UNIVERSITY OF CAPE COAST

CURRENT CONSUMPTION PATTERNS OF ENERGY DRINKS AMONG UNIVERSITY STUDENTS OF CAPE COAST AND TAMALE

LUKMAN ABDALLAH

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BY

LUKMAN ABDALLAH

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: ..... Date: .....

Name: Lukman Abdallah

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature: ..... Date: .....

Name: Prof. (Mrs.) Sarah Darkwa

ABSTRACT

In recent years, the consumption of energy drinks has increased substantially, particularly among young people. There are possible risks and adverse effects associated with energy drink consumption that have generated concerns, especially among the youth, due to the high caffeine and sugar content of these beverages. The purpose of the study was to determine the current consumption patterns of energy drinks among university students in Cape Coast and Tamale. The study employed a descriptive, cross-sectional approach. Using a multistage sampling technique, a total sample of 754 students from the University of Cape Coast and University for Development Studies was obtained, specifically 377 students from each university. For the study, structured questionnaires were used to collect data. The prevalence of energy drink consumption was discovered to be 89% among the study participants. Storm 54% (409), Rush 33% (252) and Lucozade 32% (240) were the three most consumed energy drinks. Insomnia was the most frequently reported adverse effect (36%), while seizures were the least frequent (2%). Taste, advertising, and accessibility were identified as predictors of energy drink consumption, with taste accounting for 52% of the variation in energy drink consumption and cumulatively advertising and accessibility accounting for 27% of the variance. There was a statistically significant gender difference in energy drink consumption. $t\ (678.4) = 15.75$; $p < 0.05$. Additionally, there was a statistically significant difference in the consumption pattern of energy drinks between students of UCC and UDS $t\ (753) = 7.926$; $p < 0.05$.

KEYWORDS

Energy Drink

Prevalence

Consumption

Caffeine

Sugar

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I am grateful to my family for everything. Each of you has supported, encouraged, and challenged me to do my best and achieve my objectives in your own manner. I adore you all.

DEDICATION

To my family

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LIST OF ACRONYMS

BCC	:	Business Communication Company
CAGR	:	Compound Annual Growth Rate
CNS	:	Central Nervous System
CVD	:	Cardiovascular Disease
DM	:	Diabetes Mellitus
ED	:	Energy Drink
EFSA	:	European Food Safety Authority
FAO	:	The Food and Agriculture Organization of the United Nations
FDA	:	Food and Drug Administration
GSA	:	Ghana Standard Authority
IQS	:	International Quality Standards
ISO	:	The International Organization for Standardization
SAMHSA	:	Substance Abuse and Mental Health Services Administration
SCT	:	Social Cognitive Theory
UCC	:	University of Cape Coast
UDS	:	University for Development Studies
WHO	:	World Health Organization

CHAPTER ONE

INTRODUCTION

Background to the study

As a result of economic policies that encourage cross-border trade, the Ghanaian market has been flooded with non-alcoholic beverages, specifically energy drinks. (Dasoberi & Darkwa, 2018). These drinks are an indispensable component of the Ghanaian diet and cannot be overlooked. The consumption of energy drinks that contain stimulants, the most common of which is caffeine, has become a growing concern for the health of the general public all over the world (Pomeranz et al., 2013). Regardless, it is a multi-billion-dollar industry that has experienced tremendous growth in popularity over the years across the globe. It is regarded as one of the beverage industry's fastest-growing categories, with a wide variety of brands, flavours, and sizes available.

Taisho Pharmaceuticals was the first company to introduce lipovitan D, a type of energy drink, to the Japanese market (Penalty, 2006). It was launched in Europe and Asia in 1960, although it was not well known outside of those countries at the time (Pennay & Lubman, 2012). During the 1980s, caffeinated and sugary soda known as "jolt cola" rose to prominence as a preferred beverage on a variety of college campuses (Retelny, 2007). Red Bull, which first appeared on the Austrian market in 1987, has since become the most successful and well-known brand all over the world (Pennay & Lubman, 2012). In 1997, the Red Bull brand was presented for the very first time in the United States. Ten years later, more than 500 new energy drink

brands emerged and are available for purchase all over the world by the end of 2006. (Pennay & Lubman 2012; Johnson et al., 2006).

According to Buxton and Hagan (2012), high-energy drink usage has been linked to mortality in some advanced nations. Both men and women died in these accidents. As a result, some governments have placed restrictions on the importation and sale of the product. Energy drinks that are high in caffeine and taurine have been made illegal in several countries, including France, Turkey, Denmark, Norway, Uruguay, and Iceland, among others. Only pharmacies are allowed to sell energy drinks in Sweden, making it one of the very few countries to take such a stance. Warning labels in Canada require that these products should not be used by children or pregnant women and should not be consumed in large quantities by those who drink them. Additionally, it is recommended that these products should not be mixed with alcohol. In many developing nations, including Ghana, where these are widely available, energy drinks are sold with little or no oversight responsibility from the government. A great number of young people are coaxed into drinking energy drinks by the allure of numerous advertisements that are shown on television, published in newspapers and magazines, and online. (Buxton &Hagan, 2012).

According to Harris and Munsell (2015) in their research, titled "Energy drinks and adolescents: what is the harm?" Young adults between the ages of 18 and 34 are one of the age groups that receive the most attention from the marketing of energy drinks. The consumption of energy drinks is currently experiencing significant growth. According to estimates provided by Attila and Banu (2011), between 30% and 50 % of adolescents and young adults regularly consume energy drinks. Most athletes and people who do

manual labour think of a hard physical activity and being able to work when they hear the words "energy drink" (Buxton & Hagan, 2012).

According to Rath (2012), energy drinks refer to beverages that include stimulants such as caffeine, taurine, ginseng, guarana, vitamins, herbs, and sugar. In most cases, the only components found in energy drinks are caffeine and sugar (Heckman et al., 2010). The Ghanaian market carries a diverse selection of energy drinks, such as Red Bull, Blue Ox, Power House, Atomic Energy Drink, Monster Beverage, Rockstar, Jolt Cola, and NOS, in addition to well-known brands like Gluconate and Lucozade. Indigenous beverage companies make other options like Next Level, Kabisa, Predator, Explode Rockstar, 5-star, Rush, Storm, 10 over 10, Vim, and Boss.

Concerns regarding the consumption of energy drinks revolve around caffeine, the beverage's primary stimulating component., which is routinely utilized in varying concentrations to produce energy beverages (Campbell et al., 2013). When consumed in significant amounts, caffeine can reduce insulin sensitivity, impact mental concentration and attention, and affect physical activity and vitality levels. (Buxton & Hagan, 2012; Campbell et al., 2013). The caffeine concentration of a single eight-to twelve-ounce energy drink serving ranges from 72 to 150 mg. Many bottles have two to three servings, increasing the caffeine level to 294 mg per bottle. In light of the aforementioned, pregnant women, nursing mothers, teenagers, and children should not use energy drinks (Heneman, 2010).

Adults should limit their intake of added sugar to no more than six to twelve teaspoons per day, as recommended by the World Health Organization (2004). On the other hand, one single serving (500 millilitres) of certain types

of energy drinks does have as much as 20 teaspoons of added sugar. Majority of healthy people can consume up to 400 mg of caffeine in a single day without experiencing adverse effects. Within the framework of the World Health Organization, even a moderate intake of caffeine from energy drinks can have the same effect as a high dose for people who are sensitive to the stimulant.

For the majority of people, drinking more than 2 cans of energy drinks of 500 millilitres per day is considered excessive. However, people who are sensitive to caffeine may experience the same side effects even at a lower dosage of approximately one cup per day (Stacey et al., 2017). According to Babu et al., 2008), plant compounds that contain caffeine, such as gurana tea, yerba mate and cocoa, do not need to be labelled and do not need to be included in caffeine content estimates. When these additives are present in a beverage, the amount of caffeine that it contains will increase. As a result of this, energy drinks may have a higher concentration of caffeine than what is often listed on the packaging. Energy drinks frequently have guarana and ginseng added to boost the effects of caffein (Heneman, 2010). According to Heneman (2010), it has been estimated that one gramme of guarana corresponds to forty milligrammes of caffeine, which means that adding guarana to an energy drink could significantly raise the total amount of caffeine that it contains. Ginseng, which amplifies the effects of caffeine, is associated with some negative side effects, including increased perspiration, irritability, and an irregular heartbeat. Studies have indicated that ginkgo biloba, taurine, amino acids, and ginseng have effects on the neurological and cardiovascular systems when taken with caffeine. (Franks, 2012; Rath, 2012).

Taurine is another stimulant that is frequently added to energy drinks and can be found in Red Bull as well as other brands. During the process of metabolism, the human body generates taurine through a wide variety of different pathways and mechanisms (Paddock, 2008). Every day, approximately sixty milligrams of taurine are produced. One serving of Red Bull energy drink contains one kilogram of the amino acid taurine, which is measured in milligrams. Although research has shown taurine to have only a minor impact, it is still a contentious addition.

Another common ingredient in energy drinks is sugar. The amount of sugar contained in energy drinks varies greatly (up to a quarter cup per serving in a can). With energy drinks having significant amounts of sugar, they tend to have a high caloric value and may also prevent the body from properly absorbing fluids (Buxton & Hagan, 2012). It can also be toxic to the digestive system.

To properly control the sale of energy drinks, there will be a need to overcome some challenges by individuals, organizations, and businesses. In the majority of developed countries, including the United States, both the labelling and the ingredients found in energy drinks that are imported to the country are subjected to strict regulations. In Canada, energy drinks are promoted through clear warnings on the labels and clear rules and guidelines for both the medical and non-medical substances that are in energy drinks (Paddock, 2008).

In the United States, beverages that are sold under the label "energy drinks" are subject to stringent regulations from the Food and Drug Administration (FDA). On the other hand, majority of companies that produce

energy drinks do not call their beverages by that name. In addition to this, some businesses refer to the products they sell as "dietary supplements" (Pomeranz et al., 2013). This is of the utmost importance because some nations, such as Ghana, do not have policies that are clearly defined concerning the regulation of the importation of energy beverages (Hagan & Buxton, 2012). This is a very important issue of concern.

According to Heckman et al. (2010), the market for energy drinks has been rapidly expanding in the past few years. The size of the market and the value of money that the companies have earned throughout the globe are both evidence of the quick expansion that they have experienced. According to Business Communication Company Research (BCC) (2012), for instance, the total amount of money made from the sale of energy meals and energy drinks throughout the world in 2010 was more than 115 billion dollars. This was followed by a rise in sales of more than 123 billion dollars in the following year, (2011). The Business Communication Company Research, revealed that the global market for energy drinks has a Compound Annual Growth Rate (CAGR) of more than 9% during the year 2016. When it comes to investment, the compound annual growth rate (CAGR), is a means to assess "the annual growth rate over a specified period." This rate is calculated by multiplying the initial investment by itself each year.

Consumers in Ghana have learned about additional new brands of energy drinks. According to a study on the marketing strategy for energy drinks in Ghana in terms of promotion and communication by Mwaawaaru (2009), in 2008, the quantity and value of imports into Ghana were 14,825,500 kg and $11,549,783.77 million, respectively. These figures were found in a

study on the marketing strategy for energy drinks in Ghana. The majority of Ghana's energy drinks are imported from other countries, specifically Belgium, Germany, the Netherlands, Thailand and the United Kingdom. Large local beverage producers such as the Bel group of firms, the Kasapreko company, the Angel group of companies, the Twellium industrial company, and Coca-Cola Limited all contribute to Ghana's energy drink market in their unique ways. Ghana's high consumption of imported energy drinks is a good sign of how committed the country's people are to this industry.

Regulating the sale and consumption of energy drinks is difficult in Ghana due to the country's lax oversight in this area (Buxton & Hagan, 2012). Due to this phenomenon, children and adolescents, especially those engaged in higher education, are more prone to drinking these beverages regularly. Why do most neighbourhood businesses, like supermarkets, provision stores, convenient outlets and shopping malls, give away their wares as part of a promotional strategy? (Usman & Jawaid, 2012).

It is very common for people to consume large quantities of energy drinks while simultaneously ignoring any possible adverse effects this behaviour may have on their health (Al-Shaar et al., 2017). Customers who are sensitive to caffeine may be dissatisfied to learn that there are no restrictions on where this product can be purchased. (Saku et al., 2020). If a child or adolescent consumes an excess amount of caffeine, they run the risk of developing symptoms such as hyperactivity, agitation, nervousness, and anxiety. They may also experience nausea, vomiting, diarrhoea, constipation, gastrointestinal problems, insomnia, sleep abnormalities, and, in extremely rare cases, even death. (Reid, et al., 2015).

When alcoholic beverages and energy drinks are combined, the risk to public health increases significantly. According to the findings of Al-Shaar et al. (2017), individuals who consumed energy drinks had a significantly high risk of becoming ill, experiencing anxiety, having a seizure, and even passing away. Energy drink use has been linked to several detrimental health consequences, including tooth decay, weight gain, obesity, diabetes, problems with the digestive tract, and cardiovascular disease. (Pomeranz et al., 2013). Again, energy drinks are high in calories and may result in stomach discomfort due to the high amount of sugar (9–10 %) that they contain. (Buxton & Hagan, 2012).

The World Health Organization (WHO) (2004) encourages individuals to improve and keep up their level of health by maintaining a healthy diet and engaging in physical activity regularly. The Global Strategy aims to increase public awareness of the significant influence that nutrition and physical exercise have on one's health and the advantages of implementing preventive measures. The goal of the Global Strategy is to encourage healthy eating on a global, regional, and national level by establishing, enhancing, and putting into action policies and action plans that promote healthy eating. In conclusion, it monitors the progress of science and encourages further investigation (WHO, 2004). According to the World Health Organization (2004), drinking excessive amounts of energy drinks raises serious health concerns. So, every country should try to reach the goals that have been set for healthy living by eating a well-balanced diet.

Energy drinks contain significant quantities of caffeine, sugar, and other components, and there have been concerns raised about the risks and

potential adverse health effects, particularly among adolescents. (Harris & Munsell, 2015).

Statement of Problem

Ghanaians in recent times patronize foreign food products greatly. These products include fizzy and energy drinks. The target demographic for energy drink manufacturers is the 18-and-older. Students are interested in identifying ways that will enable them to stay focused and attentive, and increase productivity while completing their daily duties out of their hectic lifestyles (Heckman et al., 2010; Woolsey, 2010).

The foods we consume have a significant impact on the kind and severity of health issues we experience. (Dixey et al., 2006). There have been reports of ailments and even deaths caused by excessive energy drink use (Schmidt & McIntire, 2008). Students are susceptible to certain health concerns as a result of their use of energy drinks (Bekoe, 2015). The sensitivity of students to energy drink advertisements, retail locations, and other variables might lead to a rise in their use. (Bekoe, 2015). It has been noted that students at UCC and UDS often take energy drinks with the purpose of achieving a high level of physical and mental performance.

Darkwa (2011), reported a rise in dental carries and diabetes since 2005. In determining the prevalence of Diabetes mellitus and the resources that are available for controlling it from three hospitals and four health facilities in Cape Coast, it was found that more Ghanaians are developing diabetes and having dental problems as a direct result of their increased consumption of sugary and fatty foods as well as their decreased level of physical activity. According to data gathered from the University of Cape

Coast Health Services Directorate (2016), the total number of patients who reported having Diabetes mellitus and dental caries between the years 2010 and 2015 has steadily increased, from 854 in the year 2010 to approximately 4627 in the year 2015.

Dr. Seidu Fitter, a Medical Practioner at Tamale Teaching Hospital issued a warning to the general public and more specifically to young people in Tamale, about the potential risks associated with excessive consumption of beverages that contain stimulants. Because energy drinks contain stimulants that cause blood vessels to constrict, Dr Seidu Fitter believes that excessive consumption of energy drinks may result in stroke or heart attack. This is because it becomes more difficult for the heart to adequately circulate blood throughout the body when blood vessels are constricted. He also cautioned that data from the public health department of the hospital shows a high prevalence of hypertension among young people. He thinks that most of the patients diagnosed with high blood pressure admitted to consuming energy drinks every day and are to blamed for this high rate. (Kumbundoo, n.d).

To date, very few studies have been conducted in line with this, especially among students who are not athletes. Determining the prevalence of energy drink use and the reasons students use them will go a long way to determine whether or not the concerns that have been raised regarding the use of stimulants are justified.

The consumption of energy drinks by university students is of great concern because this young population, involved in academic pursuits, is an appropriate target for energy drink marketers, who promise that their products

will increase energy, promote wakefulness, increase alertness, and enhance mental and physical performance.

Previous studies have focused on the possible adverse health effects that could result from the consumption of energy drinks by young athletes and those with physically demanding occupations. On the other hand, insufficient research has been done on the topic of people who do not participate in sports. For example, Buxton and Hagan (2012) used a cross-sectional research design in their investigation of the intake of energy drinks among college athletes in Ghana. Their study focused on the country's capital city, Accra. According to the findings of the research, more than half of the 180 student-athletes who took part in an interuniversity athletic competition reported that they had consumed at least 1 can of energy drink in the previous week. These student-athletes were asked whether or not they had used energy drinks before the competition. This data originated from the student-athletes' self-reporting of their experiences. In addition to these reasons, 25.9 % of those who drank energy drinks did so to provide their bodies with energy and water. Furthermore, 9.8 % of individuals who drank energy drinks did so to improve their performance or reduce feelings of fatigue.

For this reason, it is of utmost importance to expand the parameters of the study on energy drinks to incorporate a sample that is representative of a wider range of age groups and genders. At this time, it is not possible to determine what percentage of students at the University of Cape Coast and the University for Development Studies who use energy drinks. This is because there have not been sufficient studies conducted on the topic. In addition, there is a lack of understanding regarding the reasons and effects that are associated

with the consumption of energy drinks by this demographic group. This is particularly essential to comprehend because a significant number of different marketing strategies for energy drinks target t young people, athletes, and people who engage in manual labour.

Purpose of the study

The purpose of the study was to determine current patterns of energy drink consumption among university students of Cape Coast and Tamale

The Specific Objectives of the Study

1. Determine the prevalence of energy drink intake among students of UCC and UDS.
2. Identify the factors that contribute to the Universities student's consumption of energy drinks.
3. Assess the students' perceived feelings after consuming energy drinks.

Research Questions

1. What is the prevalence of energy drink intake among students of UCC and UDS.?
2. What factors influence university students' consumption of energy drinks?
3. What are the perceived feelings of students after consuming energy drinks?

Null Hypothesis

1. There is no statistically significant difference between energy drink consumption of UCC and UDS students.
2. There is no statistically significant difference in the consumption of energy drinks between male and female students.

Significance of the study

An investigation into the factors that lead students from UCC and the UDS to consume energy drinks may shed light on the pressing need for a more in-depth understanding of the potential physical health risks that are associated with the intake of energy drinks to one's physical health. The findings of the study will be beneficial for developing interventions and policy suggestions about the consumption of energy drinks on Ghanaian university campuses. Furthermore, the results of this study will also contribute significantly to the promotion of public health education campaigns focused on the adverse effects of excessive energy drink consumption among students. This study will contribute to the current body of knowledge about the usage of energy drinks, which will be beneficial for future academic studies.

Delimitation of the Study

The study did not focus on Ghana as a whole; rather, it looked at the factors that influence energy drink intake by university students in of two public universities in Ghana. The following types of beverages were not included in the study: alcoholic beverages, non-alcoholic champagne, non-alcoholic wine, iced tea, fruit drinks, and milk-based beverages.

Limitations of the study

The respondents for this study were selected using a method known as multi-stage sampling. Participants did not necessarily reflect all students in the Central and Northern regions. As a result, it is not possible to extrapolate these findings to other population groups.

Definition of Terms

Energy drinks are liquids that contain a variety of stimulants, including caffeine, taurine, ginseng, and guarana, as well as sugar, vitamins, and herbal supplements (Rath, 2012).

Sugar: is a type of carbohydrate that is crystalline in appearance, white and brown, and is used as a sweetener as well as a preservative (Offurum et al., 2022).

Stimulants: are chemical agents that temporarily boost or speed up physiological or biological processes (Liu & Santillo, 2016).

Caffeine is an alkaloid compound that is a central nervous system stimulant. It is most commonly found in tea and coffee plants. Caffeine is known as the "active ingredient" in coffee (Heckman et al., 2010)

Insomnia is a syndrome characterized by difficulty in falling asleep and/or remaining asleep during the night (Saddichha, 2010)

Systolic blood pressure is measured during heart contractions (White, 2002).

Diastolic blood pressure is measured while the heart is at rest (White, 2002)

Tachycardia is the medical term for a heart rate that is greater than 100 beats per minute (Abdi et al., 2015).

Arrhythmia is a medical condition that causes the heart to beat abnormally or irregularly (Abdi et al., 2015).

I**rritability** is a sign of depression that appears as an exaggerated physiological response to stimuli (Carrillo & Benitez, 2000)

The Organization of the Study

A review of relevant related literature is presented in Chapter 2 of the thesis. This encompasses both theoretical and practical issues. The framework describes the history of energy drinks; the different types of energy drinks; the active ingredients in energy drinks; the side effects of drinking energy drinks; and the marketing strategies that energy drink manufacturing companies use. It also describes how the differences between energy drinks and sports drinks can be used to differentiate between the two in the Ghanaian market. Previous research on the subject was incorporated into empirical reviews of the topic. The research methodology is presented in the third chapter. It provides details on the research design, study area, population, sampling procedure, data collection instruments, validity and reliability of the instrument, pilot testing, data collection techniques, data processing, and analysis of the collected data. The findings of the study are reported in chapter four. The conclusion, suggestions, and summary are included in the fifth chapter. Lastly, some recommendations and suggestions have also been presented for further study were presented.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter provides a review of the relevant literature on all topics and variables pertinent to the investigation, along with a summary. The following are the sub-topics that were discussed under Conceptual, Theoretical and Empirical Reviews: History and Market Overview of Energy Drinks, Consumption Patterns of Energy Drinks among Students, Differences between energy drinks and sports drinks, Active Ingredients in Energy Drinks, Side Effects Associated with consumption of Energy Drinks, Marketing Strategies of Energy Drink-Producing Companies, Brands of Energy Drinks, Ghana's Food Laws and Regulations, The Food and Drugs Authority (FDA), Functions of the Authority, Ghana Standard Authority (GSA), International Quality Standards (IQS), The International Organization for Standardization (ISO), The Theoretical Framework Approach and Chapter Summary.

Conceptul Review

History and Market Overview of Energy Drinks

The first energy drink was introduced to the public in the year 1901. In Scotland, it was once called Iro-Bru (Rehman et al., 2012). Gatorade was created in Japan in the early 1960s to help University of Florida athletes and sports stars, particularly the football team, perform better overall. The use of the beverage was supposed to help people stay hydrated and perform better. Under the trade name Lipovitan-D, the Japanese company Taisho Pharmaceuticals introduced the first energy drink to the market in 1962.

Lipovitan-D has all the important ingredients that are usually found in energy drinks, like B vitamins, taurine, and ginseng (Taisho Pharmaceuticals, 2009).

Lucozade energy was developed in 1980 in the UK to aid hospital patients in their recuperation. However, it was advertised as an energy drink in 1980 to replenish depleted energy. This marketing approach has persisted up until today. The first bottle of the energy drink Jolt Cola was launched in the United States of America in the year 1985 (Higher Education Centre for the Prevention of Alcohol and Drug Abuse and Violence, 2010). In 1987, the great majority of energy drinks made their debut on the world market. Since then, there has been a noticeable rise in the number of individuals who use energy drinks (Finnegan, 2003). The Josta energy drink was invented in 1995 by a significant American beverage manufacturer. However, this non-alcoholic beverage manufacturing was stopped in 1999 (Bolen, 2012).

The Spitz Company started distributing the Power Horse energy drink in Europe in 1997. In the same year, an Austrian businessman called Dietrich Mateschitz developed the concept for the energizing beverage known as Red Bull. Red Bull eventually overtook other energy drinks as the one that was sold the most globally. The traditional Thai beverage known as Krating Daeng, served by Mateschitz, served as the source of inspiration for the energy drinks Red Bull. The Coca-Cola business released two distinct powerade energy drinks in aluminium cans in the year 2001. Due to the efforts of CCCL Container and Mistic Brands, Incorporation, who participated in the national lunch programme, aluminium cans have grown in popularity. The recyclable aluminium bottle that the Mistic RE energy drink is packaged in may be recycled. Since then, other different energy drinks have come in an aluminium

can packaging. The introduction of bigger can sizes began in 2002 as a result of this persistent trend (Grósz & Szatmári, 2008). Between 2003 and 2007, the market for energy drinks increased by more than 400%. In 2004, the United States sold about 1.5 billion cans of Red Bull, indicating the magnitude of the business (Agriculture & Agri-Food Canada, 2008).

In 2007, the first effervescent pills and powdered energy drinks to dissolve in water was launched. Compared to using cans, it is an option that is simpler to transport. Thailand has the greatest per-capita use of different energy drinks than any nation in the world. In addition, among the top seven nations that consumed energy drinks the most were Kuwait, Austria, Ireland, New Zealand, and Slovenia (Pomeranz et al., 2013). According to estimations, the market share of energy drinks accounts for 47.3% of the overall market share worldwide (Heckman, & De Mejia, 2010). In the United States, energy drink sales exceeded $500 million per year, accounting for 62.2% of the market (Miller, 2008). Among the top ten most popular consumer packaged goods in both 2010 and 2011, energy drinks had the fastest pace of increase. A group of culinary and beverage goods sales increased by 16.7 % in 2010 compared to 2009 and by 13.3 % in 2010. (Symphony Group IRI, 2012).

Energy drink brands have grown quickly in popularity over the last several years, and it is now projected that this sector will be the next area of the soft drink industry to undergo significant expansion. This occurs as more businesses start to capitalize on the "profitable" industry (Mwaawaaru, 2009). Many people have started combining these energy drinks with alcohol to make the experience even more thrilling and pleasurable for themselves as they hunt for new and improved ways to get "high" (Peacock et al., 2012). Companies

that make alcohol are getting into the energy drink market by making alcoholic versions of the drinks that are already on the market (Reissig et al., 2009).

Energy drinks have been around for about 30 years, but new formulas are constantly being developed (Bhasin, 2012). As more people consume energy drinks for various reasons, the types of beverages that are accessible and their precise effects have been expanding in diversity (Reissig et al., 2009; Peacock et al., 2012). In Ghana, non-alcoholic energy beverages with names like Monster, Rockstar, Storm, Five Star, Rush, Run energy, and Hype are becoming more popular alternatives to the well-known brand Red Bull (Pangarkar & Agarwal, 2013).

Strategies Employed by Manufacturers of Energy Drinks in Their Marketing

Customer benefit relationship management may also be referred to as "marketing". It is easy to make the argument and provide evidence that successful marketing is essential to the success of every organisation (Reshidi et al., 2016). According to Alsunni and Badar (2011), the marketing of these energy drinks is based on the assumption that the natural components offer you more energy, make you more alert, and help you perform better in sports. This idea is used to sell beverages.

One approach that corporations employ to promote energy drinks is known as direct advertising, which may be found in retail establishments. Nevertheless, these companies also make use of marketing strategies that are more contemporary and cutting-edge in nature. These include advertising on the internet (for example, on the company's social media sites or the brand

itself), hosting contests, obtaining sponsorships, and forming partnerships with most athletic events. According to Simon and Mosher (2007), prominent corporations take advantage of the fact that themes of disobedience, risk-taking and adventure are enticing to teenagers and young people by employing these themes as part of their marketing strategy. Energy drink companies are often linked to high-intensity sports like football, boxing, and wrestling, as well as popular music styles among young people like dancehall and hip-hop.

When it comes to promotional strategies, messages that draw attention to the risks and potential negative effects of energy drinks are almost always relegated to a secondary position, while messages that extol the lauded positive effects of energy drinks on one's health are given a disproportionate amount of emphasis. This is because energy drink manufacturers want consumers to believe that drinking energy drinks is beneficial to their health. There has been an upsurge in the number of brands in recent years sold at lower prices to attract customers who do not want to buy more expensive products from market leaders. One reason for this rise in the number of brands that are sold at lower prices is that customers are becoming more price-sensitive (Alsunni & Badar, 2011).

The negative effects of energy drinks on people's health are amplified by firms' aggressive marketing strategies and inadequate regulatory oversight (Al-Shaar et al., 2017).). Unfortunately, manufacturers of energy drinks are left to decide the safety of their product without any clear standards on what should be stated on the brand label of their product (for example, warnings, unfavourable findings, testing, or bans against sales to or use by minors).

Seifert et al. (2011), indicate this is because there are no clear rules about what should be written on the brand label of their product.

According to Simon and Mosher (2007), Numerous attractive marketing strategies, such as eye-catching packaging, brand confusion, and the availability of more affordable alternatives, are used to promote sales of energy drinks. This is done to meet the demand for these products (Energy drinks), whether alcoholic or non-alcoholic, are typically sold in cans or bottles with tempting pictures, a unique font design, and a wide variety of flavours that are sweet and fruity. Additionally, to profit from the brand loyalty of their clients, some companies produce alcohol-free as well as alcoholic variants of the same type of energy drink

Energy drinks commercials that are broadcast on television in Ghana sell the products by stating that they provide an instant boost of energy that enables customers to do everything they set their minds to do, regardless of how taxing the task may be. Blue Jeans, Rox energy, Rush energy, Storm energy, Run energy, Good Day energy, Next Level energy, Predator energy, Burn energy, and 5-star energy are among the most well-known brands in Ghana as of today. There are, however, a great number of other well-known brands.

Patterns of Energy Drink Consumption among Students

According to Oddy and O'Sullivan (2009), energy drinks are available in over 140 countries under about 2,000 brand names. Aside multivitamins, the most common dietary supplement among adolescents and young adults is energy drinks. (Campbell et al., 2013). There has been a huge increase in the use of caffeine through the intake of energy drinks and coffee over the past

decade. Early customers of energy drinks were primarily athletes (Mcilvain et al., 2011). This is no longer the case, especially for young people, because energy drinks are readily available to everyone. In recent years, the demand for energy drinks has significantly increased and expanded into many new market regions. The overwhelming majority of accessible energy drinks are aimed towards adolescents. and young adults between the ages of 18 and 34 (Heckman et al., 2010).

University students continue to take in energy drinks for a broad range of reasons, despite all that has been published against these drinks. When asked about the frequency of their energy drink intake, slightly more than 50% (n=253) of the college students who took part in the research acknowledged being "energy drink users" since they consumed an average of more than one energy drink per month throughout the research period (Malinauska et al., 2007). Customers consumed energy drinks to make up for lost sleep (67%), to boost energy (65%), and to mix it with alcohol (65%) before going out to parties (54%).

A study conducted by Jacob et al., (2013) in the United Arab Emirates (UAE) discovered that 92% of students used energy drinks, whereas just 8% consumed nutritious liquids. Researchers confirmed this after discovering that just 8% of pupils drink nutritious beverages. 5% of energy drink consumers chose the brand "Effect," whereas 95% of energy drink users liked the brand "Red Bull." Participants in the research who used health drinks did so at least once per day, whereas those who consumed energy drinks did so at least twice per day. Sixty- four percent of children began drinking healthy beverages between the ages of 3 and 5, whereas over 92% of students started using

energy drinks after the age of 15. In addition, 72% of students were found to be affected by advertisements they viewed on television or in shops. About 85 % of people who consumed energy drinks felt that it would enhance their cognitive abilities, while 10% liked the flavour and 5% believed it would make them grow taller. Around 95% of students didn't know that energy drinks had a lot of calories and caffeine.

According to Bawazeer and Alsobahi (2013), 27% of the 257 participants in their study consumed at least one energy drink each month, with men accounting for 61.5% of the overall energy drink intake. As a result of this, it was found that men consume many more energy drinks than women. Students used energy drinks to acquire energy in general (32.8% of the total), as well as while studying for examinations or working on projects (31.4 %). Another issue identified was a lack of sleep (13.8% of the time). To comply with coworker expectations (11.4%), or to drive (8%). According to their research, heart palpitations were the most prevalent adverse effect, occurring in 20% of subjects. This was followed by sleeplessness (10%), headaches and tremors (6%), nausea and vomiting (4.2%), and anxiety (2%).

There was a total of 390 medical students who participated in the study on the usage of energy drinks; 204 (52.3%) were females and 186 (47.7%) were males. The survey was administered somewhere in Turkey. The majority of the 127 people who reported having drunk an energy drink at least once mentioned curiosity, enhanced cognitive performance and enhanced physical performance as the reasons for doing so. They proceeded by stating that the attention was mostly focused on the various flavours of energy drinks. When the responses of students to questions on their cognitive performance were

analyzed, it was discovered that many of them used energy drinks to stay alert while studying and prior to their exams. In addition, the phrase "physical performance" was used to refer to any sport whose objective was to alleviate fatigue, as well as any other physically demanding activity, such as travelling, dancing, or sexual experiences (Hidiroglu et al., 2013).

In another study conducted by Subaiea et al., (2019) 783 individuals contacted for the research responded and completed interviews. The popularity of energy drinks was ascribed by consumers to vast advertising media (46.7%) and their exciting and energizing benefits (37.5%). participants also took energy drinks for their impact on tiredness reduction (64.6%), enhanced alertness and attention (75.8%), and the sustenance it provides during long distance travels (75.7%). Participants in the study reported experiencing unpleasant symptoms, including diuresis (53.7%), palpitations (50.7%), and insomnia (50.7%). Importantly, an inverse relationship was found between energy drink knowledge and consumption rate, and a proportionate relationship was found between observed unfavourable effects and consumption frequency. Daily customers had lower knowledge ratings than 1–3 times monthly consumers, and daily consumers encountered more unpleasant occurrences than 1–3 times monthly consumers.

More research examined gender differences in the prevalence of energy drink use. According to research by Peymani et al. (2012) on consumption trends, there was 258 (57.5%) male energy drink consumers. In separate research conducted by Hidiroglu, Tanriover, Unaldi, Sulun, and Karavus (2013), men consumed significantly more energy drinks than females. Alsunni and Badar (2011) similarly found a statistically significant

difference between females (26.15%) and males (54.6%). According to Wardle et al. (2004), the difference in energy drink use may be attributed to the fact that females tend to make healthier food choices due to their concern with weight control and their strong convictions about good nutrition.

Qamhia (2011), discovered in cross-sectional research of 279 students at An-Najah National University (Nablus, Palestine) that the frequency of energy-drink intake was substantially greater among male students, as 80.5% of energy-drink users were males. The most prevalent reason for drinking energy drinks among participants was to remain awake at night (68.6%), but the majority of those who had never tasted energy drinks said they were harmful. The most prevalent negative effect observed by energy drink users was palpitations, which was experienced by 29.5% of current energy drink consumers.

Reid et al. (2015), surveyed 1,994 students from eight universities in Trinidad and Tobago. the prevalence rate was 86%. Males were more likely to use energy drinks more regularly and at a younger age. Most often, energy drinks were used to increase energy (50%) and counteract tiredness (45%), as well as improve academic performance (40%); they were also consumed during sports (23%) and coupled with alcohol (22.2%). The majority (79.6%) ingested one energy drink every sitting; 62.2% reported side effects, the most prevalent of which were restlessness (22%), jolt and crash (17.1%), and tachycardia (16.2%). Awareness of unfavourable effects was related to non-use ($p = 0.004$), but awareness of adverse effects did not discourage continuing usage.

In many developing nations, very little studies have been conducted on energy drink intake among young adults, especially among non–sports personnel. In addition, Ghana, like many other developing nations, has little published research on the intake of energy drinks by non-sports personnel, even though these beverages are widely available at retail outlets. However, there is evidence that student-athletes at institutions in Ghana take energy drinks. Approximately 62% of student-athletes use at least one energy drink each week. In addition, 79.5 % of respondents said they drink one to two energy drink cans per week, while 20.5% said they drink three to four cans per week for various reasons (Buxton & Hagan, 2012).

Seventy - seven percent of the 120 Ghanaian students surveyed consumed between 5 and 6 cans per week, whereas 23% consumed between 7 and 8 cans per week. These users have engaged in this behaviour for as long as three years to stay up late and lessen their weariness (Nti et al., 2014).

Differences and Similarities between Energy Drinks and Sports Drinks

The market for sports and energy drinks is among the fastest-growing beverage subcategories. It is offered to adolescents and young adults for several political and social agendas. Energy drinks and sports drinks are entirely distinct entities. These beverages include carbohydrates, minerals, and electrolytes, including salt, calcium, and magnesium, and have a wonderful taste. Gatorade, Powerade, Allsports, Hydrafuel, Isostar, Xcel, Sport plus, Isosports, Staminade, and Sponsor are some of examples of sports beverages. Occasionally, vitamins and other nutrients are added to various types of sports drinks. Several stimulants, such as caffeine and guarana, are commonly used in energy drinks. Carbohydrates, protein, amino acids, vitamins, and minerals

are also present. Between 13-19g of carbohydrates is included in an 8-ounce serving of sports drinks (American College of Sports Medicine, 2011).

Energy drinks contain between 18 and 25 grammes of carbohydrates per 8-ounce serving (National Federation of State High School Associations, 2011). A single serving of an energy drink bottle contains calories ranging from 10 to 270, whereas a single serving of sports drinks normally has between 10 and 70 calories. According to Schneider and Benjamin's (2011) research, it is not essential to ingest an excessive quantity of carbohydrate-containing beverages for the body to feel energized during and after exercise. In addition, both adolescents and adults have a greater likelihood of being overweight or obese if they consume more calories.

Due to their use of sports and energy beverages, adolescents' teeth become more worn down. It has been established that the pH of both beverages falls within the acidic range, which promotes the demineralization of enamel. Even with a neutral pH, citric acid is very corrosive and should be avoided. Both sports and energy beverages contain citric acid. Consumption of sports beverages, which play a significant role in the nutritional needs of young athletes who participate in intense sports, allows for the replenishment of carbohydrates, water, and electrolytes (Schneider & Benjamin, 2011). According to the Australian Sports Dietitians (2009), energy drinks and sports drinks are distinct as sports drinks do not include caffeine, whereas energy drinks do. After a strenuous sixty-minute workout, it is crucial to restore the body's fluids with sports drinks. According to a poll conducted by Itany et al. (2014), 15.7% of respondents believed that energy drinks and sports drinks were the same things.

However, taking energy drinks might cause dehydration after intake, especially if they are used after intense physical activity (School Health Council, 2011). The human body does not respond to thirst until it has lost approximately 8% of its body weight in water. In addition, electrolyte and supplement replenishment is required to restore normal hydration levels if dehydration levels are more than 3%. This task could take up to a day to finish (Sagawa et al., 1992). A person's resting heart rate increases by three to five beats per minute when they lose 1% of their total body water. When a person's degree of dehydration exceeds 2 % of their body weight, their performance will begin to deteriorate (Casa et al., 2000). When a person loses 2% of their body weight daily, it might impair their physical and mental capabilities. This is known as persistent dehydration. Persistent inflammation has been related to cancer and renal damage. According to Ganio et al., (2007), both dehydration and hyperthermia increase the risk of circulatory instability, which in turn increases the risk of heat exhaustion.

Active Ingredients in Energy Drinks

Typical active components in energy drinks include sugar, taurine, ginseng, guarana, vitamins, and herbal supplements. Caffeine and similar stimulants are typically present in energy drinks. (Rath, 2012). There are practically hundreds of unique energy drink variants on the market today, and each of these beverages contains a different amount of caffeine. Most energy drinks contain between 70 and 200 mg of caffeine per ounce of fluid (Higgins et al., 2010). There are few laws limiting the sale of energy drinks in Ghana, and there are no limits on the type of information that may be placed on their nutrition labels (Buxton & Hagan, 2012).

Due to the absence of restrictions on energy drinks, the interactions between the components in terms of quantity or function are often not examined. This is crucial since consumers are usually unaware of the food's constituents and their potential detrimental health consequences when ingested in large numbers. As a result of the frequency with which they consume these drinks, college and university students are especially exposed to the detrimental consequences of energy drink consumption. According to the findings of Breda et al., (2014), people are encouraged to believe that consuming energy drinks might enhance their mental or physical performance.

Caffeine

Caffeine is found in coffee (*Coffea spp.),* guarana (*Paullinia cupana*), tea (*Camellia sinensis*), mate (*Ilex paraguariensis*), cocoa (*Theobroma cacao*), cola nuts (*Cola vera*), caffeinated soft drinks, and energy drinks (Fulgoni et al., 2015 & European Food Safety Authority, 2015).

Due to the substantial quantity of caffeine present in energy drinks, these beverages provide customers with an additional rush of energy (Higgins et al., 2010). Multiple age groups, including children, adolescents, and adults, exhibit caffeine use, a substance that works as a stimulant on the central nervous system (Heckman et al., 2010b). Over the past decade, the use of beverages containing caffeine, such as coffee and energy drinks, has grown, leading to an increase in the number of teenagers and young people who use caffeine (Mcilvain et al., 2011). Caffeine, also known as 1,3,7-trimethyl xanthine, is an alkaloid present in the leaves, fruits, and seeds of roughly 63 plant species. Caffeine belongs to the family of methylxanthine chemical substances (Geethavani et al., 2014).

Caffeine is swiftly absorbed by the body and enters the brain significantly within five minutes after administration (Baribeau, 2014). In addition, its half-life before being eliminated from the body is five hours (Heckman et al., 2010b). It can also affect the respiratory, circulatory, digestive, and nervous systems, in addition to other physiological functions. Caffeine is often used as a mild neurochemical stimulant, and many people use it to fight fatigue (Wolde, 2014).

The effects of caffeine on the human body can be classified as pharmacological or physiological. Among the advantages include a reduced risk of liver injury (Wolde, 2014), Parkinson's disease, Alzheimer's disease (Messina et al., 2015), increased psychomotor performance, improved mood (Giles et al., 2012), and an enhanced total immunological response. On the other hand, it is responsible for several behavioural changes in the body, including addiction, anxiety, insomnia, coronary artery disease, osteoporosis, gastritis, and anaemia (Wolde, 2014; Baribeau, 2014). Stacey et al., (2017) discovered a link between excessive caffeine consumption and late miscarriage, small-for-gestational-age neonates, and stillbirth in vulnerable populations such as pregnant women and infants.

Some energy drinks contain as much as 400 milligrammes of caffeine per 250 millilitres, but the majority have between 80 and 400 mg (Sepkowitz, 2013). Since caffeine is lipid-soluble, it can cross the blood-brain barrier and the placenta (McCall et al., 1982). Thus, the distribution volume of caffeine in breast milk is 0.61 litres per kilogramme. Two of caffeine's metabolites, theophylline and paraxanthine, can contribute to the pharmacological impact that caffeine exerts on the central nervous system (Fredholm et al., 1999).

Furthermore, there are also concerns about the quantity of caffeine in energy drinks, which might result in undesirable side effects such as caffeine intoxication. Caffeine toxicity is characterised by a collection of symptoms that appear after caffeine use. Caffeine intoxication is marked by tremors, tachycardia, and psychomotor agitation. Other signs include irritability (Clauson et al. 2008). An overdose of caffeine may be caused by several circumstances, one of which is an inadequate warning label on the product, since the majority of energy drinks lack accurate warning labels indicating the amount of caffeine they contain (Gunja & Brown, 2012).

The presence of advertisements has also been linked to caffeine toxicity (Reissig et al., 2009). According to Oddy and O'Sullivan (2009), excessive caffeine consumption may result in anxiety, agitation, insomnia, gastrointestinal issues, and arrhythmias. An individual's body may be able to tolerate low levels of caffeine (Hedges et al., 2009), however excessive caffeine consumption through the use of energy drinks has been linked to major adverse effects, including arrhythmia, stroke, and sudden death (Berger & Alford, 2009). In addition, children with certain preexisting medical conditions, such as heart disease, renal disease, liver disease, seizures, diabetes, mood and behaviour disorders, or hyperthyroidism, or who are already taking specific medications, are at a higher risk if they take in energy beverages. (Lipshultz et al., 2009; Temple, 2009).

Other caffeine-containing products include prescription medicines, drugs used to relieve urinary retention, and analgesics (Mcilvain et al., 2011; Ruxton, 2008). Many consider caffeine to be an addictive substance (Astorino et al., 2008). Due to its extensive use and attractiveness, many people consider

caffeine to be an addictive chemical. Caffeine is the cheapest and most accessible drug known to humans. Many, however, believe that caffeine is a good stimulant that may improve a person's focus, alertness, and a variety of other physical characteristics (An et al., 2014). According to Campbell et al. (2013), the effects of caffeine vary on the individual, the amount of caffeine they consume, the frequency with which they consume it, and the rate at which their metabolism breaks it down

Carbohydrates

According to Campbell et al. (2013), carbohydrates are an extra ingredient present in a vast majority of energy drinks. Maltodextrin, glucose, and sucrose are sources that are utilised regularly. Campbell et al., (2013) suggest that consuming carbohydrates, particularly during 45-minute or longer exercises, could be one of the strategies for increasing endurance and physical activity. Carbohydrate consumption can increase endurance by maintaining stable blood glucose levels, promoting high rates of carbohydrate oxidation, and perhaps conserving glycogen reserves in the liver and skeletal muscle. Painelli et al., (2012) found that it can act like glycogen even during low-intensity activity and that it can affect the central nervous system.

At high concentrations, the oxidation of carbohydrates happens at a rate of around 1g of carbohydrates per minute or 60 g per hour. For instance, the process of oxidation of glucose, sucrose, maltodextrins, and amylopectin peaks at 50%, whereas fructose, galactose, and amylase peak between 25 and 50% (Campbell et al., 2013). The bulk of energy drinks includes roughly 25–30 grammes of carbohydrates per 240-millilitre cup (8 fluid ounces). This quantity meets the minimum need of 30 grammes per hour for endurance activity but falls short of the maximum requirement of 60 grammes per hour.

Even though the overall carbohydrate content of energy drinks is rising, there may be an issue with the concentration of energy drinks. Long-duration exercisers, according to the American College of Sports Medicine (2011), should consume a carbohydrate solution with a concentration of between 6 and 8 %.

Carbohydrates make up 11 to 12% of the total volume of a typical energy drink. The use of energy drinks with a concentration of carbohydrates greater than 10 % causes a delay in stomach emptying and gastrointestinal discomfort. In addition, excessive carbohydrate consumption, especially when the temperature is high, can cause dehydration because it reduces the rate at which liquids are taken into circulation. This, together with the fact that it is difficult on the stomach, might result in dehydration (Pollard et al., 2006).

Sugar and Sugar Substitutes

Sugars are the body's primary source of energy. However, excessive sugar consumption can lead to hyperactivity, and energy drinks often include a great deal of sugar (González et al., 2012). According to González et al., (2012), excessive sugar consumption, such as that found in energy drinks, can disrupt metabolic equilibrium. Sugar-sweetened beverages have been linked to obesity, type 2 diabetes, and tooth decay. In children and teenagers, tooth decay, bone fractures, pancreatic cancer, gastroesophageal reflux disease, cardiovascular disease, metabolic syndrome, and hypocalcaemia are all risks. (Abechi et al., 2014).

According to the Centre for Disease Control and Prevention (CDC) (2010), several varieties of energy drinks include sugar. According to Lustig et al. (2012), sugar consumption has grown globally over the past 50 years, and

the typical person consumes more than 500 calories per day from the use of energy drinks. According to Meier (2013), the sugar in energy drinks is a kind of usable nutritional energy for the human body. The great majority of energy drinks contain between 21 and 34 grammes of sugar per 237-millilitre can (Clauson et al., 2008).

Artificial sweeteners, sometimes known as sugar replacements, are utilised in some foods, beverages, and medicines (Abechi et al., 2014). Aspartame, an odourless white crystalline powder that is exceedingly sweet, is one of the most commonly used sugar replacements in homes and restaurants. According to Abechi et al. (2014), it has an estimated sweetness measurement that is about 200 times higher than that of sucrose. Aspartame use might result in neurological side effects such as headaches, insomnia, and convulsions. The following symptoms may occur after consuming the sweetener: They can occasionally induce brain injury and are associated with regional catecholamine concentration variations (Abechi et al., 2014).

Guarana

The *Paullinia cupana* plant, sometimes known as guarana, is a local species that can only be found in the Amazon. It is a species that is frequently used in traditional medicine and is well-known for the anti-oxidant and stimulating properties that it offers. (Schimpl et al., 2013). Caffeine is the key component in guarana that is attributed to these positive characteristics, and depending on how the extract is processed, Guarana may contain up to four times as much caffeine as coffee beans. These positive characteristics are attributed to the guarana plant. These favourable qualities may be traced back to caffeine's stimulating and energizing effects (Schimpl et al., 2013).

According to the findings of research carried out by Heckman et al. (2010a), 1g of guarana has the potential to contain more than 40 mg of caffeine. Since ancient times, people living in Amerindian communities have used guarana for a wide variety of medicinal purposes, including as a stimulant, an anti-arteriosclerosis medicine, a pain reliever, a cardiovascular drug, an astringent, an aphrodisiac, a tonic, a treatment for diarrhoea, fever, migraines, neuralgia, hypertension, and dysentery (Taylor, 2005). According to Taylor (2005), guarana seed extracts have experienced a meteoric rise in popularity over the past few decades all over the world. This is particularly the case because of the stimulant and thermogenic qualities that they possess when used as an ingredient in a variety of herbal preparations, energy beverages, and protein bars.

Guarana has been shown to improve certain cognitive performance parameters in human subjects in many different double-blind, placebo-controlled studies. These studies have shown that guarana has no effect on mood, but it does raise the speed and accuracy with which one can execute tasks involving the processing of quick visual information, and it also reduces the mental weariness that is associated with the performance of extended tasks. Finally, it improves secondary memory performance and increases alertness and some content mood ratings, and that it improves secondary memory performance (Kennedy et al., 2008; Haskell et al., 2007). 2007 marked the beginning of a series of preliminary investigations into the effects of guarana extract taken in one of four distinct doses on human subjects (37.5 mg, 75 mg, 150 mg, and 300 mg). The fact that individuals who took the guarana at the two lower dosages had benefits in memory, attentiveness, and

mood suggests that 75 mg of guarana has a good effect on cognitive performance (Haskell et al., 2007).

To summarize, no single research has provided evidence that consuming guarana in large quantities for a short period or very tiny amounts for lengthy period results in any negative side effects. This is true regardless of the length of exposure to the substance (Heckman et al., 2010a). When ingested in high quantities over a prolonged period, such as for more than seven days, guarana has the potential to cause adverse effects on the heart. Anxiety, nausea, and seizures are all among the potential adverse effects of this medication (Fetrow & Avila, 1999). It is essential to keep in mind that the quantity of guarana consumed plays a part in the appearance of undesirable effects; dosages of guarana that are higher than 250-300 milligrammes per day have been linked to harmful effects (WebMD, 2019).

Taurine

It is a kind of amino acid that is present in the tissues of many animals and may be detected there. Two of the amino acids that are utilised by the body in the process of synthesis of taurine are methionine and cysteine. Taurine is a conditional amino Sulfonic acid that plays a crucial role in the body. It is a nutrient that may be found in a variety of foods, particularly in meat and fish (Marles et al., 2010). One of the most well-known benefits of taurine is the role it plays in the formation of bile acid, which is necessary for the breakdown and absorption of fat (Ebihara et al., 2006). According to Timbrell et al. (1995), the liver makes most of the body's taurine. According to Lourenco and Camilo (2002), the right functioning of the immune system, the metabolism of glucose, the health of the cardiovascular system, and the

welfare of the brain system are all dependent on taurine in order to function properly. A healthy human being does not need to have taurine added to their diet as a supplement since the intake from diet and the biosynthesis of taurine are normally adequate to fulfil the physiological demands of the body (Reeds, 2000). There may be a restriction in the supply of precursor amino acids and significant loss of bile acids and taurine in stools in cases of digestive malabsorption, such as those found in children with cystic fibrosis, people with blind loop gut syndrome, and choleric diarrhoea. In these cases, it is recommended that a taurine supplement be taken.

Taurine also has several other biological effects on the body, including the stimulation of the production of hormones, enhancement of the capabilities of working out, and some other biological effects. Specifically, the capability of working out is increased (Giles et al., 2012). When tested on mice in vitro, Giles and colleagues found that taurine improved both the cognitive capacities and the physiological functioning of the animals. According to Heckman et al. (2010a), there were as many as 80 different varieties of energy drinks on the market that included appreciable quantities of taurine every 30 millilitres.

Ginseng

Ginseng is a perennial plant that belongs to the *Araliaceae* family and the *Panax* genus. In certain circles, it is also referred to as Asian ginseng. It is a well-known and highly regarded medicinal herb that is widely used all over the world (Kim et al., 2018). Ginseng is well-known for its capacity to improve a variety of aspects of one's health, including overall well-being, the functioning of the immune system, libido, and athletic performance. Ginseng is also well-known for its capacity to improve one's general state of health

(Chhotaram et al., 2010). For a very long time, ginseng has been used for the treatment of a variety of conditions, the restoration of homeostasis, and the extension of one's lifespan; However, it was just recently discovered that the herb may also be used to regulate the factors that are associated with heart disease. (Attele et al., 1999).

As stated by Chhotaram et al. (2010), Ginseng is useful for strengthening the body's natural mechanisms for coping with stress and promoting vitality. Ginseng is also beneficial for improving overall health. The kind of ginseng known as Panax ginseng Meyer, which is also sometimes referred to as Asian ginseng, is the form of ginseng that is widely regarded as being the most beneficial and is regularly employed for therapeutic purposes. Ginseng comes in at least thirteen different varieties (Kim et al., 2018). It has been revealed that selected species of Korean red ginseng, which is a member of the Ginseng genus and is indigenous to Asia, can improve blood sugar management and some cardiovascular parameters when paired with conventional medical treatment (Vuksan et al., 2008). As indicated by the research conducted by Yun et al. (2001), the therapy and management of erectile dysfunction in males may benefit from the use of Korean red ginseng as it has the potential to be an effective treatment option. The kind of ginseng known as Panax ginseng Meyer, which is also sometimes referred to as Asian ginseng, is the form of ginseng that is widely regarded as being the most beneficial and is regularly employed for therapeutic purposes. From the results of the first study, which used a double-blind, crossover design to look at the effects of Korean red ginseng on impotence, this was the conclusion.

Consumption of Panax ginseng was associated in one instance with inflammation of blood vessels in the brain, which might lead to migraines or strokes. This association was seen in a single patient (Chhotaram et al., 2010). Chhotaram et al., (2010) further found out that when using Panax ginseng, you may experience some unpleasant effects, some of which are small and temporary, such as changes in blood pressure, heart rate, sleeplessness, diarrhoea, itching, loss of appetite, headache, anxiety, and mood changes.

According to Wang et al. (2016), an increasing number of studies have indicated that components of ginseng produced from ginseng leaves, fruits, and roots are beneficial in lowering or inhibiting the amount of neuronal death that occurs in a variety of experimental models of neurodegenerative conditions. These models include Alzheimer's disease, Parkinson's disease, and multiple sclerosis. Ginsenosides found in the root of ginseng have the ability to treat a variety of ailments. Kim et al. (2018) found that ginsenosides are powerful antioxidants that can remove free iron from the body.

Yerba Mate

The plant that is commonly referred to as *llex paraguariensis* and from which yerba mate is produced is native to South American countries. The activity of the central nervous system is stimulated as a result of the presence of a substantial amount of caffeine in this substance. A single serving size of coffee that is 8 ounces has around 78 mg of caffeine. This is the amount of caffeine that is present in one cup of coffee. Yerba mate's popularity can be attributed, in large part, to the numerous health advantages provided by its bioactive components. These components include polyphenols, xanthines,

flavonoids, saponins, amino acids, minerals, and vitamins (Heck & De Mejia, 2007).

The phytochemicals that are present in the yerba mate plant are responsible for the plant's anti-inflammatory and anti-diabetic benefits. In addition to this, it guards against the damaging effects of oxidative stress and acts as an antioxidant (Markowicz et al., 2007). As was discovered in research carried out by De Morais et al. (2009), Intake of yerba mate increases blood lipid levels in both normolipidemic and dyslipidemic individuals. In addition, studies have indicated that patients who take statin medication and also consume yerba mate see a drop in their LDL cholesterol levels. Yerba mate has been linked to a variety of malignancies, including cancer of the mouth and throat, cancer of the oesophagus, cancer of the lungs, cancer of the bladder, and cancer of the kidneys, which has led to many people expressing concern about this connection (Heck & De Mejia, 2007).

Inositol

This is an active ingredient added to energy drink to improves a wide range of biological activities, such as the directing of neurons, the movement of substances inside cells, and the regulation of the activity of serotonin. In addition to this, there is evidence that clinical depression is linked to reduced levels of inositol that may be discovered in the cerebral fluid (Woosley et al., 2010). On the other hand, there is evidence from studies conducted on high concentrations of inositol that suggests it may be useful in the treatment of conditions such as bulimia, panic disorder, agoraphobia, and obsessive-compulsive disorder (Gina, 2004).

B- Vitamins

The water-soluble B vitamins are an important component of cellular metabolism and make up a group of vitamins known as the B vitamins. In certain circles, they are sometimes referred to together as the vitamin B complex (Kaur, 2015). B vitamins include thiamine (vitamin B1), riboflavin (vitamin B2), niacin (vitamin B3), pantothenic acid (vitamin B5), pyridoxine hydrochloride (vitamin B6), biotin (vitamin B7), inositol (vitamin B12), and cyanocobalamin (vitamin B12) (Heckman et al., 2010a). Different levels of B vitamins (B2, B3, B6, and B12) are often present in energy drinks. These four vitamins are necessary for the body to function properly, and they each contribute to meeting that requirement in their unique way.

Riboflavin, which is more commonly known as vitamin B2, is necessary for the digestion and metabolism of carbohydrates, proteins, and lipids, as well as the process of cell respiration. Vitamin B2 is required for the creation of erythrocytes and antibodies, as well as for the maintenance of normal eyesight, skin, nails, and hair. Vitamin B2 is also vital for healthy nail growth. Additionally, necessary for the upkeep of healthy cardiovascular function is vitamin B2. In addition to this, it promotes growth and reproduction while at the same time lowering stress levels in the body (Kaur, 2015). According to studies, niacin helps in the treatment of high blood pressure, the reduction of serum cholesterol, the prevention of excess fatty buildup in the liver, the maintenance of the neurological system, and the treatment of depression. Niacin also plays a role in the maintenance of the neurological system. Niacin, in addition, contributes to the proper functioning of the nervous system. Niacin is vital for healthy skin and circulation, especially when vitamin C boosters are used (niacin can induce flushing and a

warm, tingling sensation), and this is especially true for those who have light skin since fair skin is more susceptible to flushing and tingling sensations (Kaur, 2015).

It is necessary to consume adequate levels of vitamin B6 to aid the body in producing antibodies and breaking down fats and carbohydrates. It is required not only for the formation of amino acids but also for the breakdown of those acids. Using it can aid with skin health, muscular spasms, carpal tunnel syndrome, leg cramps, and numbness in the hands, among other ailments. (Kaur, 2015). It is thought that vitamin B12, which is also known as cobalamin or cyanocobalamin, helps prevent anaemia and facilitates the creation and regeneration of erythrocytes. Other names for vitamin B12 are cyanocobalamin and cobalamin. In addition, the mechanism by which the body absorbs calcium and the process by which it metabolises carbohydrate, fats, and proteins are both assisted by vitamin B12. It encourages healthier growth and development in youngsters, boosts energy levels, and helps to maintain a healthy neurological system. It also helps adults maintain healthy levels of energy (Kaur, 2015).

Glucuronolactone

The vast majority of energy drinks include this component in some form or another. Orally administered glucaric acid, xylitol, and l-xylulose are rapidly absorbed, digested, and eliminated from the bodies of human beings within a short period (European Food Safety Authority, 2009). It is a naturally occurring chemical component that is present in the connective tissues and the gums of a variety of plant species. It is odourless, non-volatile and colourless. Glucuronolactone is the starting point for the production of glucaric acid,

xylitol, and l-xylulose. In addition to this, it serves as a precursor, which means that it is involved in the production of ascorbic acid. Blood glucuronides at high levels are regarded as a detoxicant since they assist the body in eliminating toxins and other harmful substances. According to the findings of Hoffman et al. (2008), administering 350 mg of glucuronolactone was effective as a detoxicant.

L-Carnitine

The amino acid L-Carnitine helps the body to burn fat by playing a role in the catabolism of fatty acids (Lheureux et al., 2005). The consumption of energy drinks that include carnitine is linked to a variety of unpleasant side effects, such as nausea, vomiting, stomach discomfort, headache, stuffy nose, restlessness, insomnia and diarrhoea.

Ginkgo Biloba

The Ginkgo biloba tree's leaves, which are known to contain a wide variety of different bioactive chemicals, are used to make ginkgo extract by boiling them. One producer can make ginkgo extract with a completely different set of components than another. These components are what make the product ginkgo extract (Kressmann et al., 2002). The National Institutes of Health (NIH) provided funding for a clinical trial of ginkgo called the Ginkgo Evaluation of Memory (GEM)., which was done on 3,000 adults aged 75 and older between the years 2000 and 2008. A battery of tests was utilised to ascertain the participants' levels of mental capacity. It was discovered that consuming 120 mg twice a day does not affect the risk of dementia, cognitive decline, blood pressure or hypertension, or events connected to cardiovascular disease (DeKosky et al., 2008). When using ginkgo, some individuals may

have some modest negative effects, such as nausea, diarrhoea, headaches, dizziness, heart palpitations, and restlessness. These adverse effects are usually temporary and do not require medical attention. The effects often only last for a short time and do not require. It will probably affect other drugs, such as those that are used to treat depression or thin the blood. According to the findings of a recent investigation (Srecher et al., 2013), rats who had ginkgo biloba extract added to their meal for two years developed thyroid cancer.

Ghana Food Laws and Regulations

Governments and citizens of every nation are concerned about the hygiene of their food sources. The government's concern is evident in the passage of legislation that regulates food handlers' operations. Numerous national governments have set regulatory criteria for food safety and food quality to safeguard customers and guarantee that foods are fit for human consumption. These legal standards have been created in several nations. Food laws and regulations have particular requirements, the scope of which varies considerably from nation to nation. In 1992, in response to the 1981 Provisional National Defense Council Establishment Proclamation, Ghana passed the Food and Drugs Law (PNDCL 3035). It is illegal to sell food that is unsuitable for human consumption, toxic, or otherwise polluted. In addition, it takes into account the sale of food in unclean circumstances, which puts the food in danger of contamination. Teaching and evaluating potential food handlers on food safety practices would be the only permissible exception. The first examination is conducted from a hygienic standpoint by regulatory

agency personnel. After getting a license, food vendors are expected to follow the rules set by the local government.

The Accra Town Council Ordinance of 1943 has a Street Market By-law that was designed to provide public access to nutritious and healthy food alternatives. Ntiforo (2001) emphasised that a lack of appropriately educated and equipped individuals led to the inefficiency of law enforcement. The Food and Agriculture Organization of the United Nations (FAO) believes that any ideal food control system must include effective enforcement of relevant regulations, which may be achieved by implementing regular inspection programmes.

FAO (2005) notes that every food legislation must be enforced by a qualified, trained, and efficient food inspection service. This is because inspectors are the principal officials that have daily interactions with the food industry. This is because inspectors are responsible for assuring compliance with the requirements. It is more beneficial to have a reactive and enforcement-focused program to reduce the risk of food-borne disease than to have a proactive and comprehensive approach.

Food and Drug Authority

In line with the Food and Drugs Law of 1992, the Food and Drugs Authority (FDA), formerly known as the Food and Drugs Board (FDB), was founded in August 1997 as the Food and Drugs Authority (FDA). (PNDCL 305B). Under the Public Health Act of 2012, the National Regulatory Authority is responsible for overseeing the regulation of a wide variety of products, including but not limited to foods, medications, food supplements, herbal and homoeopathic medicines, veterinary medicines, cosmetics, medical

equipment, household chemical substances, tobacco, and tobacco products (Act 851). The Food and Drug Administration's (FDA) legislative authority is outlined in the Public Health Act, Act 851 of 2012, notably in sections 6 (Tobacco Control Measures), 7 (Food and Drugs), and 8 (Medical Devices) (Clinical Trials). The Food and Drug Administration (FDA) is a ministry of health agency. The organization's daily activities are overseen by the Governing Board, which is made up of eleven people, including the Chief Executive Officer.

The objective of the authority is to create and enforce standards for various consumer products, including food, herbal medicinal items, cosmetics, medications, medical equipment, and household chemical substances.

Activities Performed by the Authority

1. Make sure there are enough effective rules about food, drugs, cosmetics, household chemicals, and medical equipment;
2. Ensure that the provisions of Parts 6, 7, and 8 of the Public Health Act of 2012 (ACT 851) are followed by conducting compliance checks through the District Assemblies and any other state agency;
3. Provide the Minister with recommendations for the implementation of health protection measures for consumers;
4. To give the Minister suggestions on how to make rules for implementing Parts 6, 7, and 8 of the Public Health Act, 2012 (ACT 851) that work well;
5. Grant permission for clinical studies to commence and continue running within the country;

6. Carry out any additional responsibilities that are required to accomplish the Authority's objectives.;

Ghana Standards Authority (GSA)

The Ghana Standards Authority is a government body in Ghana that is responsible for the establishment of standards, the promotion of standardisation, and the carrying out of conformity assessments. These activities guarantee that the goods and services produced in Ghana, whether for domestic consumption or export, are risk-free, reliable, and of high quality. Its purpose is to advance standardisation in Ghana's private and public sectors to enhance the quality of Ghana's products, services, and management procedures in the process of doing business.

The Authority has the responsibility of:

1. establishing and enforcing standards to guarantee that goods manufactured in Ghana are of high quality, regardless of whether they are intended for consumption in Ghana or exported to other countries.
2. Methods such as inspection, testing, and measurement are utilised to guarantee quality.
3. Assisting manufacturers and service providers in the process of enhancing their competitiveness by developing effective quality management systems in line with ISO/IEC 9001: 2008 and 22000: 2005.
4. Encourage uniformity in the commercial and industrial sectors.
5. Advocating for improved public and workplace health and safety standards (ISO, n.d)

Food standards are what determine the requirements for both the quality and safety of food. A standard for food does not constitute a legal requirement unless it is incorporated into food laws. Infractions typically result in the imposition of monetary fines, terms of incarceration, and the closing of businesses located in areas where there is a potential for pollution (International Organization for Standardization, 2001).

International Quality Standards (IQS)

Various organisations in several nations operate quality control programmes and develop quality standards for all forms of food, including animal products, to satisfy the safety and quality concerns of consumers throughout the globe. Not only do standards outline the relevant procedures and methodologies, but also the resulting content. In the United States of America, the National Bureau of Standards is frequently responsible for putting together specifications for objects and procedures.

The International Organization for Standardization (ISO)

It accomplishes this by bringing together specialists with the goal of sharing knowledge and establishing market-relevant, voluntary, consensus-based worldwide standards. These standards foster creativity and offer solutions to global issues raised by its members. Everything works properly because of international norms. To ensure quality, safety, and productivity, they define specifications for goods, services, and systems of world-class quality. They are essential to the global economic system's operation. The International Organization for Standardization (ISO) has issued a total of 222,042 international standards and related publications. The scope of these standards includes technology, food safety, agriculture, and healthcare.

Everyone and everything is influenced by the International Organization for Standardization (ISO) (International Organization for Standardization, 2001).

When held to worldwide standards such as ISO, products and services are assured to be risk-free, trustworthy, and of high quality. They are key strategic tools for businesses since they save costs by reducing mistakes and waste while improving output. They enable businesses to grow into new markets, level the playing field for emerging nations, and make global commerce more liberal and equitable (ISO, 2001). ISO 9000: 2000 and ISO 22000: 2005 are the two food quality management series issued by the International Organization for Standardization (ISO, 2001).

The International Organization for Standardization (ISO) 9000 is a set of rules that companies may use to construct, maintain, and enhance their quality management systems. ISO 9000 is not a fixed set of standards, and companies are allowed to implement their quality control systems as they see suitable. Included in the ISO 9000 family are the following standards: ISO 9001, which describes the requirements for quality management systems; and ISO 9000, which outlines the principles of quality management systems and terminology (ISO 9000:2000), which fall within the ISO 9000 standard. This is the standard that businesses choose to follow in their operations (ISO 9001: 2000).

The ISO 9000 standard's process-oriented approach to resolving issues is one of its most fundamental characteristics. Instead of focusing on individual processes, it prioritises the integration of critical product and service components. In addition, it reduces the costs associated with the acquisition and certification of suppliers while simultaneously streamlining

and simplifying these activities. The ISO 9000 quality management system looks at measurement, analysis, and improvement, as well as organizational management, resource management, and the process of making a product.

Theoretical Review

Maintaining health is a complex, multi-step process. Therefore, it is vital to use a theoretical approach to comprehend the rationale behind university students' consumption of energy drinks. We inevitably wonder why individuals do so. And what motivates them to do so? What causes prompted their continued behaviour? To comprehend any habit, we must analyse the whole society to have a good grasp of why individuals embrace that conduct. To comprehend why university students, use energy drinks and the variables behind this behaviour, it is essential to explain the research results and conclusions using a theoretical framework at this time. This study used the Social Cognitive Theory (SCT), specifically the Reciprocal Triadic Causation, to figure out why college students buy energy drinks.

The Social Cognitive Theory (SCT), was first conceived by Miller and Dollard in 1941 as the Theory of Social Learning. It is widely regarded as one of the most effective models of health-related theories. However, in 1963, Bandura and Walters remodeled it and presented it to the public as the Social Cognitive Theory (DiClemente et al., 2013). This theory attempts to explain why and how individuals act in a given manner by focusing on individual differences in motivation. In addition to this, it is useful to comprehend the reasons behind why they continue to act in such a manner. Furthermore, it establishes the basis for public health initiatives that aim to change the behaviour in question.

This theory is based on the fundamental premise that the "social environment" influences people. Observations of the medium in which a person lives, such as parents, friends, and celebrities, are the most significant influences on their behaviour (Di Clemente et al., 2013). People tend to take what they believe to be good behaviour from their parents, friends, and famous people as part of who they are and how they conduct themselves. Some individuals, for instance, like purchasing the same clothing and beverages as Hollywood superstars.

Knowledge, perceived self-efficacy, result expectancies, goal creation, and sociostructural variables are the five components of Social Cognitive Theory (Di Clement et al., 2013). And since this theory is so broad, the research concentrated on just one aspect of it, the most important of which is "Reciprocal Triadic Causation." This aspect consists of three components: The environment, both social and physical, personal behaviour, and personal factors form a triangle with equal sides. Figure 1 is a schematic of the "Reciprocal Triadic Causation."

This structure demonstrates that each of these notions influences and is influenced by the other two aspects. It is very valuable in the realms of health education and health promotion. This construct incorporates these three notions since each one relates to certain elements and has a distinct role in the adoption of a behaviour (DiClemente et al., 2013). For instance, the pupils' conduct may be influenced by the "social, legal, physical, or even economic" environment. For example, the social environment may consist of friends, parents, classmates, and colleagues. It may play several functions, such as a barrier to performing a behaviour or an aid to adopting a behaviour.

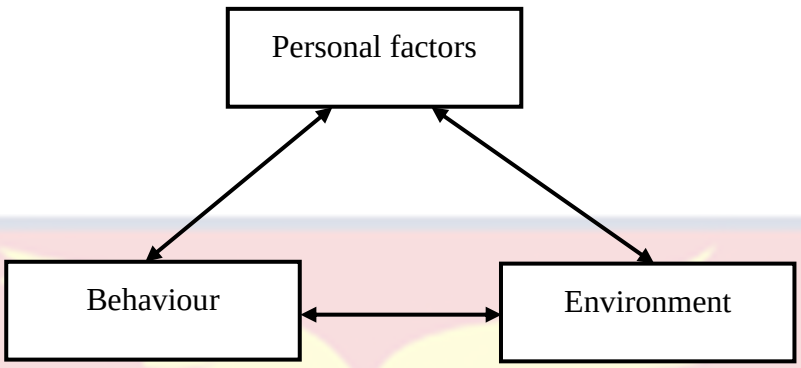

Figure 1: Reciprocal Triadic Causation

For this research, social environment impacts may be the outcome of students' friends, peers, and classmates who advocate energy drinks to their peers. Additionally, it might be from the standpoint of legislation and laws, since we are aware that there are no restrictions prohibiting the purchase of energy drinks. In addition, the physical environment, such as costs, health education campaigns regarding their negative effects, or age limitation regulations, did not hinder their purchase. In contrast, advertisements and marketing initiatives promote energy drink use as a positive activity. On the other hand, the student may influence his or her surroundings by advocating energy drinks to his or her peers, based on favourable prior experiences with beneficial outcomes. Sometimes it works in reverse, so students might influence their surroundings by informing their friends and family that energy drinks are not without ill effects. The process of change is a bidirectional phenomenon (Di Clemente et al., 2013). Individuals affect the environment, and the environment tries to change us.

The "Personal factors" construct is the second one, and it is the one that reflects the "sum of all cognitive qualities". According to Di Clement et al. (2013), personal components may be broken down into three categories:

self-efficacy, result expectancies, and outcome experiences. According to this research, the students may prefer drinking energy drinks because they had a positive experience with them, such as the fact that they tasted excellent. Additionally, the conclusion was favourable since the individual reported feeling more powerful after taking energy drinks. Because of this, they like purchasing them, drinking them, and recommending them to their friends.

The third concept is known as "behaviour," and it refers to all of the actions that people take, whether or not they are premeditated and whether or not they result in positive or negative outcomes If the action was intentional and had the desired results, the individual will look for methods to continue engaging in that activity, such as making purchases or informing their friends about a certain service. In the context of this research, it is possible to continue purchasing energy drinks and attempt to convince others to do the same in light of previous experiences.

In conclusion, since the Social Cognitive Theory helps understand why individuals behave the way they do and is highly significant in describing the elements that lie behind the behaviours that they exhibit, it is necessary to apply it. In addition, it will provide a technological route to develop health education programmes in the future. The "Reciprocal Triadic Causation" idea of Social Cognitive Theory (SCT) is being used as the theoretical foundation for this project because it could be helpful to obtain a better understanding of the reasons university students take energy drinks, whether they consume them on their own or combine them with alcohol. Additionally, it may highlight the key elements that inspire students to consume these beverages, which is an important aspect to consider. In addition to that, there is a

possibility that the study may provide positive outcomes. These results could be helpful in the future for public health experts who want to learn more about this topic and come up with new ways to stop university students or even people in the community from consuming energy drinks excessively.

Empirical Review

Side Effects Associated with Energy Drinks

Energy drinks are widely marketed to consumers, particularly younger generations because they claim to boost energy levels; however, many of these consumers are unaware of the adverse health effects that energy drinks can have (Al-Shaar et al., 2017). Energy drinks, when consumed in moderation, improve cognitive performance and mood (Energy fiend, 2013a; Heckman et al., 2010; Higgins et al., 2010; Ishak et al., 2013). According to Heneman and Zidenberg-Cherr (2011), a healthy individual may use 400 mg of caffeine per day without experiencing negative side effects. In reality, 400 milligrammes is equivalent to three to four cups of coffee (Sefcik, 2010); this quantity might be accumulated from several sources, like tea, soda, coffee, and energy drinks. According to the energy drink ingredient list, these items feature significant caffeine amounts.

In addition to caffeine, other substances, including guarana, contribute to very high caffeine concentrations (Heneman & Zidenberg-Cherr, 2011). Numerous research has shown the harmful effects of energy drinks, which include headaches, dizziness, sleep loss, nervousness, irritability, sleeplessness, and agitation (Energy fiend, 2013b; Ishak et al., 2013; Heneman & Zidenberg-Cherry, 2011). Additionally, consuming the same quantity of caffeine when under stress may result in "anxiety" (Persad, 2011). The

following are some of the most significant physiological impacts of energy drinks on the human body.

Insomnia

According to the National Foundation for Sleep (2009), energy drinks may boost cognitive function for a brief period, but their biggest drawback is sleep deprivation. According to Ishak et al. (2013), energy drinks might contribute to sleep abnormalities at night and during daytime sleeping, which could cause major problems for students, such as school absenteeism or falling asleep while driving and poor concentration during the lecture period. Recent research on military personnel in Afghanistan who drank energy drinks indicated that those who took three or more energy drinks experienced sleeping issues, exhaustion, stress, and daytime drowsiness during calls or duty hours (Centers for Disease Control and Prevention, 2012). This makes us consider the impacts of energy drinks on students who are not professionally prepared to cope with stress and sleep apnea, like U.S. military personnel who are affected by these products' negative effects.

Anxiety and depression

Energy drinks may directly impact the brain since they include various "neurotransmitters" such as caffeine (Graham, 2001; Julien, 2008), Guarana (Babu et al., 2008).; Higgins et al., 2010), and taurine (Woolsey, 2010). Woolsey (2010), contends that prolonged use of energy drinks may result in "neurotransmitter" disruptions in the consumer's mind. The author asserts that the neurological effects of energy drinks would increase the chance of "anxiety" and "depression"-related issues. Some of these components, like caffeine, ginseng, and others, have stimulating effects on the brain. Therefore, when they collaborate synergistically, there will be alterations in brain

functionality. For example, they either enhance the quantity of "pleasure reward or neurotransmitters" or extend the effect of substances such as "dopamine and serotonin." In addition, Woolsey (2010) opines that they have the same effect on stress hormones such as "noradrenaline and adrenaline"

The presence of these components will result in a sudden rise in the concentration of these neurotransmitters, followed by a gradual decrease. These repetitive alterations caused by frequent exposure to these substances will result in the malformation of the "pleasure-reward receptor" (Woolsey, 2010). Then, this will raise the tolerance limits, or "thresholds," of these "neurotransmitters," causing consumers to seek greater quantities of these substances to provide their brains with the nutrients they require to operate. Next, this alteration in the neurology of the brain causes consumers to feel weary, and in the future, this condition will cause them to exhibit "anxiety and sadness". According to Woolsey (2010), these alterations in the brain and its functions occurred among individuals less than 25 years old. Their brains are still in the developmental phase, particularly their "memory, stress, and reward systems".

Mental difficulties

Persad (2011), indicates that providing 20 to 30 mg of caffeine to "adult mice" inhibits the normal formation of nerve cells and depresses "hippocampal" neurogenesis. According to the same research, the body's caffeine consumption rate increases under stressful conditions. Then, since it acts to enhance the production of "cortisol" (hydrocortisone) by activating the "central nervous system," it induces a rise in "blood pressure" Also, it is claimed that excessive quantities of caffeine, more than 300 mg, which may be

found in coffee, tea, energy drinks, and other caffeinated beverages, might cause mental issues such as "hallucinations." This impact, according to Persad (2011), may be a consequence of elevated hydrocortisone levels, which are produced at times of stress while consuming significant quantities of caffeine.

Cardiovascular issues

The high levels of caffeine in energy drinks may have some detrimental consequences for the heart and blood vessels and can potentially result in mortality (American Heart Association, 2013; Babu et al., 2008; Seifert et al., 2011). Higgins et al. (2010) report that when 15 healthy people consumed two 500-milligram containers of energy drinks over seven days, the following outcomes occurred: First, after four hours of energy drink intake, systolic blood pressure rose by 18 % on the first day. The rate increased to 10% on the seventh day of the research. Second, two hours after consuming an energy drink, "diastolic blood pressure" increased by 7% on the first day and 8% on the seventh day. Next, the "heart rate" increased by eight percent on the first day and by 11% on the seventh day of the trial The author then asserts that energy drinks affect how the heart functions by raising the "heart rate."

According to Babu et al. (2008), all effects of energy drinks are connected to "caffeine toxicity," which might result in "tachyarrhythmias." This consists of atrial and ventricular ectopy, atrial fibrillation, ventricular tachycardia, and ventricular fibrillation. Additionally, taurine in energy drinks raises the "stroke volume" owing to its ability to enhance the "stroke volume." This action inhibits stimulation of the "Sympathetic Nervous System." In addition, it affects the calcium quantities stored in the heart muscle tissues (Seifert et al., 2011). An alarming statement from the American Heart

Association (2013) shows that energy drinks may influence "blood pressure" and trigger arrhythmias, based on research linking energy drinks to these health conditions

Lastly, in extreme circumstances, energy drinks may induce "seizures" and death owing to high levels of caffeine, which can cause cardiac issues (Babu et al., 2008; Higgins et al., 2010). A young woman died after using energy drinks and developing "myocardial infarction" (Babu et al., 2008). Another 18-year-old reported deceased after basketball practice after consuming two cans of "Red Bull". Higgins et al. (2010) also found that five people with a history of mental illness had seizures and four people with a history of mental illness had "psychiatric consequences."

Caffeine toxicity and withdrawal symptoms

According to the Substance Abuse and Mental Health Services Administration (SAMHSA) (2013), more than 10,000 individuals attended emergency rooms in 2007 owing to energy drink consumption-related issues. Due to the high levels of caffeine in energy drinks, the number of emergency room visits doubled between 2007 and 2011, reaching over 20,500 patients in 2011. (SAMHSA, 2013). Recent research demonstrates that caffeine may develop into caffeine dependency and that if the consumer attempts to stop using caffeine, a new issue, caffeine withdrawal, would emerge (Reissig et al., 2008). Caffeine withdrawal is defined by the onset of headaches one or two days following the last time a person used caffeine.

According to Reissig et al., (2008), over 50% of trial participants reported having a severe headache. Inability to focus, "vomiting, depression,

and muscular fatigue" are other symptoms that may vary from mood changes to physical discomfort (Babu et al., 2008; Reissig et al., 2008).

Impaired digestive system

About 90 % of the caffeine will be absorbed through the digestive system. The high caffeine concentrations may affect the gastrointestinal tract (Juline, 2008; Rath, 2012). Furthermore, several energy drinks contain carbohydrates, mostly sugar, in amounts covering from eighteen grammes per ounce to more than thirty grammes per ounce, with a typical amount of twenty-five grammes per ounce resulting in dehydration (Bonci, 2002).

Influencing Elements of Energy Drink Consumption

Accessibility and availability

According to Goldman (2013), youth access to energy drinks is becoming more widespread, which is a major cause for concern. Wansink et al., (2006) performed a study in which they found that the proximity and visibility of energy drinks were related to an increase in use, especially among adolescents. Moreover, Wansink (2004) suggests that proximity may enhance the visibility of energy drinks, which might increase both hunger and the desire to consume them. According to research published in the Canadian Journal of Public Health by Hamilton et al., (2013) the accessibility of inexpensive energy drinks, especially from grocery stores, and the majority of energy drinks' appealing labels make it tempting for young people to consume these beverages.

Energy drinks are most widely found at grocery shops, convenience stores, and school canteens, per the Beverage Network (2011). In addition, between 2004 and 2009, 46% and 53% of all energy drink sales occurred in

convenience shops and petrol stations. Supermarkets and other food service establishments accounted for 10% and 13% of total sales, respectively. Furthermore, accessibility and availability play a significant impact in choosing the sorts of energy drinks we choose to purchase. As a result, a significant number of individuals consume everything they may obtain at their place of job or school, including food from supermarkets, restaurants, and canteens.

Energy Drink Advertisements and Commercials

According to Tellis (2004), the majority of energy drink manufacturers market their products to persuade consumers of their value. Initially, there was not a great deal of marketing variation for energy drinks. Athletes were the major target market for the marketing of energy drinks, indicating that these beverages were marketed to a specific demographic (Lal, 2008). Young adults between the ages of 15 and 35 make up the target market for the energy drink business today. Furthermore, the total cost of promoting energy drinks in 2012 was $281.8 million, a 71 % increase over 2010 (Harris & Schiwartz, 2013). The bulk of energy drink firms employs cross-promotional techniques to attract new clients. These techniques include associating their products with extreme sporting events such as the X-Games and NASCAR and advertising their products alongside famous performers (Agriculture and Agri-Food Canada, 2008).

According to Mwaawaaru (2009), television and radio advertisements might be regarded as a catalyst in the process of accelerating consumers' adoption of energy drink goods. According to the research of Cacioppo and Petty (1980), people are motivated to consider energy drinks when they can

comprehend the message in advertising for an energy drink. An endorsement of the fact that the person advertising the product is a celebrity or music artist, will also encourage a motivated buyer.

Additionally, energy drink advertisement impact consumers' inclination to drink them through four factors: hedonic rationalization, anticipation of taste, predicted emotions and visual imagery (Baumgartner et al., 2008; Kober et al., 2010). By investigating the consumption patterns of nutritious health drinks and energy drinks through the use of visualization through the usage of different media such as television, and the presentation of energy drinks in retail locations, awareness of energy drinks was increased. As a result, television advertisements influenced 72% of students (Jacob et al., 2013).

Red Bull, one of the most prominent rivals, is constantly looking for novel ways to encourage energy drink consumers to acquire other goods. Also, they have a well-thought-out plan for advertising and are now making TV commercials for nations such as Ghana. These techniques include sponsorships, athletic events, entertainment occasions, and sales campaigns associated with such events (Mwaawaaru, 2009).

Knowledge and Perception

There is a link between a comprehensive knowledge of nutrition facts and good eating habits (Holloman et al., 2009; Wardle et al., 2000). According to a study undertaken by the Alcohol and Drug Education and Prevention Information Service (2013), the marketing of energy drinks is responsible for their usage among teenagers. According to Reissig et al. (2009), the promotion of energy drinks is predicated on the premise that they enhance cognitive and

physical performance. The marketing of these beverages stresses their energising properties. Although caffeine is the major stimulant in energy drinks, its marketing encourages the inclusion of herbs, minerals, and vitamins. (Smit et al., 2004).

According to Malinauska et al., (2007) and O'Dea (2003), the stimulating impact of energy drinks reflects youth responses such as increased athletic performance, higher energy levels during exercise, and compensation for inadequate sleep. Young people are aware of the benefits of energy drinks, but their understanding of the possible downsides is more limited. Based on the findings of O'Dea's (2003) study, it is evident that young people are unaware of the potential hazards associated with using energy drinks since none of them indicated any recognised consequences or risks associated with doing so. As a result, some individuals may be unaware that energy drinks are unhealthy.

Taste

Taste is the most crucial factor when choosing a beverage, and the sensory aspects of both meals and beverages play a major influence in defining dietary choices (Leterme et al., 2008). It is generally accepted that flavour is the single most important factor in shaping eating habits. When food is placed in the mouth, the experience of taste is also important for bringing together all of the other types of sensory stimulation (European Food Information Council, 2012). The majority of people, particularly adolescents, choose their energy drink based on their desire to drive. Energy drinks are considered functional beverages, and this will influence the sort of energy drink that individuals like to consume.

According to research done by Bawazeer and Alsobahi (2013) on the prevalence and side effects of energy drink intake among students, 35 out of 70 students (50%) chose traditional (sweet) energy drinks, whereas five out of 70 students (7.1%) preferred sugar-free energy drinks. Additionally, 42.9 % (30 students) did not care what they drank. According to the findings of a separate study done by Schmidt and McIntire (2008), 53.4% of participants indicated that taste was the most influential element in their decision to use energy drinks. It is crucial to comprehend food intake behaviour from the perspective of taste, as it resides at the intersection of the meals that a person is exposed to and their desire to prefer specific foods that are available in their locality (Garcia-Bailo et al., 2009). Our beliefs, attitudes, and expectations all contribute to the development of our flavour preferences and aversions (Clarke, 1998). Life experiences shape one's taste preferences and aversions to certain foods.

Types of Energy Drinks

Since its introduction, the market for energy drinks has developed at an exponential rate. People are offered a variety of brands from which to choose. Among these brands are "Red Bull," "Rox," "Lucozade," "Monster," "Rockstar," "Power Horse," "Burn," "Blue Jeans," "5-Star," "Rush," "Storm," and "Run."

The beverage Red Bull

Red Bull is a popular energy drink in Ghana. In 1982, Dietrich Mateschitz created a mixture of several syrups that people commonly add to their beverages to increase their energy levels. Initially, he created the Red Bull Krateng Dang energy drink only for the Asian market. In 1987,

Mateschitz founded the firm and published the initial version of the product (Hoover's Incorporation., 2011). Red Bull energy drinks have been available in over 166 countries over the past 26 years. Giving you wings is a play on the product's motto.

A can of Red Bull that is 250 millilitres or 8.4 fluid ounces has 110 calories (Venster et al., 2012). Since 1990, sports medicine experts have examined the effects of consuming Red Bull to determine what it does to the body. In research conducted by the Institute of Sports Medicine and Nutrition; the researchers utilised a cycle ergometer to determine how red bull intake influenced the athletic performance of participants. In addition to competing for rewards, athletes participated in experiments in which they were given a placebo, a controlled drink, and a red bull (Hoover's Incorporation, 2011). Researchers found that providing athletes with Red Bull energy drinks significantly enhanced their capacity to sustain relatively high levels of exercise for longer durations. According to claims made in advertisements, Red Bull is presently the market leader in energy drink sales (Malinauska et al., 2007).

Red Bull is the major player in the Ghanaian market for energy drinks. A market analysis study of the energy drink business provides evidence in support of this hypothesis. Heckman et al., (2010) discovered that Red Bull held 42% of the market share for energy drinks, which accounted for 62% of the entire market in the United States According to the results of Brooke et al. (2011), red bull extraordinarily expensive despite its effectiveness in meeting their needs.

Lucozade

The Lucozade energy drink firm was among the first to manufacture energy drinks. The company was founded in 1927 in New Castle, England, the United Kingdom. William Owen, a chemist, conceived of the beverage, which he initially sold under the name Glucozade. Patients with the common cold and influenza might gain strength from this. In 1929, was the year that the energy drink was given its name (Lile, 2013). In 1938, Thomas Beecham purchased the brand and rapidly expanded its distribution across the state (Guardian Newspaper, 2013). Beginning in 1970, however, a declining trend in Lucozade sales could be detected. The brand's spokesperson, Olympic decathlete Delay Thompson, modified the beverage so that it could be used to replenish depleted energy.

The Lucozade energy drink comes in a variety of flavours, including original classic, tropical, wild berry, orange, citrus clear, and lemon. Additionally, it is also available in tablet form, and it comes in classic, orange, and lemon flavours (Superbrands, 2004). Carbonated water, glucose syrup, citric acid, lactic acid, potassium sorbate, sodium bisulphate, ascorbic acid, and caffeine are among the ingredients of Lucozade energy. It presently has a market share of around 60% and fifteen million pounds in sales.

Rox

In 1995, the Austrian firm Rox was founded in the city of Innsbruck, in the state of Tyrol. Currently, it is present in a variety of continents, including Africa, Asia, and Europe. It is available in 250 ml, 440 ml, 1000 ml, and 1500 ml cans, as well as 1000 ml and 1500 ml PET bottles. According to the assertions made in the marketing of the Rox energy drink, it can promote

alertness and wakefulness, enhance attention and response time, accelerate metabolic processes, and aid the body in expelling potentially dangerous chemicals. The ingredients in one serving of Rox energy drink include carbonated water, sucrose, glucose sodium citrate, taurine, glucuronolactone, caffeine, inositol, niacinamide, calcium pantothenate, pyridoxine-HCL, vitamin B-12, and various artificial tastes and colours. It has a shelf life of between 12 and 24 months and is packaged with the phrase "moving mountains" (Red Bull Australia, 2008).

Monster

The monster energy drink has a 27.9 % market share and is most well-known for its 16-ounce can size (Pierceall, 2010). In 1930, Hubert Hansen and his sons founded a company in California dedicated to the sale of unpasteurized fresh juice. Originally known as Hansen's Juice Incorporated, the company eventually changed its name to the Fresh Juice Company of California. Tim Hansen founded Hansen Foods, Inc. in 1977 to satisfy the rising demand for natural juice and juice blends. In 1999, Hansen's Trademark was given a license to make, sell, and distribute unpasteurized fresh juice. In 2012, the company changed its name to Monster Beverage Corporation. One of its product lines is Monster energy drinks (Monster Beverage Corporation, 2012).

"Let the beast go" is the brand slogan for Monster energy drinks. This beverage is contained within a black container bearing the letter "M." In addition, the capital letter "M" is punched into the pull tab (Penalty, 2006). Monster energy drinks generally contain around 10 milligrammes of caffeine per ounce, which is comparable to 140 milligrammes per 16-ounce can. Other

ingredients consist of carbonated water, glucose, citric acid, natural flavour, taurine, sodium nitrate, Panax ginseng, l-carnitine, sorbic acid, benzoic acid, niacinamide, sodium chloride, glucuronolactone, inositol, guarana, pyridoxine hydrochloride, riboflavin, maltodextrin, and cyanocobalamin. The purchase of these products includes cautionary labels.

Blue Jeans

Blue Jeans is a brand of energy drink manufactured by Bekli General Trading in the Netherlands. It is available in 250 and 500-millilitre cans and has a flavour evocative of berries. The Blue Jeans energy drink contains sugar, citric acid, sodium nitrate, carbon dioxide, vitamins, niacin, calcium pantothenate, pyridoxine hydrochloride, riboflavin, cyanocobalamin, artificial flavour, guarana, taurine, caffeine, among other ingredients. The Blue Jeans Energy Drink has a two-year shelf life and claims to rejuvenate your senses, exhilarate your spirit, and help you get through difficult situations (Beverage Network, 2011).

Rockstar

Russell Weiner founded Rockstar Incorporated in 2001 with the support of his renowned botanist and herbalist father, Michael Weiner. Russell Weiner is also one of the company's co-founders. Rockstar energy drink has an 11.5 % market share with current sales of $18,839,000. The product comprises several components, including guarana, ginkgo, ginseng, caffeine, and milk thistle, among others. The advertisement for this beverage makes various claims, such as it is scientifically formulated to provide those with busy lifestyles a boost including rock stars and athletes. This energy drink was the first of its kind to be packaged in a 16-ounce can and was designed exclusively for vegetarians and vegans. "Party like a Rock Star" is the slogan

aimed at young adults between the ages of 18 and 24. According to Burke et al. (2010), the Coca-Cola Company offers the energy drink brand Rockstar in 19 countries.

Burn

The Coca-Cola Company is the owner and distributor of the energy drink brand Burn. All of its advertising includes the tagline "it fuels your fire." Burn energy drink is offered in several nations, including France, Spain, Italy, Poland, Turkey, Russia, Japan, Korea, Brazil, Afghanistan, Mexico. Kenya, Burkina Faso, the Democratic Republic of Congo, Egypt, Ghana, Guinea, Liberia, Mauritius, Morocco, Nigeria, Reunion Island, Senegal, Sierra Leone, South Africa, Tunisia, and Burkina Faso. As part of a programme designed to cultivate and refine the talents of upcoming electronic dance musicians the Burn brand of energy drink participates in live musical event. Burn is an organisation that finances high-risk hobbies such as snowboarding, skateboarding, surfing, parkour, and Formula One racing.

In addition, the company sponsors some internationally renowned athletes. Carbonated water, food colouring (E163, E150-d), ginseng, guarana, maltodextrin, preservative (E202), sugar, taurine, and water are included in Burn energy beverages. Citric acid and sodium citrate are the acidity regulators present in the Burn energy drink. Additional components include antioxidants (ascorbic drink acid), arginine, scents (theobromine), B vitamins, caffeine, and arginine. According to Wesley (2002), every 100 mL contains 32 mg of caffeine.

Power Horse

Since its introduction in 1994, the Power Horse energy drink has increased its distribution to more than fifty countries. It is made by Spitz and comes in an 8.4-ounce container (250 ml). When it was debuted in Europe, the Power Horse energy drink was the first product of its kind to offer a cola flavour. For individuals interested in limiting their caloric consumption, there are also sugar-free variants available. The following are among the components of the Power Horse energy drink: 400 milligrammes of taurine, 200 milligrammes of glucuronolactone, 32 milligrammes of caffeine, 8.6 milligrammes of sucrose, 2.1 milligrammes of glucose, 20 milligrammes of inositol, 2 milligrammes of vitamin B6 and pantothenate, and 8 milligrammes of niacin. One of the marketing claims for the Power Horse energy drink is that it may deliver an immediate energy boost, manage body electrolytes, raise metabolism, enhance overall fitness, and offer energy for optimal efficiency. Global beach soccer is sponsored by the brand Power Horse Energy Drink as part of its marketing plan. Specifically, the firm assists players and teams from Ukraine, Italy, Germany, Spain, Russia, Brazil, and the United Arab Emirates. Max Schrom, a professional cyclist, has been chosen as the Power Horse brand ambassador (Power Horse website, 2012).

Rush

Rush is an energy drink brand created in Ghana and manufactured by Twellium Industrial Limited. It is contained in a can with a capacity of 350 ml. The marketing for Rush energy drink asserts that it is a very effective fatigue-fighting energy drink and that it delivers both energy and a sense of well-being. Rush is an effective energy booster for combating exhaustion and

making up for lost energy. As a result, it is popular with test-takers, including students, overworked employees, sports fans, and even nightclubs. It offers increased resilience to fatigue. As a result, it supports mental or physical endeavours with long-term support. Consequently, your response time will improve. It is the perfect beverage to keep on hand at all times. It contains the B3, B5, B6, and B12 vitamins. Taurine, caffeine, ginseng, and inositol are incorporated as additional components. On the warning label for the product, the amount of caffeine is written as about 112 mg/350 ml.

5 Star

Since its introduction in Ghana in 2010, the 5-star energy drink has rapidly become one of the most powerful and well-liked beverages on the market. Multi Pac Limited is the manufacturer and distributor of the product. It comes in a 350-millilitre container, and each carton contains 12 bottles. It is the initial component of the ng series. The concept of a local company developing an energy drink that would be packaged in a polyethene terephthalate container (PET) is renowned for its delectable flavour, enticing aroma, and beautiful golden hue. It is a non-alcoholic beverage that stimulates both the body and the intellect. Because it contains caffeine as well as vitamins B6, B12, taurine, and inositol, it will help you remain awake and focused, which is particularly useful for long-distance travel, late-night study, or work. The glucose component produces longer-lasting energy, which eventually adds to improved sustenance. It has a one-year shelf life commencing on the date of production. It is quite popular in the local market. There is no indication whatsoever on the label of the product's caffeine

content. They are confident that you will want more of their energy drink after just one taste.

Run

The run is a brand of carbonated energy drink that Twellium Ghana Limited owns and distributes. According to the product's marketing claim, it includes guarana fruit, a stimulant that improves athletic performance and reduces mental and physical tiredness. In addition to their medicinal use, the seeds of the guarana fruit have been demonstrated to aid in weight loss. Important applications include the control of low blood pressure, the prevention of malaria, diarrhoea, fever, heart disorders, headaches, and joint pains, as well as the therapy of these illnesses. Run Energy Drink is an excellent choice when you are feeling fatigued or have an upcoming workout. It is available in 500-millilitre bottles, and each carton contains 12 bottles. The primary ingredients include glucose, taurine, guarana, caffeine, and vitamins B3, B5, B6, and B12. It has obtained ISO 9001:2015 accreditation.

In recognition of Asamoah Gyan's commitment to Ghana, Twellium Industrial Company has appointed him the face and brand ambassador for their latest product, Run Energy Drink. This honour is the outcome of Twellium's choice to appoint him to this position.

Storm

The Storm is the flagship energy drink brand produced by Kasapreko Company Limited, a major beverage manufacturer in Ghana. It was founded to provide Ghanaians with high-quality beverages at affordable prices, an idea that has now spread worldwide. For years, countries such as Ghana, Nigeria, Sierra Leone, Botswana, Uganda, Zimbabwe, South Africa, Togo, Benin, and

Burkina Faso have had Storm-branded energy beverages. It is packed in 350 ml or 500 ml PET bottles, with a total of 12 bottles in each box. Caffeine, taurine, inositol, vitamin B5, B6, B12, A, and C are all present. However, the caffeine content is not listed on the label. The Storm energy drink was deemed one of Ghana's most popular beverages. Shatta Wale, a popular dance hall artist in Ghana is the current brand ambassador of Storm energy drink.

Summary

Diverse manufacturers and producers all around the world make a vast variety of drinks. In both local and international markets, energy drinks constantly rank among the most popular beverages. There is a vast selection of brands and forms, each of which has exceptionally appealing qualities. This beverage has been consumed by humans since 1901, but it was known by a different name back then. According to industry estimations and projections, the energy drink beverage category presently accounts for around 57.3% of the market. In some nations, the use of energy drinks has grown widespread. The majority of consumers are between the ages of fifteen and thirty-five. According to gender, males are significantly more likely than females to use energy drinks.

It is not only the responsibility of the beverage industry to supply people with safe and nutritious beverages; it is also the responsibility of the government to ensure that the beverage sector fulfils its obligations. Energy drink manufacturers must adhere to the Ghana Standards Authority (GSA), the International Organization for Standards (ISO), and the Food and Drugs Authority (FDA) rules. The FDA is responsible for assuring compliance at all

phases of manufacture, including the caffeine content and labelling of goods. This is done to ensure the safety of energy drinks for human use.

Energy drinks contain a diverse assortment of components. The extremely widespread usage of caffeine as a component in energy drinks makes it an issue of concern. It is a dynamic component that can be included in energy drinks in amounts ranging from trace to substantial. There are several different caffeine concentrations, ranging from 80 to 400 mg. Caffeine use in various amounts has been associated with a variety of severe health consequences that may be extremely damaging to the human body. Taurine, ginseng, guarana, and inositol are a few of the extra compounds that may be present in energy drinks; each of these chemicals has its distinct benefits.

There is a contrast between sports beverages and energy beverages. Caffeine, which is absent from sports drinks, is one trait that distinguishes energy drinks from sports drinks. To reiterate, energy drinks are capable of causing dehydration and water loss in the body. In contrast, drinks formulated for athletic performance replenish the body's fluid levels. Energy drinks may induce cardiac effects, insomnia, coronary artery disease, osteoporosis, gastritis, anaemia, and other behavioural disorders. In terms of physiology, energy drinks can diminish the action of insulin, decrease heart rate, promote coronary vasoconstriction, relax smooth muscles, and cause cardiac arrhythmias.

Some factors, including advertisements, the taste of energy drinks, their accessibility, the amount of physical activity of consumers, and their level of understanding, all influence the use of energy drinks. The Social Cognitive Theory was meant to shed light on some of the probable driving

factors linked to the consumption of energy drinks by UCC and UDS students. This was the purpose. It has been shown that the majority of energy drink consumers are young adults, specifically university students. As a result, the researcher plans to determine the proportion of UCC and UDS students that consume energy drinks, the causes that continue to drive the students' consumption of energy drinks and the impact of energy drinks on students, as perceived

Numerous factors, including but not limited to television advertisement and commercials, the taste of energy drinks, their availability and accessibility, the quantity of physical activity, and the degree of education, might influence the use of energy drinks. The objective of establishing the Social Cognitive Theory was to shed light on some of the probable motivating variables associated with the consumption of energy drinks by students from UCC and UDS. There is an association between energy drink intake and young individuals, particularly university students. As a result, the researcher is interested in learning about the numerous accessible brands, the various consumption patterns of students at UCC and UDS, and the variables that encourage students to use energy drinks.

CHAPTER THREE

METHODOLOGY

Research Design

A cross-sectional, descriptive design was used to identify the prevalence of energy drink intake among students of UCC and UDS, factors that influenced their consumption, and perceived effects after consumption. The design was chosen because it allowed the researcher to gain a thorough comprehension of the phenomenon (Patten, 2017). Descriptive survey research designs, according to Creswell (2012), are quantitative research techniques that focus on current phenomena such as circumstances, behaviours, attitudes, processes, linkages, and trends. Furthermore, descriptive survey research collects data from both small and large populations. These data are very useful and adaptable because they contain information that can be used to make generalisations.

Study area

The Cape Coast Metropolis is situated between 50.07 and 50.20 degrees north of the Equator and between 1.11 and 1.41 degrees west of the Greenwich Meridian. The Cape Coast Metropolis is bounded on the east by the Abura-Asebu-Kwamankese District; on the west by the Komenda-Edina-Eguafo-Abrem (K. E. E. A.) District; on the south by the Gulf of Guinea; and on the north by the Twifo Heman Lower Denkyria District. Cape Coast Metropolis has a land area of approximately 124 000 square kilometres (12,200 ha.). There are 189,925 people in the city, with 92, 790 men and 97,135 women. (Ghana Statistical Service, 2021). According to Ghana Statistical Service (GSS) (2021), farmers, fishermen, and other agricultural

workers accounted for roughly 45% of the population. The University of Cape Coast is located in Cape Coast. Ghana's premier teaching and research institution There is also the Cape Coast Technical University. Furthermore, it is home to some of Ghana's best Senior High Schools.

Tamale Metropolitan area serves as the capital of Ghana's Northern Region. It is Ghana's third-largest city and the West African Metropolis with the fastest growth rate. In the region's central area, it shares borders with Sagnarigu District to the west and north, Mion District to the east, and East Gonja to the south. Tamale Metropolis' latitude is between 9°16 and 9°34 north, and its longitude is between 0°36 and 0°57 west. It has a total land area of 454 square kilometres (GSS, 2021). According to the 2021 population and housing census, the Metropolis has a population of 374, 744 people, accounting for 16.2 % of the region's population. Males make up 184,675 (49.4 %) of the total population and the population of females is 186,143 (50.6 %). Tamale is Northern Ghana's most important educational centre. It consists of several schools, including technical and vocational institutes; Tamale Technical University; and the University for Development Studies (UDS), which has two campuses in Tamale and one in Nyankpala.

Data from the Population and Housing Census in 2021, suggested that Tamale and Cape Coast have a youthful population, with the majority of them between the ages of 15 and 34. In both cities, women and men of both sexes are the least employed, with the majority still in school and a few uneducated (GSS, 2021)

Study Population

A study's target group is known as the study population. It includes all humans (or objects) who share specific qualities (Fraenkel & Wallen, 2000). The target population of the study consisted of undergraduate students of the University of Cape Coast and the University for Development Studies, with a student population of about 21,000 and 20,000, respectively. The two universities had an undergraduate student population of about 41,000 during the time of this study. The choice of UDS and UCC for the study was informed by the fact that they are the largest public universities in Tamale and Cape Coast respectively.

Sample Size and Sampling Procedure

The sample size of the study consisted of 377 students each from UCC and UDS. The sample size for the study was determined using Krejcie and Morgan's (1970) formula for sample size determination (as cited in Nizzati, 2017). According to Krejcie and Morgan's formula, a population of 21000 for UCC requires a sample size of 377, and a sample size of 377 is adequate for a population of 20000 for UDS.

A sample of 754 students from the two universities was obtained using a multistage sampling technique. First of all, a stratified random sampling technique was used to divide the population into distinct strata based on faculty affiliations from each university. The stratification ensued that each stratum had a chance to be represented in the final sample, preventing the undue influence of any single faculty on the overall findings. Secondly, a random sampling technique was then used in selecting a department in each faculty for the study. The random sampling technique provides equal

opportunities for all units of interest to be part of the study. Lastly, Participants were selected from the selected departments using the simple random method.

Instruments

A questionnaire, the Energy Drinks Survey Instrument (EDSI), was adapted and utilised to collect data. Utilizing current research, a professional nutritionist, and study-guiding principles, the questionnaire was designed. It was administered by the researcher during the school session.

The questionnaire was in two sections, A and B. Section 'A' focused on participants' demographic information such as gender, age, level in the university, and sports profile. Section 'B' was designed to collect information regarding students' purchase preferences, habits of energy drink consumption, factors that motivate them to consume energy drinks and perceived effects after consuming energy drinks. This section was further divided into subsections a, b and c. Subsections (a) contain five items which sought to identify the various kinds of energy drinks consumed and also measured the prevalence of consumption. Subsection (b) contained ten items which measured the factors that motivated the student to consume energy drinks and finally, Subsection (c) contained fourteen items which measured the perceived effect after consuming energy drinks.

Validity of the Instrument

A pilot test of the structured questionnaire was conducted using participants from Cape Coast Technical University and Tamale Technical University. The questionnaire was administered and collected independently. Both the external and internal validity of the questionnaire was assessed.

Content validity was obtained by adapting some globally standardized questions for the questionnaire's components, while face validity was attained by presenting the instrument to the supervisor and a licensed nutritionist for evaluation. The average time for responding to the questionnaire was estimated as thirty minutes. Before the instrument was used for the study, comments, suggestions, and unanswered test questions were taken into account to help improve it.

Reliability of the Instrument

Reliability is the degree to which an instrument produces consistent results. To test the instrument's reliability, data were gathered from 40 randomly selected Tamale Technical University students belonging to the same group. This was done so that ambiguous questions may be addressed and questions could be standardized to eliminate variances that could compromise the instrument's reliability. The internal consistency reliability (Cronbach Coefficient Alpha) of the data was calculated. The questionnaire's alpha reliability coefficient was calculated to be 0.684. In addition, the alpha values of the section B subscales ranged from 0.694 to 0.524; they include, factors influencing energy drink consumption (advert = 0.628); factors influencing energy drink consumption (taste = 0.694); and factors influencing energy drink consumption (accessibility = 0.524). The primary research produced a Cronbach alpha of 0.74. According to Taylor (1990), an alpha value 0.7 and above is good which is generally acceptable value indicating that items on the scale are measuring the same thing.

Data Collection Process

A letter of introduction acquired from the VOTEC department assisted the researcher in obtaining permission from the heads of the participating institutions. A cover letter attached to the questionnaire informed respondents of the purpose of the study. The cover letter briefly described the objectives of the study and assured respondents of their anonymity and voluntary participation.

The questionnaire was administered to regular undergraduate students of the University for Development Studies (UDS) and the University of Cape Coast (UCC). The respondents were approached in person to respond to the questionnaire. The respondents filled out, completed, and submitted the questionnaires within 30 minutes. The administration of the entire questionnaires for both universities was within a month, two weeks for each university.

Two field assistants were recruited and trained by the researcher to effectively gather data from the two universities. Each field assistant was engaged in one university.

Data Analysis

For the study. The data was entered into IBM SPSS Statistics 22 and analysed appropriately. The descriptive statistic function was used to analyse the demographic characteristics of respondents. Descriptive statistics such as means frequencies and percentage counts were used in analysing research questions one to four. To assess the prevalence of energy drink use, the most popular kind of energy drink consumed among UCC and UDS students, and

the frequency of energy drink intake, descriptive statistics of frequencies and percentage counts were further generated.

To test the various hypotheses, the independent t-test was first used to test for the difference in consumption of energy drinks between students of UCC and UDS and secondly to test for the difference in consumption of energy drinks between males and females.

The hierarchical multiple regression model was used to investigate the predictors of energy drink intake, including taste, advertising, and accessibility. Multiple regression is a method for detecting the association between a criterion variable (dependent) and two or more predictor variables (independent) (Babbie, 2007). Therefore, a correlation was first calculated to establish how the variables were correlated, and then a hierarchical multiple regression model was developed. Energy drink intake was assessed on a four-point interval Likert scale, while independent factors, advertising, taste, and accessibility were measured on interval scales. The findings of the analysis were shown using tables. The findings generated from the data were explained effectively and supported with the necessary citations.

Ethical Approval

The research involved engagement with students from the University for Development Studies (UDS) and the University of Cape Coast. Therefore, approval was sought from the administration of these institutions. Before the commencement of the study, the Institutional Review Board (IRB) of the University of Cape Coast gave its approval and issued a letter of clearance for the study.

Summary

The study utilised a cross-sectional, descriptive design because it allowed the researcher to gain a thorough comprehension of a phenomenon. A preliminary survey was conducted to identify the kinds of energy drinks on the market of both Cape Coast and Tamale. The study area was Cape Coast and Tamale utilizing the student population of UCC and UDS. A sample size of 754 participants representing 377 students for each university was obtained using a multistage sampling technique and determined by Krejcie and Morgan's (1970) formula for sample size determination. An energy drink survey questionnaire was constructed and a pilot study was done to help fine-tune the instrument before it was used for the study. Considering the number of participants involved, two field assistants were trained and recruited for effective data collection. Data were finally analysed using IBM SPSS, version 22 and were discussed with appropriate references to the literature.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of the study was to determine the current consumption patterns of energy drinks among the university students of Cape Coast and Tamale. The results were presented following the research questions posed. This chapter offers extensive results and reflections on the research questions, as well as a thorough description of the study's findings. The findings of the study are presented under the following headings:

Table 1: Socio-demographic Information of Study Participants (N=754)

Variables	Frequency	Percentage
University		
UCC	377	50
UDS	377	50
Gender		
Male	404	53.58
Female	350	46.42
Age		
15 – 20	287	38
21 – 25	384	51
26 – 30	53	7
31 – 35	30	4
Level		
100	219	29
200	233	31
300	130	17
400	172	23
Sports person		
Yes	183	24
No	571	76

Source: Abdallah, (2023)

Table 1. presents the background information of students used as participants in the study. A total of 754 students 377 (50%) participants respectively were

the number of participants drawn from UCC and UDS. 54% (n=404) of respondents from the study sample were males, while 46% (n=350) of the study sample participants were females. Respondents varied in age from 15 to 35 years old; however, 51% (n=384) of participants in the research sample belonged to the "typical" college age range of 21 to 25 years old. Again, 38% (n= 287) of the participants, were between the age bracket of 15- 20 years old. The age range of 31 – 35 years was the least (4%) among the participant. Level 100 students among the participants constituted 29% (n= 219), level 200 students represented the highest participants in the study at 31% (n= 233), with level 300 having the least number of participants at 17% (n= 130) and 22% (n= 172) were the level 400 participants in the study. The majority of the respondents 76% (n= 571) indicated they did not do sports while 24% (n = 189) represented sports personnel.

Research Question One: What is the prevalence of energy drink consumption and the types of energy drinks consumed by UCC and UDS students?

The aim of research question one was to ascertain energy drink consumption and the various brands that are taken by students of UCC and UDS. Data from section B, subsection (a) with Items 1 to 4 of the energy drink survey questionnaire were used in answering this research question. The findings of this research question are presented in Table 2.

Table 2: Prevalence of Energy Drink Consumption Among Students of UCC and UDS

Variable	Frequency	Percentage (%)
Consumption of energy drinks		
Yes	673	89
No	81	11
Reasons for not consuming energy drinks		
Bad taste	9	11
They are expensive	13	16
Not good for the health	48	59
Not my favourite drink	11	14
Brand of energy drink consumed		
Red Bull	62	8
Five Star	173	23
Rush	252	33
Run	190	25
Blue Jeans	113	15
Lucozade	240	32
Storm	409	54
Rox	75	10
Monster	79	11
Next Level	121	16

Source: Abdallah, (2023)

The majority 89% (N = 673) of respondents had consumed energy drinks during the time under investigation. More than half, 59% (n= 48) of the 11% who had not used energy drinks during the period under investigation, reported they had not because they believed energy drinks may not be healthful. Storm energy drink 54% (n=409) was the most patronized while Red Bull energy drink was the least preferred 8% (n = 62) patronage.

Research Question Two: What are the predicting factors of energy drink consumption?

The aim of research question two was to determine the influence of taste, advertisement and accessibility on university students' consumption of energy drinks.

Data on all the items in section B subsection (b) of the energy drink consumption survey was used in answering this research question.

Table 3: Regression Output of Taste, Advertisement, and Accessibility on Consumption

		B	Beta	R	R^2	T	P – value
Model 1		2.113		0.72	0.52	4.527	0.000
	Taste	0.362	0.72			3.545	0.000
Model 2		0.278		0.89	0.79	0.410	0.002
	Taste	0.278	0.51			2.675	0.008
	Advertisement	0.021	0.28			0.113	0.009
	Accessibility	0.472	0.24			3.142	0.002

Source: Abdallah, (2023)

Analysis of regression using a hierarchy revealed that in model 1, taste accounted for 51% of the variation in energy drink intake (t (1,753) = 4.527, p <.05). Model 2 introduced advertisements and accessibility. Similarly, Model 2 was significant, t (3,751) =.410, p. < 0.05 This model added an extra 27% to the consumption variance of energy drinks. Overall, the independent factors accounted for 79% of the variation in university students' energy drink intake. Moreover, taste contributed the most (48%), followed by advertising (28%) and accessibility (24%) Therefore, the data suggested that taste, accessibility, and advertising are good predictors of energy drink use among university students.

Research Question Three: What are the perceived effects after consuming energy drinks?

The objective of study question three was to determine the effects of energy drink consumption on participants. In answering this research question, data on the items in subsection (c) of the energy drink consumption survey were used. Participants' responses to the items are presented in Table 4.

Table 4: Perceived Effects After Energy Drink Consumption (n= 754).

Perceived effects	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Drowsy	38	5	716	95
Restless	98	13	656	87
Insomnious	271	36	483	64
Nauseous	30	4	724	96
Agitated	15	2	739	98
Seizures	15	2	739	98
Satiated	60	8	694	92
My heart beat Faster	23	3	731	97
Mental alert	53	7	701	93
Improves sexual life	38	5	716	95
Itchy	30	4	724	96
Headache	23	3	731	97
Blood pressure rises	46	6	708	94
Addiction	15	2	739	97

Source: Abdallah, (2023)

Individually, agitation, addiction seizures, nausea, a higher heart rate, itchiness, and headache all had representations below 5% and therefore had the least perceived symptoms first perceived. However, their cumulative proportions were 21%. More than 50% of respondents indicated that they had no negative impacts. The most common side effect reported was insomnia (36%) whereas seizures were seen the least (2%) reported. Increased

blood pressure was accounted for 6%. Also, mental alertness recorded 7% of the perceived side effect and 8% indicated satiety.

Hypothesis One: There is no statistically significant difference in the energy drink consumption of male and female participants.

The objective of the first hypothesis was to investigate whether there were any statistically significant differences in consumption between male and female participants of the study. The hypothesis was investigated using an independent sample t-test. The research findings are shown in Tables 5 and 6.

Table 5: Descriptive Statistic on Consumption Patterns of Male and Female Students

SEX		N	Mean	Std. Deviation
MALE	Consumption	404	3.6059	1.38819
	Valid N (listwise)	404		
FEMALE	Consumption	350	3.1795	1.33743
	Valid N (listwise)	350		

Source: Abdallah, (2023)

Table 6: Independent t-test Evaluating Male and Female Student Use of Energy Drinks

		Levene's Test for Equality of Variances		**T-test for Equality of Means**			**Male**		**Female**	
		F	Sig.	T	Df	Sig. (2-tailed)	M	SD	M	SD
	EA	13.34	.00	16.1	753	0.000	4.87	1.33	2.42	1.80
C	ENA			15.8	679	0.000				

Source: Abdallah, (2023)

C - Consumption

EA - Equal variances assumed

ENA - Equal variances not assumed

An independent sample t-test was conducted to compare the mean consumption pattern of male and female students. There was a statistically significant difference in the consumption of the two groups t (678.5) = 15.75; $p < 0.05$. Male students (M= 3.605, SD= 1.388) recorded high levels of consumption than the female students (M= 3.179, SD= 1.333).

Hypothesis Two: There is no statistically significant difference in the energy drink consumption of UCC and UDS students.

The objective of the second hypothesis was to determine whether there were statistically significant differences in energy drink consumption between UCC and UDS students. A t-test for independent samples was employed to evaluate the hypothesis. The results of the findings are reported in Tables 7 and 8.

Table 7: Descriptive Statistics Consumption of UDS and UCC Students

UNIVERSITY		N	Mean	Std. Deviation
UDS	Consumption	377	3.7552	1.55144
	Valid N (listwise)	377		
UCC	Consumption	377	3.0366	1.19247
	Valid N (listwise)	377		

Source: Abdallah, (2023)

Table 8: Independent t-test Energy Drink Consumption Output of UDS and UCC Students

		Levene's Test for Equality of Variances		t-test for Equality of Means			UDS		UCC	
		F	Sig.	T	Df	Sig. (2-tailed)	M	SD	M	SD
C	EA	.009	.925	7.926	753	0.000	4.44	1.85	3.01	1.86
	ENA			7.926	751.63	0.000				

Source: Abdallah, (2023)

C - Consumption

EA - Equal variances assumed

ENA - Equal variances not assumed

An independent sample t-test was conducted to compare the mean consumption of UCC students and UDS students. There was a statistically significant difference in the consumption patterns of the two universities t (753) = 7.926; $p < 0.05$. According to the mean scores, UDS students (M= 3.755, SD= 1.551) recorded higher levels of consumption of energy drinks than UCC students (M= 3.036, SD= 1.192).

Discussion

The market for energy drinks has been rapidly expanding in the past few years. The size of the market and the value of money that the companies have earned throughout the globe are both evidence of the quick expansion that they have experienced. The high levels of caffeine, sugar, and other chemicals that are found in energy drinks, raise concerns about the dangers and potential adverse effects on health, particularly among the youth (Harris & Munsell, 2015). The goal of the study was to determine the prevalence of energy drink intake among students of UCC and UDS. Investigate the factors

that contribute to the university students' consumption of energy drinks and determine the students' perceived feelings after consuming an energy drink

Prevalence of Energy Drink Consumption by Students and UDS

Unfortunately, little or no research had been conducted on the consumption of energy drinks among UCC and UDS undergraduates. This study reported a prevalence of 89%, which is greater than the 62.2% prevalence of energy drink use among Ghanaian student athletes observed by Buxton and Hagan (2012). However, Buxton and Hagan (2012) examined their prevalence over one week, whereas this study measured prevalence over one month. The increased prevalence seen in this study may thus be attributable to the longer time frame, which is more likely to have documented a substantial increase in energy drink consumption. Again, the prevalence obtained in this study was more than the prevalence of 64.9% reported by Balistreri and Corradi-Webster (2008) among Rosario, Argentina's physical education students. Even though Balistreri and Corradi- Webster's research included a longer period, this study's prevalence rate was greater due to the increasing popularity of energy drink use among university students over time. Furthermore, the prevalence rate achieved in this study was greater than the even higher prevalence rate of 86% reported by Reid et al. (2015) among students from eight Trinidad and Tobago institutions. This is mostly due to students with fast-paced lifestyles, seeking an energy boost, wishing to maintain extended study hours, partygoers, and extreme sports athletes. Therefore, the increasing prevalence is anticipated.

The majority of participants (59%) who had not consumed energy drinks stated that they did so because they thought they might not be healthy.

This agrees with research done by Qamhia (2011), where "They might not be healthy" was likewise the most often cited reason (79.9%) by individuals who did not consume energy drinks. This claim may be due to the high levels of caffeine and sugar in energy drinks, which may influence how the body functions physiologically and metabolically.

The three most popular energy drinks among the study sample are Storm, Rush and Lucozade (Table 2). The results of the present investigation indicated that 54% (409) of the participants took storm energy drink. The essential concept of Bandura's Social Cognitive Theory is that humans are influenced by their "social environment." Observations of the environment in which a person resides, such as parents, friends, and celebrities, have the most impact on their behaviour (Di Clemente et al., 2013). People prefer to incorporate what they perceive to be excellent behaviour from their parents, friends, and famous people into their identities and behaviours (Di Clemente et al., 2011; Glanz et al., 2008). For instance, some people like acquiring the same clothing and beverages as Ghanaian celebrities. Popular Ghanaian musician "Shatta Wale," who is the brand ambassador of Storm's marketing, has a tremendous effect on the majority of Ghanaian teenagers and young adults. According to the World Health Organization (2004), youth consist of those aged 15 to 24. The majority (about 89%) of undergraduate students fall within this age range and hence may be susceptible to "Shatta Wale's" impact. This brand's popularity may thus be attributable to his connection to Storm.

Rush, the second most popular energy drink brand (33% (n=252)), was the most affordable energy drink brand in the two university campuses and surrounding areas, priced at 3.00 Cedis for 350ml can. It's pricing, which is

averagely reasonable for the majority of students, may account for this. According to Mwaawaaru (2009), television and radio commercials might be viewed as a catalyst for increasing consumers' intake of energy drink products. (Table 2) Additionally, commercials frequently prompted students to begin using Rush. This is not unexpected given that the advertising is highly enticing and targets persons with fast-paced lives seeking an energy boost, such as university students seeking to sustain lengthy study hours, partygoers, and extreme sports athletes. "Date Rush," a popular TV programme airing on Television station based in Accra, Ghana is one of the programmes sponsored by Rush energy drink, which might influence the purchase of that brand.

Thirty – two per cent (240) of the participants, according to the results of the present study, consumed Lucozade. Lile (2013), claims that the production of Lucozade began in 1927, making it one of the earliest energy drink brands on the worldwide market in Ghana. There is no information on the introduction of Lucozade to the Ghanaian market. The lengthy history of this brand and the fact that it is available in a variety of flavours may explain why so many people use Lucozade energy drinks. There are classic, orange, tropical, lemon, orange citrus clear, and wild berry Lucozade flavours (Superbrands, 2004). The range of brands linked with Lucozade has contributed to the product's popularity among Ghanaians. It is not unexpected that the majority of participants in the study consume Lucozade.

Red bull, Rox, and Monster were the three least popular energy beverages among UCC and UDS students, according to this study (See Table 2). The study revealed that the majority of participants, n=692 (92%), did not consume Red Bull energy drink. This energy drink firm was formed in 1987

(Hoover's Incorporation, 2011). Possibly, this energy drink is not well-known in Africa and Ghana since the company has not been around as long as other brands, hence the poor patronage among university students in Ghana. Since its origin, the Red Bull energy drink has seen few product modifications (Cirillo, 2009). Therefore, the inadequate innovation in the product lines may be a problem preventing students from using Red Bull energy drinks. During the various interactive sessions with study participants, many of them reported that Red Bull energy drink was uncommon, less accessible, and one of the most expensive energy drinks available at the time. According to McCarthy's theory of social marketing (Akhtar & Bhattacharjee, 2013), accessibility and availability are elements of the four Ps of social marketing, Thus, the greater a product's availability, the greater its demand, and vice versa. Therefore, unavailability may explain why Red Bull energy drink is the least popular.

This survey found that 89 % (675) of the participants did not use Monster energy drinks. According to this research, Monster Energy Drink was the second least popular energy drink. According to Beverage Network (2011), monster energy drink has existed for some time but has undergone some name and product line changes. In addition, Monster Beverage Corporation's advertising strategy may be to blame for its limited customer base, as it does not advertise on television or in the media. At sponsored events and promotions, Monster energy drink company distribute t-shirts, towels, water bottles, and other souvenirs to advertise their products (Hoover's Incorporation, 2011). This can discourage patronage because media advertising is one of the most effective means of interacting with customers.

There is a likelihood that buyers were confused by the company's continuous rebranding resulting in low popularity and a decline in product consumption.

In Ghana, BEL Group of Enterprises, Twellium Industrial Company Limited, Kasapreko Company, and Coca-Cola Company Limited are among the indigenous beverage manufacturing industries that make storm, Rush, 5 Star, and Run energy beverages. These products tend to be extremely popular and readily available to undergraduates at UCC and UDS, unlike imported energy drink brands like Red Bull, Rox, Monster, and Blue Jeans. Also, indigenous energy drinks are far less expensive than foreign energy drinks, resulting in increased popularity and use of these drinks. This, however, contradicts the assertion that red bull is the dominant player and most popular energy drink on the Ghanaian market (Mwaawaaru, 2009). In the United States, Red Bull is currently the market leader in the energy drink sales with a 42% market share, accounting for around 62% of the whole energy drink industry (Heckman et al., 2010).

Factors Predicting Energy Drink Consumption

A hierarchical multiple regression analysis was performed to determine the variables that impact the intake of energy drinks by UCC and UDS students. Previously, correlations between the dependent variable (consumption) and the independent variables were calculated (taste, advert and accessibility). There was a strong link (r =0.71) between accessibility and taste, a moderate correlation (r =0.52) between accessibility and advertisement, and a high correlation (r =0.71) between accessibility and consumption. Furthermore, advertising had a very good correlation with all other independent variables and with consumption (See Appendix D).

Consequently, taste was included in model 1, while accessibility and advertisement (together) were entered into model 2.

Three different research items were utilised to measure factors that promoted the intake of energy drinks among students. Hierarchical multiple regression findings in Table 3 showed that in model 1, taste accounted for 52% of the variation in energy drink intake (t (1,753) = 4.527, p .05). Model 2 introduced accessibility and advertisements. Similarly, Model 2 was significant, t (3,751) = 0.410, p.05. This model added an extra 27% to the consumption variance of energy drinks. Overall, the independent factors accounted for 79% of the variation in university student energy drink intake. Moreover, taste contributed the most (48%), followed by advertising (28%) and accessibility (24%) Therefore, the data suggested that taste, accessibility, and advertising are good predictors of energy drink use among university students.

This study indicated that taste was the most important predictor of energy drink use, accounting for 48% of the variance. Taste has been identified as the most significant element in food intake on several occasions (European Food Information Council, 2012). Moreover, the sensory characteristics of drinks and foods are crucial to dietary preferences, and flavour is the most significant element in influencing beverage intake (Leterme et al., 2008). Mojet et al. (2003), also observed that the perception of the intensity of dissolvable in water varied considerably with age. Thus, young people are more prone than older persons to detect unpleasant flavours. This is consistent with the age range used in this study, in which the majority of individuals were between 15 and 24 years old.

Furthermore, Subaiea et al. (2019), in research among the Saudi Arabian population, found that the vast majority (64.7% of survey participants) preferred the taste of energy drinks as a reason for their consumption. In addition, 59.3% of participants in another study by Qamhia (2011) reported that they appreciated the flavour of energy drinks. The similarity in effect may be related to the presence of sweet fruity flavours in some energy drinks (Simon & Mosher, 2007). Schmidt and Mclntire (2008) found that 53.4% of energy drink customers claim taste as a motivating factor in support of this conclusion. The majority of energy drinks are loaded with sugar. It is not surprisingly; taste was the most reliable predictor of energy drink use in this research.

With 28% predictive power, "Advert" was the second predictor in this study. According to Lal (2008), the earliest advertisements for energy drinks were exclusively presented to a certain set of sportsmen. Presently, all adolescents and young adults are targeted by energy drink advertisements and claims (Harris & Schwartz, 2013). In response to a decline in sales, Lucozade energy drink altered its advertising campaign to emphasize the beverage's capacity to restore lost energy. In addition, the majority of energy drink companies have used cross-promotional strategies to reach their client base by combining their product with extreme athletic events and promoting their goods with prominent music icons (Agriculture and Agri-Food Canada, 2008). The idea is designed to get individuals to trust the energy drink advertisements and consume more energy drinks. The marketing of energy drinks uses enticing language and provocative titles to make them appear amusing and thrilling. Also, the marketing of energy drinks eliminates any question about

the target demographic: adolescents and young adults. (Reissig et al., 2009). Consequently, energy drink intake is expected to grow even more prevalent and socially acceptable. According to Reid et al. (2015), university students in a Caribbean nation were often influenced by marketing to begin using energy drinks. Since the advertising is incredibly enticing, they target those with hectic lives seeking an energy boost, such as college students and extreme athletes. Unsurprisingly, many types of energy drinks are manufactured to fulfil the diverse demands of individuals.

The social cognitive theory (SCT) studies the reasons and dynamics of certain behavioural patterns. Bandura (1963) as cited in Di Clemente et al., (2013) asserted that there are several dimensions to human behaviour. Consequently, there is a two-way street of influence between an individual's behaviour (personal attributes) and the modelling and persuasions of the world (environment). This suggests that, despite the innate inclination of certain individuals in connection to their dietary preferences, there are environmental influences that might influence the eating of various foods. According to the European Food Information Council (2012), physiologic nutritional requirements are not the sole factor influencing consumer decisions. People's food choices may be influenced by several factors, including appetite, flavour, money availability, access, education, time, culture, family, peers, meal routines, mood, stress, beliefs, knowledge, and attitude. This research found that accessibility was the component that had the least amount of predictive power at 24%. However, among the factors explored, it did influence consumption of energy drinks. According to the findings of Wansink et al. (2006), there is a clear relationship between the extensive accessibility of

beverages and the resulting increase in consumption., especially among younger adults. According to Wansink (2004), proximity may enhance the visibility of drinks, which can raise both appetite and desire. Students are enticed to purchase and drink beverages since they are readily available to them in locations such as campus convenience shops and grocery stores. Therefore, availability and accessibility are two factors that play a role in determining the beverage of choice for individuals (Hamilton et al., 2013). Nearly every store in the area, particularly those found on college campuses, carries a variety of energy drink options in some form or another. People are utilizing it at an alarming pace since it is simple for them to go into any store in Ghana and buy any energy drink they want because there are no regulations governing the selling of energy drinks in the country (Buxton & Hagan, 2012).

In this research, we observed the influence of taste, accessibility, and advertising as variables that increase energy drink intake, which corresponds well with the social cognitive theory.

Perceived Effects after Consuming Energy Drinks

The majority of respondents (>50%) said that they had not encountered any of the symptoms, as shown in Table 4. In contrast, Reid et al. (2015) found that 62.2% of students at a Caribbean university had rather suffered side effects. Similarly, high rates of harmful effects have been observed among university students in Saudi Arabia (74.5%), but not among college students in the United States, where just 29% reported jolt and crash, which were found to be the most prevalent adverse consequence associated with energy drink use. Berman et al. (2001) discovered racial disparities in body composition, which is very likely to result in variances in body metabolism. Nienhueser et al.

(2011) also reported that the dose of caffeine and guarana in energy drinks impacted the body's metabolism. As this research was conducted among Africans and Reid et al. carried their study among Caribbeans, the different proportions of impact in the two studies could be attributable to variations in racial metabolism. Storm and Rush, the most popular energy drinks in this study, contain an average of 85 mg of caffeine. The typical student who frequently consumes an energy drink at UCC and UDS consumes 1 can of each sitting and no more than 5 cans per month. More than 400 mg of caffeine per day is considered a high intake (Heneman & Zidenberg-Cherr, 2011), so even if energy drinks with higher caffeine levels are consumed (an average of 210 mg), it is reasonable to conclude that these students use energy drinks but do not consume dangerous or excessive amounts of caffeine in this form on average. The variances may also be attributable to variations in the dose of the components of energy drinks, which in turn led to varying metabolic modifications in the body, resulting in varying responses to stimuli, which in this instance are the components of energy drinks. According to Nawrot et al. (2003), a review of research on the moderate human use of caffeine indicated that caffeine had no discernible adverse effects.

Insomnia accounted for the largest proportion (36%) of reported adverse effects, as seen in Table 6. This aligns with the findings of Subaiea et al. (2019), where sleeplessness was similarly the most often reported side effect (50.7%). According to Grandner et al. (2014), sleeplessness, anxiety, headaches, and tachycardia are the most often reported negative effects of energy drinks containing caffeine in the proportions generally found in energy drinks. Guarana, another component of energy drinks, is the plant with the

greatest caffeine content. Consequently, guarana adds more caffeine to energy beverages. The association between coffee and insomnia is due to its antagonistic effect on Adenosine A1 and A2 receptors, which are important for slowing down brain activity and inducing sleep. Insomnia may also be induced by hyperactivity resulting from the high amount of sugar in energy drinks, which makes falling asleep harder for consumers. L-Carnitine is an amino acid that is occasionally contained in energy beverages. It has been related to restlessness when overused. (Kallmyer, 2018). Sugar-induced hyperactivity or L-Carnitine overload may be the source of restlessness, which accounted for 13% of the felt adverse effects.

According to research conducted by Jimo and Bakare (2014) among university students in Nigeria, 2.9% reported experiencing itching after taking energy drinks. This is consistent with the similarly low proportion (4%) found in this investigation, as shown in Table 4. Drucker et al. (2017) discovered that energy drinks are sometimes fortified with Niacin (Vitamin B3) to facilitate the conversion of food into energy. However, excessive Niacin has been associated with burning, tingling, itching, and redness in the face, arms, and chest. The low proportion obtained for this effect in this research may be because only a small number of respondents ingest excessive amounts of energy drinks containing niacin. Again, the caffeine content in energy drinks makes them addictive, as they are often used to improve energy and cognitive function (El-Sabban, 2016). The low figure (less than 5 %) identified may be a result of respondents not wishing to be perceived as having an addiction owing to the stigma and stereotypes associated with all forms of addiction. Hammond et al. (2018) found that 5.1% of young adults in Canada reported suffered from

Nausea / Vomiting / Diarrhea, which is comparable to the low proportion (less than 5%) identified in this research for Nausea following energy drink intake. An L-Carnitine overdose has also been linked to nausea after taking an energy drink. The low incidence of nausea seen in both investigations may be attributable to a small number of L-Carnitine overdoses.

Differences in Male and Female Consumption of Energy Drinks

An independent sample t-test was conducted to compare the mean consumption pattern of male and female students. There was a statistically significant difference in the consumption of the two groups as seen in table 6. t (678.4) = 15.75; p <.05. As indicated in Table 5, more males (404, M = 3.6059) consume energy drinks than females (350, M =3.1795). Therefore, the hypothesis that there is no statistically significant difference between male and female participants in energy drink consumption was rejected. The study's results showed a considerable disparity in male and female students' consumption. According to the findings of this study, males consumed more energy drinks than females. This conclusion is consistent with the findings of Alsunni and Badar (2011). Peymani et al. (2012) found, in a related study, that the number of male users of energy drinks was significantly greater than the number of female consumers. Additionally, Hidiroglu et al. (2013) in their study brought to light the that male students used more energy drinks than female students in their study.

Similarly, according to the Substance Abuse and Mental Health Services Administration (SAMHSA) (2013), more than 10,000 individuals attended emergency rooms in 2007 owing to energy drink consumption-related issues. The number of emergency room visits doubled between 2007 and 2011, reaching over 20,500 patients in 2011 with higher male patients

than female patients. Studies have also highlighted gender disparities in food preferences. According to Wardle et al. (2004), the difference in energy drink use may be attributed to the fact that females tend to make healthier food choices due to their concern with weight control and their strong convictions about good nutrition than males.

It's also likely that women consume less energy drinks than men in this study since the majority of Ghanaian women are less active than males. Energy drinks are often advertised for enhancing masculine characteristics such as performance, energy, and vitality. Consequently, men are encouraged to eat more than women. The fact that marketing techniques primarily target men rather than women may also account for this finding. In many countries, the absence of laws has resulted in the aggressive marketing of energy drinks that are largely marketed to men. Male predominance in the research may also explain males' greater consumption tendency.

This discrepancy may also be attributable to cultural factors in our society that permit men to be more autonomous and offer them more influence over many aspects of their lives. This argument might be confirmed by examining the most prevalent impact reported by participants after consuming energy drinks, which was "insomnia" (36%). Nighttime insomnia might be caused by a variety of factors, including partying and socializing with friends. Consequently, our culture considers this a more acceptable behaviour for men.

Differences in consumption of energy drinks between students of UCC and UDS

An independent sample t-test was conducted to compare the mean consumption of UCC and UDS students. There was a statistically significant difference in the consumption patterns of the two universities (Table 8), (t

(753) = 7.926; p <.05). UDS students recorded a significantly higher consumption of energy drinks (464, mean = 3.755) than UCC students (290, mean = 3.0366) as observed in Table 7. Therefore, the hypothesis that there is no statistically significant difference between students of UCC and UDS participants in energy drink consumption was rejected. Unfortunately, little or no research had been conducted on UCC and UDS students' intake of energy drinks. The differences recorded may result from the influence of the strong advertisement of some energy drink brands in Tamale. Again, the notion of Bandura's Social Cognitive Theory is vital in developing a deeper understanding of this occurrence. This theory postulates that people are impacted by the "social context" in which they live. The most significant influence on a person's behaviour comes from the people and circumstances around them, such as their family, friends, and the public figures they look up to. (Di Clemente et al., 2013). People have a strong desire to model their identities and behaviours after what they consider to be exemplary actions shown by influential others, such as their parents, friends, and famous people. (Di Clement et al., 2013; Glanz et al., 2008). For instance, some individuals like purchasing the same articles of apparel and drinks as their favourite celebrities. A significant number of the youth of Tamale are largely influenced by "Fancy Gadam," a Popular Ghanaian musician based in Tamale who also serves as the brand ambassador for Storm's marketing initiatives in Tamale.

Additionally, the variation in energy drink uses between UCC and UDS students might be attributable to the temperature differences between Cape Coast and Tamale. According to the Ghana Meteorological Agency for 2022, Cape Coast's average annual temperature was 29 degrees Celsius while

that of Tamale was 36 degrees Celsius. Consequently, Tamale is relatively warmer than Cape Coast, and individuals living within this region will drink more liquids. This is congruent with the study conducted by Mirasgedis et al. (2014) titled “The Effects of Climate Change on the Demand Pattern for Bottled Water and Non-Alcoholic Beverages in Greece”. They observed that when the temperature rises, the demand for bottled mineral water and other non-alcoholic beverages tends to grow, with yearly increases ranging from around 0.9% for bottled mineral water and soft drinks to 2.2% and 2.3% for carbonated water and juices.

Similarly, data from Mexico were included in Conversation (2019), a study on how heat waves enhance soda desire. They suggested that hot temperature affects patterns of food intake. Physiologically, when the temperature rises and we begin to perspire, our bodies urge us to consume more water to replenish lost fluids and maintain body temperature. In reaction to extreme temperatures, there is no physiological reason why people should consume any fluid other than water. However, we cannot disregard the potent "cravings" channel. This shows that when temperatures increase, some people may have an overwhelming desire to quench their thirst with sugar-sweetened beverages, such as energy drinks, rather than water.

Conclusion

This chapter addresses the research questions developed for the study and offers a concise summary of the study's findings. Data from 754 undergraduate students at UCC and UDS were collected and analysed under the study's research objectives. There have been reports on the prevalence, motivators for use, and consequences of energy drink consumption among UCC and UDS students. Two hypotheses were applied to discover more about

why students consume energy drinks. The assumptions to discover if males and females consume energy drinks differently and the differences between how UCC and UDS students consume energy drinks have been reported.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to identify the patterns in the consumption of energy drinks among university students of Tamale and Cape Coast. This chapter presents the study's summary, conclusions, and recommendations.

Summary

Ghanaian culture is warming around to the concept that college students should consume caffeinated beverages like energy drinks. Many factors have contributed to the widespread popularity of these beverages. Young adults (18-34) are the major consumers of energy drinks. Increases in production and distribution have led to a plethora of new energy drink varieties appearing in Ghanaian stores. Over 15 different brands of energy drinks can be bought anywhere in Ghana. There is a wide variety of advertising strategies used for these energy drinks. Most students' introduction to energy drinks came through marketing. It's not unexpected, given that the advertising is enticing and targeted toward those with active lifestyles who need an energy boost, such as students who wish to put in long hours of study, partygoers, and athletes. You may pick up an energy drink at any convenience store, supermarket, grocery shop, department store, or department in a shopping mall. More energy drinks being sold means more young people, both male and female, are consuming them. This necessitates measures to safeguard their health.

Students must read the labels on energy drinks to ensure their safety as researchers continue to examine the precise ingredients in these drinks. This

study's framework consisted of five stages, with one chapter devoted to each stage. This study utilised a cross-sectional, descriptive design. Using a multistage sampling technique, 754 students from UCC and UDS were chosen. The Energy Drinks Survey Instrument (EDSI). questionnaire was utilised to collect the data The questionnaire has two sections, labelled A and B. In Section 'A,' information on the participants' demographics have been presented. In Section 'B,' students were asked to score their degree of agreement with statements on their buying preferences, consumption patterns, the factors that drive them to consume energy drinks (advertisement, flavour, accessibility), and the effects felt after using energy drinks. Students at Tamale Technical University were employed for the questionnaire's pilot study. After the initial study, the reliability coefficient of the questionnaire was 0.68. Using descriptive statistics, the researcher analysed all of the data for the first four research subjects. Students from the University of Cape Coast (UCC) and the University for Development Studies (UDS), as well as males and females, were subjected to independent t-tests to see whether there was a significant difference in their energy drink usage. Finally, the Analysis of regression using a hierarchy was used to determine the predictors of energy drink intake, including taste, advertising, and accessibility.

Key Findings

Students at UCC and UDS often use energy drinks, with 89% reporting regular consumption. Among the consumers, 76% were non-sports personnel and 24% were sports personnel. Approximately 11% of those who are not energy drink consumers did so out of worry about the beverages' possible adverse health consequences. The most often consumed energy drink brands

were Storm (54%), Rush (33%), Lucozade (32%), Run (25%), 5 Star (23%), Next level (16%), Blue jeans (15%), Monster (11%), Rox (10%), and Red bull (8%). While all three variables (taste, accessibility, and advertising) were significant predictors of energy drink use among university students, taste accounted for 48% of the variation.

Over half (57%) of the respondents claimed they had not experienced any of the outlined symptoms; The highest (36%) of reported side effects was insomnia, whereas the least, (2%) was seizures. Statistically significant gender differences were seen in consumption (t (678.4) = 15.75, p .000). Male students (M= 3.605, SD= 1.388) recorded high levels of consumption than the female students (M= 3.179, SD= 1.333). Again, there was a statistically significant difference between the consumption patterns of the two schools (t (753) = 7.926, p .000). Students at UDS (M= 3.755, SD= 1.551) recorded higher levels of consumption of energy drinks than UCC students (M= 3.036, SD= 1.192).

Conclusion

The usage of energy drinks is popular among students of UCC and UDS. Three primary factors that led to the popularity of energy drinks were taste, advertising, and accessibility. Even though students frequently consume excessive amounts of energy drinks, their use is not associated with a high risk of unfavourable consequences. Only a small fraction of the study's participants cited a majority of the presumed negative consequences associated with energy drinks. Nonetheless, his highlights the need for educating students about the hazards of energy drinks before students' supposedly harmless intake of energy drinks becomes a public health problem.

Recommendations

1. The universities administration should assist in the organisation of educational opportunities for students to expand their knowledge about energy drinks.
2. The FDA must conduct health awareness efforts that address the negative effects of energy drink use. More contact between youth and their parents may be extremely beneficial if the information is delivered in an interesting and user-friendly manner.
3. The issue of inconsistent energy drink ingredient lists necessitates extensive lobbying activity by Civil Society Organizations to increase pressure on producers to include all ingredients on the labels of these beverages.
4. The FDA should develop guidelines for responsible energy drink consumption, emphasizing moderation and setting limits on daily intake to minimize potential health risk

Suggestions for Further Studies

1. It is necessary to conduct more studies to discover the exact levels of caffeine included in energy drinks and to assess the extent to which university students and other teenagers and young adults consume energy drinks in Ghana.
2. Some of the ingredients in energy drinks have therapeutic capabilities, but the long-term effects of these ingredients have not been properly studied. To understand more about their benefits and side effects on the human body, it is necessary to perform substantial, long-term clinical trials.

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APPENDICES

APPENDIX A

QUESTIONNAIRE FOR UNIVERSITY STUDENTS

I am a Student of the **DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION** at the **UNIVERSITY OF CAPE COAST**. I am undertaking research for my thesis on "Current Consumption Patterns of Energy Drinks Among University Students in Tamale and Cape Coast." The outcome of this research will assist policymakers and the Ghana Food and Drugs Authority make an informed decision concerning energy drink usage in Ghana by highlighting the possible need to enhance knowledge of the health concerns associated with energy drink intake.

Please take a few minutes to answer the questions as accurately as possible. The information provided will be held in strict confidence.

Thank you for your expected response.

SECTION A

Background Information

Instruction: Please indicate your response to each question by selecting all that apply or by filling in the spaces.

1. What is your gender?

a) Male [ ] b) Female [ ]

2. Age

a) 15 – 20 [ ]

b) 21 – 25 [ ]

c) 26 – 30 [ ]

d) 31 – 35 [ ]

e) 36 and above [ ]

3. Educational attainment at the university

a) Level 100 [ ]

b) Level 200 [ ]

Level 300 [ ]

c) Level 400 [ ]

4. Do you do sports? a) Yes [ ] b) No [ ]

SECTION B

Behaviour and Attitude

a. This section is designed to collect information regarding students' purchase preferences, habits of energy drinks consumption and perceived effects after consumption.

1. Do you presently consume energy drinks? a) Yes [ ] b) No [ ]
2. Have you consumed energy drinks before? a) Yes [ ] b) No [ ]
3. If not, why? (Select the best one that appeals to you)

a) I heard they do not taste good [ ]

b) They are expensive [ ]

c) They might not be healthy [ ]

d) I am just not interested in them [ ]

e) I heard one does not feel okay when he/she drinks them [ ]

f) Other (please specify) ……

Various kinds of energy drinks consumed

4. Which brand of energy drink do you consume the most?

Red Bull [ ] 5 Star [ ] Run [ ] Rush [ ] Coca-Cola [ ] Blue Jeans [ ]

Lucozade[ ] Storm [ ] Rox [ ] Kabisa [ ] Monster [ ] predator [ ] Next level [ ] 10 over 10 [ ]

Other (please specify) ……

5. Please show the frequency of energy drinks consumption (quantities of cans)

Instruction: Please indicate by marking (√) how often you consume any of the energy drinks

	Energy Drink	One can a day	Two cans a day	One can a week	Two cans a week	One can a month	Not at all
	Blue Jeans						
	Red Bull						
	Storm						
	5 Star						
	Rush						
	Coca-Cola						
	Run						
	Monster						
	Next Level						
	Lucozade						
	Rox						

b. ***Factors that influence the consumption of energy drinks***

Please indicate the reasons that motivate your energy drinks consumption, using a 5- point scale with 1 being — "strongly disagree", 2 "disagree", 3 "neutral", 4 "agree" and 5 being — "strongly agree"

S/N	**Motivators**	**1**	**2**	**3**	**4**	**5**
	Taste					
1	Energy drinks taste good	1	2	3	4	5
2	I take energy drinks to enjoy a party	1	2	3	4	5
3	I consume energy drinks because they are sweet	1	2	3	4	5
	Advertisement					
4	My friends influenced me	1	2	3	4	5
5	I am encouraged to buy energy drinks because of the	1	2	3	4	5

	television adverts					
6	Athletes and celebrities drink energy drinks, so do i	1	2	3	4	5
	Accessibility					
7	Energy drinks are affordable	1	2	3	4	5
8	Energy drinks are readily available in the university canteen	1	2	3	4	5
9	I like trying new products	1	2	3	4	5

c. Perceived effects after consuming an energy drink

When I consume energy drinks, I feel ------- (Please select all that apply to you by putting √

Drowsy [ ]

Restless [ ]

insomnia/Sleep disturbed [ ]

Nauseous [ ]

Jolt/Crash episode/Seizures [ ]

Satiated [ ]

My heart beat faster than before [ ]

Mentally alert [ ]

Itchy [ ]

Headache [ ]

My blood pressure rises [ ]

Addicted [ ]

Others, please specify……

APPENDIX B

INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

Direct: 03320-91097
Telegrams & Cables: University, cape coast

University of Cape Coast
Cape Coast

Our Ref: VTE/1AR/V.3

27th April, 2022

TO WHOM IT MAY CONCERN

Dear Sir,

INTRODUCTORY LETTER

We have the pleasure of introducing to you Mr. Abdallah Lukman, an M.Phil. student with registration number ET/HEP/20/0003 of this Department. He is working on the research topic: "Current consumption patterns of energy drinks among the university students of Tamale and Cape Coast"

Currently, he is at the data collection stage of the thesis, and we would be most grateful if you could grant him the needed support and cooperation to enable him to proceed with the work.

Thank you.

Yours faithfully,

Dr Augustina Araba Amissah
HEAD OF DEPARTMENT

APPENDIX C

ETHICAL CLEARANCE LETTER

UNIVERSITY OF CAPE COAST
INSTITUTIONAL REVIEW BOARD SECRETARIAT
TEL: 0558093143 / 0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: IRB/C3/Vol.1/0020
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0011497

6TH FEBRUARY 2023

Mr Abdallah Lukman
Department of Vocational and Technical Education
University of Cape Coast

Dear Mr Lukman,

ETHICAL CLEARANCE – ID (UCCIRB/CES/2022/56)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research on **Current Consumption Patterns of Energy Drinks among the University Students of Tamale and Cape Coast.** This approval is valid from 6th February 2023 to 5th February 2024. You may apply for a renewal subject to the submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit a periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Kofi F. Amuquandoh
Ag. UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST

APPENDIX D

CORRELATION BETWEEN TASTE, ADVERTISEMENT, ACCESSIBILITY AND CONSUMPTION

Variables	Consumption	Taste	Advertisement	Accessibility
consumption		0.69	0.84	0.75
Taste			0.54	0.24
Advertisement				0.48

N= 754