

**Applying Extended Theory of Planned Behavior to Investigate Energy Drink Consumption
Behavior among General Public in the United States**

by

Yujia Wang

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Approved by

Yee Ming Lee, Chair, Associate Professor of Nutrition,
Dietetics, and Hospitality Management
David Martin, Associate Professor of Nutrition,
Dietetics, and Hospitality Management
Imran Rahman, Assistant Professor of Nutrition,
Dietetics, and Hospitality Management

Abstract

The sales of energy drinks will reach \$21.5 billion in 2017. Energy drinks could boost energy but also bring some side effects. This study explored consumers' energy drink consumption behavior based on extended Theory of Planned Behavior. Specific objectives were to 1) examine current energy drinks consumption among consumers, 2) investigate consumers' attitudes, subjective norms, perceived behavior control and knowledge about energy drinks, and 3) identify variables that influenced consumers' energy drinks consumption intention. The survey instrument was developed based on previous researches, pilot-tested, and revised based on feedback received. A total of 539 usable questionnaires were collected through Amazon Mechanical Turk. Descriptive statistics, logistic regression and one-way Analysis of Variance were used for data analysis. The results indicated that energy drinks consumption was more prevalent among young adults aged 21 to 40 ($n=430$, 79.8%) mainly to increase energy level ($n=517$, 95.9%) and compensate for insufficient sleep ($n=439$, 81.0%). Overall, consumers demonstrated slightly positive attitudes toward energy drinks (3.6 ± 0.7). Friends mainly influenced participants' consumption of energy drinks (3.6 ± 1.3). Barriers of consuming energy drinks were taste (4.34 ± 0.9) and cost (4.34 ± 0.9). The mean energy drink knowledge score was 4.63 ± 1.30 of 9 points. Gender ($p<0.01$), educational level ($p<0.01$), income ($p<0.05$), attitude ($p<0.001$) and perceived behavior control ($p<0.01$) were significant predictors of future consumption intention.

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List of Abbreviations

TPB Theory of Planned Behavior

MTurk Amazon Mechanical Turk

CHAPTER 1 INTRODUCTION

Background

Energy drinks continue to gain its popularity since Red Bull, currently a leading brand in the energy drinks market, first introduced its products in 1997. There are more than 500 energy drink brands available worldwide, reaping the financial rewards of \$5.7 billion (Reissig et al., 2009) in year 2006. Global energy drinks sales, within the functional beverage category, reached \$49.9 billion in 2014 with 5% growth rate as compared to 2013. There are more than 200 brands of energy drinks in the United States. The sales of energy drink and shots are estimated to approach to \$21.5 billion by 2017 (Facts, 2013).

Energy drinks are produced mainly to boost energy and concentration, decrease feelings of tiredness and enhance mental alertness. In order to achieve the goal of enhancing level of energy, many energy drinks typically contain high dosages of caffeine and glucose, as well as other active ingredients such as taurine, guarana, carnitine, ginseng and various vitamins and minerals. Energy drinks could be classified as sugar-containing and sugar-free versions and typically contain 80 to 141 mg of caffeine per 8 ounces, the equivalent of five ounces of coffee or two 12-ounce cans of caffeinated soft drink such as Mountain Dew, Coca Cola or Pepsi Cola (Malinauskas et al., 2007).

It is reported that about 30 to 50 percent of adolescents and young adults are consuming energy drinks on a regular basis (Attila et al., 2011). Also, as described by Red Bull, their target markets are younger population ranging from 14 to 34 years old, gamers, sports enthusiasts and the Hip-pop crowd, based on the fact that they are especially vulnerable to exhaustion and insufficient energy. With the popularity of energy drinks increasing quickly, health-related concerns associated with energy drinks consumption arises as well. Notable side effects caused

by excessive amount of active ingredients include but not limited to shaking, agitation, insomnia, anxiety, high blood pressure and addiction (Heckman et al., 2010).

Theory of Planned Behavior was adopted as the framework of this study. The concept was proposed by Icek Ajzen to improve the validity of prediction of behavioral intentions based on the theory of reasoned action by including perceived behavioral control. According to this theory, human behavioral intentions are determined by attitudes, subjective norms and perceived behavioral control (Ajzen, 1991). Moreover, knowledge will be added as an additional attribute to form the extended model in this research.

Statement of Problem

Previous articles have profoundly discussed the health-related problems associated with energy drink consumption among young people, yet little investigation has been done to investigate the energy drinks consumption other than this group of population. For instance, Kristina and Timothy (2010) investigated drinking patterns and risk behaviors associated with combined alcohol and energy drink consumption in college drinkers in Canada. Their results indicated that more frequent drinker, compared to less frequent drinkers, had twice the chances of experiencing one or more negative consequences from alcohol mixed with energy drink use. It remains unknown if other consumers who are not categorized as “young people” demonstrated the same behavior.

Similarly, Attila and Banu (2010) performed a cross-sectional study to investigate the frequency of energy-drink consumption and associated factors in a group of fourth-year students studying at Hacettepe University in Turkey. Based on their findings, consumption of energy drinks was very common in college students despite the variation in the reason for choosing such drinks. Frequency of energy-drink consumption was higher in students of arts and sports and in

those who tend to skip breakfast on a regular basis. Common reasons for consuming energy drinks included increasing level of energy, staying awake, boosting performance while doing sports, or mixing with alcoholic beverages. Notably, most students could not correctly define the ingredients of energy drinks or potential hazardous health effects. Both of these researches were conducted overseas and among younger populations and limited studies have been conducted in the United States. Therefore there is a need to expand the scopes of investigation of energy drinks, to include broader populations with various demographics, and also in the United States to better understand the energy drinks market in this country.

Statement of Purpose

The purpose of this study was to investigate consumers' energy drink consumption behavior based on extended theory of planned behavior.

Objectives

The specific objectives of this study were to:

- Examine current energy drinks consumption among general consumers in the United States.
- Investigate general public's attitudes, subjective norms and perceived behavior control toward energy drinks.
- Assess general public's knowledge about energy drinks.
- Investigate the relationships between demographics, attitudes, subjective norms and perceived barriers, general public's knowledge, previous side effects experienced and future intention of energy drinks consumption.
- Evaluate the differences in attitude, subjective norms, perceived behavior control, and knowledge based on the demographic characteristics of respondents.

Research questions

In order to achieve the goals, several research questions were investigated.

1. What is the current energy drinks consumption trend and pattern in the United States, including the age group, top brands, and frequency of consumption?
2. What is the attitude of general public towards energy drinks?
3. Who are the individuals that influence general public's consumption of energy drinks?
4. What barriers preventing consumers from consuming energy drinks?
5. How knowledgeable are consumers about energy drinks?
6. How attitudes, subjective norms, perceived barriers and knowledge influence energy drink consumption intention?

Significance of study

The market of energy drinks continues to expand over the years. With more than 500 brands of energy drinks in the market, the competition could be intense. This study identified who the energy drinks consumers were, in addition to the target market that has already been identified, their preferred brands, frequency of consumption, and reasons for consumption, which help to uncover customers consuming habits and behaviors. Further, by recognizing customers' attitudes toward energy drink consumption, manufacturers might implement strategies to change the attitudes of consumers about this product. In addition, understanding which individual brings obvious influence on consumers' energy drink consumption is very crucial to promote product more effectively. For instance, if celebrities are the influential individuals, company might consider appointing them as a spokesperson of the product, so to increase its product popularity.

Moreover, identifying perceived barriers of consuming energy drinks could help companies to identify strategies to remove those barriers. For example, if product designs (i.e.,

size and packaging) are found to discourage consumers from buying and consuming energy drinks, the manufacturers can adjust the serving size in each bottle or change the appearance of the products to be more appealing. Moreover, the energy drink manufacturers can also ameliorate their marketing strategies if price and convenience are perceived as the main barriers by majority of consumers. Investigating consumers' knowledge of energy drinks plus associated side effects reveals a potential need to elevate awareness of health related issues causing by energy drink consumption. Overall, the findings of this research are also expected to provide theoretical implications and novel research ideas for future studies.

Assumptions

This study assumes that the respondents answered all the questions truthfully and to the best of their knowledge. It also assumes that each construct is measurable and the instrument developed based on an elicitation study is adequate to assess each construct.

Limitations

This study has some limitations. The participants were recruited through an online platform Amazon Mechanical Turk (MTurk), which has gained its popularity as one of the common tools for data collection. MTurk is a desirable outlet for any researcher looking for a random sample of the general population, which becomes more and more popular among scholars due to its efficiency and validity (Paolacci et al., 2010). MTurk workers can complete the tasks anonymously and without contact with the researchers thus the results are generally more representative. Also, researchers at Princeton, New York University and University of Venice conducted an experimental study in 2010 to compared responses from MTurk users to responses from students at a major Midwestern university and found no obvious differences between them, indicating the high validity MTurk has significant validity. However, Amazon

Mechanical Turk is not able to offer requesters the opportunity to define their populations. Moreover, since all the responses are anonymous, there generally is no punishment for falsifying information in order to qualify to complete a task. The study was conducted in the energy drinks market in the U.S. alone. Therefore, the results cannot be generalized beyond the territory of the U.S.

Definition of Terms

Energy drinks: Energy drinks are drinks designed to boost energy as well as offer metabolic or central nervous system stimulation. Those products are marketed to increase one's real or perceived physiological performance. Energy drinks typically contain various ingredients, including caffeine, taurine (an amino acid that assists with neurological development), sugar, guarana (provides 250 mg of caffeine in usage of 3-5g), and Vitamins B complex (Higgins, 2010).

Theory of Planned Behavior: The Theory of Planned Behavior is a theory that links beliefs and behavior. The concept was developed from the Theory of Reasoned Action in 1980 to predict an individual's intention to engage in a behavior at a specific time and place (Ajzen, 1991)

Attitudes: An attitude is defined as a positive or negative evaluation of people, objects, event, activities, ideas, or just about anything in your environment (Zimbardo, Ebbesen & Maslach, 1999, p. 745)

Subjective Norm: A broad definition of perceived or subjective norm is "the perceived social pressure to perform or not to perform the behavior" in question (Ajzen, 1991, p. 188)

Perceived Behavioral Control: Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior (Ajzen, 1991, p. 188)

Behavioral intention: Behavioral intention is defined as a person's perceived likelihood or "subjective probability that he or she will engage in a given behavior" (Committee on Communication for Behavior Change in the 21st Century, 2002, p. 31)

Guarana: Guarana is a dried paste that is made from the seeds of a South American climbing shrub (*Paullinia cupana*) of the soapberry family, that contains caffeine and tannin, and that is used as a stimulant (Gardiner & Heuer, 2011)

Carnitine: Carnitine is a compound derived from an amino acid that functions in fatty acid metabolism by transporting fatty acids into mitochondria for energy production (Shils & Shike, 2006)

Ginseng: Ginseng is defined as herbs consist of a light-colored, forked-shaped root, a relatively long stalk and green leaves with an oval shape. Ginseng is believed to provide an energy boost, lower blood sugar and cholesterol levels, reduce stress, promote relaxation, treat diabetes, and treat sexual dysfunction in men (Matthews, Lucier & Fisher, 1999)

Taurine: Taurine is an amino acid involved in cell volume regulation found in the brain, retina, muscle tissue, and organs throughout the body. Taurine provides a substrate for the formation of bile salts and plays a role in the modulation of intracellular free calcium concentration (Ripps & Shen, 2012)

Caffeine: Caffeine is defined as a drug that is most commonly found in coffee beans, tea, soft drinks, cocoa and chocolate. It is also found in some prescription and non-prescription drugs, including cold, allergy and pain relievers. Caffeine acts as a stimulant, causing increased alertness exerting an effect on the central nervous system. Caffeine can also be produced artificially and added to certain foods in order to give most people a temporary energy boost and elevates mood (Barone & Roberts, 1996)

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Chapter 2 Literature Review

Introduction

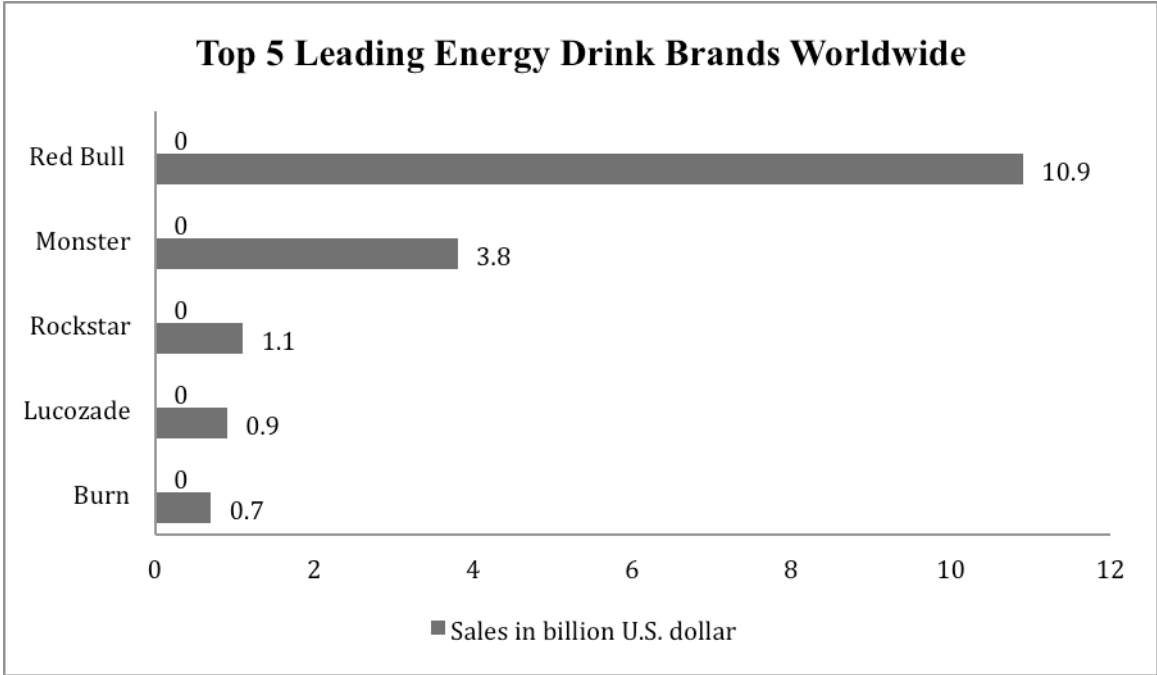
This chapter provided background information about market trends of energy drinks and the products by analyzing companies' revenue and their market share both worldwide and in the United State. It described the functions, active ingredients and potential side effects of the major energy drinks as well. Moreover, the target consumers of energy drinks, their consumption patterns and reason for use were also discussed in this chapter. Lastly, Theory of Planned Behavioral and its application in beverage consumption were introduced as the framework to develop theoretical model of current study.

Global Market

The popularity of energy drink is continuously increasing worldwide since the first energy drink product has been launched in Japan in 1960. In 1970's, energy drink was marketed in Thailand. After that, in 1987, energy drink was first introduced in Europe and then quickly expanded throughout the rest of Europe before entering the market of the United States (U.S.) in 1997 (Breda, 2015). According to BeverageDaily.com, an online news service covering the food and beverage industry, global energy drink sales has reached \$49.9 billion in 2014 with an increase rate of 5% compared to the sales in 2013. Research and Market, the world's largest market research store, has released a report titled "Global Energy Drink Market: Insights, Market Size, Share, Growth, Trends Analysis and Forecast to 2021" in Dublin on September 3rd, 2015. Their results indicated that the total global energy drink market in 2013 was 39760.8 million USD and it is expected to reach 61707.5 million USD by 2021 with a compound annual growth rate at 5.8% over the forecast period. Based on a market research carried out by American Beverage Association, a trade association that represents America's non-alcoholic beverage

industry, the markets that will be most important for energy drink growth through 2017 are the U.S., China and Brazil. In 2006, almost 500 new brands of energy drink were released worldwide (Breda, 2015). Among them, Red Bull, Monster, Rockstar, Lucozade and Burn are the top five leading energy drink brands worldwide based on their sales in 2013 (as shown in Figure 2.1).

Figure 2.1 Top 5 Leading Energy Drink Brands Worldwide (Based on Sales in billion U.S. dollars)

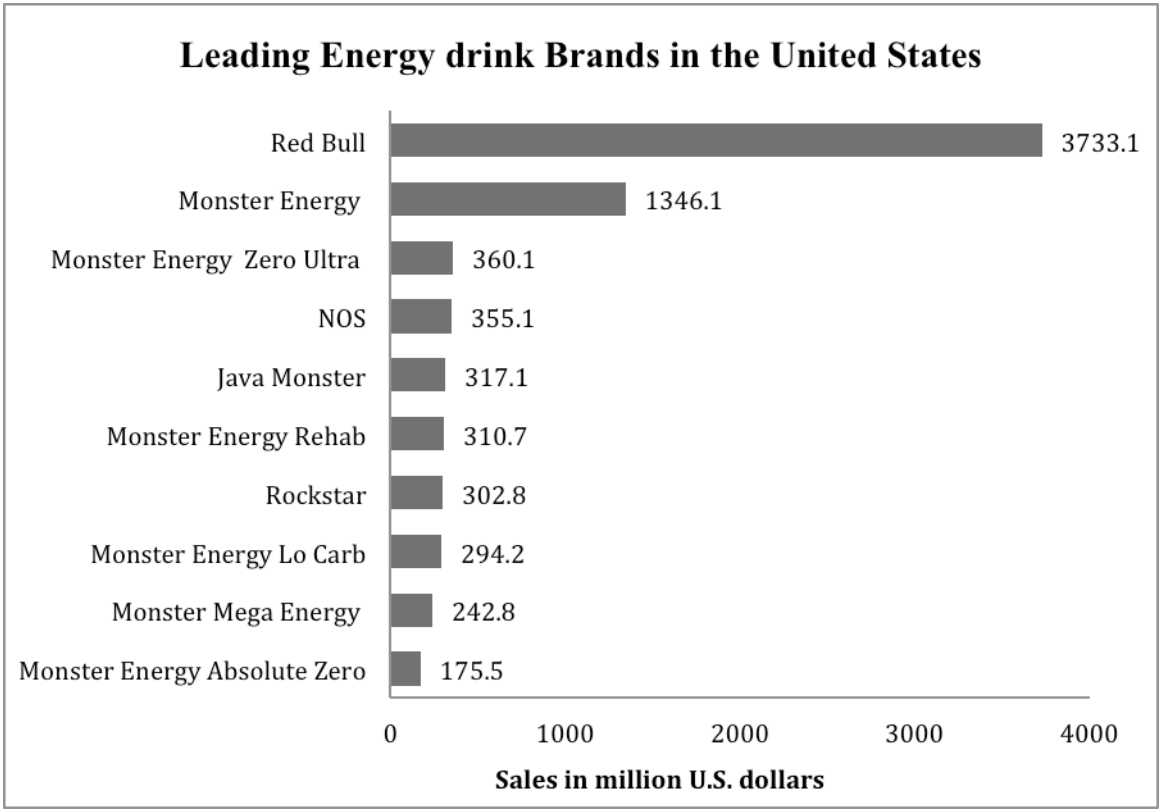


U.S. Market and Leading Brands

North America, from the geographical market standpoint, was the largest market in 2012, holding over 35% of the global energy drinks market. The Asia Pacific region came to a close second, with over 30% of the market for energy drinks. The energy drinks segment accounts for the largest share of industry revenue and Technavio's analysts forecast the energy drinks market in the U.S. to grow at a compound annual growth rate of 11.42% in terms of revenue over the

period from 2014 to 2019. There are more than 200 energy drink brands in U.S. market. Based on the market research, the top five most popular energy drink brands in U.S. that occupying up to 98% market share are Red Bull (43%), Monster (39%), Rockstar (10%), NOS (3%) and Amp (3%). Figure 2.2 demonstrates the revenues generated by leading energy drink brands in 2014.

Figure 2.2 Leading Energy Drink Brands in the United States in 2014 (Based on sales in million U.S. dollars)



Red Bull

Red Bull was founded by Dietrich Mateschitz in the mid 1980’s under the inspiration offered by a Thai energy drink called Krating Daeng. Dietrich Mateschitz samples this functional drink from Far East and created the formula of Red Bull Energy Drink as well as developed the unique marketing concept of it. This was not only the launch of a completely new product; in

fact it was the birth of a totally new product category. The Red Bull headquarters are based in Fuschl Am See, not far from Salzburg, Austria. On April 1, 1987, Red Bull Energy Drink was initially sold in its home market. After that, Red Bull's distribution expanded into neighboring countries, Hungary and Slovenia, in 1992. Right after that, Red Bull was introduced in Germany and the United Kingdom in March 1994. Although it was priced about three times as much as a can of Coca-Cola, Red Bull marketed successfully in the United Kingdom. In 1997, Red Bull energy drink entered the U.S. market via California, focusing at first on four western states: California, Oregon, Texas, and Colorado. In 2000, Red Bull has successfully launched in the Middle East. Today Red Bull is available in more than 165 countries and more than 35 billion cans of Red Bull have been consumed so far (energydrink.redbull.com).

In addition, Red bull has recently experienced strong sales growth in India, Japan, Turkey, Scandinavia, Russia, and Brazil. It plans to focus on continued expansion in the United States, Western Europe, and the East. According to the report generated by the company, Red Bull sold 5.387 billion cans of their products worldwide in 2013, a 3.1% increase over 2012. In the US market, the drink had sales of \$3.433 million from July 2012 through June 2013. Market research firm IRI announced Red Bull the leader in US energy drink sales. Furthermore, Forbes estimated the company's market value at \$20 billion last December (Amy, 2015). Red Bull's advertising strategy relies heavily on sporting events and extreme sports sponsorship. Its secret to success appears to be its early involvement in bars and clubs for the purpose of mixing with alcohol drinks plus its early sponsorship of extreme sports with their famous slogan: "*Red Bull Gives You Wings*".

Monster

Monster Beverage Corporation was founded in 1990 and began selling Monster Energy drinks in 2002. The company's subsidiaries market and distribute different product lines of energy drink beverages. Monster Energy promotes itself as "way more than an energy drink . . . a lifestyle in a can". The company associates itself with action sports, punk rock music, partying, hanging with the girls, and living life on the edge. The main ingredients of original Monster Energy are carbonated water, sucrose, glucose, taurine, ginseng, L-Carnitine, caffeine, B vitamins and guarana, though ingredients vary somewhat by flavor. Monster drinks come in 36 varieties and has been sold in 114 countries, ranging from its flagship Monster Energy drink to double-strength, coffee-flavored, fruit flavored, no calorie, protein-enhanced, and other varieties (Amy, 2015). With U.S. sales of \$3.147 billion from July 2012 through June 2013, Monster Energy is a close second to Red Bull. Together, these two brands captured more than 80% of the US energy drink market in 2013. In 2008, Monster Beverage Corporation entered an agreement with the Coca-Cola Company, which is also its proffered distribution channel. Coca-Cola's distribution network reaches more than 200 countries therefore should help increase Monster's sales internationally (Amy, 2015).

Rockstar

Russ Weiner, founder and owner, introduced Rockstar Energy in San Francisco in 2001. Rockstar Energy Drink is designed for those who lead active lifestyles such as athletes and rock stars, supporting the Rockstar lifestyle across the globe through Action Sports, Motor Sports and Live Music. Their products, come in 8.4-ounce, 16-ounce, and 24-ounce cans, are available in more than 20 flavors and mainly sold at convenience and groceries in over 30 countries. The main ingredients include carbonated water, sucrose, glucose, taurine, caffeine, L-Carnitine, milk

thistle extract, ginkgo leaf extract, guarana, and ginseng root extract (Amy, 2015). Rockstar had \$821 million in U.S. sales in 2013 and approximately \$670 million in revenue. It makes up about 10% of the US energy drink market.

NOS

NOS energy drink is from Coca-Cola product line. Coca-Cola is the world's largest beverage company, refreshing consumers with more than 500 sparkling and still brands (The Coca-Cola Company, 2016). NOS energy drink is named after nitrous oxide, and is often distributed in a bottle designed to look like a Nitrous Oxide Systems cartridge. The containers have three different sizes, including 16 fl. oz, 22 fl. oz and 12 fl. oz for 6 bottles per package. The product line is relatively simple, however, compare to other brands NOS contains high level of taurine and caffeine (Heckman et al, 2010).

Amp

Amp energy is an energy drink brand produced and owned by PepsiCo. PepsiCo products are consumed 1 billion times a day in more than 200 countries and territories. PepsiCo generated more than \$66 billion in net revenue in 2013. Amp energy was initially distributed under the Mountain Dew soft drink brand when at the time of its introduction in 2001(Heckman et.al., 2010). In 2009, it has been produced and labeled under its own trademark. The beverage is packaged in 16-ounce or 24-ounce cans and sold in United States, Canada and United Kingdom with five different flavors, including lemon (original), cherry, strawberry, passion fruit, blueberry with grape and watermelon. Amp energy drink is also fully involved in many sponsorship of activities and have a famous slogan to advertise their products: "Amp energy --- the Energy You Need, Flavors You Crave" (Heckman et al., 2010). The product lines of each leading brands and their caffeine contents are shown in Table 2.1 as below.

Table 2.1 Brands, Product Line and Caffeine Content

Brands	Product Lines	Caffeine Content
Red Bull	Original, Sugar-free, Total Zero, Red Edition-Cranberry, Blue Edition- Blueberry, Sliver Edition-Grapefruit/Citrus (Discontinued in USA), Orange Edition, Cherry Edition	80-114mg/can
Monster	<p>Monster Energy: Original, Ultra Red, Zero Ultra, Ultra Black, Ultra Blue, Ultra Sunrise, Ultra Citron, Absolutely Zero, Assault, M-80, M3, Lo-Carb, Cuba Lima, Ubermonster, Khaos, Import, Import Light, Ripper, The Doctor, Export, Lo-Cal, MIXXD, Mega Monster, Monster unleaded (zero caffeine)</p> <p>Java Monster Line: Loca Moca, Kona Blend, Toffee, Kona Cappuccino, Vanilla Light, Mean Bean</p> <p>Muscle Monster Line: <i>Chocolate, Coffee, Vanilla, Strawberry</i></p> <p>Extra Strength Line: <i>Super Dry, Anti-Gravity, Black Ice</i></p> <p>Monster Rehab Line: <i>Green Tea, Rojo, Orangeade, Pink Lemonade, Tea + Lemonade, Protean</i></p> <p>Monster Punch Line: <i>Ballers Blend, Mad Dog</i></p>	140-240mg/can
Rockstar	<p>Original, Sugar Free, Zero Carb, Perfect Berry, Lime Freeze, Pina Colada, Rockstar Boom, Organic, Horchata, Burner, Iced, Energy Cola, Xdurance Blue Berry Acai, Xdurance Tropical Orange, Juiced</p> <p>Rockstar Pure Zero: <i>Sliver Ice, Punched, Mango-Orange-Passionfruit, Blue Ice</i></p> <p>Rockstar Sport: <i>Chocolate, Cookies & Cream</i></p> <p>Rockstar Punched: <i>Fruit Punch, Blue Raspberry, Citrus Guava</i></p> <p>Rockstar Sparkling Energy: <i>Peach, Cherry, Citrus</i></p> <p>Rockstar Recovery: <i>Lemonad, Orange, Grape, Tea/Lemonade</i></p> <p>Rockstar SuperSours: <i>Bubble Berry, Green Apple, Blue Raspberry</i></p> <p>Rockstar Roasted: <i>Mocha, Caramel, Light Vanilla, White Chocolate, Almond Milk Light, Vanilla Almond Milk, Cafe Latte, Almond Milk</i></p> <p>Rockstar Energy Water: <i>Citrus, Orange, Blue Berry, Pom Acai, Peach</i></p>	160-240mg/can
NOS (Coca-Cola)	<p>Zero-sugar-free</p> <p>Loaded Cherry, Grape, Charged Citrus</p> <p>Active (non-carbonated sport drink, discontinued)</p>	160mg/can
AMP (PepsiCo)	<p>Original, Cherry Blast, strawberry Limade, Passion Fruit</p> <p>Zero Watermelon</p> <p>Zero Blueberry White Grape</p>	142-160mg/can

Active Ingredients and Related Side Effects

There are several active ingredients found in most of the energy drinks available in the market, including caffeine, guarana, taurine, sugar, ginseng, and bitter orange. An active ingredient is the ingredient in a pharmaceutical drug or a pesticide that is biologically active, that has clear effect on living being in small amount (Perva-Uzunalić et al., 2006). The Food and Drug Administration (FDA) does not approve or review energy drinks since they are marketed as dietary supplements. Also, FDA currently has no regulation for caffeine content in energy drink (Reissig et al., 2009). Therefore, many drink claims have not been proven, the amount of added ingredients is neither standardized nor identified on the label and their safety is not known. Norway, Uruguay and Denmark have banned Red Bull because of its negative health effects (Buxton & Hagan, 2012).

Caffeine

Caffeine content and caffeine concentration vary widely among different energy drink brands. It is the most commonly used behaviorally active substance in the world. Daily caffeine intake averages 170 to 210 milligrams per day in the United States, United Kingdom, and Canada (Giles et al., 2012). Caffeine has been widely studied in a variety of areas regarding human health and performance and it is evident that caffeine consumption can increase energy utilization (Smit & Rogers, 2002) and enhance mood and alertness (Kaplan et al., 1997; Lorist & Tops, 2003; Smit & Rogers, 2002). More specifically, caffeine performs many critical functions, including enhancing executive control and working memory, increasing information-processing time and awareness, improving exercise performance and attention, reducing reaction time and reducing feelings of fatigue (Cysneiros et al., 2007; Doherty & Smith, 2004; Graham, 2001). It

has also be proven that caffeine could enhance vigilance and psychomotor performance of individuals (Smith, 2011). Bonnet et al. (2005) also concluded that caffeine can contribute to improved alertness and performance at doses of 75 to 150 mg after acute sleep loss and doses of 200 to 600 mg after a night or more without sleep (Bonnet et al., 2005).

Caffeine, as an active ingredient, is widely used on the majority of energy drinks due to its stimulatory effect on the central nervous system. A review regarding caffeine consumption concluded that a moderate daily caffeine intake of ≤ 400 mg was not associated with any adverse effects among the healthy adult population (Nawrot et al., 2003). Common energy drinks contain approximately 80 milligrams caffeine per 8 ounce serving, yet they are also commercially available in 16-ounce containers and therefore can contain up to 505 milligrams of caffeine. Hence, caffeine toxicity and poisoning caused by consuming excessive amount of caffeine are great concerns. Studies indicated that caffeine doses of 78 mg/kg have demonstrated serious adverse effects in young children (Yew & Laczek, 2007). Common symptoms that are seen with caffeine intoxication include nervousness, anxiety, restlessness, insomnia, gastrointestinal upset, tremors, tachycardia, psychomotor agitation, and in rare cases, even death. Symptoms of caffeine toxicity can be similar to those experienced with anxiety and mood disorders (Reissig et al., 2008).

Guarana

Guarana comes from the *Paullinia cupana* plant, known for its small-berry like fruit it produces, which contains 1 to 3 dark seeds as the only edible part. It originated in the Amazon basin in Brazil and has been used by a long history (Angelo et al., 2008). The seeds contain a significant amount of caffeine, with 1 g of guarana being equivalent to about 40 mg caffeine (Finnegan, 2003). However, it has been showed that the caffeine from guarana is released at a

slower rate compared to pure caffeine, giving off a more subtle and lengthier stimulatory effect (Scholey & Haskell, 2008). In addition to the caffeine content, guarana also contains relatively high amounts of saponins, flavonoids, and tannins, all contributing to its bioactive properties including antioxidant activity (Heckman et al., 2010).

Guarana has become an increasingly common natural additive in energy drinks in recent years largely for its stimulatory effect (Scholey & Haskell 2008). Several research studies indicated that guarana, at physiologically relevant dosages, has a function of improving cognitive performance, mental fatigue, and mood (Haskell et al., 2007; Kennedy et al., 2008; Scholey & Haskell 2008). Another clinical study also showed that guarana is lipid metabolism, probably due to its methylxanthine content (Lima et al., 2005). Although guarana has been shown to exert no toxic effects when consumed both in acute high dosages as well as in chronic lower dosages, certain population still have chances to experience side effects such as insomnia, nervousness, restlessness, shaking, anxiety, chest pain and dysrhythmias (Barbosa, 2011).

Ginseng

Ginseng is an herb that has been used for over 2000 years by people in East Asian countries, including China, Japan, and Korea as a remedy for various diseases and for promoting longevity (Lee et al., 2005; Nam et al., 2005). Ginsenosides is the active constituent in ginseng. The entire ginseng plant has been used for medicinal purposes; however, the root is the most prominent and dominates the commercial sales. The roots are typically not harvested until after the 5th or 6th year of growth when their ginsenoside concentrations are at their peak (Heckman et al., 2010)

There are several studies have reported the health benefits of ginseng, including supporting the functions of immune systems and producing improved physical and mental

conditions (Coon & Ernst 2002; Lu et al., 2009; Reay et al., 2005). More specifically, ginseng has certain pharmacological properties such as anti-aging, antioxidant, and anti-inflammatory (Coon & Ernst 2002; Lu et al., 2009). Although a randomized placebo-controlled clinical has claimed that ginseng has no beneficial effect on mood or memory in young healthy subjects (Cardinal & Engels 2001), Reay et al. have proved the improvements in mental fatigue after the consumption of 200 mg *ginseng* (Reay et al., 2005). Despite the increasing popularity of ginseng and its reported pharmacological effects, it is crucial to know whether there are any health risks for the consumer or not. Ginseng is generally considered safe, however excessive amount of ginseng has resulted in some side effects such as hypertension, diarrhea, and sleep disturbances (Coon & Ernst 2002).

Sugar

Scholey and Kennedy (2004) assessed the influence of energy drink ingredients including caffeine, glucose, ginseng and ginkgo, as well as a whole energy drink on multiple measures of cognition and mood. They found that whole energy drink intake improved attention and memory abilities such as immediate and delayed recall. Energy drinks contain approximately 27 g glucose per 8-oz serving for its energizing effects. Glucose is believed to improve some aspects of cognitive performance, notably spatial, logical, short- term and long-term memory yet the results are controversial. Adan et al. (2010) showed that caffeine and glucose, alone and together, reduced reaction time and together improved sustained attention and verbal memory (Adan et al., 2010) However Serra found no effect of caffeine and glucose, taken together, on sustained attention (Serra et al., 2010). Glucose has greater enhancing effect in older adults than younger adults and in tasks with high levels of difficulty or that require divided attention. Nonetheless,

excessive amount of sugar in energy drinks is highly possible to cause dental erosion, cavities, diabetes and obesity (Meikle et al., 2004).

Taurine

Taurine is a sulfur containing amino acid, derived from diet or synthesized from cysteine, mainly in the liver (Bouckenooghe et al., 2006). It is the most abundant amino acid (basic unit of proteins) found naturally in our bodies, primarily in the retina and skeletal and cardiac muscle tissue (Heckman et al., 2010). Also, it is highly concentrated in the heart and liver as well as the central nervous system including the brain stem and hippocampus (Giles et al., 2012). Taurine can be obtained from meat, fish and some dairy products. Average daily human intake of taurine is between 40 and 400 mg (Shao & Hathcock 2008). Recently, energy drinks such as Red Bull, Monster, and Rockstar are considered as the sources of taurine as well because they generally contain 1000 mg taurine per 8 oz. serving. Actually, energy drinks launched between 2004 and 2008 were evaluated for the presence of taurine. The results showed that 1 in 4 (27%) energy drinks in 2004 contained taurine, whereas it was reduced to 1 in 5 (21%) in 2008 (Mintel, 2009). This reduction could be due to a cost saving initiative or the incorporation of alternative ingredients in the product formulation.

Taurine plays very significant role in osmoregulation, membrane stabilization, neuroprotection and regulation of cellular calcium level (Ripps et al., 2012). Additionally, taurine has been seen to enhance endurance performance and to aid in the reduction of lactic acid buildup after exercise (Imagawa et al., 2009). Many researchers start to investigate the cognitive effects of taurine, suggesting that taurine may prevent or reverse neurotoxin-induced deficits in learning, memory, and long-term potentiation, but does not enhance cognitive performance in healthy, intact animals (Giles et al., 2012). Based on a report analyzing taurine content of 80

different energy drinks, the result demonstrates that the average concentration of taurine in energy drinks is 3180 mg/L which is equivalent to 753 mg/8 oz. (Triebel et al., 2007). Moreover, several studies have been conducted to determine the effect of taurine at various dosages ranging from 375 to 8000 mg/d and resulting in no adverse effects (Heckman et al., 2010). Other studies (Brons et al., 2004; Sirdah et al., 2002; Zhang et al., 2004) have also investigated the safety of taurine in humans and found no adverse effects. Although there is insufficient evidence to conclude that taurine will cause any adverse health effects, health-related concern still existed due to not enough research has been conducted on the effects of large quantities of taurine in combination with other ingredients commonly found in energy drinks.

Yerba Mate

Yerba mate is native to South America where its main function is for the production of yerba mate tea. Yerba mate tea is a commonly consumed beverage in South American countries and has been used for centuries. It continuously become more and more popular in global due to its content of a variety of bioactive components such as polyphenols, xanthines, flavonoids, saponins, amino acids, minerals, and vitamins and their associated health benefits. Yerba mate possesses anti-inflammatory and antidiabetic properties as well as acts as an inhibitor to oxidative stress. In addition, yerba mate is a central nervous system stimulant due to its high caffeine concentration, which is the primary reason for yerba mate to be incorporated into energy drink formulations. The caffeine concentration in 8 oz. of yerba mate tea is equivalent to about 78 mg, which is very comparable to 8 oz. of Red Bull, which contains 80 mg (Heck & Mejia, 2007). Health concerns have been raised since yerba mate consumption has been detected to be associated with occurrence of certain types of cancer, specifically oral, esophageal, lung, bladder, and renal. However, there lacks conclusive evidence that this association is a result of

the consumption of yerba mate but rather due to various lifestyle choices including smoking and excessive alcohol consumption (Heck & Mejia, 2007).

B Vitamins

B vitamins are a group of 8 individual water-soluble vitamins, usually referred to as the B complex when grouped together, and all play essential roles in cellular processes. Vitamin B deficiencies are rare since they can be found in various types of food, such as bananas, lentils, potatoes, tuna, and turkey. B vitamins are incorporated into many of the mainstream energy drinks, especially B2 (riboflavin), B3 (niacin), B6 and B12. Vitamin B2 is a coenzyme in the metabolism of carbohydrates. Vitamin B3 plays a major role as a coenzyme in energy metabolism, fat synthesis, and fat breakdown. Vitamin B6 is a group of 3 structurally similar compounds that all can be converted into the vitamin B6 coenzyme which aids in the utilization of carbohydrates, fats, and proteins (Wardlaw & Smith 2009). Vitamin B12 assists in folate metabolism and in nerve function. The container size varies among different brands and it may hold multiple servings. A typical can of 250 mL may contain 360% of the recommended daily allowance of B6, 120% of B12, and 120% of B3 (niacin). The addition of excess amounts of B vitamins is also observed in the more extreme energy drinks like 5-Hour Energy, which contains 8333% of the recommendation daily allowance for vitamin B12 and 2000% of the recommendation daily allowance for B6. It is claimed that the consumption of these large amounts of B vitamins increases mental alertness and focus, as well as improves mood (Wardlaw & Smith 2009). Since all of the B vitamins are water soluble, once the recommended daily allowance has been met, the excess vitamins are excreted from the body via urine. Although theoretically the consumption of a large amount of B vitamins does not possess any adverse health effects, healthy concerns related to extreme amounts of B vitamins in these beverages

deserves more attention. Table 2 is a summary of active ingredients in energy drinks and potential side effects associated with excessive amount of those ingredients.

Table 2.2 Summary of Active Ingredients in Energy Drinks and Their Side Effects

Active Ingredients	Related Side Effects
Caffeine	Nausea, Heart Palpitations, Ventricular and Atrial, Tachycardias, Headache, Insomnia, Anxiety, Irritability, Seizure, Hallucinations, Hypokalemia
Guarana	Insomnia, Nervousness, Restlessness, Tachycardias, Tremors, Anxiety, Chest Pain, Dysrhythmias
Ginseng	Insomnia, Breast Tenderness, Vaginal Bleeding, Amenorrhea, Tachycardia, Heart Palpitations, Hypertension, Edema, Headaches, Vertigo, Euphoria, Mania
Sugar	Dental Erosions, Cavities, Diabetes, Obesity
Bitter Orange	Myocardial infarction, stroke, seizure, hypertension, photosensitivity, dysrhythmias, migraine, headache
Taurine	There is insufficient evidence to prove that adverse effects can occur with taurine use.

Function of Energy Drinks

Energy drinks are beverages (e.g., Red Bull, Monster, Rockstar, Venom, Burn, and Adrenaline Rush) that contain large doses of caffeine, as well as other legal stimulants such as taurine, carbohydrates, guarana, and B-complex vitamins as active ingredients. Energy drinks are marketed under different brand names and each of them varies in the amount of active ingredients. Caffeine, for example, ranges from low 50 mg to an extremely high 505 mg per can or bottle. In 1960s, energy drink first appeared in Europe and Asia in response to consumers demand for a dietary supplement that would result in increased energy (Reissig et al., 2009). In

1962, a Japanese company, Taisho Pharmaceuticals, launched one of the very 1st energy drinks called Lipovitan D, which is nowadays still dominating the Japanese market. Lipovitan D contains B vitamins, taurine, and ginseng, which are all frequent components of mainstream energy drinks with the purpose of providing sustained energy and reducing mental and physical fatigue (Taisho Pharmaceutical Co. Ltd., 2009).

Whether energy drinks have specific impacts on human physiological and psychological performance or not has already been actively debated for years. Several researchers presented conflicting results based on their previous works. Some studies reported no significant differences in either the physiological or cognitive performance of individuals who have and have not consumed energy drinks (Alvarado & Jimenez 2004; Sancho & Jimenez 2005). However, many researchers are devoted to determine the behavioral effects brought by energy drinks to consumers, specifically to their mood, concentration, reaction time, alertness, endurance, physical performance, and risk taking. More specifically, a clinical study showed that individuals' secondary memory and speed of attention were significantly improved after consuming energy drink (Scholey & Kennedy 2004).

A number of studies especially investigated the effects of Red Bull on human cognitive performance and well being, suggesting that energy drink consumption brought positive impacts on consumers' behaviors (Alford et al., 2001; Seidl et al., 2000). Moreover, it has also been approved that the consumption of Red Bull is beneficial in improving aerobic endurance and anaerobic performance. Based on Geiss et al.'s (1994) study, there was a significant increase in overall physical endurance of trained athletes after the consumption of 250 mL of the Red Bull product (Alford et al., 2001). Furthermore, Smith et al. have reported that energy drinks had an energizing effect with the strongest effect between 30 to 60 minutes after consumption (Smith et

al., 2004). In addition, other evidence also supported that visual information processing, attention, and verbal reasoning have been improved after the consumption of energy drinks (Warburton et al., 2001). A study investigated the effect of an energy blend containing caffeine, taurine, glucuronolactone, vitamins and sugar on counteracting driver sleepiness and found that this blend was effective in reducing sleepiness and sleep-related driving incidents (Reyner & Horne, 2002).

Consumers' Profile

Energy drinks were initially consumed by athletes. However, as the energy drink market grows rapidly, athletes are no longer the primary targets. The majority of the consumers nowadays are teenagers and young adults aged from 18 to 34 years old due to their on-the-go lifestyles and receptiveness to advertisements for these types of products (Lal, 2007).

In addition to market reports, several researches also confirmed that young adults are more likely to consume energy drinks (Mintel, 2009; O'Brien et al., 2008). According to O'Brien et al (2008) and Mintel (2009), energy drink was popular among 34% of the younger population from 18 to 24 years old who also consider themselves as the regular energy drink users (O'Brien et al., 2008). Another study found that about 50% of college students consume at least 1 energy drink per month in order to increase their energy level, to compensate for a lack of sleep or to mix with alcohol (Mintel, 2009). Moreover, Experian Simmons Analysis provided the evidence to show that energy drink usage among adults rising from nearly 13% in 2006 to 17% in 2012.

Furthermore, there was a modest segment of heavy users: about 5% of adults consume energy drinks 5-7 times per month and less than 2% of them consume energy drinks 10 or more times per month.

The target market for energy drinks is broadening as new products are developed to reach certain submarkets and the energy drink companies are trying to differentiate themselves from their competitors. For example, in 2007, Del Monte Foods launched its first energy drink called Bloom Energy, claiming that it was formulated specifically with women in mind (Heckman, et al., 2010). Another brand, Energy Fizz, mainly focus on improving consumers' convenience by launching creative products such as a powder that is packaged in a small portable tube that can be easily added to water on the go to boost energy. Moreover, other energy drinks promote the unique qualities such as being all natural, organic, or gluten-free, as well as diabetic-friendly or vegetarian-friendly to make them stand out from the rest.

Consumption Pattern and Reasons for Use

Previous researches have investigated energy drink consumption patterns particularly among college students, due to the fact that the use of energy drink is quite common among younger generation. In general, the most common reasons for consuming energy drinks are to enjoy leisure time with friends, keep the individuals awake, increase level of energy and for better performance in driving, sports or exams (Alsunni & Badar, 2011). Malinauskas (2007) conducted a study to determine energy drink consumption patterns among 253 college students in several state universities in the Central Atlantic region of the United States. The result indicated that consuming energy drinks is a popular practice among college students for a variety of reasons. About 51% percent of the participants reported consuming more than one energy drinks each month in an average month for the current semester. The majority of users consumed energy drinks to compensate insufficient sleep (67%), increase energy (65%), and paired with another alcoholic beverages while partying (54%). Mixing energy drinks with alcohol was

common and was associated with more frequent alcohol consumption. O'Brien et al. indicated that almost 25% of all college student drinkers mix alcohol with energy drinks (O'Brien et al., 2008). Another study conducted with 439 healthy college student volunteers at a mean age of 22.8 years by Attila in 2011 suggested that nearly 15.2% of current energy drink users reported that they mixed energy drinks with alcohol, although 37.2% of students who had ever used an energy drink reported having mixed the energy drink with alcohol (Attila et al., 2011).

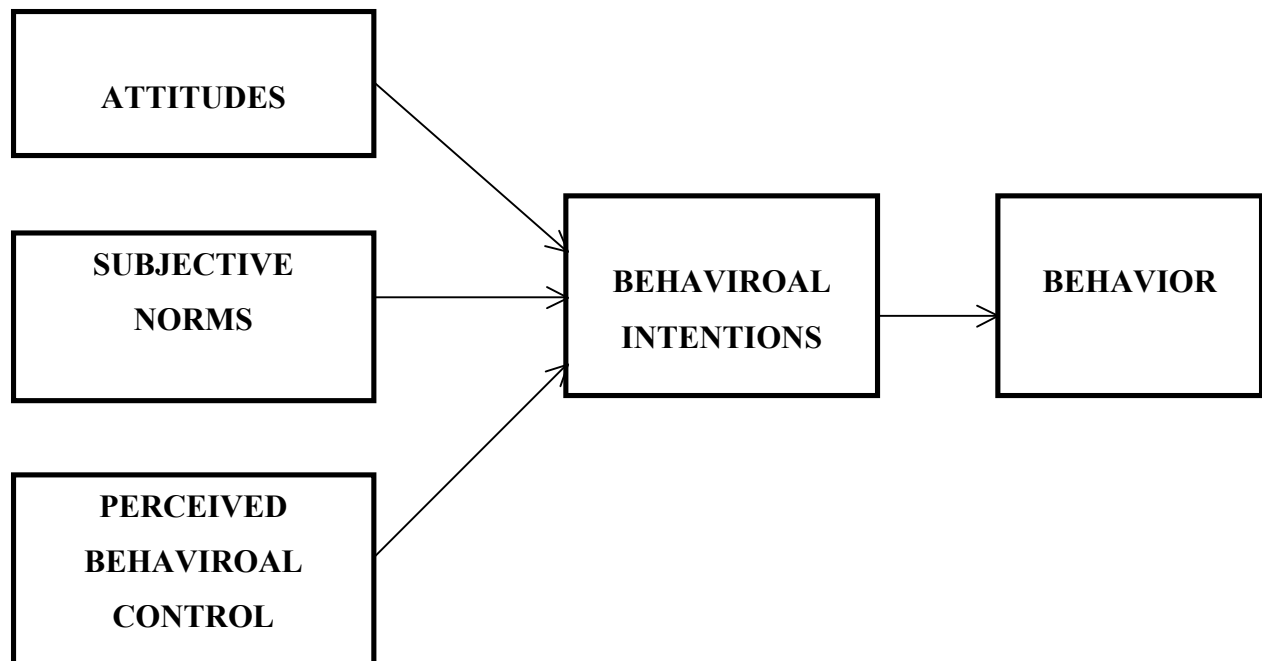
Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is one of the most well-studied and valuable theories for explaining and predicting behaviors (Zoellner et al., 2012). This theory has been applied to a wide variety of health contexts, including eating and drinking behaviors (Dunn et al., 2011; Kothe et al., 2012; Norman, 2011). This theory was proposed by Icek Ajzen to improve the validity of prediction of behavioral intentions based on the Theory of Reasoned Action by adding perceived behavioral control. According to the Theory of Reasoned Action, an individual's intention to perform a behavior is assumed to be the central determinant that the behavior will be performed. The TPB postulates three conceptually independent determinants of intention, including attitude, subjective norms and perceived behavioral control. As a general rule, the more favorable the attitude and subjective norms with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual's intention to perform the behavior under consideration (Ajzen, 2011).

Model

The Theory of Planned Behavior proposes a model about how human action is guided. It predicts the occurrence of a specific behavior provided that the behavior is intentional. Intentions are the precursors of behavior. Although there is not a perfect relationship between behavioral intention and actual behavior, intention can be used as a proximal measure of behavior. This observation was one of the most important contributions of the TPB model in comparison with previous models of the attitude-behavior relationship (Ajzen, 2011). The model is displayed in Figure 2.3 and represents the three variables (i.e., attitudes, subjective norms, and perceived behavioral control), which the theory suggests will predict the intention to perform a behavior.

Figure 2.3 Model of Theory of Planned Behavior



Attitudes

Attitude toward the behavior is a person's overall evaluation of the behavior, which can be either positive or negative. More favorable attitudes towards a behavior should increase behavioral intentions. Attitude construct comprises of two components: beliefs about consequences of the behavior (behavioral beliefs) and the corresponding positive or negative judgments about the behavior (outcome evaluations).

Nada et al. (2003) conducted a study to investigate soft drink consumption among female adolescents by using the Theory of Planned Behavior in 2003. Their results showed that attitude, subjective norm and perceived behavioral control had statistically significant positive associations with intention and together explained 64% of its variance. Although all attributes were significant predictors, attitude was detected to be the strongest predictor, followed by perceived behavioral control and subjective norms. More specifically, their regression explained 49% of the variance in attitude towards regular soda consumption. All the variables measured in their study associated with attitudes were considered to have predictive power, including "good taste", it quenched thirst, "make them feel healthy", "to gain weight" and "it had too much caffeine" (Nada et al., 2003). In addition, previous study confirmed that accessibility, modeling, attitudes and preferences were all strong determinants of adolescents' regular and diet soft drink consumption. Among them, preferences, accessibility, modeling and attitudes were the strongest determinants (Bere et al., 2008).

Subjective Norms

Subjective norms are a person's own estimate of the social pressure to perform or not perform the target behavior. Subjective norms are assumed to have two components which work in interaction: beliefs about how other people, who may be in some way important to the person, would like them to behave (normative beliefs) and the positive or negative judgments about each

belief (outcome evaluations). Many studies suggested that subjective norms have certain power to predict behavioral intentions (Nada et al., 2003; Bere, et al., 2008; Jamie et al., 2012). For example, Nada et al. concluded that parents and friends were very likely to influence adolescents' beverage consumptions. They further explained that both adolescent male and female consumed soft soda in order to enjoy leisure time with friends and participants were highly possible to prefer soft drink than other alternatives if sodas were available at home (Nada et al., 2003). Moreover, Kit et al. indicated that health professionals nowadays tend to have certain influence on sugar-sweetened beverages among youth and young adults in the United States (Kit et al., 2013).

Perceived Behavioral Control

The Theory of Reasoned Action was expanded to include the construct of perceived behavioral control based upon the premise that an individual's degree of confidence in one's own ability to engage in a behavior is a strong determinant of the behavioral intention (Ajzen, 2002). Perceived behavioral control is the extent to which a person feels able to enact the behavior. It has two aspects: how much a person has control over the behavior and how confident a person feels about being able to perform or not perform the behavior. It is determined by control beliefs about the power of both situational and internal factors to inhibit or facilitate the performing of the behavior. Previous studies related to food and beverage consumption concluded several possible factors affecting consumers' intentions of purchasing or consuming certain products, including availability, price, accessibility, taste, uncertainty, lack of information (Vermeir et al., 2006; Aertsens et al., 2009; Kassem et al., 2004; Zoellner et al., 2012)

Theory of Planned Behavior in Beverage Consumption

An increasing number of researchers have devoted their efforts into investigating beverage consumptions by using Theory of Planned Behavior (TPB) as the framework (Bere, Glomnes, Velde & Klepp, 2008; Horst, Kremers, Ferreira, Singh, Oenema & Brug, 2007; Kassem, Lee, Modeste & Johnston, 2003; Kassem, & Lee, 2004; Zoellner, Estabrooks, Davy, Chen & You, 2012). Cooke and Norman (2014) examined how well the Theory of Planned Behavior in predicting alcohol consumption by conducting a systematic review and meta-analysis. They analyzed 40 eligible studies in total to quantify correlations between variables of TPB, including attitude, subjective norms and perceived behavioral control, and intentions to consume alcohol. They also include other variables, such as pattern of consumption, gender and age of participants and their moderating effects on theory of planned behavior. According to their results, intentions had the strongest relationship with attitudes followed by subjective norms and perceived behavioral control. Perceived behavioral control had negative relationships with alcohol consumption. All moderators such as gender and age affected Theory of Planned Behavior relationships. For example, females reported stronger attitude–intention relations than males, and adults reported stronger attitude–intention (Cooke & Norman, 2014).

Bere, Glomnes, Velde and Klepp (2008) have conducted a study with 2870 9th and 10th grade students within 33 Norwegian schools to identify determinants of adolescents' consumption of carbonated soft drinks. They found a large gender differences in soft drink consumption and boys were tend to drink more often than girls. Also, educational, dieting, accessibility, modeling, attitudes and preferences all seem to be strong determinants of adolescents' soft drink consumption. For example, parents, as models of the behavior and as the ones deciding what foods and drinks should be available and accessible at home, clearly had

important influence on adolescents' soft drink consumption behaviors. Also, Grimm et al. (2004) found that soft drink intake in school-aged children was significantly correlated to taste preferences, habits of parents and friends, availability at home and school and social media such as television viewing (Grimm et al., 2004).

In 2012, Zoellner, Estabrooks, Davy, Chen and You explored the Theory of Planned Behavior to explain sugar-sweetened beverage consumption among adolescents, aiming to figure out which attribute has the most significant influence on beverage consumption behavior. The researchers conducted a cross-sectional study with 119 southwest Virginia participants. They found that behavioral intentions had the strongest relationships with sugar-sweetened beverage consumption, followed by attitudes, perceived behavioral control, and subjective norms. In a subsequent analysis, the authors controlled for age, sex, and education level. However, results indicated that the overall explained variance slightly increased yet these demographic variables were not significant in interpretation of the TPB coefficients (Zoellner et al., 2012). The authors claimed that this study was a preliminary step to expand investigation of sugar sweetened beverage consumption and they also suggested future scholars to repeat this study with larger and more diverse population.

Knowledge

According to Brucks (1985), there are three distinct categories of consumer knowledge relevant to consumer behavior, including subjective knowledge, objective knowledge and prior experience. Subjective knowledge refers to what individuals perceive that they know, also indicated as perceived or self-rated knowledge, incorporating the individual's degree of confidence in his/her own knowledge (Brucks, 1985). A low level of subjective knowledge, resulting from a lack of confidence in current knowledge, may motivate the search for additional

information, whereas a high level of subjective knowledge increases reliance on previously stored information (Brucks, 1985; Ruddell, 1979). Objective knowledge refers to what an individual actually knows, facilitating deliberation and the use of newly acquired information (Ruddell, 1979; Selnes & Gronhaug, 1986). Objective knowledge positively affects the number of attributes considered by an information-searching consumer (Brucks, 1985; Park & Lessig, 1981).

Knowledge was found to have certain influence on food consumption. Worsley (2002) conducted a study among 1040 participants, between 18–75 years old from England to explore whether nutrition knowledge change food behavior. Their results indicated that nutrition knowledge was significantly associated with healthy eating pattern such as regular fruit and vegetable intake. More specifically, knowledgeable individuals were 25 times more likely to consume adequate amounts of fruit and vegetables daily (Worsley, 2002). Another study carried out by Kim, Shin and Moon (2004) found that frequent-users for fast food had comparatively low knowledge score (15 out of 20) than the non-users (15.5 out of 20) and they were less aware of the fat type in food and the importance of breakfast (Kim, Shin, & Moon, 2004). Moreover, Kang, Park and Lee (2006) also conducted a research with 920 middle and high-school students in Korea to investigate beverage consumption and related factors among adolescents. They confirmed that drinking frequency for carbonated drinks decreased as the nutritional knowledge increased (Kang, Park, Cho, & Lee, 2006).

In addition, Aertsens et al. (2011) have found that knowledge influence the degree of attitude. They concluded that higher levels of objective and subjective knowledge about organic food are positively related to a more positive attitude towards organic food, greater experience of it and a more frequent use of information. For example, participants indicated that knowledge

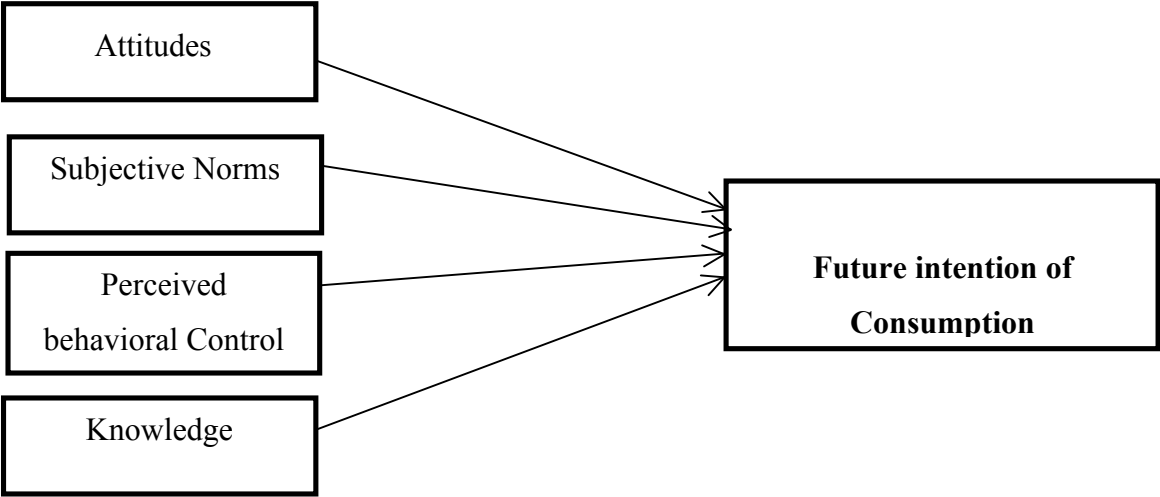
helped them to differentiate the attributes of organic food from conventional food. By understanding those factors, consumers perceived organic food to be more environmental friendly and healthier and thus form positive attitude towards organic food (Aertsens et al., 2011). Moreover, House et al. (2004) found that knowledge was important in the process of attitude-building towards genetically modified food among U.S., U.K. and French consumers. Higher levels of subjective knowledge were significantly and positively related to the willingness of consumers to intake genetically modified food, yet they did not observe this relationship for objective knowledge (House et al., 2004). The findings indicate that subjective knowledge is not only positively related to an individual's confidence in their knowledge, but also with stronger attitudes towards a product or behavior.

Furthermore, knowledge also directly influences the degree of perceived behavioral control toward behavior. Demeritt (2002) reported that lack of knowledge and awareness was considered to be the main reason for consumers not buying organic food in the U.S. The majority of respondents (59%) indicated that they have never considered organic products because they were not aware of these products. Moreover, it was also reported that 14% of non-buyers of organic food mentioned that there was not sufficient information to justify why they should pay premium price for organic products (Organic Centre Wales, 2004).

Extended Theory of Planned behavior

As mentioned above, attitudes, subjective norms, perceived behavioral control and knowledge are all perceived to bring influence consumers' consumption intentions. Those four attributes are included to form extended theory of planned behavior (Figure 2.4) as the framework for current study.

Figure 2.4 Model of Extended Theory of Planned Behavior



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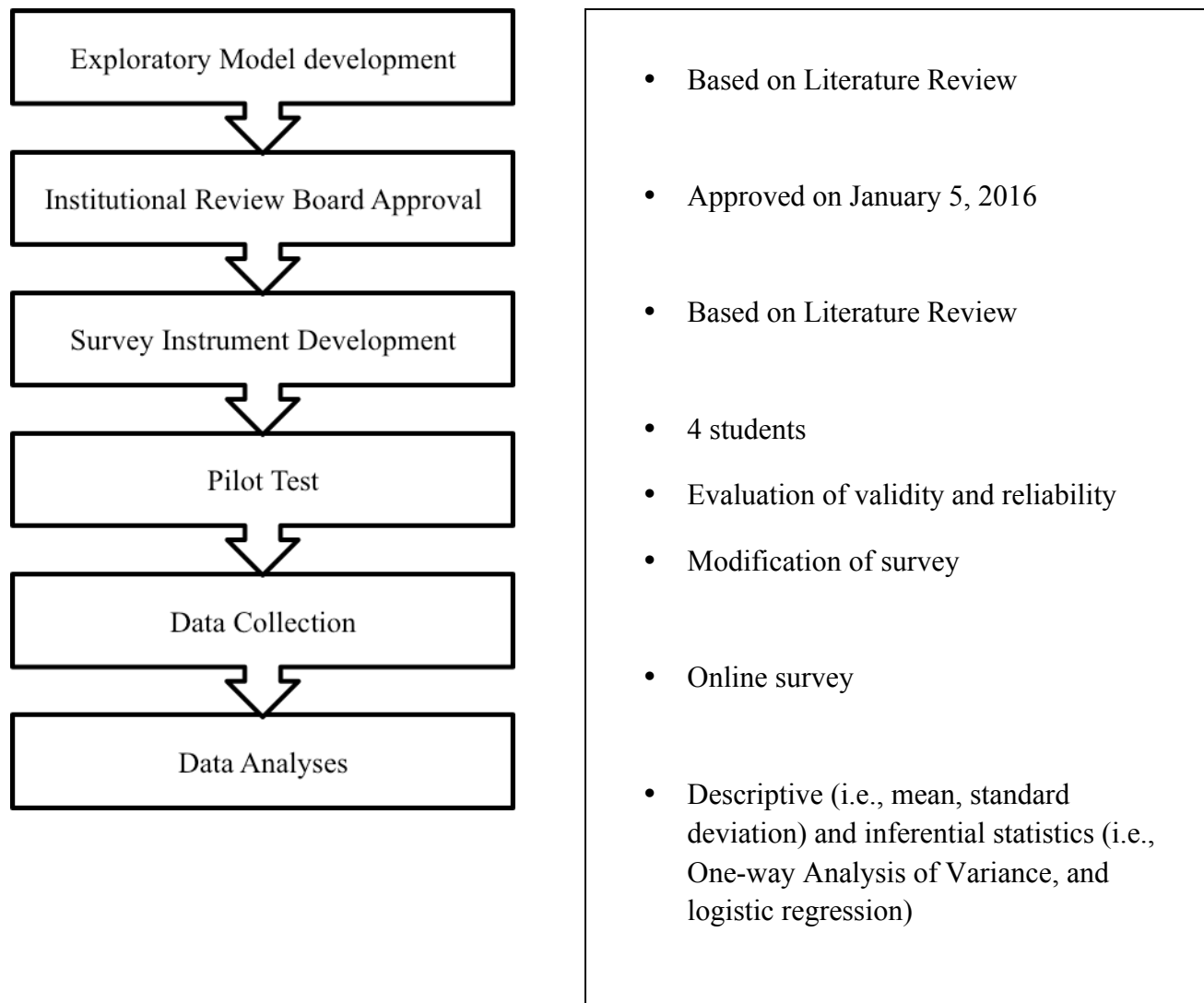
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CHAPTER 3 METHODOLOGY

The purpose of this study was to investigate consumer's energy drink consumption behavior based on Extended Theory of Planned Behavior. This chapter explained the sampling procedure, research design, data collection, and data analysis for this study. The flow chart below outlines the methodology of this research (Figure 3.1).

Figure 3.1 Research Flow Chart



Sampling and recruitment

The target population included in this study was the general public above 21 years old in the United States. A link accessed to the online questionnaire was posted on Amazon Mechanical Turk (MTurk). Amazon Mechanical Turk is a crowdsourcing Internet marketplace enabling individuals and business to coordinate the use of human intelligence (Paolacci et al., 2010). The functions include but not limited to recruiting participants for social science experiments and educational research, collecting and processing data. Mturk users are the general publics who have registered accounts that allow them to login and access the survey links. The targeted sample size was 500. Based on calculations, in order to narrow the margin of error to $\pm 5\%$, the sample population should include at least 500 randomly selected participants (Creative Research Systems, 2003).

Survey development

A cross-sectional design was applied for this study to collect data. Baumgartner and Hensley (2006) described a cross-sectional design as a “method for testing many groups and assuming each group is representative of all other groups when they are at the point in time (p. 181).” (Buchanan, 2012). The designed survey consisted of seven sections and the components of each section were described in details as the following.

Section 1: Demographic information

Basic demographic information of participants was collected in this section to describe the characteristics of the participants. There were five questions in total regarding to gender, age, educational level, occupation and yearly household income. All questions except occupation were formulated as multiple choices questions. Given the vast majority of previous researches related to energy drink consumption were conducted among college students; there was no reference for occupation category. Thus occupation was designed as the open-ended format,

allowing participants to specify their job titles. Age groups were classified into five categories, including 21-30 years old, 31-40 years old, 41-50 years old, 51-60 years old and 61 or older. Educational levels were categorized into six groups, including high school or GED, some college, associated degree, bachelor's degree and graduate's degree. The last question in this section asked about participants' yearly household income level.

Section 2: Product Information and Consumption Patterns

This section was designed to collect information regarding consumers' preferred brands of energy drinks and their habits of consuming energy drinks. A total of four questions were included, including preferred energy drink brands, reasons for use, frequency of consumption per week and amount of each consumption. Some of the examples of these questions were "Which energy drink brand do you consume the most?", "What are top three most important reasons that affect your energy drinks consumption?", "How frequently do you consume energy drink per week?", "What is the amount of each consumption of energy drink?"

Section 3: Attitudes towards Energy drinks

This section measured consumers' attitudes towards energy drinks. Eight items were adopted from a previous research titled "Qualitative Application of the Theory of Planned Behavior to Understand Beverage Consumption" (Zoellner et. al., 2012). The participants were asked to indicate how healthy energy drinks are and perceived benefits associated with consuming energy drink by rating all statements based on a 5-point Likert Scale, ranging from 1 being "disagree" to 5 "agree". These attitude statements are summarized in Table 3.1.

Table 3.1 Statements to Measure Attitudes towards Energy Drinks

Attitude Items
I think energy drink is healthy. I believe that energy drink could improve my physical performances. I believe that energy drink could improve my academic performances. I believe that energy drink could improve my athletic performances. I believe that energy drink could boast my energy and metabolic rate. I believe that energy drink could hydrate my body. I believe that energy drink could improve my attention. I believe that energy drink could improve my mood.

Section 4: Subjective norms

This section was designed to investigate whether recommendation from others would affect participants’ decision of consuming energy drinks. Participants were asked to rate individuals that influenced their decision to consume energy drinks. The statement read “Please indicate how likely each of the following individuals might influence your decision to consume energy drink, using a 5-point Likert Scale, ranging from 1 “very unlikely” to 5 “very likely”. Based on previous studies (Kassem et al., 2003; Zoellner et al., 2012), five options were included: parents, friends, celebrities (i.e., athletes, singers, and movie stars), media (i.e., advertisements on television or magazines), and health professionals.

Section 5: Perceived Behavior Control

This section was designed to identify the barriers that prevent consumers from drinking energy drinks. According to a researches conducted by Zoellner et al. (2012), previous studies related to beverage consumption, availability, cost, taste, improper serving size, negative beverage attributes such as serving temperature or unhealthy ingredients, preferred other alternatives, uncertainty or lack of information about the product played important roles in influencing customers’ decisions to consume beverages. Therefore, all of the above mentioned

factors were included in this section. Participants were asked to rate each item on a 5-point Likert Scale, ranging from 1 being “disagree” to 5 “agree”.

Section 6: Knowledge

Knowledge was assessed by seven questions, formulated as “true or false” (five questions) and multiple (two questions). The correct answer worth one point whereas the incorrect answer and “unsure” has no point. These questions measured the regulation and policies of energy drink products (example, “Food and Drug Administration has no regulation for caffeine content in energy drinks.”), recommended ways of consuming energy drinks (example, “Energy drinks can be mixed with alcohol beverages.”), active ingredients (example, “What are the top three active ingredients in energy drinks?”), and functions of active ingredients in energy drinks (example, “What is the main function of caffeine in energy drinks?”). The details of the knowledge are presented in Table 3.2.

Table 3.2 Items Included to Measure Participant’s Knowledge about Energy Drinks

Format	Statements
True or False	<ol style="list-style-type: none"> 1. It is recommended that energy drinks to be mixed with alcohol beverages. 2. Food and Drug Administration has no regulation for caffeine content in energy drinks. 3. There is no limit on consumption amount for energy drinks every day. 4. Energy drinks decrease human metabolic rate. 5. Many energy drinks might be rich in sugar.
Multiple choice questions with multiple answers	What are the top three active ingredients of energy drinks?
Multiple choice question with single answer	What is the main function of caffeine in energy drinks?

Section 7: Prior Experience and Consumption Intention

Participants were asked to indicate whether they have experienced any side effect associated with energy drink consumption and specify exact symptoms. Two questions were included in this section with one in “Yes or No” question format and one in multiple-answer format. Sample questions include “Have you ever experienced any side effects after consuming energy drinks?” and “What side effects have you experienced after consuming energy drinks?”.

The last two questions in the questionnaire aimed to investigate participants’ future intention of energy drink consumption. One “Yes or No” question asked participants to indicate whether they planned to consume energy drink in next week. Another multiple-choice question allowed them to indicate how frequently they intend to consume energy drink in next week.

Pilot study

Pilot study was conducted among four students, with the purpose of ensuring each question in the survey was understandable and to assess the clarity of words used, as well as the instructions. After the pilot study, three questions including “Do you think there is any benefit associated with consuming energy drinks?”, “Do you think there is any detrimental effect associated with consuming energy drinks?” and “Please indicate how much you agree with the following statements that related to potential detrimental effects associated with consuming energy drinks.” were omitted due to redundancy and confusion. The final survey contained 20 questions in total. Instruments included in online questionnaire were illustrated in Table 3.3.

Table 3.3 Measures included in Online Survey

Categories	Number of Questions Before Pilot Test (23 in total)	Number of questions after Pilot Test (20 in total)
Demographics	5	5
Production information	4	4
Attitudes towards energy drink	5	2
Subjective norms	1	1
Perceived behavioral control	1	1
Knowledge	5	5
Future consumption intention	2	2

Data collection

Qualified registered Amazon Mechanical Turk (Mturk) users have access to the survey link. The survey was available online starting from January 25th until the desirable number of participants was reached. Prior to completing the survey, participants had access to an initial page stating a waiver of informed consent and an invitation of participation. Also, participants were informed that their answers would be kept confidential. It was intended that the survey would take approximately 10 to 15 minutes to complete. This approximation was based on the results of the pilot test. Two screening questions were applied to select qualified respondents. The first question was “Have you ever consumed energy drinks?”. Respondents who answered “Yes” would be directed to the survey. Conversely, who answered “No” would be directed to the second screening question, asking whether they have intentions to consume energy drinks in near future. Only participants who answered “Yes” would be allowed to continue participating in the survey. It was initially determined that the survey would be closed when the number of responses reached 500. At the end, 539 usable surveys were collected within two days (January 25- January 27, 2016).

The internal reliability level was tested with Cronbach's alpha. Santos (1999) has indicated 0.7 to be an acceptable reliability coefficient therefore the cut off point for Cronbach's alpha was set as 0.7 in this study (Santos, 1999). The results of Cronbach's alpha test (Table 3.4) suggested that sets of questions were reliable. For example, attitude towards energy drink involved with health concerns and perceived benefits ($\alpha= 0.72$); subject norms ($\alpha=0.72$); and perceived behavioral control ($\alpha=0.70$).

Table 3.4 The Results of Cronbach's Alpha Test

Categories	Number of Items	Cronbach's alpha
Attitudes toward energy drink	8	0.72
Subjective norms	6	0.72
Perceived behavioral control	7	0.70

Data analysis

Using the software SPSS version 21.0, data were coded and later analyzed. First, frequencies and percentages for descriptive questions were run, as well as appropriate means and standard deviations were calculated. Ranking question regarding to reasons for consuming energy drink were recoded. Among six options, the top ranked item was recoded into "6", the second was recoded into "5", the third was recoded into "4", the fourth was recoded into "3", the fifth was recoded into "2" and the sixth was recoded into "1". For knowledge questions, the correct answers were recoded as "1" whereas the incorrect answer was recoded as "0". The total knowledge score was calculated by the "compute" function provided by SPSS before further analysis. A one-way ANOVA procedure was conducted to test the significant differences for each attribute based on demographic characteristics of participants. Logistic regression was used to identify variables that associated with the future consumption intention.

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CHAPTER 4 RESULTS

This chapter described energy drinks consumption patterns and reasons for use based on data collected. Relationships between attitudes, subjective norms, perceived behavioral control, and knowledge and energy drinks consumption intentions were investigated. The differences between above mentioned attributes and demographic characteristics of participants were also evaluated.

Demographics

The Energy Drink Consumption Survey was delivered through Amazon Mechanical Turk to the general public in January 2016. In total, 584 questionnaires were collected. Of those, 45 were excluded due to missing data. Thus, the final adjusted number of participants was 539. The detailed demographic characteristics of participants were summarized in Table 4.1 as below.

Among 539 participants, 226 are males and 273 are females. Despite the wide age range (21 to 61), close to 50% of them were between the age of 21 and 30 years ($n=251$; 46.6%). In addition, a total of 179 (33.2%) participants aged from 31 to 40 years whereas only 2.2% ($n=12$) are 61 or older. As for the education level, nearly 37.7% ($n=207$) reported they have some college or associate degree and 49.7% ($n=268$) have bachelor's degree or graduate's degree.

Respondents represented various occupations, with the most frequent job categories including: business and administration ($n=213$, 39.60%) such as managers, customer service associate, sales, government agent, administrative assistant, science and technology ($n=39$, 7.20%), healthcare ($n=33$, 6.15%), education ($n=33$, 6.15%), arts and social work ($n=18$, 3.30%), food service and production ($n=16$, 3.00%), and law enforcement and military ($n=12$, 2.20%). Besides that, about 12% ($n=63$) of the respondents are self-employed or homemaker and 7.6% of them ($n=41$) are students. As for the income level, most of the respondents ($n=128$;

23.70%) surveyed had yearly income of less than U.S. dollar 35,000. Approximately 25% of participants (n=133) earned more than U.S. dollar 65,000 per year.

Table 4.1 Characteristics of the Respondents (n=539)

<i>Characteristics</i>	<i>n</i>	<i>%</i>
Gender		
Male	226	49.4
Female	273	50.6
Age (years)		
21-30	251	46.6
31-40	179	33.2
41-50	71	13.2
51-60	26	4.8
61 or older	12	2.2
Education level		
High school or GED	68	12.6
Some college	139	25.8
Associate degree	64	11.9
Bachelor's degree	195	36.2
Graduate's degree	73	13.5
Job Category		
Business and Administration	213	39.6
Engineering and Construction	34	6.3
Food service and production	16	3.0
Science and Technology	39	7.2
Law Enforcement and Military	12	2.2
Arts and Social Work	18	3.3
Healthcare	33	6.15
Education	33	6.15
Student	41	7.6
Self-employed/Homemaker	63	11.6
Retired/Unemployed	37	6.9
Income		
<\$20K	108	20.0
\$20-\$34.999	128	23.7
\$35-\$49.999	92	17.1
\$50-\$64.999	78	14.5
>\$65K	133	24.7

Energy Drinks Consumption

In addition to participants' basic demographics, other data was collected to understand preferred energy drink brands, consumption amount, as well as reasons for use of energy drinks. Table 4.2 shows that among the five common energy drink brands in the United States, Red Bull ranked the top brand, which was indicated as the most frequently purchased brand by 48.8% (n=263) of the participants in this study. Monster was preferred by 30% (n=158) of the participants, ranking the second. Rockstar was the third most popular selling energy drink brand, with a total of 9.6% (n=52) respondents frequently purchased, followed by NOS (n=14; 2.6%) and AMP (n=16; 3.0%). However, 6.7% (n=37) participants reported that they usually consume other energy drink brands, such as Five-hour energy, Kickstart produced by Mountain Dew, Starbucks doubleshot and Venmon. Most of participants indicated that they either consumed energy drink two to three times per month or only during special occasions such as exam week or when participating in sports activities. A total of 402 participants (74.6%) indicated that they usually consumed one can or bottle each time they drank the energy drinks.

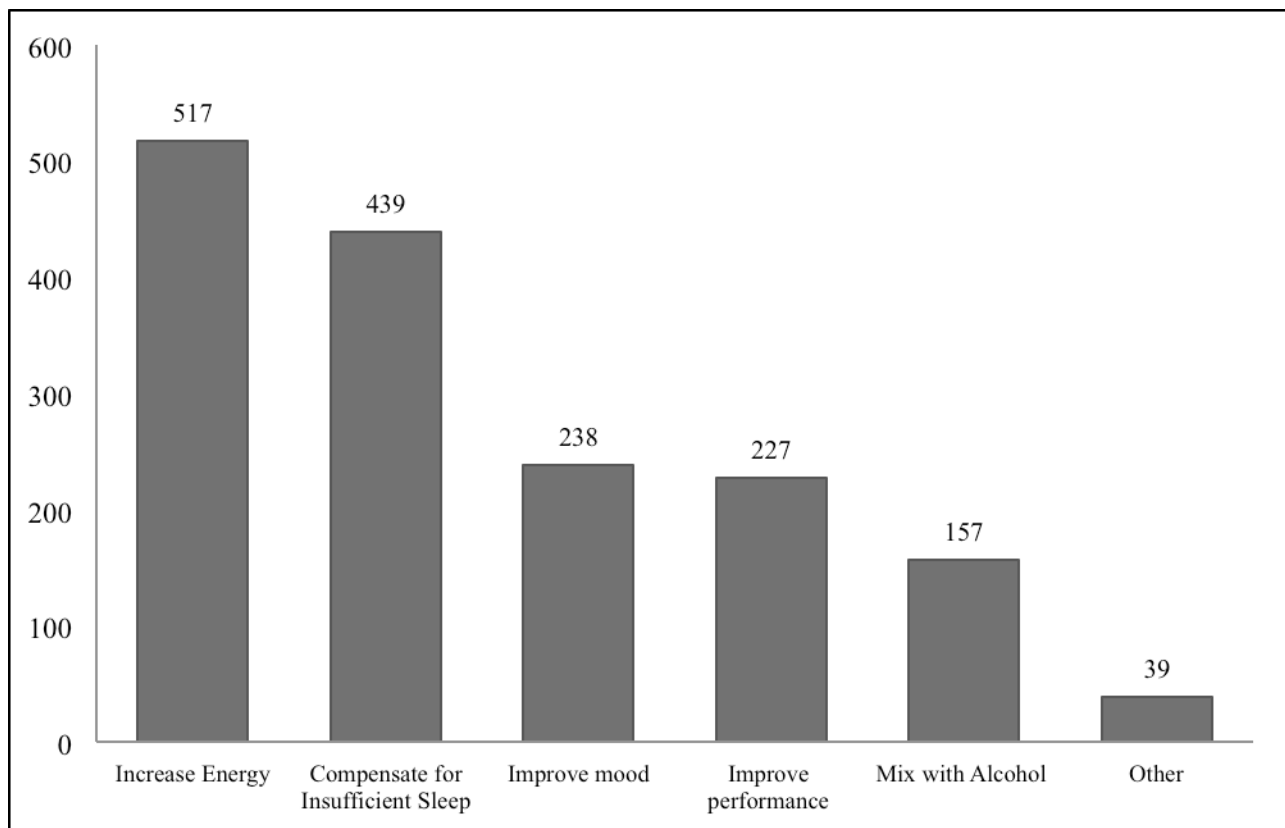
Table 4.2 Energy Drinks Consumption: Brands, Frequency and Amount (n=539)

<i>Energy Drinks Consumption</i>	<i>n</i>	<i>%</i>
Brand of Energy drinks		
Red Bull	263	48.8
Monster	158	29.3
Rockstar	52	9.6
NOS (Coca-Cola)	14	2.6
AMP (PepsiCo)	16	3.0
Other	36	6.7
Frequency		
2-3 times per month	175	32.5
A few times per week	141	26.2
Once a day	54	10.0
During Certain occasions	169	31.4
Amount of each consumption		
More than 1 can (or bottle)	72	13.4
1 can (or bottle)	402	74.6
Less than 1 can (or bottle)	65	12.0

Reasons for Consumption

The majority of participants indicated that they consumed energy drink for the purpose of increasing energy (n=517), and compensating for insufficient sleep (n=439; 81.4%), especially under energy-requiring circumstances, such as preparing for exam, doing projects and going on a road trip. Improving mood and psychomotor (n=227, 42.1%), as well as physical performance were also considered as another main reason why participants chose to consume energy drinks. In addition, energy drinks were used as the mixer for alcoholic beverages by 157 (29.1%) of participants in this survey. Participants also specified other reasons for consuming energy drinks, for instance, liking its unique taste (n=27, 5.0%), promoting personal health (n=5, 0.9%) quenching thirst (n=3, 0.5%). The results were demonstrated in Figure 4.1 as the following.

Figure 4.1 Reasons for Energy Drinks Consumption



Attitudes towards Energy Drink Consumption

All participants were asked to rate their agreement on overall attitude towards energy drink regarding to whether energy drink is healthy, and also if there was any benefits associated with consuming energy drink. These ratings were based on a five-point Likert scale, ranging from 1 being “Disagree” to 5 being “Agree”. Table 4.3 summarizes how strongly participants agreed that energy drinks is healthy and their perceived benefits of drinking energy drink. The majority (n=368, 68.7%) of participants either somewhat disagreed or disagreed that energy drink is healthy. However, as for the benefits of consuming energy drinks, close to 51% (n=196) of the participants were somewhat agreed that drinking energy drinks could improve their metabolic rate. Moreover, slightly more than 82% (n=315) and 72% (n=273) of participants believed that energy drinks improves their attention and mood respectively. In addition, other benefits such as improving physical, athletic and academic performances were also perceived by respondents, yet nearly half of them (54.6%, n=209) expressed disagreement with the statement that energy drinks help body to get hydrated. There is no difference in attitude towards energy drinks based on demographic characteristics of respondents.

Table 4.3 Attitudes of Respondents about Consuming Energy Drink (n=383)

<i>Items</i>	<i>Mean±SD</i>	<i>Disagree</i>	<i>Somewhat at Disagree</i>	<i>Neither agree nor disagree</i>	<i>Some what Agree</i>	<i>Agree</i>
		← <i>n (%)</i> →				
I believe that energy drink could boast my energy and metabolic rate.	4.19±0.8	1 (0.3)	21 (5.5)	25 (6.5)	196 (51.2)	140 (36.6)
I believe that energy drink could improve my attention span.	3.99±0.9	12 (3.1)	16 (4.2)	40 (10.4)	215 (56.1)	100 (26.1)
I believe that energy drink could improve my mood.	3.82±0.9	11 (2.9)	20 (5.2)	79 (20.6)	193 (50.4)	80 (20.9)
I believe that energy drink could improve my academic performances.	3.46±1.0	19 (5.0)	55 (14.4)	94 (24.5)	161 (42.0)	54 (14.1)
I believe that energy drink could improve my athletic performances.	3.43±1.1	25 (6.5)	60 (15.7)	83 (21.7)	157 (41.0)	58 (15.1)
I believe that energy drink could hydrate my body.	2.55±1.3	104 (27.2)	105 (27.4)	65 (17.0)	79 (20.6)	30 (7.8)

Five-point Likert Scale: 1=Disagree; 3=Neither agree nor disagree; 5=Agree

SD= Standard Deviation

Subjective Norms

Participants were asked to indicate whether their behavior of drinking energy drink was influenced by a third party. As shown in Table 4.5, friends were most likely to affect participants' decisions to consume energy drink (3.23±1.3). Approximately 44% (n=233) of participants reached the agreement that their decisions were affected by the health professionals. Moreover, 69.2% (n=373) of participants disagreed that their decisions would be influenced by favorite celebrities, such as sports players, singers, and movie stars.

Similarly, 55.5% (n=299) of participants disagreed that social media such as advertisements appearing on the Internet or television, reports showing on the newspaper or magazines, or posters influenced their energy drink consumption. Based on the results, parents are most unlikely to influence one's decision of consuming energy drink since only 2.8% (n=15)

of participants agreed that parents affect their consuming behaviors. In addition, participants also suggested that other individuals, including those who have very intimated relationships with them such as husband, wife, girlfriend, boyfriend, kids and siblings, have comparatively strong influence on their decisions. Besides that, a total of 22 participants (4.1%) indicated that that co-workers and boss, roommates and neighbors have certain influential powers as well. There is no difference in subjective norms based on the demographic characteristics of respondents.

The detailed results of the subjective norms are presented in Table 4.4.

Table 4.4 Subjective Norms of Respondents about Consuming Energy Drink (n=539)

<i>Items</i>	<i>Mean±SD</i>	<i>Disagree</i>	<i>Somewhat Disagree</i>	<i>Neither agree nor disagree</i>	<i>Some what Agree</i>	<i>Agree</i>
		←————— <i>n (%)</i> —————→				
Friends	3.23±1.3	87 (16.1)	87 (16.1)	59 (10.9)	227 (42.1)	79 (14.7)
Health professionals	2.88±1.4	141 (26.2)	81 (15.0)	84 (15.6)	168 (31.2)	65 (12.1)
Social Media	2.43±1.3	185 (34.3)	114 (21.2)	83 (15.4)	139 (25.8)	18 (3.3)
Favorite Celebrity	2.12±1.2	228 (42.3)	145 (26.9)	60 (11.1)	88 (16.3)	18 (3.3)
Parents	1.99±1.2	248 (46.0)	152 (28.2)	50 (9.3)	74 (13.7)	15 (2.8)
Other	2.45±1.3	192 (35.6)	49 (9.1)	193 (35.8)	72 (13.4)	33 (6.1)

Five-point Likert Scale: 1=Disagree; 3=Neither agree nor disagree; 5=Agree

SD= Standard Deviation

Perceived Behavioral Control

According to the results, a total of 475 (88.1%) participants indicated that taste (4.34±0.9) is one of the main barriers that keeping them away from consuming energy drink. Another main obstacle was the cost (4.34±0.9). Besides, availability (3.82±1.1) was considered to have significant influence on the participants' energy drink consumption. In addition, the results showed that the participants were unwilling to consume energy drink if they have uncertainty or

insufficient information about the products or if they prefer other alternatives such as tea, coffee and various soft drinks. A total of 133 respondents agreed that negative beverage attributes was a detrimental factor affecting their decisions to consume energy drink, including improper serving temperature (coldness), color of the liquid and appearance of the can (or bottle). Moreover, participants also mentioned that bad reviews from social media as well as poor words of mouth would discourage them to consume energy drinks.

Table 4.5 Perceived Behavioral Control of Respondents about Consuming Energy Drink (n=539)

<i>Items</i>	<i>Mean±SD</i>	<i>Disagree</i>	<i>Somewhat at Disagree</i>	<i>Neither agree nor disagree</i>	<i>Some what Agree</i>	<i>Agree</i>
		←————— <i>n (%)</i> —————→				
Taste	4.34±0.9	14 (2.6)	20 (3.7)	30 (5.6)	179 (33.2)	296 (54.9)
Cost	4.34±0.9	11 (2.0)	31 (5.8)	26 (4.8)	166 (30.8)	305 (56.6)
Availability of information	3.90±1.0	64 (11.9)	80 (14.8)	150 (27.8)	150 (27.8)	95 (17.6)
Prefer other alternatives	3.90±1.0	20 (3.7)	42 (7.8)	91 (16.9)	205 (38.0)	181 (33.6)
Availability	3.82±1.1	38 (7.1)	34 (6.3)	69 (12.8)	244 (45.3)	154 (28.6)
Beverage attributes (serving temperature, appearance, etc.)	3.46±1.3	55 (10.2)	83 (15.4)	94 (17.4)	174 (32.3)	133 (24.7)
Serving size	3.12±1.3	82 (15.2)	108 (20.0)	110 (20.4)	143 (26.5)	96 (17.8)
Other	3.24±1.2	133 (24.7)	21 (3.9)	251 (46.6)	64 (11.9)	70 (13.0)

Five-point Likert Scale: 1=Disagree; 3=Neither agree nor disagree; 5=Agree

SD= Standard Deviation

A one-way ANOVA procedure was conducted to test the significant differences for each item in the perceived behavior control scale based on demographic characteristics of participants. The differences were significant for two items in the age groups. More specifically, participants

aged from 21 to 30 years old considered availability as one of the barriers (3.88 ± 1.1), yet elder respondents at 61 or older did not ($2.83 \pm 1.5, p < .05$). In addition, compared to young adults at an age group of 21 to 30, participants at 51 to 61 showed that they preferred to consume other drinks instead of energy drinks ($4.27 \pm 1.0, p < .05$). Moreover, participants at 41 to 50 age group indicated agreed more that improper serving size, such as improper size (3.48 ± 1.3) was barrier for consuming energy drinks than younger participants in the 21 to 30 age group (3.03 ± 1.3).

Knowledge

To assess the knowledge of participants about energy drinks, they were asked to answer a series of questions (shown as Table 4.6) related to energy drink, such as ingredients of energy drink, as well as their functions and regulation policies about energy drink products. The maximum knowledge score was nine points. As presented in Table 4.8, the highest score by the entire participant was eight points, while the lowest score was zero point. The average score was 4.63 ± 1.30 , with 45.3% of participants ($n=150$) and 31.2% ($n=168$) have a total knowledge scores of 4 points and 5 points respectively. A total of 467 (86.6%) participants provided correct answer for “*Energy drinks decrease human metabolic rate*”, indicating they have basic knowledge of functions of energy drinks. However, 70.5% ($n=380$) of participants provided a wrong answer for “*Food and Drug Administration has no regulation for caffeine content in energy drinks*”, indicating that participants were unfamiliar with the regulation policies of energy drink products. The participants were also asked to select the top three active ingredients in an energy drink. A large number of participants were able to correctly select one or two items out of seven items provided but not all three of the active ingredients, including caffeine, taurine, and guarana. Thus only 7.2% ($n=40$) of the participants answered all three ingredients correctly. The last question examined the main function of caffeine in energy drink. Based on the results, about 95% ($n=511$) participants were able of identifying the main function of caffeine in energy drinks.

Table 4.6 Respondents' Answers to Knowledge Questions (n=539)

<i>Questions</i>	<i>Answer Correctly</i>	<i>Answer Incorrectly</i>
Please indicate whether the following statements are true or false.		
1. It is recommended that energy drinks to be mixed with alcohol beverages. (F)	61 (11.3)	478 (88.7)
2. Food and Drug Administration has no regulation for caffeine content in energy drinks. (T)	159 (29.5)	380 (70.5)
3. There is no limit on consumption amount for energy drinks every day. (F)	287 (53.2)	252 (46.8)
4. Energy drinks decrease human metabolic rate. (F)	467 (86.6)	72 (13.4)
5. Many energy drinks might be rich in sugar. (T)	165 (30.6)	374 (69.4)
What are the top three active ingredients of energy drink?		
Caffeine ^a	503(93.3)	36(6.7)
Sugar	115(21.3)	424(78.7)
Taurine ^a	241(44.7)	298(55.3)
Guarana ^a	102(18.9)	437(81.1)
B Vitamins	401(74.4)	138(25.6)
Carnitine	514(95.4)	25(4.6)
Ginseng	459(85.2)	80(14.8)
What is the main function of caffeine in energy drink?	511 (94.8)	28 (5.2)
Increase metabolic rate		

^a Correct answer

Table 4.7 Distribution of Total Knowledge Score (n=539)

Total knowledge Score	n	%
0.00	1	0.2
1.00	6	1.1
2.00	19	3.5
3.00	68	12.6
4.00	150	27.8
5.00	168	31.2
6.00	85	15.8
7.00	38	7.1
8.00	4	0.7

Side Effects of Consuming Energy Drink

According to the results, closely 71% (n=287) of participants have experienced some side effects after consuming energy drinks. Results showed that shaking and palpitation were the most frequent side effects, with 26.1% (n=75) and 22.7% (n=65) participants indicating that they had such experience before. Agitation (n=52, 18.1%), insomnia (n=27, 9.4%), headache (n=25,

8.7%) and chest pain (n=23, 8.0%) were also identified as other side effects. Moreover, 11 participants reported that they had dizziness and another four participants said that they experienced gastrointestinal upset after drinking energy drinks. In addition, four participants who selected “other” indicated that drinking energy drinks would cause opposite effect such as feeling sleepy as well as cavities. Results demonstrated in Table 4.8 as below.

Table 4.8 Side Effects of Consuming Energy Drink (n=539)

<i>Side Effects of Consuming Energy Drink</i>	<i>n</i>	<i>%</i>
Experience of Side Effect		
Yes	287	70.7
No	252	29.3
Types of Side Effects ^a		
Shaking	75	26.1
Palpitations (fast heartbeat)	65	22.7
Agitation	52	18.1
Insomnia	27	9.4
Headache	25	8.7
Chest pain	23	8.0
Dizziness	11	3.8
Gastrointestinal upset	4	1.4
Other	4	1.4
Paraesthesia (tingling or numbing of the skin)	1	0.4
Respiratory distress	0	0

^a N=287

Future Consumption Intentions

Table 4.9 describes participants’ intention of consuming energy drinks in near future. A total of 315 (58.4%) participants indicated that they have intentions to consume energy drinks next week. However, only 26 (8.3%) of them planned to consume energy drink every day. Close to 31% (n=97) of 315 respondents reported that they were likely to consume energy drink one or two times in next week, yet the majority of them (n=113) pointed out that their frequencies of energy drink consumption were depended on specific situations.

Table 4.9 Future consumption Intentions of Energy Drink (N=539)

<i>Items</i>	<i>n</i>	<i>%</i>
Future Consumption Intention		
Yes	315	58.4
No	224	41.6
Frequency of Future Consumption ^a		
Everyday	26	8.3
More than 5 days a week	18	5.7
3-5 days a week	61	19.3
1-2 days a week	97	30.8
Unsure/Depends on situations	113	35.9

^aN=315

Results from logistic regression analyses examining demographics, three constructs of TPB, knowledge and previous side effects on future intention of energy drink consumption. In the first model, four variables, including gender, age, education level, and household income were entered as predictors. The model was not a very good fit, with Nagelkerke $R^2=0.061$, explaining 6.1% of the variance. The model could only differentiate whether the participants would consume energy drinks in the future with an accuracy of 56.2%. Among these variables, gender and income were significant predictors with female ($B=.546$), those who have higher income ($B=.272$) were more likely to consume energy drinks in the future.

In the second step, three variables of TPB, attitudes, subjective norms and perceived behavior control were entered. The chi-square that was significant ($\chi^2=38.33, p<.001$) and the new model was significant improved. The accuracy of prediction also improved to 67.5%. The model has a Nagelkerke R^2 value of 0.183 or 18.3% of variance. The logit model showed that two of these three constructs, attitudes toward energy drinks (Wald = 25.49, $p<.001$) and perceived behavior control (Wald = 8.47, $p<.01$) were significant predictors in the model. Participants with more positive attitude ($B=.137$) and lower perceived behavior control ($B=-0.75$) would more likely to consume energy drinks in the future. Furthermore, those with better attitude were 1.15 times more likely to consume energy drinks in the future. Contrary, those have higher

barriers were slightly less likely (odd ratio= 0.93) to consume energy drinks in the future. In addition, income was detected to have significant influence on consumption intentions in this step, indicating those who have higher income ($B=.83$) were more likely to consume energy drinks in near future.

In the third model, two other variables, knowledge scores and past experience of having side effects ensued consuming energy drinks were entered. These two variables have insignificant contribution to the entire model ($p=.82$), even though the entire model was significant ($p<.001$).

Table 4.10 Logistic Regression of Variables Predicting the Future Consumption of Energy Drinks (N=315)

<i>Variables</i>	<i>B</i>	<i>Wald</i>	<i>Exp (B)</i>	<i>95% CI</i>	<i>B</i>	<i>Wald</i>	<i>Exp(B)</i>	<i>95% CI</i>	<i>B</i>	<i>Wald</i>	<i>Exp(B)</i>	<i>95% CI</i>
Constant	1.42	9.05**	.24		-.79	.61	2.20		-.92	.72	2.52	
Gender	-.55	6.88**	.72	(.38, .88)	-.50	5.02*	1.65	(.39, .94)	-.51	5.08**	1.66	(.39, .94)
Age	-.10	.85	1.11	(.73, 1.12)	-.21	3.26	1.23	(.65, 1.02)	-.22	3.37	1.24	(.64, 1.02)
Educational Level	-.27	9.61**	1.31	(.64, .91)	-.29	9.72**	1.34	(.62, .90)	-.29	9.82**	1.34	(.62, .90)
Income	.09	1.36	.92	(.94, 1.26)	.19	5.67*	.83	(1.04, 1.42)	.19	5.44*	.83	(1.03, 1.42)
Attitudes					.14	25.49***	.87	(1.09, 1.21)	.14	24.43***	.87	(1.09, 1.21)
Subjective Norms					.02	.63	.98	(.97, 1.08)	.02	.70	.98	(.97, 1.08)
Perceived Behavior Control					-.08	8.47**	1.08	(.88, .98)	-.07	7.92**	1.08	(.88, .98)
Knowledge Level									.05	.26	.96	(.88, 1.25)
Previous Side Effects									-.11	.22	1.12	(.56, 1.43)
-2 log Likelihood	507.89				469.57				469.18			
Model χ^2	.05**				.14***				.14***			
Nagelkerke R^2	.06				.18				.18			

CI=confidence interval

*** $p < .001$ ** $p < .01$ * $p < .05$

CHAPTER 5 DISCUSSION AND IMPLICATIONS

The purpose of this study was to investigate factors affecting consumption intentions of energy drinks based on Extended Theory of Planned Behavior. This discussion section compared the results of current study with similar studies previously conducted by other researchers and also discussed the theoretical and practical implications of the study.

Discussion of Results

The participants of this study revealed that energy drinks consumption was more prevalent among young adults and slightly more popular in females (n=273, 50.6%) than males (n=226, 49.4%). The most frequently consumed energy drink brands reported were: Red Bull (48.8%), Monster (29.3%) and Rockstar (9.6%). These findings are consistent with previous studies (Brenda et al., 2007; Cayley et al., 2012). For example, Cayley et al. (2012) reported that nearly 40% of 585 college students (n=234) consuming energy drinks in the past month and the most common energy drink brands selected by the participants were Red Bull (18.6%), Monster (18.1%), Rockstar (9.8%), AMP (8.1%) and 5-h energy (7.8%). Also, Brenda et al. (2007) pointed out that about 51% of 496 participants aging from 21 to 25 years old consumed more than one energy drinks each month.

Although evidence is lacking on explaining why Red Bull is more popular than other brands, but Red Bull seems to be very successful in implementing appropriate marketing strategies, such as precisely targeting their primary customers and promoting their products through various social media platforms including YouTube, Facebook, Twitter and Instagram. It also carefully design its distribution and communication strategies and do things differently compared to its competitors (Mint Innovation, n.d.). In addition, Red Bull also demonstrates its general sprit of being active and energetic by sponsoring extreme sporting events and athletes all

over the world as well as establishing a research foundation called Wings for Life to support spinal cord research (Mint Innovation, n.d.). Future studies could explore and compare marketing strategies for each of energy drinks companies to understand which techniques are the most cost-effective ways to gain popularity and market shares.

Because of the amounts and types of active ingredients, such as caffeine, taurine, guarana, ginseng and B vitamins in the products, energy drinks are especially effective in boosting energy and stimulating human metabolic rates. Individuals consume energy drinks for various reasons and under different circumstances. Previous studies conducted among college students suggested that, the majority of students (67%) consumed energy drinks in order to compensate for insufficient sleep and about 65% of energy drink users in college drank energy drinks when they needed extra energy (Brenda et al., 2007). Results from this study were consistent with previous findings, indicating that increasing energy (n=517) and compensating for insufficient sleep (n=439) were the main reasons for participants to consume energy drinks.

In addition to this, many researches examined the effects of energy drinks on psychomotor and athletic performance. Alford et al. (2001) provided clinical evidences that Red Bull energy drink brought positive effects on participants' physical performance. This particular brand of energy drinks also enhanced both aerobic and anaerobic endurance and improved mental performance, cognitive level and alertness (Alford et al., 2001). In this study, a total number of 465 participants also pointed out that they consumed energy drinks to improve mood as well as athletic performances. Moreover, a few participants (n=157) indicated that they would mix energy drinks with other alcoholic beverages. Similarly, Malinauskas et al. (2007) found that approximately 54% of energy drink consumers (n=268) reported drinking energy drinks mixed with alcohol, with nearly 49% of them used more than three energy drinks per occasion. Notably,

college students were found to be frequent users who ingest energy drinks with alcohol. In a survey conducted with 496 college students, about 27% of participants reported mixing alcohol and energy drinks in the past month (Chad, 2008). Mixing energy drinks with alcohol was associated with alcohol dependence (Arria et al., 2011) and greater amount of alcohol consumption (Peacock et al., 2013), resulting in injuries and hurts caused risky behaviors. The practice of mixing energy drinks with alcohol seems to be common, despite the fact that this practice is not encouraged. This might be due to the lack of education, knowledge, and regulatory requirements by the government. Regulation of energy drinks such as content labeling and health warnings vary across the countries worldwide. For example, according to australianbeverages.org, energy drinks are regulated by the Australia New Zealand Food Standards Code and are abided to the same regulations as the formulated caffeinated beverages. The code specifies maximum levels of substances can be added to an energy drink and also states that a formulated caffeinated beverage must not be mixed with a non-alcoholic soft drink to form a product.

Furthermore, Australia also has specific labeling requirements, stating that declarations of the average quantities, per serving size and per 100mL, of caffeine must be posted. Additionally, it must be stated that the drinks are not recommended for children, pregnant or lactating women, or caffeine sensitive persons. In Canada, energy drinks are classified and regulated as conventional food products under the Food and Drugs Act and Food and Drug Regulations. Other countries such as Norway, Uruguay and Denmark have even banned Red Bull because of its negative health effects.

However, a fact sheet provided by Francis King Carey School of Law at University of Maryland points out that U.S. Food and Drug Administration (FDA) does not require but

encourage manufacturers to disclose the amount of caffeine, the primary active ingredient in energy drinks, in their products. Although Red Bull indicates that it voluntarily places the caffeine content on its products, for other manufactures, this action is voluntary. Moreover, The FDA does not currently regulate other ingredients frequently used in energy drinks, so levels of these ingredients may vary between brands. Since the United States is the largest market for energy drinks in the world, the federal agencies such as Food and Drug Administrations (FDA) should address the potential risks of combining energy drinks with alcohol. Existing clinical evidences suggested that consumers should restrict their combined guarana and caffeine intake to less than 300 mg per day to avoid harmful effects (Clauson, 2008). Similarly, future clinical researches could focus on figuring out the proper amount of energy drinks that could be used to mix with alcohol. In addition, while energy drinks are safe for the majority of consumers when used in moderation, the high caffeine content causes serious health risks for certain populations include pregnant or lactating women, patients with diabetes, peptic ulcer disease, or pre-existing cardiovascular conditions, such as hypertension and congestive heart failure. Thus, a health warning should be place on the products to limit vulnerable populations to consumer energy drinks.

Researchers have devoted much effort in investigating the relationships between attitudes and food choice. Research showed that both an individual's personal attitudes and environmental factors affected the food choice of individuals (Urala, & Lähteenmäki, 2004). Additionally, Nina and Liisa conducted a study to quantify the attitudes behind consumers' willingness to use functional foods. They concluded that the perceived reward from using functional food and the confidence in functional foods were the most significant factors to determine consumers' willingness to use functional foods (Nina & Liisa, 2004). In this study, participants were asked to

indicate their opinions of whether energy drinks are healthy and their attitudes towards the perceived rewards from consuming energy drinks. Overall, they had slightly positive attitudes towards energy drinks (3.6 ± 0.7). Participants demonstrated more positive attitudes toward certain perceived rewards, for example, increase energy and metabolic rate (4.19 ± 0.8), improve attention (3.99 ± 0.9), and mood (3.82 ± 0.9). Positive attitudes were showed to positively influence consumers' purchasing intentions by Vermeir and Verbeke in their study titled "Sustainable Food Consumption: Exploring the Consumer 'attitude-behavioral intention' Gap" (Vermeir & Verbeke 2006). Their study concluded that consumers holding more positive attitudes tended to have higher involvement and less uncertainty towards sustainable food. They also were more likely to have intentions to purchase the products. Thus, by recognizing consumers' attitude towards to energy drinks, manufacturers can effectively promote their products. About 69% of the participants ($n=368$) in this research indicated that they either somewhat disagreed or disagreed with the statement "I think energy drinks are healthy". Based on this fact, this is imperative to identify variables that affect consumers' attitudes and the relationship between attitudes and tangible outcome (i.e., actual consumption).

Result from logistic regression was correspondent with previous studies, suggesting that participants with positive attitudes were more likely to consume energy drinks in the future. As suggested by previous studies (Nina & Liisa, 2004; Shepherd, 1990), in order to recognize consumers' attitudes in depth, future studies could examine consumers' confidence in energy drink products by asking how individuals trust the information and how strongly they believe in the scientific basis of promised health effects of energy drinks. Also, people might hold different attitudes under specific circumstances such as in special occasions or sports events, thus other studies could investigate necessity for energy drinks perceived by consumers.

This study found that friends, followed by health professional and social media, were most likely to influence consumers' decisions of consuming energy drinks. Miller et al. (2001) concluded that young people tended to eat with friends rather than eating at home, and therefore their food choice were influenced by their friends. Besides, many participants also identified that health professionals play very crucial roles in influencing their decisions of consuming energy drinks. Similarly, as indicated by The European Food Information Council, the level of education and suggestions provided by physicians and health professionals can affect dietary behaviors during adulthood (Kearney et al., 2000). Based on this conclusion, health professionals should convey accurate and consistent messages of potential benefits and detrimental effects of energy drink products, as well as recommended amounts and precautions through social media, such as television, radio, magazine, newspaper, food packaging and advertisement.

Several studies reported that adolescents' choices of food were largely influenced by parents (Story et al., 2002; Kirk & Gillespie, 1990). Researchers further explained that the influence of parents on adolescents' food consumption behavior was important because parents provide a home environment for teenage children (Kirk & Gillespie, 1990) and they also acted as role models to the children (Feunekes et al., 1998). In addition, parents determined the cooking and eating behaviors at home such as foods and snacks to purchase and the frequency of dining out (Frank, 1997). Therefore, the involvement of parents in adopting healthy eating behavior among adolescents is very important. However, parents were found to have least influence on consumption behavior in this study. Possible reason could be because the sample populations in this research were all adults above 21, and thus they were considered as more independent than adolescents.

Previous researches related to beverage consumption revealed that many barriers could influence consumption patterns of the customers. For example, Nada et al. (2003) conducted two studies with male adolescents and female adolescents respectively regarding to soft drink consumption by using the Theory of Planned Behavior in 2003. Their results suggested that lack of availability, high cost and insufficient knowledge about the health risks of products were identified as main barriers by female adolescents to consume soft drinks, whereas limited availability and no interest to try the products due to poor marketing methods were perceived as barriers by male adolescents (Nada et al., 2003).

This research reported that poor taste, high cost, uncertainty or lack of information and limited availability were the main obstacles for participants to consume energy drinks. Thus, the research and development (R&D) team of the energy drink companies should devote into improving the taste of the energy drinks. To address the concern of lack of information, the Public Relations (PR) of the energy drink companies should work with media to build brand awareness and favorable images among the public. They should also communicate with content of the information available to public relevant and credible. To remove the barrier about limited availability, the energy drink companies need to identify the right place to sell the products, for instance report showed that many convenience stores, quick-service restaurants, and fast-food chains (e.g., Carl's Junior and Hardee's) would be adding energy drinks to their menus (Barrie, 2016).

The marketing department should also implement more strategic marketing strategies to attract more customers through various channels, with one of the common one being social media. The 2013 Green Hasson Janks Food & Beverage Industry Survey showed that majority of the executive staff reported that social media have significant impacts on their businesses and

nearly 50% of them said that they used social media to gather customer feedback and engage consumers (Todd et al., 2013). Statistics showed that as of September 2014, approximately 71% of online adults use Facebook, 28% of online adults use Pinterest and 26% use Instagram. Also, nearly 41% of adult Internet users take photos or videos that they have found online and repost them for sharing images with many people (Duggan & Brenner, 2013). Thus, energy drink companies could take advantages of social media for their product promotions.

An energy drink consumption study conducted among medical students at Marmara University Medical School showed that knowledge about the ingredients and health risks of energy drinks among these students was unsatisfactory (Seyhan et al., 2011). The researchers claimed that the medical students were thought to have more knowledge about nutrition and health, and therefore should have better knowledge scores about energy drinks, but their assumptions were not supported. It was not surprising that the average knowledge score of the participants in this study was 4.63 ± 1.30 with the highest possible score of 9 points. Overall, the results showed that the majority of the participants demonstrated a low to medium knowledge level about energy drinks. More specifically, the vast majority of participants ($n=478$) agreed that energy drinks could be mixed with alcohol beverages, which is considered as an inappropriate way to consume energy drinks. About 70% of the participants were unaware of the high content of sugar in energy drinks. Misunderstanding this fact could cause false assumptions about the healthfulness of the consuming energy drinks. Hence, this study suggests that there is a potential need to increase awareness of general consumers in order to eliminate their uncertainty of the products.

This study showed that among three attributes of the Theory of Planned Behavior, attitudes toward energy drinks was the strongest predictor of intention to consume energy drinks,

followed by perceived behavioral control. However, subjective norms were not a significant predictor in the model. This finding was consistent with a previous study which suggested that attitude, subjective norms, and perceived behavioral control were each significant of intention to drink soda as well as together showed 61% of its variance (Nada et al., 2003). Although Sohyun et al., 2013 showed that knowledge about sugar sweetened beverages was significantly associated with sugar sweetened beverages intake, this study did not have enough evidence to support that knowledge could have influence on future consumption intention of energy drinks. No significant relationship between past experience and consumption intentions was found in this study. However, no previous research has investigated the relationship between past experience of side effects and future consumption intentions specifically on energy drinks. Future studies could investigate these variables more in depth to identify any possible relationship between them.

As for the demographic characteristics, the result suggested that gender ($P < .01$), educational level ($P < .01$) and income ($P < .05$) were all associated with future consumption intention. Similarly, previous study confirmed that gender, age, education, economic factors and general knowledge were found to have influence on organic food consumption (Aertsens et al., 2009). For example, Stobbelaar et al. (2007) indicated that women were generally more concerned about health and healthy food. In addition, Lea and Worsley (2005) and Lockie et al. (2004) found that a higher proportion of women than men hold positive attitudes towards organic food. The influence of education on food consumption seemed to be controversial. Yue et al., 2008 identified a positive relation between education and organic food consumption. However, Lea and Worsley (2005) concluded that the impact of education on organic food beliefs was

insignificant. Arbindra et al. (2005) also reported that the level of education has no statistically significant effect on organic food purchase patterns.

Income was also identified to be associated with food consumptions. Cunningham (2002) pointed out that income played a significant positive role in explaining organic food purchases in Europe. A study in Canada reported a positive relationship between income and willingness to buy organic products. Lockie et al. (2002) found that the proportion of Australians consuming organic food rises when income increased. As mentioned before, cost was perceived by participants as one of the main barriers that keeping them from consuming energy drinks. It is known that energy drinks are typically more expensive than soft drinks and Red Bull is the most expensive non-alcoholic drink available in any convenience store. Hence, energy drink companies should consider adjusting the prices for their products in order to expand the markets and make them more affordable to consumers.

Results also showed that the R^2 (.18) of this model is relatively low, indicating the variables identified were not strong predictors of future consumption intention. The possible reason might be because other situational factors, such as social events, sporting events, and physical activities are also likely to bring certain influences on consumers' intention. Therefore, future studies could include situational factors as mentioned when investigating consumption intention.

Limitations

The current study has several limitations. First, the participants were recruited through Amazon Mechanical Turk (Mturk), which is a popular online data collection platform. Although Mturk is generally recognized as a reliable source for data collection, respondents from Mturk was not truly representative for the general public in the U.S as they are all registered users only

for Mturk. Also, when asking about past experience about energy drinks and side effect experienced, participants recalled those events retrospectively. . Retrospective self-report may be affected by memory consolidation or poor recall (Marx et al., 1996). As a result, the results might not be extremely precise. In addition, this study was only conducted in the United States and therefore cannot represent the large population outside of this geographic location. Besides that, the future intention to consume energy drinks was only formulated as a single question item, which limits the types of statistical analysis that can be performed on this data set. For instance, more complicated data analysis method, such as Structure Equation Modeling (SEM) could have been used to investigate the relationship between independent variables and future consumption intention if it is formulated as multi-item questions.

Conclusion

As conclusion, the study found that energy drinks consumption was more prevalent among younger generations aging from 21 to 40 in United States. People with higher education level and higher income were more likely to consume energy drinks. Among common energy drink brands, Red Bull, Monster and Rockstar are the most popular as well as preferred brands as indicated by participants in this study. They also reported that typically consuming 1 bottle (can) when needed during special occasions. Although the majority of the participants did not considered energy drinks as healthy beverages, they still perceived certain benefits of its functions, resulting in slight positive overall attitudes towards energy drinks. Friends, health professionals and social media were determined to have most powerful influences on energy drink consumption intentions. Poor taste, high cost and lack of information, or uncertainty, were perceived as the main barriers leading to lower future consumption intentions. The general public has relatively limited knowledge about energy drinks, especially regarding to recommended way to consume, and regulations and policies for energy drink products. Among all the attributes

were measured, attitudes and perceived behavioral control were found to significantly influence energy drink consumption intention whereas subjective norms and knowledge did not. More specifically, positive attitude and lower perceived barrier were associated with higher energy drink consumption intention.

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Appendix A: Online Questionnaire

Screening Questions

1. Have you ever consumed energy drinks?

Yes

No ----- **Q2**

2. Do you have intentions to purchase energy drinks in the near future?

Yes

No ----- **Survey ends**

Section I: Demographic information

This section is designed to obtain demographic information of the participants. Please respond to each of the questions by checking the statements that best apply to you or by filling in the blanks.

1. What is your gender?

Male

Female

2. What is your age?

21 – 30 years old

31 – 40 years old

41 – 50 years old

51 – 60 years old

61 or older

3. What is your highest educational level?

High school or GED

Some college

Associate degree

Bachelor's degree

Graduate's degree

Other (please specify)

4. What is your occupation?

5. What is your average yearly household income?

<\$20K

\$20K - \$34,999

\$35K - \$49,999

\$50K - \$64,999

>\$65K

Section II: Product information

This section is deigned to collect information regarding to consumers' purchase preferences and habits of energy drinks.

6. Which energy drink brand do you consume the most?

- Red Bull
- Monster
- Rockstar
- NOS (Coca-Cola)
- Amp (PepsiCo)
- Other (please specify)

7. Please indicate the reasons that affect your energy drinks consumption, using the 5-point scale with 1 being "disagree" and 5 being "agree".

Benefits	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree
Compensate for insufficient sleep					
Increase energy					
Improve mood					
Mix with alcohol					
Improve performance					
Other (Please Specify)					

8. How frequently do you consume energy drink per week?

- Everyday
- More than 5 days/week
- 3-5 days/week
- 1 to 2 days/week
- None (please **skip Q9**)

9. What is the amount of your **each** consumption of energy drink?

- More than 1 can (or bottle)
- 1 can (or bottle)
- Less than 1 can (or bottle)

Section III: Attitudes Toward Energy Drinks

This section is designed to investigate participants' attitudes toward energy drink.

10. Please indicate your overall attitude towards energy drinks, using the 5-point scale with 1 being “disagree” and 5 being “agree”.

Attitude item	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree
I think energy drink is healthy					

11. Please indicate how much you agree or disagree with the following statements that related to benefits associated with consuming energy drinks, using the 5-point scale with 1 being “disagree” and 5 being “agree”.

Benefits	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree
I believe that energy drink could boost my energy and metabolic rate.					
I believe that energy drink could improve my attention span.					
I believe that energy drink could improve my academic performances.					
I believe that energy drink could improve my athletic performances.					
I believe that energy drink could hydrate my body.					
I believe that energy drink could improve my mood.					

Section IV: Subjective Norms

This section is designed to investigate participants' subjective norms of consuming energy drink.

12. Please indicate how likely each of the following individuals might *influence* your decision to consume energy drink, using the 5-point scale with 1 being “Very Unlikely” and 5 being “Very Likely”.

Individuals	Very Unlikely	Unlikely	Neither likely or unlikely	Likely	Very Likely
Parents					
Friends					
Favorite Celebrity (<i>sports player/singer/movie star/etc.</i>)					
Social Media (Internet/Television/Newspaper/Magazine/Poster/etc.)					
Health professionals					
Other (Please Specify)					

Section V: Perceived Behavior Control

This section is designed to investigate barriers that affect participants' decision to consume energy drink.

13. Please indicate what reasons make it difficult to consume energy drink, using the 5-point scale with 1 being “disagree” and 5 being “agree”.

Factors	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree
Availability					
Taste					
Cost					
Improper serving size (too much)					
Negative beverage attributes (Severing temperature)					
Prefer other alternatives					
Uncertainty or lack of information					
Other (please specify)					

Section VI: Knowledge

This section is designed to investigate participants' knowledge of consuming energy drink.

14. Please indicate whether the following statements are true or false.

- a) It is recommended Energy drinks to be mixed with alcohol beverages.
- b) Food and Drug Administration has no regulation for caffeine content in energy drinks.
- c) There is no limit on consumption amount for energy drinks everyday.
- d) Energy drinks decrease human metabolic rate.
- e) Many energy drinks are rich in sugar.

15. What are the TOP THREE active ingredients of energy drinks? (Please select up to THREE)

- Caffeine
- Sugar
- Taurine
- Guarana
- B Vitamins
- Carnitine
- Ginseng
- I do not know

16. What is the main function of caffeine in energy drinks?

- Increase shelf life of energy drinks
- Increase hydration of body
- Boost energy
- Enhance sweetness

17. Have you ever experienced any side effects after consuming energy drinks?

- Yes
- No (please **skip Q18**)

18. What side effects you have been experienced after consuming energy drinks? (Please check all that apply)

- Palpitations (fast heartbeat)
- Shaking
- Agitation
- Gastrointestinal upset
- Chest pain
- Dizziness
- Paraesthesia (tingling or numbing of the skin)
- Insomnia
- Respiratory distress
- Headache
- Other (please specify)

Section VII: Purchase Intention

This section is designed to investigate participants' intentions of consuming energy drink.

19. Please indicate whether you have intention to consume energy drink in next week?

Yes

No (**survey ends**)

20. Please indicate how frequently you intend to consume energy drink in next week?

Everyday

More than 5 days/week

3-5 days/week

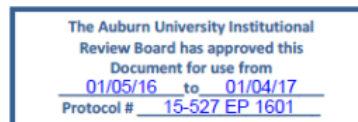
1 to 2 days/week

Unsure/Depends on Situations

Thank you for your participation!

Appendix 2 Inform Consent

Date: Jan 25, 2016



Dear Sir/Madam:

You are invited to a survey titled, “Applying Extended Theory of Planned Behavior to Investigate Energy Drink Consumption”. Many articles have revealed that drinking energy drink has potential health related risks. However, the popularity of energy drinks continues to rise despite the problems caused by side effects. It is necessary to understand what are the intentions for people to consume energy drinks and what are the factors affecting their intentions. The purpose of the survey is to investigate consumer purchase intentions of energy drink based on modified Theory of Planned Behavior.

This survey is intended for the general U.S. population above 19 years old.

Completion of the survey will take 10-15 minutes of your time. Your participation is completely voluntary. Your response will remain completely confidential. Only the summary of the results will be reported in manuscripts or abstracts. The survey is anonymous. You will be offered \$0.50 to fill out the survey through Amazon Mechanical Turk.

The Auburn University Institutional Review Board has approved this document for use from January 5, 2016 to January 4, 2019. Protocol #15-527 EP 1601. If you have any question regarding this study, please feel free to contact Yujia Wang at (612) 868-6608 (email: yzw0064@tigermail.auburn.edu). For questions about your rights as a participant or the manner in which the study is conducted, you may contact Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

I appreciate for your time and effort in participation of this survey.

Sincerely,
Yujia Wang
Graduate Student
Department of Nutrition, Dietetics, and Hospitality Management
Phone: 612-868-6608
Email: yzw0064@tigermail.auburn.edu