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Perceptions and Use of Nonnutritive Sweeteners Among College Students Based Upon Athletic Status, Gender, and Academic Major

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Perceptions and Use of Nonnutritive Sweeteners Among College Students Based Upon Athletic Status, Gender, and Academic Major

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in Health Sciences and Kinesiology

By

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ABSTRACT

Nonnutritive sweeteners, which include sucralose, aspartame, saccharin, and stevia may positively impact health of individuals by helping to reduce Caloric and added sugar intake. Athletes may consider these factors when attempting to improve performance and, as such, may benefit from their use. However, no one has examined sources of nutrition knowledge and perceptions as well as use of nonnutritive sweeteners in college students based upon athletic status, gender, and whether students are studying a health or non-health related major. The objective of this study was to compare college students' sources of nutrition knowledge to their perceptions and consumption of nonnutritive sweeteners. Excerpts of two validated surveys were completed by 930 students enrolled in HLTH 1520: Healthful Living at Georgia Southern University. While the majority of students noted their primary source of nutrition knowledge was the Internet, non-collegiate athletes, regardless of their gender, consulted the Internet significantly more than collegiate athletes. No significant differences between perceptions and use of nonnutritive sweeteners based on gender, athletic status, or academic major were noted. Many college students felt artificial sweeteners were harmful, had no health benefits, and they didn't trust the regulators that license and control them. Since research and regulation confirm safety and potential health benefits of nonnutritive sweeteners, these results suggest overall lack of education about nonnutritive sweeteners among college students. Future work may include examination of the extent that nutrition courses are covering the topic of nonnutritive sweeteners.

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Abbreviations

AceK- Acesulfame-Potassium

ADI- Acceptable Daily Intake

BMI- Body mass index

CPR- Cephalic phase responses

FDA- US Food and Drug Administration

HFCS- High-fructose corn syrup

HLTH 1520- Healthful Living

IRB- Institutional Review Board

MRI- Magnetic Resonance Imaging

NNS- Nonnutritive sweetener

Chapter 1

Introduction and Literature Review

1. 1 **Nutritive Sweeteners**

Nutritive sweeteners, also known as sugars, caloric sweeteners, or added sugars, are those that provide the body with energy (Fitch & Keim, 2012). Sugars can be found naturally in foods such as fruits and vegetables, or can be added during the processing of products (Fitch & Keim, 2012). There are many different names for added sugars that can be found on ingredient labels, such as sucrose, high-fructose corn syrup, and sugar alcohols (Fitch & Keim, 2012).

Various forms of sweeteners have important functions in foods. Nutritive sweeteners are popular among consumers due to their effect on the enhancement of sweetness and taste of food products (Erickson & Slavin, 2015). Sugars also play an important role during the baking and production of food; important functions of sugars include caramelization, Maillard browning, texture enhancement, inhibition of ice crystallization, and enhancement of the shelf-life of products (Erickson & Slavin, 2015).

1.1.1 *Types*

1.1.1.1 *Sucrose*

Sucrose is one of the most common forms of sugar, often considered as table sugar (Pawar, Krynitsky, & Rader, 2013). It comes from either sugarcane or sugar

beets, and is composed of one molecule of glucose and one molecule of fructose (Fitch & Keim, 2012).

1.1.1.2 *High Fructose Corn Syrup*

One of the most commonly used nutritive sweeteners in the food industry is high-fructose corn syrup (HFCS) (Serra-Majem et al., 2014). Popular products that contain HFCS include sugar-sweetened beverages (sodas, juices, etc.), cakes, cookies, yogurt, and canned fruits (Bray & Popkin, 2013). HFCS is commonly used by food manufacturers because it is relatively inexpensive since it is ultimately derived from corn which is a low-cost and abundant source (Fitch & Keim, 2012). HFCS comes from corn syrup, which is 100% glucose, and is processed to increase the content of fructose (Fitch & Keim, 2012). High-fructose corn syrup has a high composition of fructose, usually ranging between 45-55% (Fitch & Keim, 2012). Sucrose is a disaccharide composed of equivalent parts of glucose to fructose (Fitch & Keim, 2012).

1.1.1.3 *Sugar alcohols*

Sugar alcohols, also known as polyols, are nutritive sweeteners, but are popular alternatives to sucrose and high fructose corn syrup (Grembecka, 2015). Although used to replace these other sweeteners, they are still classified as nutritive sweeteners because they provide the body with a small amount of calories, due to limited digestion and absorption (Shankar, Ahuja, & Sriram, 2013).

Sugar alcohols are low digestible carbohydrates, meaning they are ideal for

diets of people who need to reduce their sugar intake, such as diabetics and overweight individuals (Grembecka, 2015). Polyols are partially digested in the human body, and only slightly raise blood glucose levels (Grembecka, 2015).

A few of the different types of sugar alcohols include mannitol, tagatose, sorbitol, and trehalose; these sweetening agents are commonly found in chewing gums, sugar-free candies, and cookies (Grembecka, 2015).

1.1.2 *Health Effects*

It is important that sugar is consumed within the recommended amounts because overconsumption can have various health effects on our bodies (Erickson & Slavin, 2015). According to the World Health Organization and the Dietary Guidelines for Americans, added sugar should be limited to less than 10% of total daily calories (Erickson & Slavin, 2015). Since sugar consumption has continued to increase over the last several decades, many studies have been performed on the effects it has on the human body. According to NHANES data, caloric intake from added sugars doubled from 1999 to 2006 in contrast to previous data taken from 1977 to 1978 (Wang, Steffen, Zhou, Harnack, & Luepker, 2013). This increase was due to the higher availability of sweeteners and sugar to the public around this time (Wang et al., 2013). Currently, the average American consumes 93 pounds of added sugar yearly, with teenagers and young adults being the highest consumers (Southcote, Jacobsen, McGowan, & Edelstein, 2016).

1.1.2.1 *Negative Health Effects*

The high intake of sugar is linked to many negative physiological changes and has been shown to contribute to many health problems (Serra-Majem et al., 2014). One major change associated with the rising consumption of added sugar is weight gain and in increase in body mass index (Johnston, Stevens, & Foreyt, 2013) (Wang et al., 2013). Added sugars are a source of "empty calories", meaning they usually don't provide the body with any important nutrients (Erickson & Slavin, 2015). When consumed in excess of caloric needs, sugar is stored in the body as fat in adipose tissue, causing weight gain.

High-sugar diets also cause stress on the human body, specifically the pancreas. When the body is exposed to high levels of sugar for a long period of time, hyperinsulinemia may develop, which is a risk factor for Type 2 Diabetes (Riobó Serván et al., 2014). People with diabetes either lack the ability to produce insulin or the ability to respond to it, so must limit their added sugar intake (Gibson et al., 2014).

Sugar has also been believed to cause psychological changes in the brain. Studies performed on animal subjects show that sugar can act as an addictive substance in the way that other commonly abused drugs can (Fitch & Keim, 2012). Magnetic Resonance Imaging (MRIs) performed on obese individuals show that they experience sugar cravings that are very similar to those of drug addicts. (Fitch & Keim, 2012).

Another consequence of excess sugar consumption are changes in the amount and type of microorganisms and bacteria that inhabit the gastrointestinal

tract (Lll, Klimczak, Rachubinski, Jaglowska, & Kwapiszewska, 2015). Microorganisms and bacteria thrive off of sweeteners and replicate drastically in the presence of sugar. Increases in the consumption of sugar, such as through sweetened beverages, can cause an increase in oral bacteria, leading to fungi growth and tooth decay (Lll et al., 2015). Sugar is an excellent nutrient source for microorganisms that live in the GI tract, which becomes problematic when it supports the growth of harmful fungi (Lll et al., 2015). Colonies of fungi that grow in the upper region of the GI tract can lead to serious infections in humans (Lll et al., 2015).

Foods that contain high levels of added sugars often contain lower amounts of micronutrients, such as calcium, magnesium, and vitamin B12 (Joyce & Gibney, 2008). This imbalance of nutrients can lead to micronutrient inadequacies and deficiencies, and possibly eventually lead to other health problems (Joyce & Gibney, 2008). It has also been observed that when total sugar intakes increase, protein and fiber intakes decrease due to the amount of calories coming from the high sugar diet (Joyce & Gibney, 2008).

High intakes of fructose have been linked to risks of developing metabolic syndrome, fatty liver disease, weight gain, obesity, and other cardiovascular diseases (Fitch & Keim, 2012). Some metabolic changes that have been observed with the consumption of sugar-sweetened beverages include an increase in inflammation markers, body weight, triglyceride levels, blood pressure and visceral fat (Bray & Popkin, 2013). The symptoms of metabolic syndrome and fatty liver disease can be seen when two 16 ounce sugar sweetened beverages are consumed

daily over a period of just 6 months (Bray & Popkin, 2013). Increased levels of triglycerides and visceral fat leads to weight gain and potentially leads to obesity (Bray & Popkin, 2013). Obesity itself then leads to other cardiovascular diseases (Azizi, Aghaee, Ebrahimi, & Ranjbar, 2011).

1.1.2.2 *Positive Health Effects*

On a more positive note, the sugar alcohol Mannitol may be helpful in removing toxic substances from the body since it increases the formation of urine (Patra, Tomar, & Arora, 2009). Mannitol falls under the category of drugs referred to as the "osmotic diuretics" (Patra, Tomar & Arora, 2009). With this being said, Mannitol plays a role in helping to prevent renal failure and reducing cerebral edema (Patra, Tomar & Arora, 2009).

Tagatose is a sugar alcohol that is known for its many diverse health benefits; it is known to help with pregnancy and fetal development, treatment of obesity, promotion of weight loss, acts as an antibiotic and prebiotic, and much more (Patra, Tomar, & Arora, 2009). Tagatose provides zero calories and has a low glycemic response (Shankar et al., 2013).

In addition, the sugar alcohol sorbitol is beneficial to our health, as it supports the absorption of some vitamins and minerals (Patra, Tomar, & Arora, 2009). In particular, Sorbitol helps with the absorption of "unstable" vitamins, such as Vitamin B 12 (Patra, Tomar, & Arora, 2009). Sorbitol also acts as a laxative to help relieve constipation (Patra, Tomar, & Arora, 2009).

Trehalose is a unique sweetener that protects proteins in the body and prevents the acidification of plaque on teeth (Patra, Tomar, & Arora, 2009). The protein protection provided by Trehalose has been of high interest of researchers and has been studied in many different scenarios (Patra, Tomar, & Arora, 2009). Trehalose has the ability to preserve embryos as well as increase the viability of transplant cells (Patra, Tomar, & Arora, 2009). The ability of Trehalose to protect the alteration of proteins has lead to interest on the effects it may have on diseases like Alzheimer's and Parkinson's (Patra, Tomar & Arora, 2009).

1.2 **Non-nutritive Sweeteners**

Non-nutritive sweeteners are those that don't provide the body with energy and include aspartame, saccharin, stevia, sucralose, and acesulfame-potassium (Sharma, Amarnath, Thulasimani, & Ramaswamy, 2016). The US Food and Drug Administration (FDA) approves these sweeteners as safe for consumption and use among the general public based on previous study results (Sharma, Amaranth, Thulasimani, & Ramaswamy, 2016). Studies that look at non-nutritive sweetener (NNS) consumption include individuals at the 95th percentile of intake, individuals at higher than normal intake, and individuals that could be at risk due to age or a specific medical condition (Fitch & Keim, 2012). Studies performed on animals show whether certain doses of NNS have any short or long-term health effects (Bearth, Cousin, & Siegrist, 2014). Many factors are evaluated such as carcinogenicity, chronic toxicity, and mutagenicity (Serra-Majem et al., 2014). Results of these studies are used to determine an Acceptable Daily Intake (ADI) value, which is the

safe limit at which the substance may be consumed (Bearth, Cousin, & Siegrist, 2014).

1.2.1 *Types*

1.2.1.1 *Aspartame*

Aspartame is a non-nutritive sweetener sold under the brand name Equal (Shankar, Ahuja, & Sriram, 2013). Compared to sucrose, aspartame is 160-220 times sweeter (Brown, de Banate, & Rother, 2010). Aspartame is used as the sweetener in diet and low-calorie beverages. Inside the human body, the intestine hydrolyzes aspartame to aspartic acid, methanol, and phenylalanine (Fitch & Keim, 2012). While some of these components provide calories, their amounts are negligible, hence the categorization of aspartame as non-nutritive (Fitch & Keim, 2012). The FDA has established the ADI value for Aspartame to be 50 mg/kg body weight (Fitch & Keim, 2012).

1.2.1.2 *Saccharin*

Saccharin is a non-nutritive sweetener that is often sold under the brand name Sweet' N Low. (Shankar, Ahuja, & Sriram, 2013). Compared to sucrose, saccharin is 300 times sweeter (Brown, de Banate, & Rother, 2010). The body does not metabolize saccharin, so it passes through the digestive system unchanged. Saccharin was the first NNS approved for consumption and has a history with banning and regulations because of various potential health effects discussed later

in this chapter (Fitch & Keim, 2012). The FDA has not established a set ADI value for Saccharin yet (Fitch & Keim, 2012).

1.2.1.3 *Stevia*

Stevia is a non-nutritive sweetener that comes from the *Stevia rebaudiana Bertoni* plant (Riobó Serván et al., 2014). Compared to sucrose, stevia is 150-400 times sweeter (Riobó Serván et al., 2014). The human gut hydrolyses stevia to release free steviol which is then absorbed and transported to the liver where it is excreted (Riobó Serván et al., 2014). The ADI value for Stevia was established by the Joint Expert Committee on Food Additives and was set at 4 mg/kg body weight (Fitch & Keim, 2012).

1.2.1.4 *Sucralose*

Sucralose is a non-nutritive sweetener that is often sold under the brand name Splenda (Shankar, Ahuja, & Sriram, 2013). Compared to sucrose, sucralose is 600 times sweeter (Brown, de Banate, & Rother, 2010). The chemical composition is similar to sucrose. However, the three hydroxyl groups found in sucrose are replaced by three chlorine molecules (Rodero, Rodero, & Azoubel, 2009). Sucralose is not metabolized and is passed through the body unchanged, excreted through feces or urine (Fitch & Keim, 2012). The FDA has established the ADI value for Sucralose to be 5 mg/kg body weight (Fitch & Keim, 2012).

1.2.1.5 *Acesulfame-Potassium*

Another popular non-nutritive sweetener found in many products such as soft drinks, chewing gum, and sugar-free baked goods is Acesulfame-Potassium (AceK). Compared to sucrose, AceK is 200 times sweeter (Brown, de Banate, & Rother, 2010). Acesulfame-potassium is not metabolized by the body so is excreted through the kidneys unchanged (Shankar et al., 2013). The FDA has established the ADI value for Acesulfame-Potassium to be 15 mg/kg body weight (Fitch & Keim, 2012).

1.2.2 *Health Effects*

As with other food additives, there are both potential risks and benefits that come with the use of non-nutritive sweeteners. Both researchers and the public have raised numerous concerns dealing with potential health effects that non-nutritive sweeteners (NNS) may have on consumers (Riobó Serván et al., 2014).

1.2.2.1 *Negative Health Effects*

The consumption of NNS has been said to affect appetite and cause conditions such as Type 2 diabetes and obesity, however there isn't research to support this claim (Serra-Majem et al., 2014). Individuals who use NNS are most likely already at risk for developing one of these conditions and are using NNS to limit their caloric intake. Non-nutritive sweeteners have also been under speculation as to whether they support weight loss or promote weight gain (Serra-Majem et al., 2014).

Some researchers argue that users of NNS experience weight gain while using calorie-free sweeteners due to the compensation of calories elsewhere (Brown et al., 2010). Non-nutritive sweeteners were believed to be supernormal stimuli to sugar, supposedly increasing an individual's response to sweetness, however this has not been proven or supported by research (Antenucci & Hayes, 2014).

Another concern is the possible alteration of the gut microbiome. Changes in the microbiota have been found only in animal studies when the highest acceptable amount of sweetener is used (Burke & Small, 2015). Even the highest users of non-nutritive sweeteners use amounts much lower than the set ADI value.

Another concern identified is the potential impairment of cephalic phase responses, which helps prepare the body for digestion and absorption of food (Burke & Small, 2015). The body is familiar with sugar, a conditioned stimulus, which creates cues that cause cephalic phase responses (CPRs), such as salivation at the mouth, insulin secretion, and thermogenesis (Burke & Small, 2015). Some studies have shown that when non-nutritive sweeteners are present in the body, CPRs are not expressed because NNS act as an unconditioned stimulus (Burke & Small, 2015). This can cause problems when sugar is reintroduced in the body because CPRs still may not occur, creating problems with energy balance (Burke & Small, 2015).

Another concern is the finding of sucralose, saccharin, and acesulfame-K in the breast milk of breast-feeding human mothers (Rother, Sylvetsky, & Schiffman, 2015). This is potentially concerning due to the lack of research on the early

exposure of NNS on infants and young children (Rother, Sylvetsky, & Schiffman, 2015).

Currently, the only studies available on the effects of non-nutritive sweeteners are for short-term use only. There is not sufficient information available on the long-term effects of non-nutritive sweeteners since they've only been heavily used within the last couple of decades (Bruyère et al., 2015). The content of phenylalanine from aspartame may cause problems for people with phenylketonuria, but is considered safe for other consumers who consume amounts below the ADI value (Shankar et al., 2013).

A small-scale study has also been performed on the effects of aspartame on the memory and learning of college students (Orange, 1998). The results from this observation suggest that aspartame may negatively affect memory. However, a large-scale study has not been performed to prove this suggestion (Orange, 1998).

Studies found that saccharin had caused cancerous tumors to develop in the bladders of lab rats (Tandel, 2011). It was discovered that certain enzymes only found in rats were able to metabolize saccharin, leading to the formation of these tumors (Tandel, 2011). Humans do not have these enzymes, therefore saccharin is non-carcinogenic and safe for human consumption (Tandel, 2011).

Stevia is a non-cariogenic natural sweetener that plays an important anti-bacterial role on teeth, supporting good oral hygiene (Ferrazzano et al., 2016). Studies performed on rats have shown that high dosages caused harm on the male reproductive system. However, this has not been shown to happen in humans (Ferrazzano et al., 2016).

Sucralose is a sweetener that is easily passed through the body, so ingestion should be limited in pregnant women due to the possibility of it passing to the fetus (Rodero et al., 2009). Although there isn't sufficient evidence, sucralose in very large doses may have teratogenic effects and disrupt normal fetal development (Rodero et al., 2009).

Acesulfame-Potassium has been looked at for the potential ability to cross the blood-brain barrier thus altering brain activity (Burke & Small, 2015). This ability has only been found in mice that were given excessive amounts of AceK that highly exceeded the established limit for humans (Burke & Small, 2015).

1.2.2.2 *Positive Health Effects*

Non-nutritive sweeteners may aid in weight management, as they provide zero calories to the human body (Bellisle & Drewnowski, 2007). By replacing sugar, NNS drastically reduce the energy density of foods and drinks (Bellisle & Drewnowski, 2007). Weight loss has been observed in those who use non-nutritive sweeteners, especially when individuals are also engaged in daily physical activity or exercise (Riobó Serván et al., 2014). A study was performed that looked at the sole consumption of NNS sweetened beverages versus sugar sweetened beverages (Hendriksen et al., 2011). The group that was only given the NNS sweetened beverages had reduced body mass index (BMI) values, while the group that was only given sugar sweetened beverages had higher BMIs (Hendriksen et al., 2011). The reduction in caloric intake by people who use NNS has been shown to help with

lowering body weight and BMI values, which in turn helps reverse the obesity epidemic (Johnston et al., 2013).

Along with weight management, non-nutritive sweeteners are beneficial for people with diabetes since they have no affect on blood glucose levels (Gibson et al., 2014). Non-nutritive sweeteners help lower the carbohydrate intake of diabetics, which is essential in managing ideal blood glucose levels and body weight (Johnston et al., 2013). Diabetics that use NNS have a wider range of food choices that have the same sweet taste that regularly sweetened foods and drinks have (Spencer et al., 2016).

Non-nutritive sweeteners help promote good oral health since bacteria in the mouth are unable to break them down (Gibson et al., 2014). A group of individuals in a study that solely drank NNS sweetened beverages had lower instances of tooth decay than those that solely drank sugar sweetened beverages (Hendriksen et al., 2011).

1.3 **College Students**

1.3.1 *Athletes vs. Non-Athletes*

Universities and colleges have very diverse populations of students that fall into many different categories. For the purpose of this study, students that make up the college population can be separated into two general groups, athletes and non-athletes. Athletes include the individuals that represent the school by being a member of one of the collegiate sports team. Non-collegiate athletes are students who are not members of a collegiate team, even though they may participate in

intramural or club sports. Collegiate athletes often have unique values, personalities, and differing schedules than non-collegiate, recreational, or non-athletes in a college setting, and are therefore, categorized separately (Tang, 2016).

1.3.2 *Nutrition Knowledge*

College students may be particularly vulnerable to developing poor nutrition habits due to new-found independence and being away from home (Christoph, An, & Ellison, 2015). During this transition, students form their own dietary patterns and habits, which will most likely continue into later adulthood (Christoph, An, & Ellison, 2015). Many students lack the nutritional knowledge needed to maintain a diet that consists of all the essential nutrients needed in adequate amounts (McArthur et al., 2000). College students have poor understanding of three major aspects of nutrition which are understanding the food pyramid, dietary guidelines, and how nutrition ties in with health and disease (McArthur et al., 2000). For example, 63% of college students surveyed could not correctly select the grains group as the group that should be consumed the most throughout the day (McArthur et al., 2000). Additionally, the majority (59-61%) did not know that a low-fiber diet could support colon cancer (McArthur et al., 2000).

In addition to being unaware of nutritional needs, some college students may be unable to interpret nutritional information even when it is presented to them. College students may also have a hard time using and interpreting nutrition labels (Marietta, Welshimer, & Anderson, 1999). This study showed that when students do use nutrition labels, they are only looking at total fat, calories, and calories from fat

and ignoring information regarding calcium, iron, and vitamin A (Marietta et al., 1999). Many are uncertain as to what they should be including or what they should be limiting in their diets.

Another issue is that many young adults lack interest in nutrition (Christoph, Ellison, & Meador, 2016). Students are often too busy with school and other activities to focus on their health and wellness. However, one study showed that over half of the students said they would take time to focus more on nutrition if information about nutrition was presented to them from their university (Rao, Lozano, & Taani, 2014).

1.3.2.1 *Sources of Nutrition Knowledge*

College students are also highly susceptible to misinformation from online sources. The issue is that younger generations rely heavily on the Internet for their health information and advice (Rennis et al., 2015). This becomes problematic when students can't interpret the information or don't understand how to identify whether the information comes from a credible source (Rennis et al., 2015). Studies have shown that some younger adults avoid seeking care from health care professionals because they believe that the Internet provides them with all the health information they need (Rennis et al., 2015). Some young adults that are exposed to social media daily rely on it as their sole source for information (Rennis, McNamara, Seidel, & Shneyderman, 2015).

1.3.3 *Dietary Patterns*

Within the student population, those with majors relating to some sort of health field typically have better nutritional habits than students with other majors (Labban, 2015). With this being said, it is important to include nutrition education in all areas of study so that college students not majoring in a health-related field can learn about proper nutrition (Labban, 2015). A study done on nutrition label use found that there is a positive correlation between nutrition knowledge and dietary patterns (Cooke & Papadaki, 2014). University students were looked at for nutrition label use and those that had higher nutrition knowledge had better eating patterns, while those with lower knowledge had poorer dietary behaviors (Cooke & Papadaki, 2014).

Collegiate athletes are also a special group of students that have different nutritional needs and requirements than the non-athlete college student (Ozdo, Ozcelik, Ozdoğan, & Ozcelik, 2011). These students have multiple intense workouts throughout the duration of the day, and meeting proper nutrition requirements can help with performance, recovery, and with reducing fatigue (Ozdo et al., 2011). Collegiate athletes have very busy schedules so it may be difficult at times to obtain nutritious meals that meet all of the nutritional needs for the day. The timing of nutrient intake also highly effects athletic ability and performance (Ozdo et al., 2011). One major problem identified in a study performed by Ming Tang was that almost half of the athletes reported that they didn't believe nutrition affected their performance (Tang, 2016). On a positive note however, this study also showed that athletes would like to know more about nutrition and how it impacts their body and

performance (Tang, 2016). In a study performed on collegiate athletes, over half understood that carbohydrates are needed to meet the energy needs of rigorous physical activity (Ozdo et al., 2011). Hydration and fluid consumption are also important aspects of athlete's diets that effects performance; less than half of participants correctly recognized that "dehydration decreases performance" (Ozdo et al., 2011).

The dietary patterns of non-athletes is particularly alarming since the general college population gains weight at a rate 6.7 times higher than the general public (Matthews, Doerr, & Dworatzek, 2016). There is a positive correlation between stress and weight gain in this population in which higher levels of stress have been linked with skipping breakfast and increased consumption of fatty foods (Cousineau, Goldstein, & Franko, 2004). High calorie foods and drinks are being consumed in excess, while essential nutrients are lacking in student's diets (Matthews et al., 2016). Additionally, students are unaware of appropriate dietary recommendations (Matthews et al., 2016).

1.3.3.1 *Dietary Patterns for Sweeteners*

The consumption of non-nutritive sweeteners by college students is influenced by many factors, including parental beliefs, costs, and education. From a young age, people are exposed to their parent's nutritional habits and over time may adapt them as their own. Children that grew up in a home with parents that completed higher education often have better dietary habits because their parents understood proper nutrition needs (Szczuko, Seidler, Gutowska, & Stachowska,

2014). Children that have parents that are health-conscious tend to be exposed to better nutrition habits (Li, Lopetcharat, & Drake, 2015). Parents that believe that alternative sweeteners are bad typically won't give their children products that contain any (Li et al., 2015). On the other hand, parents who are using non-nutritive sweeteners to help control their own weight and believe NNS are beneficial tend to introduce NNS to their children's diets as well (Brown et al., 2010). For example, a study done with chocolate milk showed that "label-conscious" parents preferred reduced-sugar chocolate milk for their children while "traditional" parents preferred regular chocolate milk (Li et al., 2015). Parents' preference on sugar versus non-nutritive sweetener determines what the child will be exposed to growing up (Li et al.,2015).

The cost of traditional versus alternatively sweetened products also affects consumption (Yang & Chiou, 2010). A study done with differently sweetened beverages showed that when the price of unhealthy beverages (sugared soda, sweet tea, fruit juice, and sports drinks) increased, more healthy alternatives (milk, sugar-free green tea, and mineral water) were purchased and vice versa (Yang & Chiou, 2010). Additionally, it was found that the purchase of healthy alternatives was increased with the use of health claims on these products (Yang & Chiou, 2010).

Overall, it has been shown that the use of alternative sweeteners is highest among those with higher education and higher income. This finding suggests that older adults that have completed college may use sweetener substitutes more often than younger adults. Households with higher incomes tend to purchase low-calorie sweetened beverages most often (Piernas, Ng, & Popkin, 2013).

1.4 **Goals of this Study**

The principle goal of this study was to determine college students' knowledge and perception of non-nutritive sweeteners, as well as their consumption of them. The hypothesis of this study was that more than 50% of students surveyed at Georgia Southern University have negative perceptions about non-nutritive sweeteners (NNS), that these negative perceptions of NNS result in non-use, that athletes consume NNS more often than non-athletes, that students in health-related majors use NNS more often than those in non-health related majors, and that female students use NNS more often than male students.

The specific aims of this study were:

Aim 1

To determine the perceptions that college students have about non-nutritive sweeteners, including their sources of information about the sweeteners.

Aim 2

To determine the prevalence of consumption of non-nutritive sweeteners among male and female collegiate and non-collegiate athletes.

Aim 3

To compare the prevalence of consumption and the perceptions about non-nutritive sweeteners among collegiate athletes to non-collegiate athletes, heath related majors to non health related majors, and male students to female students.

Chapter 2

Materials and Methods

2.1 **Subjects/Demographics**

The subjects of this study were male and female college students enrolled in a Healthful Living (HLTH 1520) course and male and female collegiate athletes at Georgia Southern University. Participants in this study were asked to provide demographic information such as age, gender, and class in school (freshman, sophomore, junior, senior) at the beginning of the study. Additional questions included whether participants were studying a health-related major and whether or not they had a prior nutrition class during high school or in college. Furthermore, participants were asked whether they were involved in a collegiate sport at Georgia Southern University, and if so, were asked to indicate in what sport they participated.

2.2 **Instrumentation**

The instrument used in this study was a survey derived from a twenty eight-item survey by Bearth, Cousin, and Siegrist (2014) and a nine-item survey by Klein, Boudreau, Devlin, and Walsh (2006). Participants were asked to answer from a list of options what their primary source of information is for nutrition and healthy eating. Participants were then asked to select on a scale, which ranged from “do not agree at all” to “completely agree”, how they felt about four statements made about nonnutritive sweeteners, which were referred to as “artificial sweeteners” in this

survey. The statements included “I think that certain artificial sweeteners are harmful to health”, “artificial sweeteners bring about many benefits for the consumer”, “artificial sweeteners allow for a reduction of unnecessary calories”, and “I trust the regulators in relation to the licensing and control of artificial sweeteners in food.” The nonnutritive sweetened items in the survey included chewing gum, artificially sweetened beverages, and packets of artificial sweeteners and frequency of consumption was evaluated as monthly, weekly, or daily. This survey instrument appears in Appendix A.

2.3 **Procedures**

The survey was given to six sections of Healthful Living (HLTH 1520) courses at Georgia Southern University at the beginning of the class period. The survey was also given to all the collegiate sports teams at Georgia Southern University at the beginning of practice.. Students (N=930) completed the survey before they received the nutrition lecture in the course or before they received sports nutrition advice during their current season. As such, the study was conducted during the first few weeks of the Fall 2017 semester. The survey was administered electronically through the research engine, Qualtrics, sponsored by Georgia Southern University. The survey link was given to students who had Internet access on their phones or computers, and paper copies of the survey were also available to students who didn’t have access. The students were given the option to either take the survey or decline participation. There was no penalty if a student chose not to participate in the survey. Students also had the right to refuse participation at any time during the

administration of the survey. The length of time provided for the survey was approximately ten minutes.

2.4 **Approval**

This study was approved by the Institutional Review Board (IRB) at Georgia Southern University (See Appendix B).

2.5 **Analysis of the Data**

Comparison of sweetener use and perceptions among athletes and non-athletes was analyzed for significance ($p < 0.05$) using Fishers Exact Test within Vassar Stats (www.vassarstats.net/2017).

Chapter 3

Results

3.1 **Demographics**

The total number of female participants was five hundred fifty-six and the total number of male participants was three hundred seventy-four **(Table 1).** The majority of participants were freshmen (57.5% of males, 64.9% of females), with the remainder being sophomores (30.8% of males, 21.8% of females), juniors (9.1% of males, 8.8% of females), and seniors (2.7% of males, 4.5% of females). Most of these participants were enrolled in non health-related majors (79.3% of males, 55.5% of females). Most male and female students reported taking a nutrition class/lecture in high school (72.5%; 72.4%; respectively). Few reported having had a nutrition class/lecture for the first time in college (16.4% of males, 17.8% of females) and still fewer reported not having a nutrition course/lecture at all (11.1% of males, 9.7% of females).

Participants in this study included 71 male and 104 female collegiate athletes (19.2%; 18.9% respectively). Of the male collegiate athletes, most played football (37.3%), followed by baseball (33.3%), soccer (14.7%), basketball (5.3%), and track & field (1.3%) **(Table 2).** Other sports comprised 8.0% of what male collegiate athletes participated in. Female collegiate athletes mostly participated in swimming and diving (30.5%), then softball (19.1%), soccer (13.3%), track & field (8.6%), basketball (4.8%), cross country (1.9%), and golf (1.9%). Twenty percent of female collegiate athletes participated in other sports.

Table 1. Demographics of Participants by Gender

	Male	Female
Class	**% (N)**	
Freshman	57.5% (215)	64.9% (361)
Sophomore	30.8% (115)	21.8% (121)
Junior	9.1% (34)	8.8% (49)
Senior	2.7% (10)	4.5% (25)
Major		
Health-Related*	20.8% (77)	44.5% (248)
Non-Health Related	79.3% (294)	55.5% (309)
Previous Nutrition Class		
Yes, in high school	72.5% (269)	72.4% (402)
Yes, in college	16.4% (61)	17.8% (99)
No	11.1% (41)	9.7% (54)
Collegiate Athlete		
Yes	19.2% (71)	18.9% (104)
No	80.8% (299)	81.1% (447)

*** Health-related majors include:**
Males: Athletic Training 2.7% (10), Child & Family Development 0.0% (0), Exercise Science 7.6% (28), Health Education & Promotion 0.5% (2), Nursing 2.7% (10), Nutrition & Food Science 0.0% (0), Recreation 0.3% (1), Other Health-Related Major 7.0% (26)
Females: Athletic Training 2.3% (13), Child & Family Development 2.0% (11), Exercise Science 9.3% (52), Health Education & Promotion 0.7% (4), Nursing 20.8% (116), Nutrition & Food Science 2.2% (12), Recreation 0.9% (5), Other Health-Related Major 6.3% (35)

Table 2. Collegiate Athlete Participants by Gender and Sport

Male		**Female**	
Sport	**% (N)**	**Sport**	**% (N)**
Football	37.3% (28)	Swimming & Diving	30.5% (32)
Baseball	33.3% (25)	Softball	19.1% (20)
Soccer	14.7% (11)	Soccer	13.3% (14)
Basketball	5.3% (3)	Track & Field	8.6% (9)
Track & Field	1.3% (1)	Basketball	4.8% (5)
*Other	8.0% (6)	Cross Country	1.9% (2)
		Golf	1.9% (2)
		**Other	20.0% (21)

* Other (male) included: cheerleading

**Other (female) included: cheerleading, rifle, volleyball

3.2 **Survey**

Participants consulted several main sources for information about nutrition and eating. As shown in **Table 3**, both male and female college students reported relying most on the internet for information about nutrition and healthy eating (57.6% of males, 59.5% of females). Male non-collegiate athletes relied significantly more on the Internet as their source of health information, than male collegiate athletes ($p<0.0001$). While male collegiate athletes relied on the Internet, they also consulted health professionals, and personal trainers for nutrition information. Similarly, female non-collegiate athletes tended to rely on the Internet as their source of nutrition and health information significantly more than female collegiate athletes ($p<0.0001$) who also consulted family, health professionals, and personal trainers.

A further examination of sources of nutrition information based upon student major showed that male collegiate athletes in non-health related majors relied significantly more on the internet for their health information than those in health-related majors ($p=0.003$) who relied more on "other" sources. These other sources included things like books, friends, and magazines. Male collegiate athletes in health-related majors significantly relied more on "other" sources of health information, such as books and friends, while more male non-collegiate athletes in a health-related major relied primarily on the internet ($p= 0.008$). The majority of both male collegiate and non-collegiate athletes in non health-related majors relied on the Internet. However, significantly more male non-collegiate athletes in non

Table 3. Sources of Information about Nutrition & Healthy Eating by Gender, Athletic Status, and Major

% (N)					
	Internet	**Family**	**Health Professional**	**Personal Trainer**	**Other**
Male	57.6% (209)	15.4% (56)	12.1% (44)	5.8% (21)	9.1% (33)
Female	59.5% (324)	13.4% (73)	15.6% (85)	4.2% (23)	7.3% (40)
Collegiate Athlete, Male [A]	36.6% (26)	16.9% (12)	18.3% (13)	19.7% (14)	8.5% (6)
Non-Collegiate Athlete, Male [A]	62.7% (183)	15.1% (44)	10.6% (31)	2.4% (7)	9.2% (27)
Collegiate Athlete, Female [B]	39.4% (41)	20.2% (21)	20.2% (21)	10.6% (11)	9.6% (10)
Non-Collegiate Athlete, Female [B]	64.2% (283)	11.8% (52)	14.5% (64)	2.7% (12)	6.8% (30)
Health Major Collegiate Athlete, Male [C, D]	20.0% (3)	13.3% (2)	20.0% (3)	13.3% (2)	33.3% (5)
Non-Health Major Collegiate Athlete, Male [C, E]	41.1% (23)	17.9% (10)	17.9% (10)	21.4% (12)	1.8% (1)
Health Major Non-Collegiate Athlete, Male [D]	59.0% (36)	14.8% (9)	16.4% (10)	1.6% (1)	8.2% (5)
Non-Health Major Non-Collegiate Athlete, Male [E]	63.5% (146)	15.2% (35)	9.1% (21)	2.6% (6)	9.6% (22)
Health Major Collegiate Athlete, Female [F]	29.3% (12)	26.8% (11)	26.4% (11)	7.3% (3)	9.8% (4)
Non-Health Major Collegiate Athlete, Female [G]	46.0% (29)	15.9% (10)	15.9% (10)	12.7% (8)	9.5% (6)
Health Major Non-Collegiate Athlete, Female [F]	64.5% (129)	13.0% (26)	13.5% (27)	3.5% (7)	5.5% (11)
Non-Health Major Non-Collegiate Athlete, Female [G]	63.9% (154)	10.8% (26)	15.4% (37)	2.1% (5)	7.9% (19)

p-values: A <0.0001, B < 0.0001, C 0.003, D 0.008, E <0.0001, F 0.001, G 0.001

health-related majors used the Internet than collegiate athletes in non-health related majors ($p < 0.0001$).

Female non-collegiate athletes in health-related majors used health information from the Internet significantly more than female collegiate athletes in similar health-based majors, who tended to use the Internet, but also family and health professionals ($p = 0.001$). In contrast, female collegiate and non-collegiate athletes in non health-related majors reported similarly using the Internet as their main source for information. However, significantly more of these non-collegiate female athletes in non health-related majors used the Internet than similar collegiate athletes ($p = 0.001$).

Table 4 shows the results about whether participants agreed or disagreed with the perception that artificial sweeteners are harmful to health. Females felt that they were harmful more than males ($p = 0.02$). Among males, collegiate athletes felt that they were less harmful to health than male non-collegiate ($p = 0.01$). Among female collegiate athletes and non-collegiate athletes, there was no significant difference in their perceptions about sweeteners being harmful with both feeling as though they were harmful to health. However, when collegiate athletes are compared by gender, a greater percentage of female athletes felt that artificial sweeteners were harmful to health that male athletes ($p = 0.01$).

Contrary to what was expected, non-collegiate female athletes in health-related majors felt that artificial sweeteners are harmful to health more than those in non health-related majors ($p = 0.004$). In contrast, among males in non-health related majors, non-collegiate athletes felt that nonnutritive sweeteners were

Table 4. Perception that Artificial Sweeteners are Harmful to Health

	≤ 3 (disagree)	≥ 4 (agree)
	% (N)	
Male [A]	42.2% (153)	57.9% (210)
Female [A]	34.9% (188)	65.1% (351)
Collegiate Athlete, Male [B, C]	55.7% (39)	44.3% (31)
Non-Collegiate Athlete, Male [B]	38.9% (114)	61.1% (179)
Collegiate Athlete, Female [C]	36.6% (37)	63.4% (64)
Non-Collegiate Athlete, Female	34.5% (151)	65.5% (287)
Health Major Collegiate Athlete, Male	53.3% (8)	46.7% (7)
Non-Health Major Collegiate Athlete, Male [E, F]	56.4% (31)	43.6% (24)
Health Major Non-Collegiate Athlete, Male	41.4% (24)	58.6% (34)
Non-Health Major Non-Collegiate Athlete, Male [E]	38.5% (90)	61.5% (144)
Health Major Collegiate Athlete, Female	35.9% (14)	64.1% (25)
Non-Health Major Collegiate Athlete, Female [F]	37.1% (23)	62.9% (39)
Health Major Non-Collegiate Athlete, Female [D]	27.2% (53)	72.8% (142)
Non-Health Major Non-Collegiate Athlete, Female [D]	40.3% (98)	59.7% (145)

p-values: A 0.02, B 0.01, C 0.01, D 0.004, E 0.02, F 0.04
*Scale: 1 (do not agree at all), 2, 3, 4, 5, 6 (completely agree)
1, 2, and 3 were grouped together as ≤ 3 (disagree)
4, 5, and 6 were grouped together as ≥ 4 (agree)

harmful to health more than similar collegiate athletes (p= 0.02). Among all types of college athletes in non-health-related majors, significantly more females than males agreed that artificial sweeteners were harmful to health (p= 0.04) while there was no difference in perceptions between male and female non-collegiate athletes in health-related majors.

Table 5 displays data about whether participants agreed or disagreed with the perception that artificial sweeteners bring about many benefits for the consumer. Regardless of gender, athletic status, or academic major, the majority of students felt that nonnutritive sweeteners do not bring about many benefits for the consumer. More female non-collegiate athletes in a health-related major felt that sweeteners do not bring about many health benefits than female non-collegiate athletes in a non-health related major do (p=0.02).

Table 6 and 7 shows that, consistently, all students felt that nonnutritive sweeteners do not allow for reduction in unnecessary calories and that regulators are not trustworthy in the licensing and control of these sweeteners. No significant differences existed between comparison groups.

Table 8 shows consumption patterns for sugar-free gum by month, days per week, and number of servings per day and breaks down data by gender, athlete type, and major. Females consumed significantly more sugar-free gum in the last month than males (p=0.0002). Most males and females consumed one to two servings a day, but more females consumed one to two servings than males (p=0.02). Among athletes, non-collegiate male athletes consumed sugar-free gum within the last month more than both male and female collegiate athletes (p=0.04;

Table 5. Perception that Artificial Sweeteners Bring About Many Benefits for the Consumer

	≤ 3 (disagree)	**≥ 4 (agree)**
	% (N)	
Male	80.2% (291)	19.8% (72)
Female	83.7% (451)	16.3% (88)
Collegiate Athlete, Male	88.6% (62)	11.4% (8)
Non-Collegiate Athlete, Male	77.7% (229)	22.4% (64)
Collegiate Athlete, Female	87.0% (87)	13.0% (13)
Non-Collegiate Athlete, Female	82.9% (364)	17.1% (75)
Health Major Collegiate Athlete, Male	93.3% (14)	6.7% (1)
Non-Health Major Collegiate Athlete, Male	87.3% (48)	12.7% (7)
Health Major Non-Collegiate Athlete, Male	82.8% (48)	17.2% (10)
Non-Health Major Non-Collegiate Athlete, Male	76.9% (180)	23.1% (54)
Health Major Collegiate Athlete, Female	87.2% (34)	12.8% (5)
Non-Health Major Collegiate Athlete, Female $_{G}$	86.9% (53)	13.1% (8)
Health Major Non-Collegiate Athlete, Female	85.1% (166)	14.9% (29)
Non-Health Major Non-Collegiate Athlete, Female $_{G}$	76.5% (186)	23.5% (57)

p-values: G 0.02
*Scale: 1 (do not agree at all), 2, 3, 4, 5, 6 (completely agree)
1, 2, and 3 were grouped together as ≤ 3 (disagree)
4, 5, and 6 were grouped together as ≥ 4 (agree)

Table 6. Perception that Artificial Sweeteners Allow for a Reduction of Unnecessary Calories

	≤ 3 (disagree)	**≥ 4 (agree)**
	% (N)	
Male	68.9% (250)	31.1% (113)
Female	66.1% (356)	34.0% (183)
Collegiate Athlete, Male	64.3% (45)	35.7% (25)
Non-Collegiate Athlete, Male	70.0% (205)	30.0% (88)
Collegiate Athlete, Female	65.0% (65)	35.0% (35)
Non-Collegiate Athlete, Female	66.3% (291)	33.7% (148)
Health Major Collegiate Athlete, Male	75.3% (11)	24.7% (4)
Non-Health Major Collegiate Athlete, Male	61.8% (34)	38.2% (21)
Health Major Non-Collegiate Athlete, Male	65.5% (38)	34.5% (20)
Non-Health Major Non-Collegiate Athlete, Male	70.9% (166)	29.1% (68)
Health Major Collegiate Athlete, Female	66.7% (26)	33.3% (13)
Non-Health Major Collegiate Athlete, Female	63.9% (39)	36.1% (22)
Health Major Non-Collegiate Athlete, Female	63.6% (124)	36.4% (71)
Non-Health Major Non-Collegiate Athlete, Female	68.5% (167)	31.6% (77)

*Scale: 1 (do not agree at all), 2, 3, 4, 5, 6 (completely agree)
1, 2, and 3 were grouped together as ≤ 3 (disagree)
4, 5, and 6 were grouped together as ≥ 4 (agree)

Table 7. Perception that Regulators are Trustworthy in Relation to the Licensing and Control of Artificial Sweeteners in Foods

	≤ 3 (disagree)	**≥ 4 (agree)**
	% (N)	
Male	79.3% (288)	20.7% (75)
Female	77.9% (419)	22.1% (119)
Collegiate Athlete, Male	77.1% (54)	22.9% (16)
Non-Collegiate Athlete, Male	79.9% (234)	20.1% (59)
Collegiate Athlete, Female	76.0% (76)	24.0% (24)
Non-Collegiate Athlete, Female	78.3% (343)	21.7% (95)
Health Major Collegiate Athlete, Male	86.7% (13)	13.3% (2)
Non-Health Major Collegiate Athlete, Male	74.5% (41)	25.5% (14)
Health Major Non-Collegiate Athlete, Male	74.1% (43)	25.9% (15)
Non-Health Major Non-Collegiate Athlete, Male	81.6% (191)	18.4% (43)
Health Major Collegiate Athlete, Female	76.9% (30)	23.1% (9)
Non-Health Major Collegiate Athlete, Female	75.4% (46)	24.6% (15)
Health Major Non-Collegiate Athlete, Female	80.5% (157)	19.5% (38)
Non-Health Major Non-Collegiate Athlete, Female	76.5% (186)	23.5% (57)

*Scale: 1 (do not agree at all), 2, 3, 4, 5, 6 (completely agree)
1, 2, and 3 were grouped together as ≤ 3 (disagree)
4, 5, and 6 were grouped together as ≥ 4 (agree

Table 8. Consumption of Sugar-free Gum by Gender, Athletic Status, and Academic Major

	Last Month		Days Consumed per Week		Servings per Day	
	Yes	**No**	**3 or less**	**4 or more**	**1-2**	**3 or more**
	% (N)					
Male	40.0% (144)	60.0% (216) A	63.8% (97)	36.2% (55)	72.6% (138) B	27.4% (52)
Female	52.4% (278) A	47.7% (253)	66.5% (195)	33.5% (98)	81.3% (273) B	18.8% (63)
Collegiate Athlete, Male	29.0% (20)	71.0% (49) C, D	68.2% (15)	31.8% (7)	74.3% (26)	25.7% (9)
Non-Collegiate Athlete, Male	42.6% (124)	57.4% (167) C, E	63.1% (82)	36.9% (48)	72.3% (112)	27.7% (43)
Collegiate Athlete, Female	45.0% (45)	55.0% (55) D	63.3% (31)	36.7% (18)	83.3% (50)	16.7% (10)
Non-Collegiate Athlete, Female	54.1% (233)	45.9% (198) E	67.2% (164)	32.8% (80)	80.8% (223)	19.2% (53)
Health Major Collegiate Athlete, Male	33.3% (5)	66.7% (10)	66.7% (4)	33.3% (2)	85.7% (6)	14.3% (1)
Non-Health Major Collegiate Athlete, Male	27.8% (15)	72.2% (39)	68.8% (11)	31.3% (5)	71.4% (20)	28.6% (8)
Health Major Non-Collegiate Athlete, Male	54.4% (31)	45.6% (26)	72.7% (24)	27.3% (9)	82.9% (29)	17.1% (6)
Non-Health Major Non-Collegiate Athlete, Male	39.9% (93)	60.1% (140) F	59.8% (58)	40.2% (39)	69.2% (83)	30.8% (37) G
Health Major Collegiate Athlete, Female	43.6% (17)	56.4% (22)	55.0% (11)	45.0% (9)	87.0% (20)	13.1% (3)
Non-Health Major Collegiate Athlete, Female	45.9% (28)	54.1% (33)	69.0% (20)	31.0% (9)	81.1% (30)	18.9% (7)
Health Major Non-Collegiate Athlete, Female	53.9% (103)	46.1% (88)	64.0% (71)	36.0% (40)	76.6% (98)	23.4% (30)
Non-Health Major Non-Collegiate Athlete, Female	54.2% (130)	45.8% (110) F	70.0% (93)	30.1% (40)	84.5% (125)	15.5% (23) G

p-values: A 0.0002, B 0.02, C 0.04, D 0.03, E 0.003, F 0.002, G 0.003

p=0.03, respectively). Among non-collegiate athletes, females used sugar-free gum significantly more than males (p= 0.003). Significant differences existed among non-collegiate athletes in non-health majors based upon gender. Specifically, females used sugar-free gum within the last month significantly more than males (p= 0.002) and more of these same females consumed sugar-free gum than their male counterparts (p= 0.003).

Table 9 shows the consumption of diet beverages by month, days per week, and number of servings per day and is also broken down by gender, athletic status, and major. While the majority of both male and female participants reported not consuming diet beverages in the last month, more females consumed than males (p= 0.01). Female collegiate athletes that had consumed diet beverages in the last month drank them 3 days or less a week, a frequency that was significantly greater than female non-collegiate athletes who also consumed diet beverages 3 days or less a week (p= 0.01). Both the majority of male and female collegiate athletes indicated that they hadn't consumed diet beverages within the last month, however more females again consumed them than males (p= 0.01). When looking at female non-collegiate athletes in any major, the majority claimed they hadn't had a diet beverage within the last month. However, after further breakdown by major, more participants in non health-related majors reported consuming diet beverages (p= 0.03). Less than 50% of females in health-related majors consumed diet beverages, with collegiate athletes using them significantly more than non-collegiate athletes (p=0.03). However, female collegiate athletes consumed them less in the last month than male athletes (p=0.01).

Table 9. Consumption of Diet Beverages by Gender, Athletic Status, and Academic Major

	Last Month		Days Consumed		Servings per Day	
	Yes	No	3 or less	4 or more	1-2	3 or more
	% (N)					
Male	25.2% (88)	74.8% (261) A	78.4% (76)	21.7% (21)	87.5% (98)	12.5% (14)
Female	32.8% (172)	67.2% (353) A	80.5% (153)	19.5% (37)	90.4% (187)	9.7% (20)
Collegiate Athlete, Male	19.4% (13)	80.6% (54) C	73.3% (11)	26.7% (4)	80.0% (12)	20.0% (3)
Non-Collegiate Athlete, Male	26.6% (75)	73.4% (207)	79.3% (65)	20.7% (17)	88.7% (86)	11.3% (11)
Collegiate Athlete, Female	38.0% (38)	62.0% (62) C	93.2% (41) B	6.8% (3)	93.3% (42)	6.7% (3)
Non-Collegiate Athlete, Female	31.5% (134)	68.5% (291)	76.7% (112) B	23.8% (34)	89.5% (145)	10.5% (17)
Health Major Collegiate Athlete, Male	7.1% (1)	92.9% (13) E	100.0% (2)	0.0% (0)	100.0% (2)	0.0% (0)
Non-Health Major Collegiate Athlete, Male	22.6% (12)	77.4% (41)	69.2% (9)	30.8% (4)	76.9% (10)	23.1% (3)
Health Major Non-Collegiate Athlete, Male	30.4% (17)	69.6% (39)	72.2% (13)	27.8% (5)	84.2% (16)	15.8% (3)
Non-Health Major Non-Collegiate Athlete, Male	25.8% (58)	74.2% (167)	81.3% (52)	18.8% (12)	89.8% (70)	10.3% (8)
Health Major Collegiate Athlete, Female	43.6% (17)	56.4% (22) E	100.0% (21)	0.0% (0)	94.7% (18)	5.3% (1)
Non-Health Major Collegiate Athlete, Female	34.4% (21)	65.6% (40)	87.0% (20)	13.0% (3)	92.3% (24)	7.7% (2)
Health Major Non-Collegiate Athlete, Female	36.8% (70)	63.2% (120) D	79.2% (61)	20.8% (16)	92.6% (75)	7.4% (6)
Non-Health Major Non-Collegiate Athlete, Female	27.2% (64)	72.8% (171) D	73.9% (51)	26.1% (18)	86.4% (70)	13.6% (11)

p-values: A 0.01, B 0.01, C 0.01, D 0.03, E 0.01

Table 10 shows the consumption of packets of artificial sweeteners by month, days per week, and number of servings per day by gender, athletic status, and major. The majority of males and females in any participant category did not consume packets of artificial sweeteners in the last month. However, more females reported consuming them than males (p= 0.01). Similarly, among non-collegiate athletes, more females again consumed them in the last month than males (p= 0.02). Finally, among non-collegiate athletes in non health-related majors more females again consumed them in the last month than males (p= 0.04).

Table 10. Consumption of Packets of Artificial Sweeteners by Gender, Athletic Status, and Academic Major

	Last Month		Days Consumed		Servings per Day	
	Yes	No	3 or less	4 or more	1-2	3 or more
	% (N)					
Male	15.1% (53)	84.9% (298) A	86.4% (57)	13.6% (9)	86.5% (64)	13.5% (10)
Female	22.2% (116)	77.8% (406) A	76.7% (99)	23.3% (30)	85.8% (109)	14.2% (18)
Collegiate Athlete, Male	19.1% (13)	80.9% (55)	86.7% (13)	13.3% (2)	84.2% (17)	15.8% (2)
Non-Collegiate Athlete, Male	14.1% (40)	85.9% (243) B	86.3% (44)	13.7% (7)	87.3% (48)	12.7% (7)
Collegiate Athlete, Female	27.3% (27)	72.7% (72)	90.0% (27)	10.0% (3)	82.8% (24)	17.2% (5)
Non-Collegiate Athlete, Female	21.0% (89)	79.0% (334) B	72.7% (72)	27.3% (27)	86.7% (85)	13.3% (13)
Health Major Collegiate Athlete, Male	20.0% (3)	80.0% (12)	100.0% (4)	0.0% (0)	100.0% (4)	0.0% (0)
Non-Health Major Collegiate Athlete, Male	18.9% (10)	81.1% (43)	81.8% (9)	18.2% (2)	80.0% (12)	20.0% (3)
Health Major Non-Collegiate Athlete, Male	15.8% (9)	84.2% (48)	92.3% (12)	7.7% (1)	92.9% (13)	7.1% (1)
Non-Health Major Non-Collegiate Athlete, Male	13.8% (31)	86.2% (194) C	84.2% (32)	15.8% (6)	85.4% (35)	14.6% (6)
Health Major Collegiate Athlete, Female	31.6% (12)	68.4% (26)	86.7% (13)	13.3% (2)	86.7% (13)	13.3% (2)
Non-Health Major Collegiate Athlete, Female	24.6% (15)	75.4% (46)	93.3% (14)	6.7% (1)	78.6% (11)	21.4% (3)
Health Major Non-Collegiate Athlete, Female	21.2% (40)	78.8% (149)	67.4% (29)	32.6% (14)	85.7% (36)	14.3% (6)
Non-Health Major Non-Collegiate Athlete, Female	20.9% (49)	79.1% (185) C	76.8% (43)	23.3% (13)	87.5% (49)	12.5% (7)

p-values: A 0.01, B 0.02, C 0.04

Chapter 4

Discussion

The first aim of this research was to determine the perceptions that college students have about non-nutritive sweeteners. Overall, college students appear to have negative perceptions of these sweeteners. The majority believe that nonnutritive sweeteners are harmful to health, do not have health benefits and do not allow for a reduction of unnecessary calories. In addition, participants didn't trust the regulators in charge of licensing and controlling them despite many studies supporting the safety and potential health benefits that these sweeteners offer. The US Food and Drug Administration (FDA) approves these sweeteners as safe for consumption and use in the general public based on previous study results (Sharma, Amaranth, Thulasimani, & Ramaswamy, 2016). For example, the FDA approved Sucralose, after 110 studies addressing consumption of the NNS were assessed and determined its consumption safe for use (Rodero, Rodero, & Azoubel, 2009). Potential health benefits include that nonnutritive sweeteners may aid in weight management, as they provide zero calories to the human body (Bellisle & Drewnowski, 2007). Along with weight management, NNS are an appropriate substitution for sucrose for people with diabetes since they have no affect on blood glucose levels (Gibson et al., 2014). Additionally, nonnutritive sweeteners can help promote good oral health since bacteria in the mouth are unable to break them down (Gibson et al., 2014). After analyzing the results from the perceptions of the participants in this current study, it can be speculated that college students may

have these negative misconceptions about artificial sweeteners due to a possible lack of nutrition knowledge specific to nonnutritive sweeteners. From the demographic data, it was observed that over 70% of college students had a nutrition course or lecture, which was taught in high school and only approximately around 15% had a nutrition course or lecture in college, and roughly 10% had never had a nutrition course or lecture. Despite a majority of students having had nutrition education prior to this study, it has been shown in previous studies that college students in general tend to have poor understandings of three major aspects of nutrition: the food pyramid, dietary guidelines, and links between nutrition and health and disease (McArthur et al., 2000). If students are struggling to understand these basic concepts, they might not understand the consequences of consuming too much added sugar and therefore may not have an understanding of the potential benefits that nonnutritive sweeteners can offer. Teaching college students specifically about nonnutritive sweeteners and the role they may play in nutrition and health may be beneficial for this population.

Another important aspect of this aim was to determine the sources of information college students used to find information about NNS. The majority of both male and female college students reported primarily using the Internet for information about nutrition and healthy eating. This is problematic since college students have been shown in previous studies to be highly susceptible to misinformation from online sources since they appear to be less proficient at interpreting information or may not understand how to identify whether the information on the Internet comes from a credible source (Rennis et al., 2015). Due

to notoriously variable reliability of information from the Internet, the data in the current study suggests that as nutrition is discussed more, either as part of collegiate sports or as part of an academic major, students, at least male students, appear to seek information from sources other than the Internet. A reason why this is not extractable to female students is unknown. Previous studies have shown that females are more persuadable and more easily influenced than males (Orji, 2014). It may be that males who receive information from credible sources stick with it, while females waiver from their information from other sources and are persuaded to believe what the Internet states. It can be suggested that college students' inaccurate perceptions about non-nutritive sweeteners may be because they are getting their information about them from unreliable sources. Unfortunately, an analysis of where specific individuals got certain perceptions and their sources of information about nutrition was not made.

The second aim of this thesis was to determine the prevalence of consumption of non-nutritive sweeteners among male and female collegiate and non-collegiate athletes in health and non-health based majors. When asked about consumption of sugar-free gum, diet beverages, and packets of artificial sweeteners, only sugar-free gum was consumed regularly (daily) and was consumed more by females than males and more so by non-collegiate athletes than collegiate athletes. As seen from this study, the majority of this study's participants didn't feel as though artificial sweeteners were beneficial to their health and felt as though they were harmful. This observation was also seen when analyzing aim three, which compared the prevalence of consumption and the perceptions about non-nutritive

sweeteners among collegiate athletes versus non-collegiate athletes, health-related majors versus non health-related majors, and male students versus female students. The majority of all students had negative perceptions about nonnutritive sweeteners along with low consumption of products that contain them. This may be due to the limited education that all college students may have on nonnutritive sweeteners, whether they are in a health-related major or not. Unfortunately, questions in this study about prior nutrition education did not include questions about prior NNS education.

A limitation of this study may be that it is possible that college students may not know what artificial sweeteners are or what kind of products contain them. Participants that reported that they didn't consume sugar-free gum within the last month may not realize that the gum they have is sugar-free. Many chewing gum companies display "sugar-free gum" in very small font in a way that is easy miss. For example, Orbit, a well-known chewing gum brand, displays "sugar-free gum" in a very small, light-colored font at the bottom corner of the package (Orbit Gum). If individuals aren't specifically searching for this information, it is very easy to overlook. Another limitation of this study is that it is not known what is being taught in nutrition courses at the high school or college level. Artificial sweeteners may not be taught, or its coverage may be limited.

In the future, this study could be expanded to determine what college students are learning about artificial sweeteners in their nutrition courses and lectures. If very little or none is taught, then education about NNS may potentiate their wider use in this population as a means to reduce caloric and added sugar

intake. In addition, perceptions could be individually compared to sources of information about nutrition in order to determine exactly where misconceptions are coming from. There continues to be an alarmingly high consumption rate of added sugars (Southcote, Jacobsen, McGowan, & Edelstein, 2016), which is contributing to the obesity epidemic our country is currently facing (Piernas, Ng, & Popkin, 2013). Previous work has shown that college students are highly susceptible to developing poor dietary habits during their college years due to independence from parents, extremely busy schedules, and lack of nutrition knowledge (Matthews et al., 2016). If more college students are educated on the positive health benefits of nonnutritive sweeteners, it may be possible to halt an increase in the consumption of added sugars, and possibly reduce their consumption as well as reduce the rise in obesity. Educating college students now may have a lasting impact on many future generations to come.

In conclusion, this study adds valuable information to the body of knowledge about perceptions and usage of nonnutritive sweeteners by college students.

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Appendices

Appendix A: Copies of Instruments

Appendix A1

Demographics Questions

1. Gender (select one):

- ❍ Male
- ❍ Female

2. Age _____

3. Class in college

- ❍ Freshman
- ❍ Sophomore
- ❍ Junior
- ❍ Senior

4. Are you studying a health-related major? If yes, select which one

- ❍ Athletic Training
- ❍ Child and Family Development
- ❍ Exercise Science
- ❍ Health Education and Promotion
- ❍ Nursing
- ❍ Nutrition and Food Science
- ❍ Recreation
- ❍ Other (specify) _____
- ❍ No, I am not in a health-related major

5. Have you had a nutrition class/lecture in college or high school of any kind before today?

- ❍ Yes
- ❍ No

6. If yes, when?

- ❑ High school
- ❑ College

7. Are you a collegiate athlete at Georgia Southern?

- ❍ Yes
- ❍ No

8. If yes, which sport do you participate in?

- ❍ Baseball
- ❍ Basketball
- ❍ Cross country
- ❍ Football
- ❍ Golf
- ❍ Soccer
- ❍ Softball
- ❍ Swimming & Diving
- ❍ Tennis
- ❍ Track & Field
- ❍ Other (specify) _____

Appendix A2

Survey of Sources, Perceptions, and Use of Non-nutritive Sweeteners

9. When obtaining information about nutrition and healthy eating, which source do you consult the most?

- ❍ Books
- ❍ Family
- ❍ Friends
- ❍ Health professional
- ❍ Internet
- ❍ Magazines
- ❍ Personal trainer
- ❍ Other (specify) _____

10. I think that certain artificial sweeteners are harmful to health.

- ❍ 1 (do not agree at all)
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6 (completely agree)

11. Artificial sweeteners bring about many benefits for the consumer.

- ❍ 1 (do not agree at all)
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6 (completely agree)

12. Artificial sweeteners allow for a reduction of unnecessary calories.

- ❍ 1 (do not agree at all)
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6 (completely agree)

13. I trust the regulators in relation to the licensing and control of artificial sweeteners in foods.

- ❍ 1 (do not agree at all)
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6 (completely agree)

14. Have you consumed Sugar-free chewing gum within the last month?

- ❍ Yes
- ❍ No

15. If yes...On how many days do you consume it per week?

- ❍ 1 day
- ❍ 2 days
- ❍ 3 days
- ❍ 4 days
- ❍ 5 days
- ❍ 6 days
- ❍ 7 days

16. How many servings do you consume per day?

- ❍ 1 serving
- ❍ 2 servings
- ❍ 3 servings
- ❍ 4 or more servings

17. Have you consumed Diet beverages (low-calorie, artificially sweetened) within the last month?

- ❍ Yes
- ❍ No

18. If yes...On how many days do you consume it per week?

- ❍ 1 day
- ❍ 2 days
- ❍ 3 days
- ❍ 4 days
- ❍ 5 days
- ❍ 6 days
- ❍ 7 days

19. How many servings do you consume per day?

- ❍ 1 serving
- ❍ 2 servings
- ❍ 3 servings
- ❍ 4 or more servings

20. Have you consumed Packets of artificial sweeteners within the last month?

- ❍ Yes
- ❍ No

21. If yes...On how many days do you consume it per week?

- ❍ 1 day
- ❍ 2 days
- ❍ 3 days
- ❍ 4 days
- ❍ 5 days
- ❍ 6 days
- ❍ 7 days

22. How many servings do you consume per day?

- ❍ 1 serving
- ❍ 2 servings
- ❍ 3 servings
- ❍ 4 or more servings

Appendix B: IRB Forms

Appendix B1

Georgia Southern University
Office of Research Services & Sponsored Programs

Institutional Review Board (IRB)

Phone: 912-478-5465
Fax: 912-478-0719
IRB@GeorgiaSouthern.edu
Veazey Hall 3000
PO Box 8005
Statesboro, GA 30460

To: Heydinger, Madison
Romanchik-Cerpovicz, Joelle

From: Office of Research Services and Sponsored Programs
Administrative Support Office for Research Oversight Committees
(IACUC/IBC/IRB)

Approval Date: 3/31/2017

Subject: Status of Application for Approval to Utilize Human Subjects in Research

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After a review of your proposed research project numbered **H17347** and titled **"Knowledge and Use of Nonnutritive Sweeteners Among College Students."** it appears that your research involves activities that do not require full approval by the Institutional Review Board (IRB) according to federal guidelines. In this research project research data will be collected anonymously.

According to the Code of Federal Regulations Title 45 Part 46, your research protocol is determined to be exempt from full review under the following exemption category(s):

B2 Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (I) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (II) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Any alteration in the terms or conditions of your involvement may alter this approval. *Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that your research, as submitted, is exempt from IRB approval. No further action or IRB oversight is required, as long as the project remains the same. If you alter the project, it is your responsibility to notify the IRB and acquire a new determination of exemption. Because this project was determined to be exempt from further IRB oversight, this project does not require an expiration date.*

Sincerely,

Eleanor Haynes
Compliance Officer

Appendix B2

Research Compliance Combined Cover Page

Georgia Southern University

Application for Research Approval

Investigator Information:		
Name of Principal Investigator: Madison Heydinger	Phone: 816-284-8242	**For Office Use Only:** **Protocol ID**
Email: mh09099@georgiasouthern.edu (Note: Georgia Southern email addresses will be used for all correspondance.)	Department Name and PO Box: Department of Health and Kinesiology, P.O. Box 8076	
☐ Faculty ☐ Doctoral ☐ Specialist ☐ Masters ☒ Undergraduate ☐ Other:		
Name(s) of Co-Investigators: Dr. Joelle Romanchik-Cerpovicz	Phone: 912-478-1420	
Email addresses: jromchik@georgiasouthern.edu	Department Name and PO Box: Department of Health and Kinesiology, P.O. Box 8076	
☒Faculty; ☐Doctoral; ☐Specialist; ☐Masters ☐ Undergraduate ☐ Other: *(If multiple: identify by initial letter behind name. E.g., F for faculty)*		
Personnel and/or Institutions Outside of Georgia Southern University involved in this research (Attach training certification): N/A		
Project Information: (Note: funded project titles MUST match grant title)		
Title: Knowledge and Use of Nonnutritive Sweeteners Among College Students		
Brief (less than 50 words) Project Summary: This project will survey male and female college students enrolled in Healthful Living class (HLTH 1520) to assess their knowledge and use of nonnutritive sweeteners.		
Compliance Information:		
Please indicate which of the following will be used in your research: (application may be submitted simultaneously) ☒ Human Subjects (Complete *Section A: Human Subjects* below) ☐ Care and Use of Vertebrate Animals (Complete *Section B: Care and Use of Vertebrate Animals* below) ☐ Biohazards (Complete *Section C: Biohazards* below)		
☐ Yes ☒ No Do you or any investigator on this project have a financial interest in the subjects, study outcome, or project sponsor. (A disclosed conflict of interest will not preclude approval. An undisclosed conflict of interest will result in disciplinary action.)		
Desired Start Date: 8/15/2017 (no more than 1 year) Anticipated renewals ☐ year 2 ☐ year 3	☒ ☐ **Check one: New submission Resubmission #**	
Funding Source: ☐ Federal ☐ State ☐ Private ☐ Internal GSU ☒ Self-funded/non- funded Funding Agency/Department: Grant Number:		

Section A: Human Subjects ☐ Not Applicable
Number of Subjects (Maximum) 2300
Please indicate if the following are included in the study (Check all that apply): ☐ Survey delivered by email to .georgiasouthern.edu addresses ☐ Human Subjects Incentives ☐ Deception ☐ At Risk Populations (prisoners, children, pregnant women, etc) ☐ Video or Audio Tapes ☐ Medical Procedures, including exercise, administering drugs/dietary supplements, and other procedures, or ingestion of any substance

Section B: Care and Use of Vertebrate Animals ☒ Not Applicable

Purpose of use/care of animals:	*Please indicate if the following are included in the study:*
☐ Research ☐ Teaching ☐ Demo only ☐ Student participation in faculty work ☐ Class Project ☐ Exhibition ☐ Display	☐ Physical intervention with vertebrate animals ☐ Housing of vertebrate animals ☐ Euthanasia of vertebrate animals ☐ Use of sedation, analgesia, or anesthesia ☐ Surgery ☐ Farm animals for biomedical research (e.g., diseases, organs, etc.) ☐ Farm animals for agricultural research (e.g., food/fiber production, etc.) ☐ Observation of vertebrate animals in their natural setting

Section C: Biological Research ☒ Not Applicable ☐ Submitted Separately	
Biosafety Level:	*Please indicate if the following are included in the study:*
☐ Exempt ☐ BSL 1 ☐ BSL 2 ☐ BSL 3	☐ Use of rDNA ☐ Non native/invasive plant species ☐ Last EHS lab safety inspection date: ☐ Last IBC biosafety lab inspection date:

Signature of Applicant(s)(PI, CoPI): Madison Heydinger Date: 03/21/2017

If student project, please complete research advisor's information below (note that advisor signature must be received before application will be reviewed.)
If faculty project, please complete department chair's information below.

By signing this cover page I acknowledge that I have reviewed and approved this protocol for scientific merit, rational and significance. I further acknowledge that I approve the ethical basis for the study.

Department Chair or Research Advisor's Name (Print or Type): Dr. Joelle Romanchik-Cerpovicz

Signature of Committee Chair/Research Advisor (if student)/Department Chair(if faculty): J. Romanchik-Cerpovicz Date: 03/21/2017

Please submit this protocol to IRB@georgiasouthern.edu in a single email; scanned signatures and official Adobe electronic signatures are accepted. Applications may also be submitted via mail to the Georgia Southern University Office of Research Integrity, P.O. Box 8005.

The application should contain all required documents specific to the committee to which you are applying. Questions or comments can be directed to (912)478-5465 or IRB@georgiasouthern.edu.

Appendix B3

CERTIFICATION OF INVESTIGATOR RESPONSIBILITIES

By signing below I agree/certify that:

1. I have reviewed this protocol submission in its entirety and I state that I am fully cognizant of, and in agreement with, all submitted statements and that all statements are truthful.

2. This application, if funded by an extramural source, accurately reflects all procedures involving human participants described in the proposal to the funding agency previously noted.

3. I will conduct this research study in strict accordance with all submitted statements except where a change may be necessary to eliminate an apparent immediate hazard to a given research subject.
   a. I will notify the IRB promptly of any change in the research procedures necessitated in the interest of the safety of a given research subject.
   b. I will request and obtain IRB approval of any proposed modification to the research protocol or informed consent document(s) prior to implementing such modifications.

4. I will ensure that all co-investigators, and other personnel assisting in the conduct of this research study have been provided a copy of the entire current version of the research protocol and are fully informed of the current (a) study procedures (including procedure modifications); (b) informed consent requirements and process; (c) anonymity and/or confidentiality assurances promised when securing informed consent (d) potential risks associated with the study participation and the steps to be taken to prevent or minimize these potential risks; (e) adverse event reporting requirements; (f) data and record-keeping requirements; and (g) the current IRB approval status of the research study.

5. I will not enroll any individual into this research study: (a) until such time that the conduct of the study has been approved in writing by the IRB; (b) during any period wherein IRB renewal approval of this research study has lapsed; (c) during any period wherein IRB approval of the research study or research study enrollment has been suspended, or wherein the sponsor has suspended research study enrollment; or (d) following termination of IRB approval of the research study or following sponsor/principal investigator termination of research study enrollment.

6. I will respond promptly to all requests for information or materials solicited by the IRB or IRB Office.

7. I will submit the research study in a timely manner for IRB renewal approval.

8. I will not enroll any individual into this research study until such time that I obtain his/her written informed consent, or, if applicable, the written informed consent of his/her authorized representative (i.e., unless the IRB has granted a waiver of the requirement to obtain written informed consent).

9. I will employ and oversee an informed consent process that ensures that potential research subjects understand fully the purpose of the research study, the nature of the research procedures they are being asked to undergo, the potential risks of these research procedures, and their rights as a research study volunteer.

10. I will ensure that research subjects are kept fully informed of any new information that may affect their willingness to continue to participate in the research study.

11. I will maintain adequate, current, and accurate records of research data, outcomes, and adverse events to permit an ongoing assessment of the risks/benefit ratio of research study participation.

12. I am cognizant of, and will comply with, current federal regulations and IRB requirements governing human subject research including adverse event reporting requirements.

13. I will notify the IRB within 24 hours regarding any unexpected study results or adverse events that injure or cause harm to human participants.

14. I will make a reasonable effort to ensure that subjects who have suffered an adverse event associated with research participation receive adequate care to correct or alleviate the consequences of the adverse event to the extent possible.

15. I will notify the IRB prior to any change made to this protocol or consent form (if applicable).

16. I will notify the IRB office within 30 days of a change in the PI or the closure of the study.

Madison Heydinger	Madison Heydinger	03/21/2017
Principal Investigator Name (typed)	Principal Investigator Signature	Date
Joelle Ronarchik Laponice	J. Ronarchik	03-21-2017
Faculty Advisor Name (typed)	Faculty Advisor Signature*	Date

***Faculty signature indicates that he/she has reviewed the application and attests to its completeness and accuracy**

Appendix B4

GEORGIA SOUTHERN UNIVERSITY INSTITUTIONAL REVIEW BOARD
INSTRUCTIONS FOR PREPARATION OF PROPOSAL NARRATIVE

Instructions: Please respond to the following as clearly as possible. The narrative should include a step by step plan of how you will obtain your subjects, conduct the research and analyze the data. Make sure the narrative clearly explains aspects of the methodology that provide protections for your human subjects. Your narrative should be written to be read and understood by a general audience who does not have prior knowledge of your research and by committee members who may not be expert in your specific field of research. Your reviewers will only have the information you provide in your application. Explain any technical terms, jargon or acronyms. The narrative is a part of the complete application.

The application may be submitted electronically at irb@georgiasouthern.edu (email attachment) or sent to the Office of Research Integrity, at PO Box 8005, Statesboro, GA 30460, fax (912) 478-0719.

Personnel. *Please list any individuals who will be conducting research on this study. Also please detail the experience, level of involvement in the process and the access to information that each may have.*
No other individuals will be participating in the research beyond the advisor, Dr. Joelle Romanchik-Cerpovicz. The personal investigator, Madison Heydinger, is an undergraduate student completing research for the Honor's Program. Madison will be involved in the majority of the project. Dr. Joelle Romanchik-Cerpovicz, a professor at Georgia Southern University in the College of Health and Human Sciences, will be advising Madison during the research process. Only these two individuals will have access to the data. Madison Heydinger will be involved in the collection of the data. Both Madison Heydinger and Dr. Joelle Romanchik-Cerpovicz will be involved in the analysis, preparation, presentation of the data at professional conferences, and publication of the data.

Purpose. *1. Briefly describe in one or two sentences the purpose of your research. 2. What questions are you trying to answer in this experiment? Please include your hypothesis in this section. The jurisdiction of the IRB requires that we ensure the appropriateness of research. It is unethical to put participants at risk without the possibility of sound scientific result. For this reason, you should be very clear about how participants and others will benefit from knowledge gained in this project.*
1. The purpose of this research is to identify the knowledge and use of nonnutritive sweeteners (NNS) by college students. The purpose is also to see if there are differences between classes (freshman, sophomore, junior, senior), males and females, health-related majors and non-health related majors, and collegiate athletes and nonathletes.
2.Questions to be answered in the study include: Do female college students use nonnutritive sweeteners more than male college students? Are nonathletes using nonnutritive sweeteners less than collegiate athletes? Do students with health-related majors use nonnutritive sweeteners more than students with non-health related majors? Do college students have misconceptions about nonnutritive sweeteners? If so, where are they getting their information from?
The hypothesis of this study was that more than 50% of students surveyed at Georgia Southern University have misconceptions about sweeteners, that possible associations between negative perceptions of NNS and their use or non-use will exist, that athletes will consume nonnutritive sweeteners more often than non-athletes, that students with health-related majors will use nonnutritive sweeteners more often than students in non-health related majors, and that female students will use nonnutritive sweeteners more often than male students.

Literature Review. *Provide a brief description of how this study fits into the current literature. Have the research procedures been used before? How were similar risks controlled for and documented in the literature? Have your instruments been validated with this audience? Include citations in the description. Do not include dissertation or thesis chapters.*
In the current literature, Johnston et al (2013) found that the reduction in caloric intake by people who use nonnutritive sweeteners has been shown to help with lowering body weight and BMI values, which in turn helps reverse the obesity epidemic. According to Matthews, Doerr and Dworatzek (2016), the dietary patterns of college students is particularly alarming because the rate of weight gain is 6.7 times higher than the general public. It is important to educate college students that current research on the use of nonnutritive sweeteners points to possible weight control effects and other various health benefits.

Johnston, C. A., Stevens, B., & Foreyt, J. P. (2013). The role of low-calorie sweeteners in diabetes. *European Endocrinology, 9*(2), 96–98. https://doi.org/10.17925/USE.2013.09.01.13

Matthews, J. I., Doerr, L., & Dworatzek, P. D. N. (2016). University Students Intend to Eat Better but Lack Coping Self-Efficacy and Knowledge of Dietary Recommendations. *Journal of Nutrition Education and Behavior, 48*(1), 12–19.e1. https://doi.org/10.1016/j.jneb.2015.08.005

Outcome. *Please state what results you expect to achieve? Who will benefit from this study? How will the participants benefit (if at all). Remember that the participants do not necessarily have to benefit directly. The results of your study may have broadly stated outcomes for a large number of people or society in general.*
The results to be expected are that the majority of students at Georgia Southern University will have misconceptions about nonnutritive sweeteners, that negative perceptions of nonnutritive sweeteners are associated with non-use, that athletes consume nonnutritive sweeteners more often than non-athletes, that students with health-related majors use nonnutritive sweeteners more often than students in non-health related majors, and that female students use nonnutritive sweeteners more often than male students. In the

future, students may benefit from the possible education that will arise from the result of this study. This education may include the benefits and risks of using nonnutritive sweeteners.

Describe your subjects. *Give number of participants, and applicable inclusion or exclusion requirements (ages, gender requirements, etc.).*
The number of participants in this study will be a total of 2,300 college students enrolled in several sections of the Healthful Living course (HLTH 1520) and Georgia Southern University men's and women's athletic teams. The participants of this study will be above the age of 18. There will be no minors participating in this study. There are no gender requirements, however they will be asked to provide this information if they decide to. The survey will be administered electronically through the Georgia Southern University research engine, Qualtrics, using the anonymous function. The link will be provided for students who have access to the Internet on their cell phones. Paper copies of the survey will also be available for those students who don't have access to the Internet. All participants taking the survey will remain anonymous and no identification will be necessary, except for noting age and gender and major and whether they participate in a collegiate sport.

Recruitment and Incentives: *Describe how subjects will be recruited. (Attach a copy of recruitment emails, flyers or etc.) If provided, describe what incentives will be used and how they will be distributed.)*
Individuals participating in the study will be recruited from Georgia Southern University's Healthful Living courses (HLTH 1520) and Georgia Southern University men's and women's athletic teams. See emails detailing permission to administer survey in the classes and during practices. There will be no incentives used to recruit individuals for the study.

Research Procedures and Timeline: *Enumerate specifically what will you be doing in this study, what kind of experimental manipulations you will use, what kinds of questions or recording of behavior you will use. Focus on the interactions you will have with the human subjects. (Where applicable, attach a questionnaire, focus group outline, interview question set, etc.) Describe in detail any physical procedures you may be performing.*
For this study, a voluntary survey will be accessed through Qualtrics by college students during the last ten minutes of the period in their Healthful Living class. The survey will also be distributed to collegiate sports teams during the first ten minutes of practice. Qualtrics is an electronic survey database used by Georgia Southern University, used to collect and analyze data. The anonymous function will be used for this survey. The link to the survey will be established prior to the start of surveying in early August so it can only be accessed by students in the study. The instrument used will be one derived from a twenty eight-item survey by Bearth, Cousin, and Siegrist (2014) and a nine-item survey by Boudreau, Devlin, Klein, and Walsh (2006). The nonnutritive sweetened items in the survey will include chewing gum, artificially sweetened beverages, and packets of artificial sweeteners. The survey will be administered electronically through the Georgia Southern University research engine, Qualtrics. The link will be provided for students who have access to the Internet on their cell phones. Paper copies of the survey will also be available for those students who don't have access to the Internet. The student investigator will financially support the copying of the paper surveys.

Bearth, A., Cousin, M., & Siegrist, M. (2014). The consumer's perception of artificial food additives: Influences on acceptance, risk and benefit perceptions. Food Quality and Preference,38. 14-23. doi:10.1016/j.foodqual.2014.05.008

Klein, D. A., Boudreau, G. S., Devlin, M. J., & Walsh, B. T. (2006). Artificial sweetener use among individuals with eating disorders. *International Journal of Eating Disorders, 39*(4), 341-345. doi:10.1002/eat.20260

Data Analysis: Briefly describe how you will analyze and report the collected data. Include an explanation of how will the data be maintained after the study is complete and anticipated destruction date or method used to render it anonymous for future use.
The frequency of use of nonnutritive sweeteners by college students will be analyzed using the Georgia Southern University research engine, Qualtrics. The anonymous function will be used for this survey. All survey data and demographics collected on subjects for presentation purposes will be kept confidential and stored in a locked file drawer in Hollis 1128B. Data collected for this study will be archived for 3 years. This information will be available only to the investigators. The data will be destroyed after 3 years.

Special Conditions:

Risk. *Is there greater than minimal risk from physical, mental or social discomfort? Describe the risks and the steps taken to minimize them. Justify the risk undertaken by outlining any benefits that might result from the study, both on a participant and societal level. Even minor discomfort in answering questions on a survey may pose some risk to subjects. Carefully consider how the subjects will react and address ANY potential risks. Do not simply state that no risk exists. Carefully examine possible subject reactions. If risk is no greater than risk associated with daily life experiences state risk in these terms.*
There are minimal risks associated with this study. Data collected will remain confidential. Risk is no greater than risk associated with daily life experiences.

GEORGIA SOUTHERN UNIVERSITY INSTITUTIONAL REVIEW BOARD

INSTRUCTIONS FOR PREPARATION OF PROPOSAL NARRATIVE

indicate whether the study will be a part of the normal curriculum/school process. Please provide both parental consent letters and child assent letters (or processes for children too young to read). If not applicable indicate N/A or delete this section.

N/A

Deception. *Describe the deception and how the subject will be debriefed. Briefly address the rationale for using deception. Be sure to review the deception disclaimer language required in the informed consent.* ***Note:*** *All research in which active deception will be used is required to be reviewed by the full Institutional Review Board. Passive deception may receive expedited review. If not applicable indicate N/A or delete this section.*

N/A

Medical procedures. *Describe your procedures, including safeguards. If appropriate, briefly describe the necessity for employing a medical procedure in this study. Be sure to review the medical disclaimer language required in the informed consent. If not applicable indicate N/A or delete this section.*

N/A

Literature Review Reference list:

N/A

Cover page checklist. *Please provide additional information concerning risk elements checked on the cover page and not yet addressed in the narrative. If none, please state "none of the items listed on the cover page checklist apply." The cover page can be accessed from the IRB forms page. (Note – if a student, make sure your advisor has read your application and signed your cover page. (Your advisor is responsible for the research you undertake in the name of Georgia Southern.)*

Reminder: No research can be undertaken until your proposal has been approved by the IRB.

Appendix B5

COLLEGE OF HEALTH AND HUMAN SCIENCES

SCHOOL OF HEALTH AND KINESIOLOGY

KNOWLEDGE AND USE OF NONNUTRITIVE SWEETENERS BY COLLEGE STUDENTS

1. My name is Madison Heydinger and I am a senior Nutrition and Food Science undergraduate at Georgia Southern University. I am a student in the University Honor's Program and I am conducting research as my capstone project. I am interested in discovering the perceptions and use of nonnutritive sweeteners by college students.

2. Purpose of the Study: The purpose of this research is to study if college students are using nonnutritive sweeteners, if there are any differences in use between males and female, if there are differences between use of athletes and nonathletes, and if there are differences between students in health-related majors and non-health related majors.

3. Procedures to be followed: Participation in this research will include completion of a sixteen-question survey relating to knowledge and use of nonnutritive sweeteners. This survey will remain anonymous.

4. Discomforts and Risks: The risks are minimal and include the possibility of feeling uncomfortable answering a question regarding their dietary intake of certain items. The possibility of harm or discomfort that could occur during the study is no greater than those encountered in ordinary life. The students are informed that they can withdraw at any time during the completion of the survey. Hence, the risks are minimal.

5. Benefits: Participating in this research will include benefitting from recognizing aspects of their own food consumption patterns as well as aspects of nonnutritive sweeteners.

6. Duration/Time required from the participant: The time required to take survey is minimal and should last no longer than five to ten minutes.

7. Statement of Confidentiality: All survey data and demographics collected on subjects for presentation purposes will be kept confidential and stored in a locked file drawer in Hollis 1128B. This information will be available only to the investigators. Your identity will not be revealed in publications or presentations so as to protect your privacy and confidentiality. All data will be reported as means and standard deviations. Data collected for this study will be archived for 3 years. The data will be destroyed after 3 years.

8. Right to Ask Questions: You have the right to ask questions and have those questions

answered. If you have questions about this study, please contact the researcher named above or the researcher's faculty advisor, whose contact information is located at the end of the informed consent/ For questions concerning your rights as a research participant, contact Georgia Southern University Office of Research Services and Sponsored Programs at 912-478-5465.

9. Compensation: You will not be compensated for participation in this study. Participation is completely voluntary.

10. Voluntary Participation: This study is completely voluntary. You may end participation at any time by telling the person in charge, or by not finishing or turning in the survey. You also have the right to not answer any questions that you do not want to answer.

11. Penalty: There is no penalty for deciding not to participate in this research study. You may at any time decide to withdraw from the study. If you consent to participate in this research study and to the terms above, please sign your name and indicate the date below.

12. You must be 18 years of age or older to consent to participation in this research study. If you consent to participate in this research study and to the terms above, please sign your name and indicate the date below.

You will be given a copy of this consent form to keep for your records. This project has been reviewed and approved by the GSU Institutional Review Board under tracking number H17347

Title of Project: Knowledge and Use of Nonnutritive Sweeteners by College Students
Principal Investigator: (Madison Heydinger, School of Health and Kinesiology; mh09099@georgiasouthern.edu)
Faculty Advisor: (Dr. Joelle Romanchik-Cerpovicz, School of Health and Kinesiology; 912-478-1420; jromchik@georgiasouthern.edu)

Appendix B6

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Madison Heydinger (ID: 6195424)
- **Institution Affiliation:** Georgia Southern University (ID: 1063)
- **Institution Email:** mh09099@georgiasouthern.edu
- **Institution Unit:** Health and Human Sciences
- **Phone:** 8162848242

- **Curriculum Group:** Human Subjects-Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22441290
- **Completion Date:** 23-Feb-2017
- **Expiration Date:** 23-Feb-2020
- **Minimum Passing:** 80
- **Reported Score*:** 83

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	23-Feb-2017	2/3 (67%)
Students in Research (ID: 1321)	23-Feb-2017	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	23-Feb-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	23-Feb-2017	4/5 (80%)
The Federal Regulations - SBE (ID: 502)	23-Feb-2017	4/5 (80%)
Assessing Risk - SBE (ID: 503)	23-Feb-2017	3/5 (60%)
Informed Consent - SBE (ID: 504)	23-Feb-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	23-Feb-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	23-Feb-2017	5/5 (100%)
Consent in the 21st Century (ID: 17060)	23-Feb-2017	3/5 (60%)
Research with Prisoners - SBE (ID: 506)	23-Feb-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	23-Feb-2017	2/5 (40%)
International Research - SBE (ID: 509)	23-Feb-2017	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k5ba3f955-308f-4e00-91d2-156a0520ffd1-22441290

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Madison Heydinger (ID: 6195424)
- **Institution Affiliation:** Georgia Southern University (ID: 1063)
- **Institution Email:** mh09099@georgiasouthern.edu
- **Institution Unit:** Health and Human Sciences
- **Phone:** 8162848242

- **Curriculum Group:** Human Subjects-Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 22441290
- **Report Date:** 23-Feb-2017
- **Current Score**:** 83

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID: 1321)	23-Feb-2017	5/5 (100%)
History and Ethical Principles - SBE (ID: 490)	23-Feb-2017	5/5 (100%)
Defining Research with Human Subjects - SBE (ID: 491)	23-Feb-2017	4/5 (80%)
Belmont Report and CITI Course Introduction (ID: 1127)	23-Feb-2017	2/3 (67%)
The Federal Regulations - SBE (ID: 502)	23-Feb-2017	4/5 (80%)
Assessing Risk - SBE (ID: 503)	23-Feb-2017	3/5 (60%)
Informed Consent - SBE (ID: 504)	23-Feb-2017	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	23-Feb-2017	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	23-Feb-2017	4/5 (80%)
Research with Children - SBE (ID: 507)	23-Feb-2017	2/5 (40%)
International Research - SBE (ID: 509)	23-Feb-2017	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	23-Feb-2017	5/5 (100%)
Consent in the 21st Century (ID: 17060)	23-Feb-2017	3/5 (60%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k5ba3f955-308f-4e00-91d2-156a0520ffd1-22441290

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Joelle Romanchik-Cerpovicz (ID: 1828685)
- **Institution Affiliation:** Georgia Southern University (ID: 1063)
- **Institution Email:** jromchik@georgiasouthern.edu
- **Institution Unit:** Health and Kinesiology
- **Phone:** 912-478-1420

- **Curriculum Group:** Human Subjects-Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 2 - Refresher Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 21067363
- **Completion Date:** 04-Oct-2016
- **Expiration Date:** 04-Oct-2019
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
SBE Refresher 1 – Defining Research with Human Subjects (ID: 15029)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Privacy and Confidentiality (ID: 15035)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Assessing Risk (ID: 15034)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – History and Ethical Principles (ID: 936)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Federal Regulations for Protecting Research Subjects (ID: 937)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Informed Consent (ID: 938)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Instructions (ID: 943)	04-Oct-2016	No Quiz
SBE Refresher 1 – Research with Children (ID: 15036)	04-Oct-2016	2/2 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k7c5241dd-0a01-43f4-8d57-b477fcc9bff3-21067363

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Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Joelle Romanchik-Cerpovicz (ID: 1828685)
- **Institution Affiliation:** Georgia Southern University (ID: 1063)
- **Institution Email:** jromchik@georgiasouthern.edu
- **Institution Unit:** Health and Kinesiology
- **Phone:** 912-478-1420

- **Curriculum Group:** Human Subjects-Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 2 - Refresher Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Record ID:** 21067363
- **Report Date:** 11-Apr-2017
- **Current Score**:** 100

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
SBE Refresher 1 – History and Ethical Principles (ID: 936)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Federal Regulations for Protecting Research Subjects (ID: 937)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Informed Consent (ID: 938)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Instructions (ID: 943)	04-Oct-2016	No Quiz
SBE Refresher 1 – Defining Research with Human Subjects (ID: 15029)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Assessing Risk (ID: 15034)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Privacy and Confidentiality (ID: 15035)	04-Oct-2016	2/2 (100%)
SBE Refresher 1 – Research with Children (ID: 15036)	04-Oct-2016	2/2 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k7c5241dd-0a01-43f4-8d57-b477fcc9bff3-21067363

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Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

Appendix B7

myapps georgia southern

Joelle Romanchik-Cerpovicz <jromchik@georgiasouthern.edu>

Fwd: Undergraduate Research Study

1 message

Madison Heydinger <mh09099@georgiasouthern.edu> Mon, Mar 20, 2017 at 4:50 PM
To: Joelle Romanchik-Cerpovicz <jromchik@georgiasouthern.edu>

---------- Forwarded message ----------
From: <mh09099@georgiasouthern.edu>
Date: Tue, Mar 7, 2017 at 12:44 PM
Subject: Fwd: Undergraduate Research Study
To: Joelle Romanchik-Cerpovicz <jromchik@georgiasouthern.edu>

Sent from my iPhone

Begin forwarded message:

From: Robert Clouse <rclouse@georgiasouthern.edu>
Date: March 7, 2017 at 12:36:44 PM EST
To: mh09099@georgiasouthern.edu
Subject: Re: Undergraduate Research Study

Madison,
Thank you for following up with me today regarding your email last week. We would be happy to help with your data collection next fall. Once your IRB is approved please send me a copy so I can get the blessing from the PAHL Cluster group and we can prepare a tentative schedule for you to come into our classes. Also, please make sure you send a follow up email approximately two weeks prior to the start of fall classes.

Thank you,
Rob Clouse

On Tue, Feb 28, 2017 at 9:22 AM, <mh09099@georgiasouthern.edu> wrote:

> Hi Mr. Clouse,
> My name is Madison Heydinger and I am a student in the Honors Program majoring in Nutrition and Food Science. One of our requirements is to complete research and a thesis paper on a nutrition topic of our choice. I am doing my research on the knowledge and perceptions of college students on the use of nonnutritive sweeteners. I have created a survey targeting the college student population and wanted to know from you if I would be able to survey students in Healthful Living (HLTH 1520) classes early next fall. In order to collect information from students before they have nutrition lectures, I would need to distribute these surveys within the first and second week of classes next semester. If this is alright, could you please send back a confirmation email that I could then show to Dr. Romanchik, the advisor I am working with?
> Thank you so much,
> Madison Heydinger

--
Robert C. Clouse, MS
Lecturer
Physical Activity/Healthful Living Program Director
School of Health and Kinesiology

myapps georgia southern

Madison Heydinger <mh09099@georgiasouthern.edu>

Fwd: Research Study

7 messages

Brandy Petty <bpetty@georgiasouthern.edu> Fri, Mar 10, 2017 at 2:54 PM
To: Madison Heydinger <mh09099@georgiasouthern.edu>

---------- Forwarded message ----------
From: **Brandy Petty** <bpetty@georgiasouthern.edu>
Date: Fri, Mar 10, 2017 at 11:08 AM
Subject: Research Study
To: mh09099@georgiasouthenm.edu

Madison has my permission to move forward with the athletic teams to survey the student athletes. We are happy to help you data collection next fall. We will send out an email to the teams and I will follow up via email regarding any teams NOT willing to participate in the survey.

–
Brandy P. Clouse, M.S., ATC, LAT
Georgia Southern University
Associate Athletic Director / SWA
Sports Medicine / Head Athletic Trainer
912-478-7581 office
912-478-5058 fax
www.gseagles.com

–
Brandy P. Clouse, M.S., ATC, LAT
Georgia Southern University
Associate Athletic Director / SWA
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Appendix C: Time Schedule of Study

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Submit IRB forms	March 2017
Final Thesis Proposal Submitted	April 2017
Data Collection	August-September 2017
Data Analysis	September 2017
Submit Final Draft of Thesis to Mentor	March 2018
Submit Final Thesis to Honors Program Office	April 2018
Presentation of Thesis	April 2018

Appendix D: Biography

Appendix D: Biographical Summary

Madison Brooke Heydinger

Date of Birth: January 13, 1997

Home Address:	11008 Parkview Avenue
	Kansas City, KS 66109

Georgia Southern University:

Bachelor of Science:	Nutrition and Food Science
Emphasis:	Dietetics

Thesis Title:

Perceptions and Use of Nonnutritive Sweeteners Among College Students Based Upon Athletic Status, Gender, and Academic Major

Mentor: Dr. Joelle Romanchik-Cerpovicz