authors report a weak relationship between count and severity (.27) and suggest severity might be examining different aspects of stress. Test and retest reliability was performed on two occasions one week apart. Coefficient scores ranged from .66 to .93, the scores for severity were less consistent ranging from .01 to .94.

The Global Stress measure was correlated with the RUSHS and the results ranged from .08 to .64. Time pressures, financial constraints, and physical appearance had the strongest correlations. The results suggest hassles are statistically significant indicators of global stress related to time pressures, financial constraints, and physical appearance, but that other factors still contribute to student stress. Independent T-tests demonstrated, when compared to students with low stress, frequency of hassles was significantly correlated with high stress in time pressures, friendships, total hassles, physical appearance, and financial constraints.

The SF-36 Medical Outcomes Survey was used to examine hassles compared to perceived mental and physical health. Scores for the RUSHS were more closely related to mental health than physical health, as would be expected. A negative correlation demonstrated lower mental health scores with higher hassle scores in the subscales of time pressures, financial concerns, parental expectations, friendships, physical appearance, and total hassles scale and ranged from -.34 to -.50 (Pett & Johnson, 2005).

Studies that used the Revised University Student Hassles Scale

Several studies have used the Revised University Student Hassles Scale as a measurement instrument in their research. MacNeil et al. 2012 used the RUSHS scale to examine the relationship between daily hassles, eating disorder attitudes and behaviors, and avoidance coping. They found a significant interaction between avoidance coping and number of daily hassles ($p=.05$) and stated those participants who reported greater levels of avoidance coping had higher reported daily hassles and greater levels of eating disorder attitudes and behaviors. Another study performed by Sheldon, Cummins, & Kamble 2010 used the RUSHS to examine subjective well-being and three life-balance measures. The RUSHS scale was used to support their expectation that life balance would be associated more with time stress and not necessarily the other kinds of stress assessed by the RUSHS. Currently, there are a limited number of studies that use the RUSHS and none that have used the RUSHS in combination with energy drink consumption. This instrument was chosen because of the focus on college aged persons, the length of the questionnaire, its high correlation with stress compared to other stress scales, and the concerns that are faced while attending a university.

Stress and Energy Drink Consumption

Stress is usually studied in conjunction with other factors in addition to energy drink use. In one study, the purpose was four fold. The study investigated (1) whether a relationship existed between perceived stress and energy drink consumption among college students, (2) if a relationship existed between energy drink consumption and

academic performance, (3) if perceived stress differed by gender and year in school, and (4) if energy drink consumption differs by gender and year in school. A convenience sample of 136 undergraduate students filled out an online survey. While no significant difference was found for perceived stress based on gender, Pearson correlation coefficients indicated significant positive relationships between participants' perceived stress and the consumption of at least one energy drink in the past 30 days ($r=.241$, $p<.01$). There was no significant difference in the number energy drinks consumed based on year of school, but there was a significant difference ($p=.001$) in energy drink consumption based on gender with males (mean = 0.86) consuming more than females (mean = 0.29). An inverse relationship was found between academic performance and the number of energy drinks consumed. In summation, participants who had higher levels of stress had higher energy drink consumption meaning those who reported the highest stress also had the highest number of energy drinks consumed (Pettit & Debarr, 2011).

Regulation of Energy Drinks

As noted previously, the FDA currently does not regulate the sale of energy drinks. The purpose of one article was to enlighten the FDA, policymakers, analysts, and scientists about issues related to energy drink consumption so that it could inform them during the process of making decisions or disseminating information regarding energy drinks. The study further aimed to reduce the impact of energy drink consumption on vulnerable populations such as children, adolescents, and pregnant

women. Since the main directive of this paper was to influence policy changes and to minimize adverse events related to energy drink consumption, the authors made a series of recommendations that included capping caffeine levels in energy drinks to 100mg per 250ml, creating a public education campaign, and increasing the regulation of energy drinks by improving label readability and requiring product ingredients (Thorlton, Colby, & Devine, 2014).

Another paper also addresses the need for regulation of energy drinks. The author compares the initial lack of regulation of cigarettes to how the FDA currently fails to regulate energy drinks. Since energy drinks are current categorized as a dietary supplement that requires very little regulation, the author addresses the specific needs to reclassify energy drinks, to empower the FDA to monitor the amount of caffeine in these drinks, and to enable them to have authority over labeling and regulations.

Many arguments are presented related to the benefits of caffeine and the detriments of over consumption. The author suggests that energy drinks have the same addictive qualities as the nicotine found in cigarettes. Also mentioned are the many adverse health consequences such as nervousness, irritability, sleeplessness, increased urination, abnormal heart rhythms, decreased bone density, and in extreme cases, death from over consumption. In conclusion, the author hoped that legislators act before consumers experience too much harm (Hoflander, 2010).

Prevalence of Energy Drink Consumption

The purpose of one study was to determine energy drink consumption patterns among college students. The authors investigated the prevalence and frequency of energy drink use during a variety of situations and for different purposes. These included consumption as a response to periods of insufficient sleep, to increase energy, while studying, when driving for long periods of time, when drinking alcohol while partying, and for treating a hangover. They also wanted to know the prevalence of adverse side effects and energy drink dose effects. They found that 51% of the surveyed college students consumed greater than one energy drink each month. The primary reasons given for consuming energy drinks were to counteract the effects of insufficient sleep and to increase energy level in general, while drinking with alcohol, and while studying (Malinauskas, et al 2007).

Another study provided a complete in-depth analysis of the United States consumption of caffeine to The Food and Drug Administration. The study encompassed the entire United States while focusing on core groups of children 2-13, youth 14-21 and women of childbearing age 16-45. The first phase of the study compiled caffeine content of food and beverages using the National Nutrient Database for Standard Reference, scientific publications, the Internet, trade association data, and industry sources. The second phased entailed compiling information regarding the intake of caffeine for the whole population. They then estimated consumption levels for various age and gender groups. Many sources were used for the compilation of data including surveys from the National Health and Nutrition Examination Survey (NHANES) and the NDP Group's Food Consumption surveys. When necessary, the information was

updated by statistics provided by The National Coffee Association, The Tea Association of the USA, and the American Beverage Association. The majority of caffeine intake was determined to be from beverages including 97% for youth and adults and 95% for children. Food supplies did not contribute a significant amount of caffeine intake. Adults (22 and older) had an average intake of 300 mg/day. Younger people consumed less since their beverages that contained caffeine were mostly soda as opposed to coffee or tea. It also was found that adult females, including those in the childbearing age range, consumed less caffeine than males. Males 40-59 years old consumed the highest caffeine doses of all groups (Laszlo, 2009).

A third study calculated prevalence rates from publicly available data collected with the 2010 National Health Interview Survey. The population targeted was adults 18 and older with 48% of those being male. The analysis had a sample population of 25,492. The authors concluded that one in four US adults consumed sports and energy drinks at least once a week and one in nine consumed them at least three times per week. The analysis also identified a variety of subpopulation that consumed higher amounts. These included younger adults, non-married individuals, and current smokers (Park et al., 2013).

Another study described caffeine consumption among young children. A convenience sample of 228 families was recruited in order to obtain information about their children aged 5-12yrs old. Data was collected during clinic visits and was reported by parents. Results showed 75% of the children in this sample consumed caffeine. On average, the 5-7 year olds consumed 52mg of caffeine per day while the 8-12 year olds consumed 109mg (Warzak et al., 2011). A study by Terry-McElrath,

O'Malley, and Johnston collected self-reported prevalence data among 8th, 10th, and 12th grade students using a cross sectional survey. They reported that 30% of students consume energy drinks, 40% reported daily use of soft drinks, and 20% reported daily use of diet soft drinks. They concluded that caffeine consumption is on the rise and that, even though causality could not be established, those adolescents that consume energy drinks had a higher chance of substance abuse than those with soft drink consumption based on the finding that ED users reported more illicit drug use (Terry-McElrath, O'Malley, & Johnston, 2014).

Summary of literature review

The literature that has been reviewed helps us to understand the concerns regarding energy drinks. While the effects of caffeine have been well studied, the effects of energy drinks and the combination of ingredients that are found in energy drinks has not been studied. Consumption of energy drinks is on the rise. Studies (sources) report a relationship between energy drink consumption and positive health outcomes such as improved reaction time, improved mental recall, and reduced perception of discomfort. Studies also report negative health consequences, but these are not consistent across all demographics. Higher levels of consumption are associated with negative health consequences such as increased stress, anxiety, lack of sleep, and depression, but the amount that must be consumed to develop negative effects varies across studies. While studies have examined the relationships between energy drink consumption and stress in combination with other factors (i.e., anxiety, depression, sleep quality), no study has used the Revised University Student Hassle Scale to

measure stress independently in relation to energy drink consumption in the college student population.

Chapter 3

Methodology

The purpose of this study was to survey a sample of college students at the University of Oklahoma to investigate the relationship between energy drink consumption and level of perceived hassles. For the purposes of this study, stressors were broken down into categories related to time pressures, financial constraints, race/ethnicity, gender, friendship, traffic, religion, safety, employment, physical appearance, and parental expectations. Previous studies found a relationship between stress and energy drink consumption. This study sampled college students from the University of Oklahoma, which is located in the Southwest portion of the United States. Methods, instruments, and study sample are described in this chapter.

Sample

Seven hundred fifty six male and female participants were recruited during the spring 2016 semester. Participants were enrolled as students at the University of Oklahoma and received an e-mail requesting participation. If interested in participating, they clicked on the link that was provided in the e-mail and were directed to an informed consent form that provided details about the survey. Inclusion criteria included the following:

- participants had to be students at the University of Oklahoma and
- participants had to be between 18-55 years of age

Participants were excluded if:

- they were not students of the University of Oklahoma and
- If their age fell outside to the 18-55 year range.

Both energy drink consumers and non-energy drink consumers were recruited. This study population was chosen because energy drinks are marketed to college students and consumption is on the rise among these students (Stasio et al. 2011; Malinauskas et al. 2007).

Instrumentation

Revised University Student Hassles Scale. For this study, data was collected using the Revised University Student Hassles Scale (RUSHS) and an energy drink consumption survey. The original Hassles Scale was developed in 1981 by Kanner and colleagues and included 117 items. The first version, which attempted to produce a scale more related to students, resulted in the University Student Hassles Scale. Further study and revision resulted in the RUSHS. The RUSHS contains 11 subscales that address the frequency and severity of a variety of stressors. The subscales include questions that quantify time pressures, financial constraints, race/ethnicity, gender, friendships, traffic, religion, safety, employment, physical appearance, and parental expectations. The subscales vary in length. For example, the Time Pressures subscale has 13 questions that ask about situations such as too many things to do, class assignment deadlines, studying for class, trouble relaxing, etc. The Financial constraints subscale has seven questions regarding financial security, money for emergencies, owing money, college expenses, and not enough money for clothing. All

questions use a 5-point Likert-type scale for how often the stressor occurs and if the stressor does occur another a 5 point scale to indicate the severity (Pett and Johnson, 2005). The psychometric evaluation of the RUSHS was performed by Drs. Marjorie Pett and Mary Johnson. A Principal Factor Analysis with Varimax rotation was used to identify the 11 factors (subscales) representing unique hassles that constituted the final instrument. The subscale test-retest reliabilities were determined to be adequate, ranging from .73 for parental expectations to .90 for time pressures. Test- retest reliability scores for seven of the subscales were greater than .80. Convergent construct validity of the instrument subscales was established by correlating values with a global stress measure (Global Stress Scale) and the mental health (MCS) and physical health (PCS) subscales of a health outcome measure (SF-36 Health Survey). They found a significant positive correlation between all of the measures and the 11 subscales of the RUSHS.

Energy Drink Consumption Survey. The energy drink consumption survey contains 19 questions including two demographic questions and 17 questions that ask participants about specific conditions under which they drink energy drinks (i.e. when taking a long drive or when studying for an exam). Scores for each condition were developed by multiplying the number of drinks for each condition by the number of times per month that condition was performed. For example, if two energy drinks were consumed for lack of sleep and the participant did not get enough sleep eight times in the past month then the participant would receive a total of 16 energy drinks consumed for the condition lack of sleep. The total of all conditions would be added to reach a total energy drink consumption value.

Research Design

This study used a cross-sectional design with the survey being delivered electronically. All participants completed the same survey, which was hosted on Qualtrics. Data was collected electronically as participants completed their surveys.

Data Collection Procedures

Data were collected in the spring of 2016. All data were collected electronically and will be anonymous. Recruitment involved distribution of two mass e-mails to undergraduate and graduate students at the University of Oklahoma. Response to the first email resulted in an inadequate number of participants who consume energy drinks. Because of this, a second mass email was distributed that targeted participants that consume energy drinks. Participation was voluntary. After e-mails were distributed, potential participants had the opportunity to click on a provided link that directed them to the online informed consent form and the survey.

Data Management and Analysis

Data was stored on a password-protected computer. Analysis was performed with SPSS V20. Descriptive statistics included percentages for categorical data and means and standard deviations for continuous data. An alpha level of .05 was used for all inferential tests. Assessment of the relationship between energy drink consumption and stress was determined by correlation analysis. Differences in energy drink consumption and stress levels by group were assessed by t-tests or ANOVA depending in the number of groups.

Chapter 4

Results

The purpose of this study was to explore the relationship between perceived hassles and energy drink consumption on a southwestern university campus. Additional purposes include determining if there is a difference in self-reported hassles based on whether students consume energy drinks or if there is a difference in the conditions under which energy drinks are consumed based on demographic characteristics. Students were sent an e-mail that contained a link to the survey mid semester in the spring of 2016 and again towards the end of the semester in 2016. Students were able to complete the questionnaire at their convenience.

The questionnaire contained 57 hassle items that describe conditions that may be stressful to college students. Participants were asked to indicate how often the hassle occurred over the previous month on a five point Likert scale from "did not occur" to "always occurred". If the hassle did occur, then the participant was asked to indicate the severity of the hassle on a five point Likert scale from "not at all severe" to "extremely severe". The questionnaire also contained 13 energy drink items, eight of which had an associated question that was answered based on initial response. If an energy drink was consumed under a specific condition (i.e. being tired), then the respondent was asked to indicate (1) how many times a month they drank energy drinks under that condition (i.e. being tired) and then (2) how many drinks were consumed on each occurrence of that condition (i.e. being tired). The questionnaire contained six demographic items such as gender, age, year in school. Four items were related to other

sources of caffeine intake that were independent of consumption of energy drinks (i.e., diet pills, soft drinks, pre-workout mix, or coffee).

The results of this study are presented as follows:

1. Participant characteristics
2. Overview of variables
3. Description of data analysis
4. Descriptive statistics
5. Results and discussion organized by research hypothesis
6. Discussion of results

Participant Characteristics

Seven hundred fifty-six participants accessed the questionnaire. Demographic questions were located in the middle of the questionnaire with some questions requiring participants to write in a response (i.e., age), some with two choices (i.e., gender), and some with multiple choices (i.e., ethnicity). Out of the 756 participants who accessed the questionnaire, 449 completed the questionnaire for a 59.5% completion rate. Another 293 only partially completed the questionnaire and were therefore, not included in data analysis. The age of the participants ranges from 18 to 51 with a mean age of 23±5.2. Table 1 presents categorical descriptive data for gender, ethnicity, class, living situation, and membership in a sorority/fraternity. Categories listed for living situation were living on campus in a dorm or apartment, living on campus in a sorority or fraternity, or living off campus. Both people who live in a sorority or fraternity house and members who do not live in a sorority or fraternity house were included as

members of a sorority or fraternity. The participants in this study were predominantly female, Caucasian, lived off campus, and were not members of a sorority or fraternity.

Table 1. Summary of participant characteristics (Categorical) (n = 449)

Gender	
	Male – 147 (32.7%)
	Female – 302 (67.3%)
Ethnicity	
	Caucasian – 333 (74.2%)
	Black/African American – 13 (2.9%)
	Native American/Alaska Native – 16 (3.6%)
	Asian – 47 (10.5%)
	Hispanic –39 (8.7%)
	Missing – 1 (.2%)
Class	
	Freshman – 98 (21.8%)
	Sophomore – 62 (13.8%)
	Junior – 84 (18.7%)
	Senior – 97 (21.6)
	Graduate Student – 107 (23.8%)
	Missing – 1 (.2%)
Living Situation	
	On campus dorms/apt – 122 (27.2%)
	Sorority or Fraternity – 12 (2.7%)
	Off Campus – 315 (70.2%)
	Missing –
Sorority or Fraternity* (n=342)	
	Yes – 63 (18.4%)
	No – 279 (81.6%)

*undergraduate participants only

Table 2 presents categorical descriptive data for questions related to energy drink consumption. Type of energy drink refers to regular or sugar free versions. Headaches and heart palpitations refer to symptoms that could be produced by the stimulant(s) in energy drinks. Caffeine pills refer to over the counter pills that can be purchased and contain substances that act as central nervous system stimulants that are similar to or the same as those found in energy drinks. Supplements refers to work out

or diet aid supplements that contain caffeine or other stimulants. Jolt and crash episodes were approximately one (1) per month with ±3.1 standard deviation.

Table 2. Descriptive Statistics for Categorical Variables: Energy Drink Related, Other Caffeine Sources, and Symptoms

Energy drink consumer*	
	Yes – 185 (41.3%)
	No – 263 (58.7%)
Coffee consumption*	
	Yes – 270 (60.7%)
	No – 179 (39.3%)
Soft Drink consumption*	
	Yes – 222 (49.4%)
	No – 229 (50.6%)
Caffeine pills*	
	Yes – 48 (10.7%)
	No – 401 (89.3%)
Supplements containing caffeine*	
	Yes – 61 (13.6%)
	No – 388 (86.4%)
Energy drink type**	
	Only regular – 63 (34.1%)
	Mostly regular – 30 (16.2%)
	Mixed – 25 (13.5%)
	Mostly sugar free – 27 (14.6%)
	Only sugar free – 40 (21.6%)
Jolt and Crash**	
	Yes – 99 (53.5%)
	No – 86 (46.5%)
Headaches**	
	Yes – 34 (18.4%)
	No – 151 (81.6%)
Heart palpitations**	
	Yes – 81 (43.8%)
	No – 104 (56.2.4%)

* Based on all response (n=449)
** Based on responses of energy drink consumers (n=185)

Overview of Variables

Energy Drink Variables. The variables sleep, energy, exam, driving, partying, hangover, exercise, and tired represent the specific conditions under which energy

drinks were consumed. Each variable was quantified by multiplying the numeric responses provided for two related questions. One question asked for the number of energy drinks consumed per day under the specified condition and the other asked for the number of days per month drinks are consumed under that condition. For example, responses to questions ED6 (drinks per day) and ED6a (days per month) were multiplied to produce the value for the SLEEP variable, which indicates the average number of energy drinks consumed by a participant per month when they do not get enough sleep.

Hassle Variables. Participants were queried with respect to 57 hassles, responding on a 5-point Likert scale from "did not occur" to "always occurred." Scores from the subscale items were added to form the score for each hassle subscale. The variable name, type, range, and items that measure each variable are described in Table 3.

Process for Treating Missing Data

Missing data for energy drink questions were replaced using the following methods. If the participant indicated that they consumed at least one (1) energy drink under a given condition (i.e. partying) but did not answer how many times per month this occurred, the missing data was replaced by a one (1) to indicate the minimum possible times per month this occurred. If the participant indicated that they consumed energy drinks at least one (1) time per month under a given condition (i.e. partying) but did not indicated how many drinks were consumed on those days, missing data was replaced by a one (1) to indicate the minimum possible number of drinks consumed.

Table 3. Overview of variables

Variable Name	Measurement Items	Range	Type
Sleep	ED6 * ED6a	0-150	Integer
Energy	ED7 * ED7a	0-100	Integer
Exam	ED8 * ED8a	0-150	Integer
Driving	ED9 * ED9a	0-50	Integer
Partying	ED10 * ED10a	0-50	Integer
Hangover	ED11 * ED11a	0-30	Integer
Exercise	ED12 * ED12a	0-100	Integer
Tired	ED13 * ED13a	0-120	Integer
(H)time	53,28,51,40,6,22,9,12,23,15,30,39,36	0-52	Likert
(H)financial	18,11,24,21,25,16,41	0-28	Likert
(H)race	10,29,47,27,33,17	0-23	Likert
(H)gender	38,35,43,50,52	0-20	Likert
(H)friendship	44,32,4,48,37,42	0-24	Likert
(H)Traffic	54,2,14,19	0-16	Likert
(H)religion	55,3,57	0-12	Likert
(H)safety	13,1,56,31	0-15	Likert
(H)employment	7,34,46	0-12	Likert
(H)physical appearance	5,20,26	0-12	Likert
(H)parental expectation	49,8,45	0-12	Likert

Energy drink questions that had duplicate data for the two related questions about a specific condition were edited by the following method. If greater than ten (10) energy drinks were consumed for a condition (i.e., studying) and the times per month was also reported as ten (10), then the number of energy drinks consumed under this condition was reduced to one (1) and the number of days on which energy drinks were consumed while studying was not changed. For example, one person indicated they consumed 29 energy drinks each day when they were studying and they studied 29 times a month. This led to an outlier of 841 (29 x 29) energy drinks consumed in one month for studying. In this instance the number of energy drinks consumed each day under the condition was reduced to one (1) and the number of days per month that they drank energy drinks while studying remained at 29. This changed the total of energy drinks consumed in one month while studying to 29, which is a much more conservative estimate. Questions with a response of consuming greater than ten (10) energy drinks under a condition were reduced to one (1). For example, one person indicated they consumed 15 energy drinks when exercising and they exercised 20 times a month which totaled 300 energy drinks consumed in one month for exercise. In this instance, the number of energy drinks consumed per day under this condition was reduced to one (1), which changed the total number of energy drinks consumed in one month for exercising to 20, a much more conservative report. Missing data for the hassle questions were replaced using the mean score for the total sample for that question. For example, the mean value for hassle two (2) was 1.996. Therefore, any participant that missed inputting an answer for hassle two received a two (2). Missing data for demographic questions (i.e. age or gender) was not replaced.

Descriptive Statistics for Continuous Variables

Table 4 presents descriptive statistics for the eight energy drink measures and the total number of energy drinks consumed (Total drinks). The minimum and maximum scores, mean, and standard deviation are reported for each variable.

Table 4. Descriptive statistics for energy drink variables

Variable Name	Minimum	Maximum	Mean	Std. Deviation
Sleep	0	150	3.5	10.3
Energy	0	100	4.0	11.2
Exam	0	150	2.6	8.9
Driving	0	50	1.3	4.7
Partying	0	50	.84	4.1
Hangover	0	30	.3	2.1
Exercise	0	100	1.1	6.6
Tired	0	120	4.3	12.9
Total Drinks	0	511	17.9	42.9

Table 5 presents the descriptive statistics for each of the 57 hassle items. In Table 5, the minimum, maximum, mean, and standard deviation for all 57 hassles are reported.

Table 5. Descriptive Statistics for Hassle Variables 1-24

Variable Name	Minimum	Maximum	Mean	Std. Deviation
H1	0	4.0	1.0	1.0
H2	0	4.0	1.9	1.1
H3	0	4.0	0.3	0.7
H4	0	4.0	1.1	1.1
H5	0	4.0	1.9	1.3
H6	0	4.0	2.1	1.2
H7	0	4.0	0.9	1.1
H8	0	4.0	0.8	1.1
H9	0	4.0	2.7	1.2
H10	0	4.0	0.3	0.8
H11	0	4.0	1.1	1.3
H12	0	4.0	2.5	1.2
H13	0	4.0	0.7	1.0
H14	0	4.0	1.7	1.4
H15	0	4.0	2.2	1.4
H16	0	4.0	1.3	1.3
H17	0	4.0	0.5	1.0
H18	0	4.0	1.5	1.4
H19	0	4.0	1.2	1.3
H20	0	4.0	1.7	1.3
H21	0	4.0	0.8	1.2
H22	0	4.0	2.4	1.4
H23	0	4.0	1.5	1.4
H24	0	4.0	1.0	1.3

Table 5. Descriptive Statistics for Hassle Variables 25-48 (cont.)

Variable Name	Minimum	Maximum	Mean	Std. Deviation
H25	0	4.0	1.7	1.5
H26	0	4.0	1.9	1.3
H27	0	4.0	0.5	1.0
H28	0	4.0	2.0	1.3
H29	0	4.0	0.3	0.8
H30	0	4.0	1.7	1.4
H31	0	4.0	0.6	0.9
H32	0	4.0	1.0	1.3
H33	0	4.0	0.4	0.9
H34	0	4.0	0.9	1.2
H35	0	4.0	0.7	1.1
H36	0	4.0	2.0	1.3
H37	0	4.0	0.9	1.1
H38	0	4.0	0.6	1.0
H39	0	4.0	1.7	1.3
H40	0	4.0	2.0	1.3
H41	0	4.0	0.9	1.3
H42	0	4.0	1.2	1.2
H43	0	4.0	0.3	0.8
H44	0	4.0	1.3	1.3
H45	0	4.0	1.0	1.3
H46	0	4.0	1.2	1.3
H47	0	4.0	0.6	1.1
H48	0	4.0	0.9	1.1

Table 5. Descriptive Statistics for Hassle Variables 49-57 (cont.)

Variable Name	Minimum	Maximum	Mean	Std. Deviation
H49	0	4.0	1.1	1.3
H50	0	4.0	0.4	1.0
H51	0	4.0	2.0	1.3
H52	0	4.0	0.6	1.1
H53	0	4.0	2.4	1.4
H54	0	4.0	1.3	1.5
H55	0	4.0	0.5	1.0
H56	0	4.0	0.7	1.0
H57	0	4.0	0.4	0.8

Table 6. Descriptive Statistics for Hassle Subscales

Variable Name	Minimum	Maximum	Mean	Std. Deviation
Time	0	52	26.9	12.2
Financial	0	28	8.3	7.8
Race	0	23	2.6	4.2
Gender	0	20	2.8	4.1
Friendship	0	24	6.5	5.0
Traffic	0	16	6.1	4.0
Religion	0	12	1.2	2.2
Safety	0	15	3.0	3.0
Employment	0	12	3.0	3.1
Physical appearance	0	12	5.5	3.3
Parental expectations	0	12	2.9	3.0
Total hassles	0	204	68.7	34.9

Table 6 presents the descriptive statistics for the hassle subscales. In Table 6, the minimum and maximum scores, mean, and standard deviation are reported for total hassle and all 11 subscales.

Results and Discussion Organized by Research Hypothesis

The following research questions were explored in this study.

H_R1: There will be a positive association between self-reported hassles and the number of energy drinks consumed.

H_R2: Energy drink consumers will have higher total hassle scores and hassle subscale sores than non-consumer.

H_R3: There will be a difference in the total number of energy drinks consumed based on demographic variables.

H_R4: There will be differences in the number of energy drinks consumed under different conditions based on demographic variables.

H_R5: There will be a difference in total hassle scores based on demographic variables.

H_R6: There will be differences in hassle subscale scores based on demographic variables.

H_R7: There will be differences in the number of energy drinks consumed under what conditions (lack of sleep, need for energy, when studying, when driving, when partying, for a hangover, when exercising, and when tired) among college students who report consuming energy drinks.

Result for each of these research hypotheses are included in this section.

H_R1: There will be a positive association between self-reported hassles and the number of energy drinks consumed.

A correlation analysis (1-tailed) was used to determine if there were associations between total number of energy drinks consumed and total hassle score and hassle subscale scores. Results for the total sample and for the subset of participants that consumed energy drinks are presented below.

Total Sample. There was not a significant correlation between total hassle score and total number of energy drinks consumed for the total sample (N=446, r=.02, p=0.279). Therefore, we failed to reject the null hypothesis for this relationship. However, there was a significant correlation between the total number of energy drinks consumed and hassles related to employment (N=449, r=.100, p=0.017) and hassles related to safety (N=449, r=-.111, p=.009). It should be noted that, although statistically significant, these correlations are weak, and likely have no practical significance. We failed to reject the null hypothesis for the relationship between the number of energy drinks consumed and all other hassle subscales.

Energy Drink Consumers. There was not a significant correlation between energy drink consumers' total number of energy drinks and total hassle score (n=183, r=.061, p=0.207). We failed to reject the null hypothesis for the relationship between number of energy drinks consumed and (1) total hassle score and (2) scores of all hassle subscales.

These results do not agree with the findings of previous studies. Pettit and Debarr (2011) found a positive relationship between perceived stress and energy drink consumption. Stasio et al. (2011) found that as frequency of energy drink use increased, experiences of anxiety also increased. Trapp et al. (2014) also found a positive association between anxiety and energy drink consumption.

H_R2: Energy drink consumers will have higher total hassle scores and hassle subscale scores than those who do not consume energy drinks.

Independent t-tests (1-tailed) were used to identify differences in hassle scores based on status as a consumer of energy drinks. Results indicate that there was not a significant difference in total hassle score between energy drink consumers and non-consumers ($p=0.675$). However, there was a significant difference ($p=.016$) in hassles related to safety, with non-energy drink users (3.3 ± 2.9) reporting higher safety related hassle scores than energy drink users (2.7 ± 3.0). There were no other between group differences in subscale mean scores.

Currently there is no other literature related to energy drinks and hassles in which to compare these results.

H_R3: There will be a difference in the total number of energy drinks consumed based on demographic variables.

Data were analyzed using independent t-tests (1-tailed) for dichotomous demographic variables (gender and membership in a sorority/fraternity) or one-way ANOVA for demographic variables with three or more categories (ethnicity, academic class, and living situation). The results for demographic variables will be presented in the following order: gender (male or female), membership in a sorority or fraternity (yes or no), ethnicity (Caucasian, African American, Native American/Alaska Native, Asian, Hispanic), academic class (freshman, sophomore, junior, senior, graduate student), and living situation (on campus, sorority/fraternity house, off campus).

Gender. An independent t-test indicated that there was a significant difference (t=2.56, p=.005) in the total number of energy drinks consumed based on gender, with males (26.7±56.7) consuming significantly more energy drinks than females (13.7±33.7). There were more than twice as many females (N=302) in the sample as there were males (n=147).

Sorority/Fraternity Membership **(undergraduate students only, n=342)**. For this variable, responses from undergraduate students only were used in the analysis since graduate students are not eligible for membership in a sorority or fraternity. An independent t-test indicated that there was no significant difference (t=1.48, p=.142) in the number of energy drinks consumed based on membership in a sorority or fraternity (30.1±72.7) versus non-members (15.8±36.3). However, it should be noted that there was a large disparity the number of participants in the two groups, with nearly 6 times

more non-members (n=383) than sorority/fraternity members (n=63) in the sample. There is the possibility that there may have been between group differences if the groups were more similar in size.

Ethnicity **(Caucasian = C; African American = AA; Native American/ Alaska Native = NA; Asian = A; Hispanic = H).** A one-way ANOVA was used to determine if there were between groups differences in the number of energy drinks consumed based on ethnicity. Results indicated that there were no significant differences (F=.397, P=.811) between groups (C - 18.9±47.2; AA – 25.6±26.9; NA – 13.4±18.2; A – 16.5±33.5; H – 11.8±21.4). Again, there was an inconsistency in the sizes of the ethnic groups (C=333, AA=13, NA=16, A=47, H=39). There is the possibility that there may have been between group differences if the groups were more similar in size.

Academic Class **(F=freshman, SO=sophomore, J=junior, SR=senior, G=graduate student)**. A one-way ANOVA was used to determine whether there were between group differences for energy drink consumption based on academic class. Results indicated that there was no significant difference (F=1.29, p=.258) in number of drinks consumed based on class (F – 12.3±39.9, SO – 15.5±34.3, J – 26.2±51.1, SR – 19.9±57.2, G – 18.0±43.0). There was greater consistency in the sizes of the academic class subsamples (F=98, SO=62, J=84, SR=97, G=107), but there remains a possibility that there may have been between group differences if the groups were more similar in size.

Living Situation **(OnC – on campus dorms or apartments, SFH – sorority or fraternity house, OffC – off campus)**. A one-way ANOVA was used to determine

whether there were between group differences for energy drink consumption based on living situation. Results indicated that there was no significant difference (F=2.26, p=.105) in number of drinks consumed based on living situation (OnC – 11.4±28.3, SFH – 29.3±48.5, OffC – 20.1±47.1). Again, there was an inconsistency in the sizes of the ethnic groups (OnC=122, SFH=12, OffC=315). There is the possibility that there may have been between group differences if the groups were more similar in size.

Currently there is no other literature related to the Revised University Student Hassles Scale and living situation in which to compare these results.

H_R4: There will be differences in the number of energy drinks consumed under different conditions based on demographic variables.

Data were analyzed using independent t-tests (1-tailed) for dichotomous demographic variables (gender and membership in a sorority/fraternity) or one-way ANOVA for demographic variables with three or more categories (ethnicity, academic class, and living situation). The results for demographic variables will be presented in the following order: gender (male or female), membership in a sorority or fraternity (yes or no), ethnicity (C, AA, NA, A, H), academic class (F, SO, J, SR, G), and living situation (OnC, S/F, OffC). The results for the different conditions under which energy drink consumption was reported will be reported in the following order: SL – lack of sleep, EN – low energy, EX – studying for an exam, DR – when driving, PA – when partying, HA – for a hangover, EXER – when exercising, TI – when tired. The only

statistically significant differences in the number of energy drinks that were consumed under these different conditions will be reported for each demographic variable.

Gender. Independent t-tests were used to identify a difference in energy drink consumption for each condition based on gender (F=302, M=147):

- **SL** - There was a significant difference (t=2.55, p=.006) in the number of energy drinks consumed under the condition of lack of sleep based on gender, with males (5.7±15.3) consuming significantly more energy drinks than females (2.4±6.3) under this condition.
- **EN** - There was a significant difference (t=2.46, p=.007) in the number of energy drinks consumed under the condition of low energy based on gender, with males (6.2±14.8) consuming significantly more energy drinks than females (3.0±8.9) under this condition.
- **EX** - There was a significant difference (t=1.96, p=.025) in the number of energy drinks consumed under the condition of studying for an exam based on gender, with males (4.1±13.4) consuming significantly more energy drinks than females (1.9±5.3) under this condition.

Data analysis for between group comparisons for energy drink consumption by gender resulted in significant differences for subscales sleep, energy, exam, and total drink. This study found more females reported consuming energy drinks than males, which is similar to Malinauskas et al, 2007, and Pettit and Debarr 2011. However, when drinking energy drinks, males reported consuming more energy drinks per person than females.

Sorority/Fraternity Membership. Independent t-tests were used to identify differences in energy drink consumption for each condition based on membership in a sorority or fraternity (M=63, NM=277):

- **PA** - There was a significant difference (t=2.28, p=.013) in the number of energy drinks mixed with alcohol when partying based on membership in a sorority/fraternity, with members (3.1±8.9) consuming significantly more energy drinks mixed with alcohol than non-members (0.5±2.75) under this condition.
- **HA** – There was a significant difference (t=1.71, p=.046) in the number of energy drinks consumed for a hangover with members (1.2±4.7) consuming significantly more energy drinks for a hangover than non-members (0.2±0.8).

Ethnicity **(C, AA, NA, A, H).** One-way ANOVAs were used to determine if there were between group differences in the number of energy drinks consumed for each condition based on ethnicity. There were no differences identified for these conditions based on ethnicity

Academic Class **(F, SO, J, SR, G)**. One-way ANOVAs were used to determine whether there were between group differences in energy drink consumption based on academic class (F=98, SO=62, J=84, SR=97, G=107).

- **EXER** - There was a significant difference (F=2.66, p=.032) in the number of energy drinks consumed when exercising based on academic class, with juniors (2.9±12.3) consuming significantly more energy drinks than seniors (0.2±1.0) under this condition.

The junior consumers drank a mean difference of 2.663 more energy drinks when compared to seniors for exercise. This is comparable to Pettit and Debarr (2011) in which junior classmen were also the highest consumers. One reason for this result is juniors consumed more total energy drinks and seniors consumed less for exercise.

Living Situation **(OnC – on campus dorms or apartments, SFH – sorority or fraternity house, OffC – off campus)**. One-way ANOVAs were used to determine whether there were between group differences in energy drink consumption based on living situation (OnC=122, SFH=12, OffC=315).

- **HA** - There was a significant difference (F=2.54, p=.030) in the number of energy drinks consumed when for a hangover based on living situation, with those living in sorority or fraternity house (1.8±5.7) consuming significantly more energy drinks than those living on campus (0.5±2.8) or off campus (0.3±2.1) under this condition. Persons in a sorority or fraternity consumed a mean difference of 1.661 more energy drinks than persons living on campus. Persons in a sorority or fraternity consumed a mean difference of 1.516 more energy drinks than persons living off campus.

Currently there is no other literature related to the relationship between stress as measured by the Revised University Student Hassles Scale, consumption of energy drinks, and the demographic variables used in this study. Because of this, there are no other research findings to which these results can be compared.

H_R5: There will be a difference in total hassle scores based on demographic variables.

Total Hassle scores were analyzed using independent t-tests (1-tailed) for dichotomous demographic variables (gender, membership in a sorority/fraternity, and status as an energy drink consumer) or one-way ANOVA for demographic variables with three or more categories (ethnicity, academic class, living situation). The results for demographic variables will be presented in the following order: gender (male or female), membership in a sorority or fraternity (yes or no), status as an energy drink consumer (consumer or non-consumer), ethnicity (Caucasian, African American, Native American, Asian, Hispanic), academic class (freshman, sophomore, junior, senior, graduate student), and living situation (on campus, sorority/fraternity house, off campus).

Gender. An independent t-test indicated that there was a significant difference (t=-6.54, p=.000) in the total hassle scores based on gender, with females (75.9±35.4) reporting significantly higher total hassle scores than males (53.9±29.0). There were more than twice as many females (n=299) in the sample as there were males (n=147).

Sorority/Fraternity Membership **(undergraduate students only, n=342)**. An independent t-test indicated that there was no significant difference (t=0.93, p=.186) in total hassle scores based on membership in a sorority or fraternity (72.6±38.3) versus non-members (67.9±36.3). It should be noted that there was a large disparity the number of participants in the two groups, with nearly 6 times more non-members (n=380) than sorority/fraternity members (n=65) in the sample. There is the possibility

that there may have been between group differences if the groups were more similar in size.

Status as an Energy Drink Consumer (C=consumer, NC=non-consumer). An independent t-test indicated that there was no significant difference (t=-.420, p=.675) in total hassle scores based on status as an energy drink consumer (67.8±39.4) versus non-consumer (69.3±31.5). It should be noted that there were approximately 1.5 times more non-consumers (n=262) than consumers (n=186) in the sample. There is the possibility that there may have been between group differences if the groups were more similar in size.

Ethnicity **(C, AA, NA, A, H).** A one-way ANOVA was used to determine if there was a difference in total hassle score based on ethnicity. Results indicated that there were no significant differences (F=2.278, p=.060) between groups (C – 67.1±34.3; AA – 93.0±34.6; NA – 61.6±22.0; A – 72.0±39.5; H – 74.1±36.3). Therefore, we failed to reject the null hypothesis. Again, there was an inconsistency in the sizes of the ethnic groups (C=330, AA=13, NA=16, A=47, H=39). There is the possibility that there may have been between group differences if the groups were more similar in size.

Academic Class **(F=freshman, SO=sophomore, J=junior, SR=senior, G=graduate student)**. A one-way ANOVA was used to determine whether there was a between group difference in total hassle score based on academic class. Results indicated that there was a significant difference (F=2.65, p=.033) in total hassle scores with sophomores having higher total hassle scores (76.6±34.1) than freshmen (59.7±33.6). No other between group differences were identified (J – 72.1±40.8; SR –

69.9±36.3; G – 68.6±29.0). There was greater consistency in the sizes of the academic class subsamples (F=97, SO=62, J=83, SR=97, G=106).

Living Situation **(OnC – on campus dorms or apartments, SFH – sorority or fraternity house, OffC – off campus)**. A one-way ANOVA was used to determine whether there were between group differences in total hassle score based on living situation. Results indicated that there was no significant difference (F=2.42, p=.090) in total hassle scores based on living situation (OnC – 62.7±35.0, SFH – 71.4±41.4, OffC – 70.9±34.5). Therefore, we failed to reject the null hypothesis. Again, there was an inconsistency in the sizes of the ethnic groups (OnC=121, SF=12, OffC=313). There is the possibility that there may have been between group differences if the groups were more similar in size.

Demographic samples in this study were similar to those of the participants in the study by MacNeil et al. (2012), which included 71.3% female and 28.7% male undergraduate students. Ethnicity of the sample was 50.4% Caucasian, 14.8% Black or African American, 21.7% Asian, and 13.0% reported they were another race. Even though the demographic sampling was similar (mostly Caucasian and female), the researchers did not identify differences related to demographics and hassles. Similarly, the study by Sheldon, Cummins, & Kamble (2010) had 67.2% female and 32.8% male participants. However, that study did not publish other demographic information

H_R6: There will be differences in hassle subscale scores based on demographic variables.

Hassle subscale scores were analyzed using independent t-tests (1-tailed) for dichotomous demographic variables (gender, membership in a sorority/fraternity, and status as an energy drink consumer) or one-way ANOVA for demographic variables with three or more categories (ethnicity, academic class, living situation). The results for demographic variables will be presented in the following order: gender (male or female), membership in a sorority or fraternity (yes or no), status as an energy drink consumer (consumer or non-consumer), ethnicity (C, AA, NA, A, H), academic class (F, SO, J, SR, G), and living situation (OnC, S/F, OffC). The results for the different hassle subscales, which self-reported hassles related to each area, will be reported in the following order: Time, Financial, Race, Gender, Friendships, Traffic, Religion, Safety, Employment, Physical Appearance, and Parental Expectations. Only statistically significant differences in subscale scores will be reported for each demographic variable.

Gender. Independent t-tests (1-tailed) were used to identify differences in hassle subscale scores based on gender. See Table 7 for t-test results for each subscale.

- **Time** - There was a significant difference in the number of time related hassles reported based on gender, with females reporting significantly higher time hassle subscale scores than males. There is a moderate effect size (Cohen's d=0.64).
- **Race** – There was a significant difference in the number of race related hassles reported based on gender, with females reporting significantly higher race related hassle subscale scores than men. There is a small effect size (Cohen's d=0.17).
- **Financial** - There was a significant difference in the number of financial related hassles reported based on gender, with females reporting significantly higher

financial hassle subscale scores than males. There is a small effect size (Cohen's *d*=0.37).

- **Gender -** There was a significant difference in the number of gender related hassles reported by males and females, with females reporting significantly higher gender hassle subscale scores than males. The effect size is approaching large (Cohen's *d*=0.71).
- **Friendships -** There was a significant difference in the number of friendship related hassles reported based on gender, with females reporting significantly higher friendship hassle subscale scores than males. The effect size is approaching practical significance (Cohen's *d*=0.44).
- **Traffic -** There was a significant difference in the number of traffic related hassles reported based on gender, with females reporting significantly higher traffic hassle subscale scores than males. The effect size is approaching practical significance (Cohen's *d*=0.45).
- **Safety -** There was a significant difference in the number of safety related hassles reported based on gender, with females reporting significantly higher safety hassle subscale scores than males. There is a small effect size (Cohen's *d*=0.28).
- **Employment -** There was a significant difference in the number of employment related hassles reported based on gender, with females reporting significantly higher employment hassle subscale scores than males. There is a small effect size (Cohen's *d*=0.23).
- **Physical Appearance -** There was a significant difference in the number of physical appearance related hassles reported based on gender, with females reporting

significantly higher physical appearance hassle subscale scores than males. There is a moderate effect size (Cohen's *d*=0.53).

Table 7. Independent t-test Results for Hassle Subscale Scores by Gender

Subscale Name	Group	N	Mean ±SD	t	p*	Cohen's *d*
Time	M	147	21.9±11.5	-6.36	.000	0.64
	F	302	29.4±11.7			
Financial	M	147	6.5±5.9	-3.95	.000	0.37
	F	302	9.1±7.6			
Gender	M	147	1.0±2.2	-8.33	.000	0.71
	F	302	3.7±4.6			
Friendships	M	147	5.1±4.4	-4.41	.000	0.44
	F	302	7.2±5.0			
Traffic	M	147	5.0±3.6	-4.49	.000	0.45
	F	302	6.7±3.9			
Safety	M	147	2.5±2.6	-2.65	.008	0.28
	F	302	3.3±3.0			
Employment	M	147	2.5±2.8	-2.23	.026	0.23
	F	302	3.2±3.1			
Physical appearance	M	147	4.4±3.0	-5.44	.000	0.53
	F	302	6.1±3.3			
Parental expectations	M	147	2.0±2.6	-4.54	.000	0.44
	F	302	3.3±3.1			
Race	M	147	2.1±3.8	-1.71	.044	0.17
	F	302	2.8±4.3			

- **Parental Expectations -** There was a significant difference in the number of parental expectations related hassles reported based on gender, with females reporting significantly higher parental expectations hassle subscale scores than males. The effect size is approaching practical significance (Cohen's *d*=0.44).

There were significant differences in subscale scores for time, race, financial, gender, friendship, traffic, safety, employment, physical appearance, parental expectations, and total hassles based on the gender of the respondent. In each of these 10 subscales and in total stress females reported being more stressed than males which is similar to Hudd et al. (2000) but different to Pettit and Debarr (2011), Trapp et al. (2014), and Smit et al. (2004) each of which reported no significant differences between male and female levels of stress.

Sorority/Fraternity Membership (undergraduate students only). Independent t-tests were used to identify differences in hassle subscale scores based on membership in a sorority or fraternity (M=63, NM=277). There were no significant differences in hassle subscale scores based on sorority/fraternity membership.

Status as an Energy Drink Consumer. Independent t-tests were used to identify differences in hassle subscale scores based on status as an energy drink consumer (M=65, NM=383). There were no significant differences in hassle subscale scores based on sorority/fraternity membership.

- **Safety -** There was a significant difference (t=-2.14, p=.033) in safety hassle subscale score based on status as an energy drink consumer, with non-consumers (3.3±2.9) reporting higher levels of safety related hassles than consumers (2.7±3.0).

***Ethnicity* (C, AA, NA, A, H).** One-way ANOVAs were used to determine if there were between group differences in hassle subscale scores based on ethnicity.

- **Race -** There was a significant difference (F=18.6, p=.000) in the race related hassles subscale score based on ethnicity, with African Americans reporting significantly higher subscale scores than Caucasians, Native Americans, Asians, and Hispanics. Asians and Hispanics also reported significantly higher subscale scores than Caucasians and Native Americans.

Table 8: One-way ANOVA Results for Hassle Subscale Scores by Ethnicity

Subscale Name	Group	N	Mean ±SD	F	p
Race	Caucasian	333	1.9±3.4	18.6	.000
	African Amer.	13	8.7±6.3		
	Native Amer.	16	0.7±1.3		
	Asian	47	5.2±5.1		
	Hispanic	84	4.2±5.7		
Parental expectations	Caucasian	333	2.7±2.9	2.9	.021
	African Amer.	13	4.4±3.6		
	Native Amer.	16	1.6±2.1		
	Asian	47	3.8±3.2		
	Hispanic	84	3.2±3.2		

- **Parental Expectations -** There was a significant model difference (F=2.91, p=.021) in the hassles related to parental expectations based on ethnicity. However, post hoc analysis did not indicate there were significant differences in the hassle score based

on parental expectations between groups. This can happen with multivariate significance but no univariate significance (Timm, 1975) and may be related to the large disparity in group sizes (C=330, AA=13, NA=16, A=47, H=39).

***Academic Class* (F, SO, J, SR, G)**. One-way ANOVAs were used to determine whether there were between group differences in hassle subscale scores based on academic class.

- **Time** - There was a significant difference (F=3.785, p=.015) in the time related hassle subscale score based on academic class, with sophomores reporting significantly higher time related hassles subscale score than freshmen.
- **Traffic -** There was a significant difference (F=4.89, p=.001) in the traffic related hassle subscale score based on academic class, with freshmen reporting significantly lower traffic related hassle subscale score than sophomores, juniors, seniors, and graduate students.
- **Employment -** There was a significant difference (F=7.86, p=.000) in the employment related hassle subscale score based on academic class, with freshmen reporting significantly lower employment related hassle subscale score than juniors, seniors, and graduate students. Sophomores also reported significantly lower employment related hassle subscale score than graduate students.
- **Parental Expectations -** There was a significant difference (F=4.24, p=.002) in the subscale scores for hassles related to parental expectation based on academic class, with sophomores and juniors reporting significantly higher hassle subscale scores for parental expectations than graduate students.

Table 9: One-way ANOVA Results for Hassle Subscale Scores by Academic Class

Subscale Name	Group	N	Mean ±SD	F	p
Time	Freshman	98	23.9±11.9	3.8	.005
	Sophomore	62	30.9±9.8		
Traffic	Freshman	98	4.6±3.5	4.9	.001
	Sophomore	62	6.6±3.9		
	Junior	84	6.6±3.8		
	Senior	97	6.4±4.1		
	Graduate	107	6.6±3.9		
Employment	Freshman	98	1.7±2.6	7.9	.000
	Sophomore	62	2.6±3.0		
	Junior	84	3.2±3.4		
	Senior	97	3.1±3.2		
	Graduate	107	3.9±2.7		
Parental expectations	Sophomore	62	3.7±3.5	4.2	.002
	Junior	84	3.3±3.5		
	Graduate	107	1.9±2.5		

Living Situation **(OnC – on campus dorms or apartments, SFH – sorority or fraternity house, OffC – off campus)**. One-way ANOVAs were used to determine whether there were between group differences in energy drink consumption based on living situation (OnC=122, SFH=12, OffC=315).

- **Traffic -** There was a significant difference (F=24.18, p=.000) in the traffic related hassle subscale score based on living situation, with students who live off campus

reporting significantly higher traffic related hassle subscale score than those who live on campus.

Table 10: One-way ANOVA Results for Hassle Subscale Scores by Living Situation

Subscale Name	Group	N	Mean ±SD	f	p
Traffic	On campus	122	25.6±12.2	24.2	.000
	Off campus	315	27.3±12.2		
Employment	On campus	122	2.08±2.6	7.9	.000
	Off campus	315	3.3±3.1		

- **Employment -** There was a significant difference (F=7.93, p=.000) in the employment related hassle subscale score based on living situation, with students who live off campus reporting significantly higher employment related hassle subscale score than those who live on campus.

Currently there is no other literature related to differences in the subscales of the Revised University Student Hassles Scale and the demographic variables used in this study in which to compare these results.

H_R7: There will be differences in the number of energy drinks consumed under conditions (lack of sleep, need for energy, when studying, when driving, when partying, for a hangover, when exercising, and when tired) among college students who report consuming energy drinks.

A repeated measures ANOVA was used to identify differences in the number of energy drinks consumed under different conditions. Analysis was restricted to only those participants (n=185) who reported energy drink consumption. Mauchly's test of sphericity indicated the sphericity assumption was violated (χ^2 (27) = 1575.1, p=0.000). Therefore, the Greenhouse-Geisser correction was used (Jaccard & Ackerman 1985; Geisser & Greenhouse 1958). A significant time main effect (F = 4.128, p=0.017, partial eta squared = 0.022) was found indicating differences in the number of energy drinks consumed between some of the conditions studied (see Table 11). Paired samples tests indicated the number of energy drinks consumed:

- when lacking sleep was significantly greater than the number consumed when driving (p=0.000), for a hangover (p=0.000), when partying (p=.000), and when exercising (p=0.000)
- when tired was significantly greater than the number consumed for studying for an exam (p=0.019), when driving (p=0.000), when partying (p=0.000), for a hangover (p=0.000), and when exercising (p=0.000),
- for energy was significantly greater than when driving (p=0.000), when partying (0.000), for a hangover (p=0.000), and when exercising (p=0.000),
- when studying for an exam was significantly greater than the number of energy drinks mixed with alcohol when partying (p=.002), when driving (p=0.054), for a hangover (p=0.000), and when exercising (p=0.039), and
- when driving was significantly greater than for the number consumed for a hangover (p=0.000)

The percentage of energy drink consumers who reported drinking at least one energy drink in the last month for a condition is reported as Frequency in Table 10. Consuming energy drinks for "energy" (90.3%) was the most commonly reported condition with drinking them for a "hangover" (16.2%) was the least common condition. The majority of consumers drank energy drinks for the conditions of for energy (90.3%), for lack of sleep (87.0%), when tired (85.4%), when studying for an exam (80%), and when driving long distances (59.5%). This is similar to the results found by Malinauskas et al. (2007) who reported lack of sleep (67%), for energy (65%), and when partying (54%) as the primary conditions for which the majority of users consumed energy drinks. Additionally, Stasio et al. (2011) found that the frequency of energy drink use was positively correlated with disturbances in sleep duration and subjective sleep quality.

Table 11. Percent of Participants Reporting Energy Drink Consumption under Different Conditions

Condition	N	Mean	Std. Deviation	Frequency
Sleep	185	8.39	14.64	87.0%
Energy	185	9.81	15.82	90.3%
Exam	185	6.35	12.92	80.0%
Driving	185	3.18	6.88	59.5%
Partying	185	2.05	6.26	28.6%
Hangover	185	0.77	3.19	16.2%
Exercise	185	2.66	10.04	20.5%
Tired	185	10.43	18.59	85.4%

Chapter 5

Conclusion and Recommendations

The purpose of this study was to further the understanding of the relationship between stress and energy drink consumption in college students. An additional purpose was to describe energy drink consumption patterns and possible reasons for energy drink consumption among college students. The research questions for the study were:

RQ1: To what degree is stress related to energy drink consumption in college students?

RQ2: Will there be a difference in total hassle scores and hassle subscale sores based status as an energy drink consumer versus non-consumer?

RQ3: Is there a difference in the total number of energy drinks consumed by college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ4: Are there differences in the number of energy drinks consumed under different conditions by college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ5: Is there a difference in total hassles scores of college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ6: Are there differences in hassles subscale scores of college students at The University of Oklahoma based on demographic characteristics such as gender, ethnicity, and year in school?

RQ7: Under what conditions (lack of sleep, need for energy, when studying, when driving, when partying, for a hangover, when exercising, and when tired) are energy drinks most commonly consumed by college students?

Conclusions Organized by Research Hypotheses:

For this study, seven research questions were formed to help explore relationships between energy drink consumption and stress, differences in energy drink consumption based on demographic characteristics, differences in perceived hassles based on demographic characteristics, and differences in reasons for consuming energy drinks.

Research hypothesis 1 addresses the degree to which is stress related to energy drink consumption in college students. The results of this study did not support a relationship between energy drink consumption and stress as measured by level of perceived hassles. However, there were differences in energy drink consumption and hassle scores based on demographic characteristics.

Research hypothesis 2 states energy drink consumers will have higher total hassle scores than non-consumers. For these questions, we failed to reject the null hypothesis. There was a non-significant correlation between reported hassles and energy drink consumption for both the total sample and among energy drink consumers.

This study did not find a relationship between perceived stress as measured by hassles and energy drink consumption which is different than what has been found in other studies (Hudd et al., 2000; Naquin & Gilbert, 1996; Owens et al., 2014; Pettit & Debarr, 2011; Toblin, 2012). Studies have shown negative relationships between anxiety and energy drink consumption (Trapp et al., 2014; Stasio et al., 2011). Studies have shown negative relationships between loss of sleep and energy drink consumption (Stasio et al., 2011; Owens et al., 2014). Further research has shown a correlation between poor academic performance and energy drink consumption (Pettit & Debarr, 2011). Previous studies measured stress or anxiety, while the current study measured hassles. Self-reported hassles contribute to perceived stress and hassle measures can be a used as a surrogate measure for stress. However, the use of a hassle rather than stress or anxiety measure in this study may account for the difference in results with previous literature. Another possible explanation for this result could be because participants were college students from the same university, and they were mostly Caucasian (74%) and female (67%), which could have affected responses. Only one significant difference was found between groups, with the non-consumers reporting higher safety related hassle scores than the consumers, which is counter to the expected results. There is no logical explanation for this finding, so it should be considered a spurious result. Even though this study did not focus on certain aspects of the data that was gathered, some of the other results still contain information that could add to the body of literature. More research is recommended in understanding the effects of energy drinks on reported hassles and in perceived stress.

Research hypothesis 3 and 4 relate to patterns of energy drink consumption based on gender, ethnicity, living situation, or year in school and the different conditions under which energy drinks are consumed. For these hypotheses, we failed to reject the null hypothesis and the research hypothesis was accepted. There were significant differences found for the number of energy drinks consumed when exercising with juniors reporting more energy drink consumption than seniors. Juniors may simply exercise more than seniors, which would increase consumption rate. Analysis showed significant differences in the number of energy drinks consumed for a hangover between those who live in a sorority or fraternity reporting higher energy drink consumption than those who live off campus. One reason for this could be more "partying" that may be happening within sororities or fraternities. Sorority and fraternity members may drink more than students who live off campus because of the strong social climate within the organization. Consequently, they may have hangovers that are more frequent, which could affect overall energy drink consumption. Another possibility may be that they share information within the sorority or fraternity network about the perceived effectiveness of energy drinks in combatting hangover symptoms. Analysis in the gender demographic showed significant differences between males and females for the number of energy drinks consumed for a lack of sleep, for energy, when studying for an exam, and total drinks consumed with males reporting greater number of energy drinks consumed in all areas. Interestingly females reported consuming energy drinks more often however males, when consuming, drank significantly more energy drinks. One explanation for this could be the larger number of females that responded to the questionnaire (Males = 147, Females = 302). Perhaps if more males

had responded, then male energy drink consumption would have been more often and in higher numbers. Analysis of energy drink consumption by ethnicity did not show significant differences between Caucasian, African American, Asian, Native American, or Hispanic groups.

Research hypothesis 5 addressed differences in total hassle score and **research hypothesis 6** addressed differences in hassle subscale scores based on demographic variables. In this study, Caucasians reported lower total hassle scores than all other groups. This could be due to larger Caucasian representation or because these individuals may face fewer obstacles or hassles than other ethnic groups who may have to deal with pressures associated with being a minority, such as having less social support or access to fewer resources. In addition, females reported significantly more hassles than males, which is different from what has been reported by Pettit and Debarr (2011), Trapp et al. (2014), and Smit et al. (2004). Those studies reported no significant differences between male and female levels of stress. This suggests that women may more frequently perceive various situations as hassles or they may simply report more accurate perceptions of stress than men, who under may report their stressors as a means to maintain a persona of strength or toughness. Again, this could have been due to the larger female representation (67%) in this study. Analysis showed freshmen reported significantly less stress than all other groups for hassles relating to traffic. One reason for this may be freshman could be living on campus and therefore not have to seek parking, which is an issue on this campus. Freshmen also reported less hassles for

the time, employment, and total hassles subscales. This could be explained by the perception that the first year of college is easier which may decrease perceived stress.

Research hypothesis 7 attempted to identify conditions under which energy drinks were most commonly consumed in this college population. For this question, we rejected the null hypothesis since there were differences in the number of energy drinks consumed under different conditions/for different. Analysis showed significant differences in the reasons for consuming energy drinks, with more drinks being consumed when tired, for energy, when lacking sleep, and when studying for an exam than when driving, mixed with alcohol when partying, for a hangover, and when exercising. The highest percent of participants reported drinking energy drinks for energy (90%), when lacking sleep (87%), when tired (85%), and when studying for an exam (80%), while the lowest percent of participants reported drinking energy drinks when driving (59%), during exercise (20%), mixed with alcohol when partying (28%), and for a hangover (16%). One factor influencing these results may have been the timing of distribution of the questionnaire. The questionnaire was distributed in the middle of the semester when many students were focused on studying for mid-term exams, therefore consuming energy drinks for energy, lack of sleep, tired, and when studying for exams makes would be logical. If the questionnaire was distributed around spring break, students may have responded differently and perhaps when driving, when partying, or for a hangover may have been more common.

Recommendations for Future Research

The following recommendations may improve future research.

- For this study, two instruments were combined that measured patterns of energy drink consumption and perceived hassles. Although the separate instruments were established as valid and reliable tools in previous research with college students, the reliability and validity of the combined instrument was not established. Combination of the surveys may have resulted in measurement error. The psychometric characteristic of the combine instrument should be established prior to continued use of the instrument for research purpose.
- This study required the participant to recall energy drink consumption for the previous month, which may have resulted in over- or underestimation of actual consumption patterns. Therefore, other studies may choose to use another method such as a daily consumption log in order to more accurately quantify energy drink consumption.
- Since studies of this nature are limited in scope, a collaboration with multiple research institutes may allow results to be generalized to a broader university student population. This study may contribute to the literature that seeks to understand energy drink consumer demographics and reasons for energy drink consumption.
- This study used a convenience sample self- selected participants who volunteered which led to an uneven number of men and women, an uneven number of different ethnicities, and an uneven number of energy drink consumers and non-consumers.

Some demographic variables had unequal numbers of participants in sub categories. Future research may need to use stratified sampling in order to create statistically representative group sizes. Future research should work to minimize these differences in order to create statistically even groups.

Recommendations for Professional Practice

Based on the findings of this study, recommendations for future practice include:

- Creation of an educational program that provides information about the ingredients contained in the energy drinks. Currently, most of the claims made in regards to benefits of energy drinks are unsubstantiated by research.
- Education should be target college aged students across all ethnic and gender groups in a University environment. The information provided should target the four main conditions under which students reported energy drink consumption. These include consuming energy drinks for a lack of sleep, when needing energy, when tired, and when studying for an exam. Information about getting enough sleep, alternative methods for providing the body with energy, strategies for avoiding fatigue, and healthier ways to study (besides last minute cramming) would be the main focus of this education.
- Development of stress and hassle management educational programs that target upperclassmen, women, and ethnic groups.

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Appendix A: Informed Consent

Online Consent to Participate in Research

Would you like to be involved in research at the University of Oklahoma?

I am Anthony McGaughey from the Department of Health and Exercise Department and I invite you to participate in my research project entitled "Relationship Between Energy Drink Consumption and Perceived Stress Among College Students". This research is being conducted at the University of Oklahoma. You were selected as a possible participant because you are a student at the University of Oklahoma. You must be at least 18 years of age to participate in this study.

Please read this document and contact me to ask any questions that you may have BEFORE agreeing to take part in my research.

What is the purpose of this research? The purpose of this research is to explore the relationship between consumption of energy drinks and perceived stress among college students.

How many participants will be in this research? A maximum of 800 people will take part in this research.

What will I be asked to do? If you agree to be in this research, you will fill out a questionnaire online. All of your responses will be recorded anonymously.

How long will this take? Your participation will take approximately 15 minutes.

What are the risks and/or benefits if I participate? There are no risks and no benefits associated with being in this research.

Will I be compensated for participating? You will not be reimbursed for your time and participation in this research. However, you may enter your email address at the end of the survey to be entered into a drawing for one (1) of four (4) twenty five ($25) dollar gift cards. Winners will be selected and gift cards distributed after all surveys have been completed.

Who will see my information? In research reports, there will be no information that will make it possible to identify you. Research records will be stored securely and only approved researchers and the OU Institution Review Board will have access to the records.

Do I have to participate? No. If you do not participate, you will not be penalized or lose benefits or services unrelated to the research. If you decide to participate, there are questions that have to be answered in order to proceed through the survey. You can stop participating at any time by closing your browser.

Who do I contact with questions, concerns or complaints? If you have questions, concerns, or complaints about the research or have experienced a research-related injury, contact me (Anthony McGaughey) at 405-325-5211 or Anthony.mcgaughey-1@ou.edu or my faculty advisor, Dr. Laurette Taylor, at 405-325-5211 or eltaylor@ou.edu.



IRB NUMBER: 6620
IRB APPROVAL DATE: 03/04/201

You can also contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu if you have questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than the researcher(s) or if you cannot reach the researcher(s).

Please print this document for your records. By providing information to the researcher(s), I am agreeing to participate in this research.

- o I agree to participate
- o I do not want to participate

This research has been approved by the University of Oklahoma, Norman Campus IRB.

IRB Number: 6620 **Approval date:** 03/04/2016

IRB APPROVED AAHRPP
IRB NUMBER: 6620
IRB APPROVAL DATE: 03/04/201

Appendix B: Recruitment E-mail

Hello,

My name is Anthony McGaughey, and I am a graduate student in the Department of Health and Exercise Science at the University of Oklahoma. I am conducting a study for my thesis research to explore the relationship between energy drink consumption and perceived stress in college students.

I would greatly appreciate it if you could assist me by participating in this survey. The survey will take you approximately 15 minutes to complete and all of your responses will be anonymous. Completion of the survey is strictly voluntary. You must be a currently enrolled student at OU and between the ages of 18-45.

A raffle drawing will be held at the conclusion of this study for one of four $25 gift cards. You may enter your e-mail address at the completion of the survey to be entered into the raffle. If you provide your email address so that you can enter the raffle, it will not be linked to your responses and all email addresses will be deleted after gift cards have been distributed. The winners will be notified through email. You can participate in the survey even if you do not want to provide your email address,

The information collected from this study will be used only for research purposes. If you have any questions about the study, please feel free to contact me (Anthony.mcgaughey-1@ou.edu0 or Dr. Laurette Taylor, my faculty advisor (eltaylor@ou.edu).

Thank you for your time. Please click on the link below to participate, or copy and paste the following link into the address bar on your computer:

https://ousurvey.qualtrics.com/SE/?SID=SV_3Dd7qBMYTd8kIfj

The OU IRB has approved the content of this message, but not the method of distribution. The OU IRB has no authority to approve distribution by mass e-mail. The University of Oklahoma is an Equal Opportunity Institution.



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Appendix C: Questionnaire

Energy Drinks and Hassles

Q40 Online Consent to Participate in Research Would you like to be involved in research at the University of Oklahoma? I am Anthony McGaughey from the Department of Health and Exercise Department and I invite you to participate in my research project entitled "Relationship Between Energy Drink Consumption and Perceived Stress Among College Students". This research is being conducted at the University of Oklahoma. You were selected as a possible participant because you are a student at the University of Oklahoma. You must be at least 18 years of age to participate in this study. Please read this document and contact me to ask any questions that you may have BEFORE agreeing to take part in my research. What is the purpose of this research? The purpose of this research is to explore the relationship between consumption of energy drinks and perceived stress among college students. How many participants will be in this research? A maximum of 800 people will take part in this research. What will I be asked to do? If you agree to be in this research, you will fill out a questionnaire online. All of your responses will be recorded anonymously. How long will this take? Your participation will take approximately 15 minutes. What are the risks and/or benefits if I participate? There are no risks and no benefits associated with being in this research. Will I be compensated for participating? You will not be reimbursed for your time and participation in this research. However, you may enter your email address at the end of the survey to be entered into a drawing for one (1) of four (4) twenty five ($25) dollar gift cards. Winners will be selected and gift cards distributed after all surveys have been completed. Who will see my information? In research reports, there will be no information that will make it possible to identify you. Research records will be stored securely and only approved researchers and the OU Institution Review Board will have access to the records. Do I have to participate? No. If you do not participate, you will not be penalized or lose benefits or services unrelated to the research. If you decide to participate, there are questions that have to be answered in order to proceed through the survey. You can stop participating at any time by closing your browser. Who do I contact with questions, concerns or complaints? If you have questions, concerns, or complaints about the research or have experienced a research-related injury, contact me (Anthony McGaughey) at 405-325-5211 or Anthony.mcgaughey-1@ou.edu or my faculty advisor, Dr. Laurette Taylor, at 405-325-5211 or eltaylor@ou.edu. You can also contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu if you have questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than the researcher(s) or if you cannot reach the researcher(s). Please print this document for your records. By providing information to the researcher(s), I am agreeing to participate in this research. I agree to participate I do not want to participate This research has been approved by the University of Oklahoma, Norman Campus IRB. IRB Number: _____ Approval date: _____

- ❍ I agree to participate (1)
- ❍ I do not want to participate (2)

Q1 We are interested in learning about factors related to energy drink consumption in college students. Energy drinks refer to drinks like Red Bull, Monster energy, Rock Star, Amp, 5 hour



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energy, and Full Throttle, and include all types, including sugar-free and low-sugar versions. Please answer all questions referring to the past month. Please be as accurate as possible.

Q2 Last month, on average, did you drink more than 1 energy drink per month?
- yes (1)
- No (2)

Q3 Last month, when you drank energy drinks, did you usually drink regular or sugar free energy drinks?
- Only regular (1)
- Mostly regular (2)
- Mixed (3)
- Mostly sugar free (4)
- Only sugar free (5)

Q4 Have you ever had headaches from drinking energy drinks?
- Yes (1)
- No (2)

Q5 Last month, on average how many "jolt (increased alertness and energy) and crash (sudden drop in energy)" episodes did you have from drinking energy drinks?

Q6 Have you ever had heart palpitations (rapidly beating heart) from drinking energy drinks?
- Yes (1)
- No (2)

Q7 Last month, on an average day when you felt like you did not get enough sleep, how many energy drinks did you have? _____ energy drinks per day

If Last month, on an average d... Is Equal to 0, Then Skip To Last month, on an average day when yo...

Q7a Last month, how many times did you drink energy drinks when you felt like you did not get enough sleep? _____ days per month

Q8 Last month, on an average day when you needed more energy, how many energy drinks did you have? _____ energy drinks per day

If Last month, on an average d... Is Equal to 0, Then Skip To Last month, on the average day when y...

Q8a Last month, how many times did you drink energy drinks when you needed more energy? ____ days per month

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Q9 Last month, on the average day when you were studying for an exam or a major project, how many energy drinks did you have? _____ energy drinks per day

If Last month, on the average ... Is Equal to 0, Then Skip To Last month, on the average day when y...

Q9a Last month, how many times did you drink energy drinks when studying for an exam or major project?_____ days per month

Q10 Last month, on the average day when you were driving for a long period, how many energy drinks did you have?_____ energy drinks per day

If Last month, on the average ... Is Equal to 0, Then Skip To Last month, on an average night of pa...

Q10a Last month, how many times did you drink energy drinks when driving for a long period? _____ days per month

Q11 Last month, on an average night of partying, how many energy drinks did you mix with alcohol (example: Red Bull with vodka) _____ energy drinks per day

If Last month, on an average n... Is Equal to 0, Then Skip To Last month, on an average day when yo...

Q11a Last month, how many times did you mix energy drinks with alcohol? _____ days per month

Q12 Last month, on an average day when you had a hangover, how many energy drinks did you have? _____ energy drinks per day

If Last month, on an average d... Is Equal to 0, Then Skip To Last month, on an average day when yo...

Q12a Last month, how many times did you drink energy drinks when recovering from a hangover?____ days per month

Q13 Last month, on an average day when you exercised, how many energy drinks did you have? _____ energy drinks per day

If Last month, on an average d... Is Equal to 0, Then Skip To Last month, on an average day when yo...

Q13a Last month, how many times did you drink energy drinks when exercising? _____ days per month

Q14 Last month, on an average day when you felt tired, how many energy drinks did you have? _____ energy drinks per day

If Last month, on an average d... Is Equal to 0, Then Skip To End of Block



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Q14a Last month, how many times did you drink energy drinks when you felt tired? _____ per month

Q15 What is your age?

Q16 What is your gender?
- ❍ Male (1)
- ❍ Female (2)

Q17 What is your ethnicity?
- ❍ Caucasian (1)
- ❍ Black or African American (2)
- ❍ Native American or Alaska Native (3)
- ❍ Asian (4)
- ❍ Native Hawaiian or Pacific Islander (5)
- ❍ Hispanic (6)

Q18 What is your current Class Year?
- ❍ Freshman (1)
- ❍ Sophomore (2)
- ❍ Junior (3)
- ❍ Senior (4)
- ❍ Graduate Student (5)

Q19 How would you describe your living arrangement?
- ❍ On Campus dorms or apartment (1)
- ❍ Sorority house or Fraternity house (2)
- ❍ Off Campus (3)

Q20 Are you a member of a social sorority or fraternity?
- ❍ Yes (1)
- ❍ No (2)

Q21 Last month, on an average day, how many cups of coffee did you drink?

Q22 Last month, on an average day, how many soft drinks did you drink?

Q23 Last month, did you take caffeine pills, diet pills that contain caffeine, or other stimulants?
- ❍ Yes (1)
- ❍ No (2)

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Q24 Last month, did you consume supplements (i.e. a pre-workout mix) that contain caffeine or other stimulant?

- ❍ Yes (1)
- ❍ No (2)

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Q39 Hassles are irritating, frustrating, distressing demands that characterize everyday transactions with the environment (Kanner, Coyne, Schaeffer, 1981). They can occur few or many times. Listed below are a number of ways in which a person can feel hassled. Please indicate in the first column, How often did the hassle occur? by circling on the adjacent 5 point scale (0 = did not occur to 4 = always occurred) approximately how often the hassle occurred for you in the last month. Then, in the next column (If so, how severe was the hassle?), please indicate on the adjacent 5-point scale (1 = not at all severe to 5 = extremely severe) how severe on average each hassle was in the last month. If a particular hassle did not occur, mark did not occur in the first column and N/A in the second column.

	How often did the hassle occur?					If this hassle did not occur mark N/A it did occur, how severe was the has					
	Did not occur (1)	Rarely (2)	Occasionally (3)	Frequently (4)	Always occurred (5)	N/A (1)	Not at all severe (2)	- (3)	- (4)	- (5)	Extrer Seve (6
1. Fear of losing valuables (1)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
2. Traffic (2)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
3. People making fun of my religion (3)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
4. Making friends (4)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
5. Weight concerns (5)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
6. Balancing school and social relationships (6)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
7. Problems on the job (7)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
8. Demanding parents (8)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
9. Studying for class (9)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
10. Being treated differently because of race, ethnicity (10)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
11. Not enough money for	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

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emergencies (11)											
12. Concentrating on school work (12)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
13. Safety of personal belongings (13)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
14. Parking (14)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
15. Concerns about meeting high standards (15)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
16. Not enough money for entertainment (16)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
17. People assuming I am rich/poor because of my race/ethnicity (17)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
18. Financial security (18)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
19. Driving around town (19)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
20. Physical appearance (20)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
21. Not enough money for housing (21)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
22. Pressure to get good grades (22)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
23. Not enough time for family (23)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
24. Owing money (24)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
25. College expenses (25)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

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26. Getting into shape (26)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
27. People unable to relate to people of color (27)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
28. Too many responsibilities (28)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
29. Feeling neglected by my race, ethnic group (29)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
30. Trouble relaxing (30)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
31. Personal safety (31)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
32. Not having close friends (32)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
33. Feeling discriminated against (33)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
34. Job satisfaction (34)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
35. Being treated differently due to gender (35)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
36. Not enough personal energy (36)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
37. Introducing myself at school (37)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
38. Not taken seriously because of my gender (38)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
39. Learning material is difficult (39)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
40. Organizing time (40)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

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41. Not enough money for clothing (41)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
42. Going out with friends (42)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
43. Denied opportunities because of gender (43)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
44. Being lonely (44)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
45. Dependence on parents (45)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
46. Work schedule (46)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
47. Perceptions others have based on cultural stereotypes (47)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
48. Communication problems with friends (48)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
49. Parental expectations (49)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
50. Someone saying, "Here, let me do that" thinking i can't because of my gender (50)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
51. Class assignment deadlines (51)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
52. People making gender jokes (52)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
53 Too many things to do (53)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
54. Driving to	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

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school (54)											
55. Close mindedness toward my religious beliefs (55)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
56. Locking up personal belongings (56)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍
57. Feeling unaccepted because of my religion (57)	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍

If How often did the hassle oc... Is Selected, Then Skip To End of SurveyIf How often did the hassle oc... Is Selected, Then Skip To End of SurveyIf How often did the hassle oc... Is Selected, Then Skip To End of SurveyIf How often did the hassle oc... Is Selected, Then Skip To End of SurveyIf How often did the hassle oc... Is Selected, Then Skip To End of Survey

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Appendix D: IRB approval letter



Institutional Review Board for the Protection of Human Subjects

Approval of Initial Submission – Exempt from IRB Review – AP01

Date: March 04, 2016 **IRB#:** 6620

Principal Investigator: Anthony McGaughey **Approval Date:** 03/04/2016

Exempt Category: Category 2

Study Title: RELATIONSHIP BETWEEN ENERGY DRINK CONSUMPTION AND PERCIEVED STRESS AMONG COLLEGE STUDENTS

On behalf of the Institutional Review Board (IRB), I have reviewed the above-referenced research study and determined that it meets the criteria for exemption from IRB review. To view the documents approved for this submission, open this study from the *My Studies* option, go to *Submission History*, go to *Completed Submissions* tab and then click the *Details* icon.

As principal investigator of this research study, you are responsible to:

- Conduct the research study in a manner consistent with the requirements of the IRB and federal regulations 45 CFR 46.
- Request approval from the IRB prior to implementing any/all modifications as changes could affect the exempt status determination.
- Maintain accurate and complete study records for evaluation by the HRPP Quality Improvement Program and, if applicable, inspection by regulatory agencies and/or the study sponsor.
- Notify the IRB at the completion of the project.

If you have questions about this notification or using iRIS, contact the IRB @ 405-325-8110 or irb@ou.edu.

Cordially,



Fred Beard, Ph.D.
Vice Chair, Institutional Review Board