ANIMATED MEDIA EXPOSURE AND
SNACK CHOICES OF PRESCHOOL CHILDREN

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By
Caitlin H. Mathews
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The purpose of this study was to investigate whether acute media exposure to a brief animated video clip influences the snack choices of preschool children. The study was a non-experimental, post-test, observational, quantitative, comparative design. Participants (n=58) were preschool students enrolled in pre-kindergarten class, ages four to six years, from four local Ohio early childhood education centers. Participants were divided into three groups: a treatment I group (HSV), who were exposed to a short animated video clip depicting a character consuming a healthful snack; a treatment II (USV) group, who was exposed to a short animated video clip depicting a character consuming an unhealthful snack; and the control group, who underwent no media exposure. Participants were asked to choose from seven snack foods varying in nutritional content and self-selected portions. Food Processor SQL and SPSS software were utilized to analyze data. Digital photography was used to measure snack food choices, portion size, and plate waste. A two by three factorial ANOVA was used to compare variables. A p-value of ≤ 0.05 was established to determine significance. Tukey HSD Multiple Comparisons testing was used to analyze significant results among group
treatment variables. There were no significant differences (p > 0.05) between treatment and control groups; however, there were significant differences among gender. According to the p-values, males consumed significantly greater amounts of kilocalories, carbohydrates, protein, saturated fat, and trans fat versus females. This study demonstrates there is more to dietary behaviors and preferences than short-term media exposure, and gender is a factor in the formation of these habits.
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CHAPTER I
INTRODUCTION

A healthful dietary intake is necessary for adequate growth and development among the preschool-aged (four to six years old) population. In fact, the U.S. Department of Agriculture’s ChooseMyPlate.gov states, “[b]etween the ages of 2 and 5, the average child grows about 2 1/2 inches taller each year, and also gains 4 to 5 pounds each year.” ChooseMyPlate.gov emphasizes nutrition as a key factor contributing to the proper growth of children among this particular age group. The Dietary Guidelines for Americans, a publication of the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA), encourages individuals two years of age and older to consume a diet plentiful in fruits and vegetables, whole grains, and low-fat dairy products, while limiting the intake of foods containing large amounts of certain fats, sodium, sugar, and refined grains. In addition to providing nourishment conducive to the growth and development of a young child, consuming a healthful diet “helps reduce one's risk for developing obesity, osteoporosis, iron deficiency, and dental caries” (Centers for Disease Control and Prevention [CDC], 2014). Over one-third of children are considered overweight or obese as of the year 2012. Being overweight or obese occurs when caloric intake is greater than caloric expenditure (CDC, 2014). Previous research indicates a poor dietary intake in the early years of life may lead to serious health implications such as diabetes, obesity, and cardiovascular disease (Cooke et al., 2004).
The CDC (2014) also reports the majority of American children are not meeting dietary recommendations, such as the established guideline of consuming two-and-a-half to six-and-a-half cups of fruits and vegetables per day, or the recommendation of consuming two- to three-ounces of whole grains per day. American children are also exceeding the maximum daily sodium intake, consuming nearly half of their daily caloric intake from empty calorie sources, and consuming more sweetened-carbonated beverages than milk. The USDA identifies the parent as possessing the most influence regarding the formation of a child's dietary behaviors. Because the USDA believes that parents possess the most influence on what children eat, ChooseMyPlate.gov offers recommends that parents to assist a child in the development of healthful eating behaviors by setting a good example themselves. This means that the parent consumes a variety of healthful foods, eats serving of moderate portions, etc. An additional factor the USDA describes as influential in the development of a child's dietary habits includes the child’s own growth and development, as there are dietary behavioral milestones typical at each age group. For example, as described by the USDA, at age four years, children are “[i]nfluenced by TV, media, and peers, may dislike many mixed dishes, rarely spills with spoon or cup, knows what table manners are expected, can be easily sidetracked. . . .may suddenly refuse certain foods.” At age five years, the child “Has fewer demands, will usually accept the food that's available” and “Dresses and eats with minor supervision.” The USDA’s ChooseMyPlate.gov also identifies marketing and advertising as a factor influencing the dietary behaviors of preschool children. According to the CDC (2014),
many factors influence the dietary behaviors of children; these factors include “families, communities, schools, child care settings, medical care providers, faith-based institutions, government agencies, the media, and the food and beverage industries and entertainment industries.”

The media, food and beverage industries, and entertainment industries are of particular interest considering their influential abilities. According to the American Academy of Child and Adolescent Psychiatry (AACAP, 2011), “Young children are impressionable and may assume that what they see on television is typical, safe, and acceptable. As a result, television also exposes children to behaviors and attitudes that may be overwhelming and difficult to understand.” In an article entitled Parental Influence on Children's Socialization to Gender Roles, Witt (1997) states “[a] further reinforcement of acceptable and appropriate behavior is shown to children through the media, in particular, television.” The media children are exposed to may influence dietary behavior factors, such as food choices. As discussed in the 2006 publication Food Marketing to Children and Youth: Threat or Opportunity? published by the Committee on Food Marketing and the Diets of Children and Youth, “[c]hildren and youth represent an important demographic market because they are potential customers, they influence purchases made by parents and households, and they constitute the future adult market.” (p. 138). The food industry does, in fact, try to capitalize on this opportunity and provides advertisements depicting their products. Often times, food companies go so far as to utilize established images of beloved children's characters to advertise their food products. These products are typically calorically dense, high in
sugar or fat, and of little nutritional value (Committee on Food Marketing and the Diets of Children and Youth, p. 139). A review by Gregori et al. (2014) highlights previous literature that posits economic development and urbanization as factors associated with adiposity rates in children and adolescence (p. 563). The review also implies that increased television viewing has a proposed association to decreased physical activity levels, as advertising promotes the overconsumption of foods containing large amounts of fat and sugar, contributing to the poor dietary intake of children (Gregori et al., p. 563).

Alvy and Calvert (2008) discuss the marketing strategies employed by food and beverage companies on popular children's websites. These strategies include the usage of animation, bold and colorful texts, and dynamic images that are prominent specifically in the "advertisements, advergames, and integrated marketing pages" of these websites. Story and French (2004) describe the motivation for the marketing of food products towards the adolescent population as “the desire to develop and build brand awareness/recognition, brand preference and brand loyalty.” This seems to be an effective method of increasing revenue for food and beverage companies, as Nestle (2006) reports “candies, soft drinks, and snack foods” are among the foods marketed most to the adolescent population, and that approximately $30 billion are spent by American children each year on these types of food products marketed towards children.

**Problem Statement**

Poor dietary habits may inhibit proper growth and development, and/or cause nutrient-deficient issues such as iron deficiency, or osteoporosis in adulthood (CDC, 2014). Additionally, children who are considered overweight or obese in the early years
of life typically see this classification transfer into adulthood, as well as the promotion of chronic diseases associated with obesity such as hypertension, cardiovascular disease, and increased blood glucose levels (Berkey et al., 2000; Cooke et al., 2004). Several studies attribute the increasing adiposity rates in children to environmental factors (Gregori et al., 2014; Berkey et al., 2000; Cooke et al., 2004; Campbell, Crawford, & Ball, 2006; van der Horst et al., 2007; and Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009). Van der Horst et al. (2007) describes the increase in obesity as conducive to a culture where the overconsumption of foods is “encouraged” and physical activity levels are decreasing. As previously mentioned, the USDA’s ChooseMyPlate.gov describes marketing as a factor influencing the dietary intake of preschool-aged children. To combat this factor, the USDA suggests reducing television usage, watching television with children so that the parent is able to monitor what is being viewed, and minimizing exposure to marketing.

Media exposure is becoming a popular proposed mechanism for the increasingly poor dietary intake of children. Campbell et al. (2006) found that a greater caloric intake was associated with a higher amount of time spent viewing television. Campbell and colleagues attribute this finding to the exposure of children to food advertisements while watching television and a resulting increased desire for the food items advertised. Food and beverage companies utilize marketing techniques such as branding, advertising, consumer promotion, trade promotion, and market segmentation. These companies target markets focused towards the children's segment of the population by utilizing beloved animated characters to market their nutritionally poor food products to children.
According to Kraak and Story (2014), in the year 2009, “[h]alf of all child-marketing dollars ($530.7 million) involved cross-promotions including: media character merchandising and tie-ins with movies, television programmes, videogames and social media (46).” In a study conducted by Roberto and colleagues (2010), upon investigating whether licensed characters influenced the taste preferences and snack choices of children, they found that preschool-aged children prefer snack foods depicting a licensed character on the package. Their findings reinforce the conclusion that dietary choices of children are influenced by the promotion of popular animated characters. Tighter regulations on the amount and types of foods marketed towards children must be established in order to reverse this trend of the increasing consumption of unhealthy foods.

**Purpose Statement**

A study depicting how a media clip influences the acute snack choices of a child will investigate whether acute media exposure to a brief animated video clip influences the snack choices of preschool children. The nature of this study examines the impact that animated media exposure has on a preschool child's snack food choices.

**Hypothesis**

This study will test the following two hypotheses:

1. Brief animated media exposure will influence the snack choices of preschool children, and the subsequent nutritional content of snack choices, and there will be a difference among the control group and the treatment groups.
2. Brief animated media exposure will influence the snack choices of preschool children, and the subsequent nutritional content of snack choices, and there will be a difference among gender.

**Operational Definitions:**

- “Preschool children”: Children who are between four- to six-years of age and are enrolled in pre-kindergarten.
- “Brief Animated Media Exposure”: Presentation of an animated video clip no greater than 11 minutes and 56 seconds in length.
- “Go” Foods: “These are foods that are good to eat almost anytime. They are the healthiest ones. Example: skim and low-fat milk.” (The Nemours Foundation, 2014)
- “Whoa” Foods: “These foods should make you say exactly that — Whoa! Should I eat that? Whoa foods are the least healthy and the most likely to cause weight problems, especially if a person eats them all the time. That’s why Whoa foods are once-in-a-while foods. Example: French fries.” (The Nemours Foundation, 2014)
- “HSV”: Healthy snack video.
- “USV”: Unhealthy snack video.
CHAPTER II
REVIEW OF LITERATURE

MyPlate Recommendations

MyPlate (http://www.choosemyplate.gov) is a promotional tool developed and released by the USDA in June of 2012 to combat the increasing obesity epidemic currently affecting the United States. MyPlate is the most recent reference provided by the federal government to serve as a guideline for the recommended dietary food groups and servings. Congruent with its name, the image depicts a plate and cup, divided into five sections. The plate is divided into “fruits,” “grains,” “protein,” and “vegetables” sections, while the cup indicates a dairy serving. Each section represents the suggested serving size of each group in accordance with dietary recommendations. Additionally, each food group section is color coded in order to simplify the identification of each group within the educational tools provided on the choosemyplate.gov website. The MyPlate image can be found on the choosemyplate.gov website, along with images, food and group descriptions/qualifications, and charts depicting specific dietary recommendations considered for gender and age.

According to the choosemyplate.gov website, the suggested dietary serving of fruit each day for male and female children ages four to eight years old is approximately one to one-and-a-half cups per day. MyPlate qualifies any type of fruit or 100% fruit juice as a fruit serving.

Similar to fruit, any vegetable or 100% vegetable juice is considered a vegetable serving under MyPlate standards. The recommended vegetable intake for children four
to eight years of age is approximately one-and-a-half cups of vegetables or vegetable equivalents per day (http://www.choosemyplate.gov).

MyPlate describes the several types of foods included in the “grain” food group as “[a]ny food made from wheat, rice, oats, cornmeal, barley or another cereal grain”. These foods include: "[b]read, pasta, oatmeal, breakfast cereals, tortillas, and grits" (http://www.choosemyplate.gov). The choosemyplate.gov website describes the differences between whole and refined grains and provides examples of these types of products. According to MyPlate, children between the ages of four and eight years old are recommended to have a daily intake of approximately five ounce equivalents of grain foods, as well as a daily minimum amount of whole grains of two-and-a-half ounce equivalents.

MyPlate describes a “protein” as "all foods made from meat, poultry, seafood, beans and peas, eggs, processed soy products, nuts, and seeds" (http://www.choosemyplate.gov). MyPlate suggests children in between the ages of four and eight years old consume approximately four-ounce equivalents of protein each day in order to achieve adequate protein intake.

The "dairy" group encapsulates fluid milk products, as well as some foods produced from milk. According to www.choosemyplate.gov, "[f]oods made from milk that retain their calcium content are part of the group." MyPlate recommends these dairy products consumed be fat-free or low-fat. Children ages four to eight years are encouraged to consume approximately two-and-a-half cups of dairy per day.
Poor Dietary Intake in Children

The occurrence of obesity in U.S. children and adolescence has doubled from 1980 to 1990. This dramatic increase is more likely attributed to environmental circumstances, as opposed to genetic factors (Berkey et al., 2000). Previous studies examining adiposity rates found these numbers have increased in preschool and school-age children, and approximately one-third of obese preschool-age children and one-half of obese school-age children become obese adults (Gregori et al, 2014 & Berkey et al., 2000). Although there are multiple factors contributing to obesity causation, environmental factors play a significant role in the development of obesity. As described in a 2004 Public Health Nutrition article published by Cooke et al., there is increasing evidence indicating that a poor diet in the early years of life may cause serious health implications typically found in older adults, such as diabetes, obesity, and cardiovascular disease. Environmental factors are modifiable, and childhood is a critical period for the establishment of dietary patterns and behaviors, so assessment of the roles of modifiable behaviors on the adiposity of adolescents is necessary (Berkey et al., 2000).

Examining the past dietary intake of U.S. children provides evidence of an inadequate diet lacking in key nutrients conducive to a healthy lifestyle. Brady, Lindquist, Herd, and Goran (2000) conducted a study examining and comparing the dietary intake patterns of 110 U.S. children aged seven- to fourteen-years to the U.S. recommended dietary guidelines. At that time, dietary guidelines were still based on the U.S. Department of Agriculture Food Guide Pyramid which suggested one-half of grain consumption be derived from whole-grain products, whereas results indicated only one-
seventh of the grains consumed by children were whole-grain products. These outdated guidelines are still being promoted in some instances. For example, the AHA continues to suggest only one-half of grain intake be derived from whole-grain sources. Additionally, the AHA recommends a grain intake ranging from two ounces per day for a child one year of age, to seven ounces per day for male adolescents ages 14-18 years. Brady et al. (2000) also reported milk consumption was the highest among food products consumed from the dairy group. The AHA currently recommends consumption of fat-free or low-fat dairy products for children and adolescents. An intake of two cups of milk (or its equivalent) per day is suggested for children ages one- to eight-years old. The AHA also recommends an intake of three cups of milk (or its equivalent) per day for children and adolescents ages nine- to eighteen-years old. Brady et al. reports dark-green and yellow vegetables were consumed below the recommended constitution of one-third of vegetable servings. Protein intake was comprised of primarily red meat. Fruit consumption among the U.S. children did follow guidelines, with citrus fruits, melons, etc. comprising one-half of total fruit servings. Their results also indicated a high intake of energy-dense foods, and a lower-than-recommended average intake of all other food groups with the exception of grains. Approximately one-third of the participating children did not achieve any of the food group serving recommendations, and none of the participants achieved all of the five USDA dietary requirements (Brady et al., 2000).

As convenience plays a role in the foods we consume, it is appropriate to examine fast-food consumption when considering the dietary intake of children. Paeratakul, Ferdinand, Champagne, Ryan, and Bray (2003) compared the dietary intake of fast food
consumption in children versus their dietary intake without consuming fast food. Their results indicated children consumed less healthful dietary intakes on days when fast food was eaten. Fast-food consumption is a common among youth. This is supported by the findings of Paeratakul et al. (2003) that consumption of fast-food occurs in higher numbers in those ten to thirty-nine years of age versus older adults, and the adolescent population visit a fast food restaurant an average of two times per week. Upon examining data regarding the fast food intake of 4,746 students aged 11- to 18-years old, three-fourths of the sample reported dining at a fast-food restaurant the previous week. Greater intakes of “fried potato, hamburger, pizza, and soft drink” were found in conjunction with fast-food consumption, as well as lesser dietary intakes from “fruits, vegetables, and milk” (Paeratakul et al., 2003). Perhaps this is because children who indicate strong preferences for high-fat foods typically consume a high percentage of their caloric intake from dietary fat (Fisher & Birch, 1995). Paeratakul et al. (2003) also found the consumption of grains to be significantly lower in children and adolescents who consumed fast food. When fast food was consumed, significantly higher caloric and fat intakes were reported, as well as less protein, vitamin A, and beta-carotene versus children who did not consume fast food (Paeratakul et al., 2003).

**Fruit and Vegetable Consumption**

According to the 2010 Dietary Guidelines for Americans, the recommended number of servings of fruits and vegetables is established at two and a half cups, or approximately five half-cup servings per day for both adults and children over two years of age (http://www.dietaryguidelines.gov). The AHA webpage “Dietary
recommendations for healthy children” suggests serving various types of fruits and vegetables each day by consuming one serving one fruit or vegetable with each meal (http://www.heart.org). AHA recommendations for vegetable consumption for children consist of a range of three-fourths of a cup of vegetables for children aged one year to three cups a day for male adolescents ages 14-18 years.

According to an article by Perry et al. (1998), children and adolescents are typically consuming less than the recommended five servings of fruits and vegetables per day. Perry et al. (1998) found only 16% of children ages six- to eleven-years of age consume at least five servings of fruits and vegetables per day, and one-quarter of vegetable consumption among adolescents is in the form of French fries. This is congruent to the research conducted by Paeratakul et al. (2003) who found that children and adolescents who consumed fast food “consumed fewer dark green vegetables and other vegetables, but significantly more fried potato.”

A 2009 study by Briefel, Crepinsek, Cabili, Wilson, and Gleason reported on the fruit and vegetable consumption of children at school. Briefel et al. (2009) found greater than one-half of the children participating in their study reported consuming a fruit or vegetable acquired at school. Elementary school children were reported as receiving an average of one-half of the “MyPyramid cup equivalents” of a fruit or vegetable from school per day, while secondary school children reported an average of one-third of the “MyPyramid cup equivalents” of a fruit or vegetable from school per day.
Fat Consumption

According to the American Heart Association, the total fat intake for children two- to three-years of age may be derived from between 30-35 percent of total caloric intake, and 25-35 percent of the total caloric intake for children and adolescents four- to eighteen-years of age. The AHA guidelines are contrary to the recommendations provided by the Dietary Guidelines for Americans 2010, which promotes a fat intake comprised of 30-40% of the total caloric intake for children ages one- to three-years of age. The Dietary Guidelines for Americans 2010 also suggests keeping calories derived from saturated fats below ten percent of the total caloric intake, obtaining the majority of the fat consumed from polyunsaturated and monounsaturated fatty acids. These fats are provided by sources such as fish, nuts, and vegetable oils (AHA, 2014). The consensus among these sources is for fat intake to comprise approximately one-third of children’s total caloric intake.

Upon examination of data from three National Health and Nutrition Examination Surveys (NHANES), Troiano, Briefel, Carroll, and Bialostosky (2000) reported since the beginning of the 1970s, the total and saturated fat intakes of children and adolescents have, in fact, decreased as they contribute to the total caloric intake percentage. The percentage of fat intake has decreased from 36-37% of caloric intake, to 33-34% of caloric intake. Additionally, the percentage of saturated fat intake has decreased from 14% to 12% of total caloric intake. The decrease in the amount of fat consumed may be attributed to an increased carbohydrate consumption (CDC, 2004). Despite these decreases in total and saturated fat intake over the years, the average fat and saturated fat
intakes of one day exceeded dietary recommendations and the national health objectives of 2000 (Troiano et al., 2000).

In their review of data from the third NHANES along with previous national surveys, Troiano et al. (2000) found approximately 23% of children ages two- to five-years old, 16% of children ages six- to eleven-years old, and 15% of adolescents ages 12-19 years old were compliant with the total fat intake dietary recommendations for the years 1988 to 1991. Kilocalorie, total fat, and saturated fat intakes did not display any significant differences between children considered overweight versus children who were not overweight.

Fisher and Birch (1995) found the dietary fat intakes of children seem to have increased as time progressed. Their study examined the fat preferences and consumption of children three- to five-years of age, and its relation to parental adiposity. According to their data, the average caloric intake recorded over a 24-hour time period for the children participating in their study was 1,325±62 kcal (75 kcal/kg). This average caloric intake exceeded the Recommended Dietary Allowance of 70 kcal/kg by ~7%. The mean caloric intake recorded over a 30-hour time period was reported at 1,989±97 kcal. The macronutrient breakdown of the average caloric intake consists of 50% of kilocalories derived from carbohydrate consumption, 13% from protein, and 32% from fat. Fisher and Birch also report that over a 30-hour time period, the children’s caloric intake from fat ranged from 24.7% to 41.3%. The minimum percentage of kilocalories derived from fat falls only slightly below the more recent recommendations made by the AHA for
children who are four and five years old, while the maximum percentage of kilocalories from fat exceeds these guidelines by approximately ten percent.

**Kilocalorie Consumption**

Troiano et al. (2000) describes the occurrence of an overweight person or population as a “result of a sustained positive energy balance.” This positive energy balance is attributed to the excessive daily kilocalorie intake and decreased caloric expenditure of the adolescent and adult population (The Dietary Guidelines for Americans 2010). The Dietary Guidelines for Americans 2010 describe the caloric needs estimated for young children ranging from 1,000 to 2,000 kilocalories per day, and from 1,400 to 3,200 kilocalories per day for older children and adolescents. These ranges differ slightly from the caloric intake recommendations provided by AHA. The AHA reports the necessary caloric intake for children as ranging from 900 kilocalories per day for a child one-year of age to 1,800 kilocalories for a girl ages 14-18 years, and 2,200 for a boy ages 14-18 years. Troiano et al. (2000) found initial analysis of the NHANES III data depicting beverage consumption as one of the greatest contributors to caloric intake for child and adolescent population. More specifically, beverage intake provided between 20-24% of energy for all age and sex groups. Children who were under the age of 12 years had at least one-half of beverage consumption contributing to caloric intake derived from milk. The number one beverage consumed by adolescents contributing to caloric intake from beverages, were soft-drink products, providing approximately eight percent of total caloric intake. Additionally, research by Paeratakul et al. (2003) describes fast food as a factor encouraging soft-drink consumption, and this consumption
Dietary Intake of Males Versus Females

Considering dietary intake, gender must be accounted for, as there are both physiological and psychological factors comprising our food choices. Like many aspects in life, these factors and choices differ between males and females. A study conducted by Wansink, Cheney, and Chan (2003) examines comfort food preferences between men and women. According to their survey results, females preferred more snack-type comfort foods, such as candy, cookies, ice cream, or chocolate, whereas males preferred more meal-type comfort foods, such as pizza, pasta, steak, or beef. Additionally, females were more likely to view vegetables as comfort food versus their male counterparts. Wansink and colleagues also found approximately 52% of participating females accepted salad as a comfort food, versus 41% of males.

Bates, Prentice, and Finch (1999) performed interviews, analyzed dietary records, and recorded the measurements of individuals aged 65 years and older. The results indicated females consumed more foods such as butter, whole milk, cakes, apples, pears, and bananas, whereas men consumed more eggs, sugar, meats, and alcoholic beverages.

Another study comparing the dietary preferences of males versus females was conducted by Cooke and Wardle (2005), and determined and analyzed the taste preferences of 1,291 children, ages four to 16 years. Upon examination of the results, it appeared males were pickier eaters at an earlier age and developed more taste preferences as time progressed, whereas females became pickier of foods as they aged. Cooke and
Wardle offer an explanation for these phenomena, stating that “[a]n alternative explanation for girls disliking more foods may be that weight and diet issues become more pertinent for girls at this age” (p. 745). This research regarding the differences between the dietary intake of males and females appear to yield similar results; males tend to prefer high-protein foods such as steak, meats, and eggs, while females tend to prefer sweeter types of foods such as cookies, ice cream, or cake.

**Dietary Behaviors of Children**

Upon examining the composition of a child’s eating behaviors, Campbell, Crawford, and Ball (2006) discuss “[f]amily food environment and dietary behaviors likely to promote fatness in 5-6 year-old children.” Campbell et al. (2006) identifies several factors to consider for the development of the dietary behaviors of children, ages five- to six-years of age. These factors include “parental perceptions of their child’s diet, food availability, child feeding practices, parental modeling of eating and food preparation, and television (TV) exposure.” Utilizing the Australian Bureau of Statistics Socio-Economic Index for Areas (SEIFA), Campbell et al. (2006) distributed questionnaires to 560 children in SEIFA area schools regarding various aspects of the survey population’s home life, assessing the aforementioned predictors. Their results indicated an association between dietary outcomes and the parent’s perception of their “child’s dietary adequacy,” the “parental pressure to encourage eating,”, and the time spent viewing television. According to their research, a greater caloric intake was associated with a longer television-viewing period. Campbell et al. (2006) describes the possible rationale for this association as being attributed to the exposure to food
advertisements while watching television, and an increased desire for the food items advertised. Television viewing may also create an environment conducive to the overconsumption of foods, or children who are able to view television for greater amounts of time may have parents with little nutritional knowledge (Campbell et al., 2006).

As previously mentioned, one of the predictors associated with dietary outcomes was the parents’ perception of their children’s dietary adequacy. “Parental perception of dietary adequacy,” “parental pressure to eat,” and “high cost of/low preference for fruits and vegetables” displayed a positive association with savory snack food consumption. Campbell et al. (2006) state this may suggest that as the values for these factors increase, so does the consumption of these types of foods. The results also indicated a heightened parental perception of their child’s dietary adequacy was associated with a lower consumption of low-energy dense vegetables.

According to a review composed by van der Horst et al. (2007), the majority of previous research concerning the factors influencing the dietary intake of children and adolescents focus primarily on determinants such as “attitudes, taste preferences, social influences, and perceived behavioral control.” As van der Horst et al. (2007) describes, the focus on environmental factors contributing to the occurrence of obesity is due to the existence of an environment that “encourages eating” and ”discourages physical activity.” They discuss how dietary behaviors of children and adolescents may be influenced by environmental factors, as children possess less autonomy in food choices. Dietary behaviors of children are influenced, from the age of three years, according to
their “responsiveness to environmental cues,” and that a “variety of family and social factors start to influence children’s eating behaviors.” (van der Horst et al., 2007). Parental roles are significant in the construction of adolescent behaviors, as parents “directly determine the child’s physical and social environment” and “indirectly influence behavior and habits through socialization processes and modeling” (van der Horst et al., 2007). As a child develops and experiences various environmental changes into adolescence, dietary intake changes. There also appears to be a decrease in the quality of the adolescent’s diet versus childhood. According to their review, dietary intake of fruit, vegetables, milk, and fruit juice decreases, while consumption of sweetened, calorically dense beverages increases. This is cohesive with data provided by Briefel et al. (2009), describing the eating behaviors of children in academic settings. Their research depicted a decrease in fruit and vegetable intake, and an increase in sugar-sweetened beverage consumption of children.

Briefel et al. (2009) found an inverse relationship between fruit and vegetable consumption and grade advancement. According to their research, soft drink and sugar-sweetened beverage consumption was reported at 17% in elementary school children, 32% in middle school children, and 36% in high school children. Upon analysis, the review composed by van der Horst et al. (2007) found many studies present consistent findings of an established relationship between the dietary intake of parents, and the fat, fruit and vegetable consumption of children. These studies also confirmed an association between parent and sibling dietary intakes and the kilocalorie and fat intakes of children, as well as an association between the education level of the parents and fruit and
vegetable consumption of children. There were also multiple positive associations found between factors such as 1) food availability/accessibility and the fruit and vegetable intake of children; 2) food restrictions and fat intake; 3) the education level of the parent and fat intake; 4) modeling and fruit and vegetable intake; 5) parental intake and soft drink consumption; 6) “parenting style” and fruit and vegetable intake; 7) “family connectedness” and fruit/vegetable intake; and 8) encouragement to consume foods and fruit and vegetable intake. Analysis of the review also indicated a negative association for “encouragement/assistance/prompts" and kilocalorie intake (van der Horst et al., 2007). These results support the concept that the dietary behaviors of a child are partially derived from his or her parents.

Environmental factors were examined once again by Briefel, Crepinsek, Cabili, Wilson, and Gleason (2009). They composed a study investigating the effects of school food environments and practices, focusing on factors such as “access to competitive foods and beverages,” the quality of “school lunches,” and exposure to “nutrition promotion” on the consumption of sweetened-beverages, foods of little nutritional value, and fruit and vegetables, in children at school. Results indicated on a typical day when school is in session, children consume 35% of their daily total caloric intake at school. The majority of children participating in the study reported consuming at least one meal or snack at school (95%), typically lunch (91%). Additionally, Briefel et al. (2009) reported approximately one-fourth of the children (23%) consumed breakfast at school, while under half (40%) of children reported consuming a snack at school. Approximately two-thirds (62%) of the public school children participating in the study consumed a
calorically-dense, low-nutrient food item at school, and approximately 45% of such items were obtained at school.

**Gender Roles**

In a 1997 publication by Susan Witt, the author discusses the formation of gender roles, and how a child is first exposed to these roles from his/her parents. Witt explains these roles include exposing children to gender specific clothing, toys, and even differences in expectation of behaviors from parents of males versus females. According to Witt,

> [p]arental attitudes towards their children have a strong impact on the child’s developing sense of self and self-esteem, with parental warmth and support being key factors for the child (Richards, Gitelson, Petersen, & Hartig, 1991). Often, parents give subtle messages regarding gender and what is acceptable for each gender—messages that are internalized by the developing child (Arliss, 1991). Sex role stereotypes are well established in early childhood. Messages about what is appropriate based on gender are so strong that even when children are exposed to different attitudes and experiences, they will revert to stereotyped choices (Haslett, Geis, & Carter, 1992).

These results suggest children are internalizing what they witness at an early age. An article from the Food and Agriculture Organization of the United Nations (FAO, 2015) entitled “Women play a decisive role in household food security, dietary diversity and children's health” emphasizes the role gender plays in determining food security and
health in families. The article describes males in developing countries as responsible for growing field crops, while females prepare food in the home, as well as tend to livestock. This role reinforces the concept that females, regardless of location, are typically viewed as especially influential in the development of their children’s dietary behaviors (Alderson & Ogden, 1999).

**Meal Patterning**

In a study by Haapalahti, Mykkanen, Tikkanen, and Kokkonen (2003), food frequency questionnaires incorporating questions regarding meal patterns and food use, along with the Child Behaviour Checklist, were completed by parents and children in Ylivieska, Finland. These questionnaires were analyzed to determine the meal patterns and food use during weekdays of Finnish children aged ten- to eleven-years. Furthermore, analysis investigated the relation of these patterns to the socio-economic status of the family and the behaviors of the child. Similar to previous studies, Haapalahti et al. (2003) describes parental roles as an important aspect in the development of dietary habits and food preferences of children. Environmental factors such as socio-economic status level education are considered when examining the eating behaviors of children, as there is an association between poor dietary intake and lower socio-economic status. Although the focus of this article is to determine the meal patterns, food use, and child behavior in Finnish children, perhaps understanding how these factors interrelate contributes to a greater understanding of these factors in children of other nationalities, as well. The results indicated the vast majority of the children participating in the study consumed breakfast daily (99%). Approximately the same
percentage was identified for consuming lunch, daily (94%). Eighty percent of families reported preparing dinner, daily. Haapalahti et al. (2003) found the majority of participants reported “having regular family dinner on weekdays.” Over half (54%) of participants reported eating together on a daily basis, over one-third (38%) eating together “almost daily,” and eight percent reporting “seldom or never” eating together.

Additional findings regarding the food use in these children indicated an association between the father’s occupation and family meal patterns, and the children’s food habits. Haapalahti et al. (2003) also reported significant differences among socio-economic classes and food use of “vegetables, butter, high-fat milk and sweet pastries/biscuits.” It appears as though the higher the socio-economic status, the more common the daily use of vegetables and the less common use of butter and high-fat milk products versus families of a lesser socio-economic class. Children who were from families of lower socio-economic status typically made more poor nutritional food choices versus children from families of higher socio-economic status (Haapalahti et al., 2003). This may be attributed to the lack of education regarding purchasing healthful foods on a limited income.

A study conducted by Nicklas et al. (2004) examined and analyzed the meal patterns of children over the course of twenty-one years. A total of 1,584 children ten years of age, enrolled in the Bogalusa, LA school system were under study during seven cross-sectional surveys conducted from the year 1973 to 1994. Data collected and analyzed indicated the dietary intakes of children have, indeed, transformed over the course of twenty-one years. The percentage of total caloric intake derived from fat
decreased, while the percentage of total caloric intake derived from protein and carbohydrate sources had increased. Nicklas et al. (2004) found that although trends experienced a “shift toward a healthier diet,” the total caloric intake of children was found to either remain the same or even increase. This increase in total caloric intake is conducive to the development of a generally positive caloric balance, a contributing factor to the rise in obesity rates in the United States.

Another work concerning meal patterning was conducted by DuBois, Girard, Kent, Farmer, and Tatone-Tokuda (2009), who produced a study examining the association between skipping breakfast and factors such as daily caloric intake, macronutrient and food intake, and BMI, in children with an average age of 49 months. The research involved collecting data on one thousand five hundred and forty-nine Quebecois children from parents and day-care attendants using their responses to a 24-hour recall interview and eating behavior questionnaires. Ten percent of the children under study were reported as consuming breakfast fewer than seven days per week, classifying them as “breakfast skippers.” Their results indicated these “breakfast skippers” consumed lower amounts of protein versus those who consumed breakfast. Additionally, “breakfast skippers” consumed less kilocalories at breakfast, yet greater kilocalories at lunch and via afternoon/evening snacks versus those who consumed breakfast. The same was true for carbohydrates; lower amounts were consumed in the morning for those who skipped breakfast, and greater amounts of carbohydrates were consumed via afternoon and evening snacks, and dinner. To summarize, according to their findings, when considering caloric intake, those who skipped breakfast were found
to consume less kilocalories and less macronutrients per meal, and a greater caloric and macronutrient intake from snack foods versus children who consumed breakfast. Children who skipped breakfast were also at a significantly greater risk of being considered “overweight” or “obese” (DuBois et al., 2009). When comparing children who consumed breakfast each day versus preschool children who “regularly” or “occasionally” do not consume breakfast, breakfast-eaters consumed more servings of healthful foods such as “vegetables, grain and milk products.” Based upon these results and the consistency with previous research, there is an apparent association between breakfast consumption and healthful food choices and a more nutritional dietary intake (DuBois et al., 2009).

As previously discussed in a review composed by van der Horst et al. (2007), it is important to consider the parental role in influencing the eating behaviors of children, as it determines factors such as the physical and social environment of the child. Because parents play a large role in the development of a child’s eating behaviors, the parents’ role must be considered when accounting for the meal patterning of children. This is due to family meal consumption and its proposed impact on the regulation of meal patterning, “positive psycho-social development” in children, and a decrease in the occurrence of eating disorders (Wurbach, Zellner, & Kromeyer-Hauschild, 2009).

Additional research regarding meal patterning was conducted by Neumark-Sztainer, Hannan, Story, Croll, and Perry (2003), who investigated “Family meal patterns: Associations with socio-demographic characteristics and improved dietary intake among adolescents.” Their study consists of answers from 4,746 students enrolled
in middle- and high-school, pertaining to the Project (EAT) Eating Among Teens survey and Adolescent Food Frequency Questionnaires. Upon examination of the results, a positive association was identified between the frequency of family meals and the intake of fruits, vegetables, grains, and calcium-rich foods. Neumark-Sztainer et al. (2003) found a “strong positive association” between the family meal frequency and caloric intake, the amount of calories derived from protein sources, the mineral calcium and iron, vitamins A, C, E, B-6, folate, and dietary fiber. A negative association was determined between the frequency of family meals and carbonated sweetened-beverage consumption. The results of their study indicated in families where meals were consumed together, more healthful dietary intakes were reported (Neumark-Sztainer et al., 2003).

Providing additional information regarding the familial implications on the meal patterning of a child, Wurbach, Zellner, and Kromeyer-Hauschild (2009) discuss the associations between child and adolescent meal patterns and weight status and parental characteristics. The study consists of a cross-sectional design examining the BMI standard deviation scores and weight statuses of 2,054 German children ages seven- to fourteen-years. A total of 1,571 of these subjects provided additional information concerning parental education, employment status, weight status in accordance with World Health Organization (WHO) guidelines, and meal patterns, considering such factors as school lunch participation rates, meal frequencies, breakfast consumption, and the frequency of family meals. The results described an established association between parental weight status, parental education, and parental employment status and overweight and obesity classifications.
Consistent with the findings by DuBois et al. (2008) describing those who skip breakfast as being at a greater risk of being considered “overweight” or “obese,” breakfast consumption was indicated as a factor contributing to “the degree of BMI” (Wurbach et al., 2009). Wurbach et al. (2009) expanded upon this thought, discussing the importance of obtaining “an equal energy distribution throughout the day.” Regular breakfast consumption is associated with a more nutritional diet, as well as a decrease in snack consumption. Their research identifies other factors contributing to the “degree of BMI,” including parental employment and the number of family meals. Wurbach et al. (2009) confirm an established inverse relationship between meal frequency and the BMI of children. An association was found between the habit of skipping meals and the occurrence of greater BMI values.

**Snacking**

A study conducted by Borradaile et al. (2009) focused on the purchasing habits of children at urban corner stores within the proximity of their schools. The study was executed using 833 intercept surveys depicting the purchasing habits of children enrolled in grades four through six, outside of 24 corner stores before and after school. Upon examination of the items purchased, the type of item and caloric content were considered. Results indicated the total caloric amount per purchase was $1497.7 \pm 1219.3$ kJ. The types of items purchased were categorized as follows: beverage, candy, gum, chips, frozen treats, pastries, and prepared items. Approximately 80% of the items purchased were food items, while about 20% were beverage items. The types of items purchased
most frequently were those of little nutritional content and calorically dense (Borradaile et al., 2009).

Despite concluding the snack choices of the children under study were high in energy and of little nutritional value, the previously mentioned study by Nicklas et al. (2004) reported the amount of children consuming snack foods has decreased. Another study conducted by Piernas and Popkin (2010) examines the snacking trends of U.S. children between intervals including 1989-1991 to 1994-1998, and 1994-1998 to 2003-2006. Contradictory to the 2004 study by Niklas et al., Piernas and Popkin reported that “[n]ationally representative surveys of food intake in U.S. children show large increases in snacking between the 1989-91 to 1994-98 and 1994-98 to 2003-06 periods.” The snacking habits of children appear to be increasing to three snacks per day, and contributing to over 27 percent of children’s total daily caloric intake. Salty snack foods and candy are among the snack items of increasing prevalence; however, desserts and sweetened-beverages are the greatest contributors of calories derived from snack food consumption. These findings are congruent with those of Troiano et al. (2000), as their analysis of the NHANES III data also described beverage consumption as a major contributor to the energy intake of children and adolescents.

Expanding beyond the types of foods children consume when snacking, a study by Cross, Babicz, and Cushman (1994) examined the snacking behaviors of children and adults, highlighting “frequency,” “time of day,” “location,” and “qualities sought in snack choices.” This study highlighted the snacking behaviors of two groups: children enrolled in kindergarten through sixth grade who Cross, Babicz, and Cushman refer to as
“children”; and fifth- and sixth-grade students, who these authors refer to as “students.”

According to the results received via survey questionnaires for children, the majority of children (92.6%) enrolled in kindergarten through sixth grade reported snacking at least once per day, as well as the majority (87.2%) of fifth- and sixth-grade students reporting consuming at least one snack or more per day. Their research also found that children enrolled in kindergarten through sixth grade were the least likely to snack only a few times a week or less and the most likely to snack multiple times each day.

Approximately one-third (28.7%) of participating students reported consuming snack foods four times per day. When considering the time of day when snacking occurred, Cross et al. (1994) reported snacking in the morning had the lowest frequency among all age groups versus afternoon or evening snacking. Snacking occurred most frequently in the afternoon, as the majority of kindergarten through sixth grade children (92.7%) and students (98.7%) reported snacking in the afternoon at least one time per week.

Additionally, over one-half of the children (66.9%) and students (53.9%) reported consuming afternoon snacks at least five days per week. At least one-third of all of the age groups participating in the study reported consuming snacks during the evening at least five days per week. The types of snack preferred included fruits, sweets, and “meal-type items” (Cross et al., 1994).

Additional research regarding the snacking behaviors of children and how these behaviors are associated with meal-skipping was conducted by Savige, MacFarlane, Ball, Worsley, and Crawford (2007). Utilizing data collected from a cross-sectional, self-reported online food habits survey administered to 3,250 Australian children seven and
nine years of age, frequencies of meal skipping and snacking were examined. According to their findings, snacking was reported to occur most frequently following school, while viewing television, and while spending time with friends. Snacking was reported to occur less frequently when engaging in homework or working, while “on the run,” and when traveling to or from school. Participants reported they were least likely to snack throughout the day and “in the middle of the night.” Those who reported a higher frequency of snacking “on the run,” traveling to or from school, throughout the day, or “in the middle of the night” were also at an increased risk of skipping meals (Savige et al., 2007). These results suggest snacking frequency appears to be greater in times of leisurely activity, socialization, or convenience.

**Time Management in Families**

Another aspect to consider regarding the dietary intake of children and adolescents is time management. Time management goes hand-in-hand with meal patterning and snacking, as many adults experience a fast-paced lifestyle, working at least 40 hours each week, traveling in between extracurricular activities, etc. Time constraints certainly influence eating behaviors, as convenience foods become more appealing when speed is a factor. These convenience foods, as previously discussed, tend to be calorically dense and of little nutritional value.

A 2012 study conducted by Pelletier and Laska examines cross-sectional survey results concerning time constraints and the dietary behaviors of a sample of 1,201 college students from the Midwest. Their results indicated more than half of the participants felt they experienced time constraints; one-third to one-half of participants reported having
difficulties finding time to sit down to a meal; and almost half (46.4%) reported they
would eat healthier if they were less busy and had more time. Pelletier and Laska
concluded that “[w]hile lack of time is among the most commonly reported barriers to
healthy dietary habits and physical activity among young adults, little is known about
specific factors that contribute to feelings of time scarcity among this age group” (p. 6).
Poor time-management can cause individuals to consume less healthful options, as many
foods considered convenient are also those of little nutritional value.

**Socioeconomic Status and Dietary Intake**

When considering the dietary intake of an individual, one must consider
environmental and social aspects such as food availability, education, and socioeconomic
status. The World Health Organization also describes a future low socioeconomic status
as a consequence of malnutrition, stating in a 2003 report “The tragic consequences of
malnutrition include death, disability, stunted mental and physical growth, and as a result,
retarded national socioeconomic development” (p. 8). WHO also describes individuals
with smaller statures as likely to have experienced poor socioeconomic conditions in
adolescence, perhaps due to malnourishment.

As previously mentioned, an analysis conducted by Haapalahti et al. (2003) found
when comparing meal patterns, children’s eating behaviors, and the occupation of each
participating family’s father, significant differences were established depending on
socioeconomic status. Vegetable intake was greater in those with higher socioeconomic
status, versus those with lower socioeconomic status, who had greater intakes of high-fat
milk products. Additionally, Haapalahti and colleagues noted children who were from
families of a lower socioeconomic status tended to make poorer nutritional food choices versus children from families of higher socioeconomic status.

A 2006 article published in The American Journal of Clinical Nutrition, by Janssen, Boyce, Simpson, and Pickett, examined the socioeconomic factors, eating behaviors, and physical activity of 6,684 adolescents across 169 schools spanning across Canada. These children were enrolled in grades six through ten, and data was collected via survey methods. The results indicated there appeared to be a relationship between obesity incidence and lower socioeconomic status. Janssen et al. (2006) attributes this to energy-dense foods being more affordable than healthful foods. Drewnowski and Darmon (2005) discuss the high prevalence of obesity occurring in those of lower socioeconomic status, and also attribute this trend to the economics of food choice, insisting people choose foods that are more calorically-dense with fats and added sugars, in super-sized portions, for little cost, thus exacerbating the pursuit of unhealthy dietary behaviors.

Malnutrition and overconsumption appear to be the two biggest issues regarding low socioeconomic status. WHO suggests “people living in circumstances of low socioeconomic status may be more at the mercy of the obesogenic environment because their eating and activity behaviors are more likely to be the ‘default choices’ on offer” (p. 66). Lake and Townshend (2006) quote Swinburn and Egger (2002) by defining the obesogenic environment as “the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations.” (p. 262). The study produced by Pelletier and Laska (2012) discusses those of lower socioeconomic
status attributing “high time constraints” to “not having a healthy balance in life” (p. 6). Solutions to reverse these trends include educating communities populated by those of low socioeconomic status and experiencing food insecurity that being overweight and/or obese are not conducive to adequate nutrition and proper health, and to encourage fruit and vegetable consumption to all socioeconomic groups. According to the Texas Food Bank Network web page “What is food insecurity?” (2015) the USDA defines “food insecurity” as “consistent access to adequate food is limited by a lack of money and other resources at times during the year.”

**Chronic Diseases as Consequences of Poor Diet in Childhood**

A report published by the WHO in 2003 entitled “Diet, Nutrition and the Prevention of Chronic Diseases” states chronic disease accounted for approximately 60% of the 56.5 million reported deaths worldwide, as well as 46% of global disease in 2001. An increase in obesity and diabetes incidence is causing concern, “not only because they already affect a large proportion of the population, but also because they have started to appear earlier in life” (p. 4). “Diet, Nutrition and the Prevention of Chronic Diseases” also discusses how the human diet and nutrition may continue from mother to fetus, and from fetus to the elder years, implying “[t]he continuity of the life course is seen in the way that both undernutrition and overnutrition. . .play a role in the development of chronic disease. The effects of man-made and natural environments. . .on the development of chronic diseases are increasingly recognized” (p. 30). To summarize these concepts from the WHO, both the inadequate intake of nutrients necessary for
physiological processes and the overconsumption of sugar and fat contribute to chronic disease.

Because the World Health Organization has identified chronic disease as an occurrence from a multitude of various detrimental physical and social environments throughout a lifetime, the development of stages of intervention were established. The stages include: fetal development and the maternal environment, infancy, childhood and adolescence, adulthood, and aging and older people. WHO describes the difficulty of identifying whether being overweight in childhood is an independent factor of breast, colon, rectum, or prostate cancer, as children who are overweight typically remain overweight into adulthood, thus the predisposition to these cancers may stem from lifelong obesity. Additionally, the report describes an increased caloric intake in childhood may be related to an increase in the risk of cancer in adulthood.

Hypertension is another chronic disease that, when occurring in children, is heavily associated with obesity. The hypertension in children may be attributed to a high intake in total and saturated fats, an abundance of triglyceride consumption, increased sodium and decreased potassium consumption, and engaging in other unhealthy/sedentary behaviors, such as excessive television viewing. WHO describes these unhealthful habits as the driving factor for the premature development of chronic diseases such as obesity, dyslipidemia, hypertension, impaired glucose tolerance, and associated disease risk.

According to WHO, there are three factors contributing to the development of chronic disease in the child population. This includes: 1) “the development of risk
factors during this period;” 2) “the tracking of risk factors throughout life; and, in terms of prevention,” and 3) “the development of healthy or unhealthy habits that tend to stay throughout life” (p. 36). An article by Wansink, Cheney, and Chan (2003) reinforces the conclusions from WHO that the eating behaviors of children tend to adhere as they develop taste preferences, and these preferences continue on into their lifetime eating behaviors. The WHO also describes a ”clustering of risk factor variables” known as “syndrome X,” that can be identified in children and adolescence, has an association with atherosclerosis in young adults, and may develop into cardiovascular disease later into adulthood. The factors included among “syndrome X” are “insulin resistance, including hyperinsulinaemia, impaired glucose tolerance, hypertension, elevated plasma triglyceride and low HDL cholesterol” (p. 36). This research supports the concept that the chronic diseases typically plaguing older adults can begin to develop as early as childhood.

Expanding upon the health habits of children and its relation to the development of chronic disease in adulthood, the WHO reports children who consume unhealthful diets in their adolescent years and are subsequently overweight or obese are predisposed to chronic vascular health disparities in adulthood, as over 60% of children who are overweight tend to possess at least one other additional risk factor for cardiovascular disease, and 20% possess at least two other risk factors (p. 37). Additionally, an article by Stein and Colditz (2004) describes overweight and obesity in adolescent years as a predictor of coronary heart disease mortality, as overweight youth are more than twice as likely to expire from coronary heart disease when they are an adult versus their normal
weight counterparts. WHO suspects unhealthy lifestyles conducive to the development of chronic disease may be attributed to the “changes in family eating patterns, including the increased consumption of fast foods, pre-prepared meals and carbonated drinks” occurring over the past thirty years (p. 38). This concept supports the WHO’s previous conclusion of one of the major factors contributing to the development of chronic disease in the child population: that the health habits of children develop and remain throughout life, and these unhealthful habits promote disease.

**Media and Food Marketing to Children**

The Committee on Food Marketing and the Diets of Children and Youth composed a textbook entitled “Food Marketing to Children and Youth: Threat or Opportunity?” discussing various aspects of this controversial topic. This work addresses 1) the overall physical health, wellness, and eating patterns of children and adolescents; 2) factors influencing food and beverage consumption of children and adolescents; 3) food and beverage marketing to children and adolescents; 4) the implications this type of marketing imposes on the dietary patterns of the youth population; 5) public policy in food and beverage marketing to children; and 6) conclusions and recommendations to remedy the issue of marketing nutritionally poor food and beverage products to children.

According to “Food Marketing to Children and Youth: Threat or Opportunity?”, marketing professionals employ various tactics to appeal to consumers, promote brand awareness and loyalty, and increase revenue (p. 134). These strategies include: branding, advertising, consumer promotion, trade promotion, and market segmentation and target markets (p. 136-138). Additional strategies employed by corporations include embedded
marketing strategies. The Committee on Food Marketing and the Diets of Children and Youth describe these practices, stating, “[e]mbedded marketing strategies blend commercial content with programming or editorial content, or other lifestyle experiences, to add brand exposure and avoid resistance to direct advertising” (p. 141).

Another work composed by Nestle (2006) discusses the Institute of Medicine (IOM) study, “Food Marketing to Children and Youth: Threat or Opportunity?” and how these types of marketing practices may be attributed to the childhood obesity epidemic. Nestle (2006) agrees these marketing practices are successful, stating, “[m]arketing strongly influences children’s food preferences, requests, and consumption” (p. 2528). She describes food marketing practices towards children as a design focused on manipulating children who are unable to “distinguish advertising from truth,” encouraging them to consume calorically-dense foods of little nutritional value in order to increase the revenue of food and beverage companies. She also advocates the need for regulation of these marketing strategies employed by companies. Methods of marketing food products towards children are becoming increasingly prevalent, and are not only limited to television media. Product placements are occurring more frequently in other forms of media, such as “games, educational materials, songs, and movies” and “stealth methods such as ‘advergames’ and ‘viral’ campaigns involving word of mouth, cellular-telephone text messages, and the Internet.” Nestle (2006) also describes the utilization of character licensing and celebrity endorsements to market products towards children. These strategies are employed by food and beverage companies to enable children to recognize brands and encourage parents to purchase these items. Nestle (2006) states
“[t]he IOM notes that by two years of age, most children can recognize products in supermarkets and ask for them by name” (p. 2528).

"Diet, Nutrition and the Prevention of Chronic Diseases,” a 2003 publication from WHO also describes the role the industrialization of the food market has played, contributing to the increase in chronic disease throughout developed nations. In the report, WHO emphasizes the need to discuss guidelines with the food industry. These measures include the production of foods containing less saturated fats, increased fruits and vegetables, effective food labeling, and providing some sort of incentive for the marketing and production of more healthful products. Additionally, WHO identifies the need to work in unison with advertising, media and entertainment partners,” to stress the importance of clear and unambiguous messages to children and youths.” as “Global ‘health and nutrition literacy’ requires a vast increase in attention and resources” (p. 7). Essentially, WHO suggests collaborating with the food industry to develop healthier practices, hoping to create a more healthful environment.

**Historical Perspective of Marketing**

In “The Psychology of Food Choice” Grunert (2010) defines “marketing” as “advertising, merchandising, sales promotions, samples, coupons and other measures aimed at increasing sales of a particular product.” Grunert continues, explaining marketing theory. He describes it as a successor to economic theory consisting of only price as a parameter affecting demand (p. 162). In other words, “[t]he relationship between price and demand can be analysed in a price response function” (p. 162).
Advertisements have been utilized for decades, particularly print advertising in newspapers and magazines, to depict various “behaviors, styles, and roles” for a multitude of objects throughout our social and cultural history (Pollay, 1985). Pollay (1985) states print advertising became more prevalent as the United States experienced “the growth of industrialism, urbanization, mass literacy, and the associated mass print media.” (p. 24). As years progressed, the development of new technologies increased the means of mass communication, and new advertising strategies were developed. Communication through television and radio expanded the network of advertising opportunities. Additionally, Pollay (1985) states, “[w]ithin print media, the technological changes within photography and printing permitted imagery of increasing vividness” (p. 24). The application of psychology to advertising was developed during this century within the profession and academia. During the 1950s era, ethical concerns arose as psychologists were enlisted to incorporate applied behavioral sciences into advertising, via motivation research and subliminal advertising. By the 1960s, consumer behavior research had led to the development of university texts and a specialized academic discipline (p. 25). As advertising become more prevalent, “agents struggled to conduct themselves in the manner of professionals in order to gain credibility among clients and the public” (Pollay, p. 25). Pollay writes “[t]he credibility of media claims for effective reach were enhanced by the establishment of the Standard Rate and Data Service and the Audit Bureau of Circulations in the next decade” (p. 25). Advertising was doing well during the 1920s following World War I; however, once the Great Depression hit, and World War II occurred, revenue from marketing products declined. Following World
War II, the United States experienced an affluent economy, allowing marketing and advertising to progress. As technology advanced, the development of a slew of new products occurred, and consumer demand was high. According to Pollay (1985), “These flush and fulsome days saw the emergence of many gadgets and promotional gimmicks, as well as durable products and sound strategies, and advertising grew proportionally larger with both” (p. 25). The marketing and advertising of products increased consumerism, thus creating revenue for businesses, paving the way for industries to come.

**Media/Food Marketing Practices to Children**

Alvy and Calvert (2008) analyze the marketing of foods towards children utilizing popular children’s websites. Their data and analysis indicated 13.9% of 740 web pages reviewed demonstrated at least one strategy of food marketing. Seven of the ten children’s sites reviewed contained an instance of food marketing. Similar to the food products advertised on television, the food products marketed on these websites were foods of poor nutritional quality (Alvy & Calvert, 2008). Advertised foods were categorized into a possibility of 15 different categories. The types of foods marketing on these popular children’s websites were categorized into 1) candy, 2) sweetened breakfast cereals, 3) quick-serve restaurants, 4) chips, 5) dairy products, 6) sweet snacks, and 7) other. The strategies implemented to market these food products to children were similar to the advertising strategies utilized via television. These techniques included “attention-getting production features, branded characters, and repetition” (p. 712). According to Alvy and Calvert (2008), “[f]eatures such as animation, bold/colorful text, and dynamic
images that are likely to attract children’s attention were prevalent in all online food marketing but were especially pronounced in advertisements, advergames, and integrated marketing pages” (p. 712). These techniques were utilized to grasp the attention of the youth population to promote the consumption of these types of nutritionally poor food products.

**Children’s Exposure to Media**

The American Academy of Pediatrics (AAP) reports that children currently spend an average of seven hours per day on “entertainment media”, described as “televisions, computers, phones and other electronic devices.” Roberts and Foeher (2008) describe “media use” as implying the “amount of time young people devote to all media,” and “media exposure” is the “media content encountered by young people expressed in units of time.” Roberts and Foeher (2008) also report that the adolescent population is spending more time utilizing media “than any single activity other than sleeping.” The average eight- to eighteen-year old reports media use greater than six hours per day. In actuality, because people now engage in what is known as “media multitasking,” the simultaneous usage of several forms of media, the statistic is multiplied to an average of eight and a half hours of media exposure each day (Roberts & Foeher, 2008). The AAP encourages parents to monitor what children view, as “excessive media use can lead to attention problems, school difficulties, sleep and eating disorders, and obesity.” This exposure to media provides a means for food and beverage companies to advertise their products to the child population.
Effect of Media Exposure on Children

The review by Gregori et al. (2014) discusses the body of research concerning television advertising and the dietary intake of children. The review, entitled “Randomized controlled trials evaluating effect of television advertising on food intake in children: Why such a sensitive topic is lacking top-level evidence?” examines the results of randomized controlled trials investigating and “assessing” how television advertising influences the dietary intake of children age four- to twelve-years of age. Gregori et al. (2014) describe the increasing adiposity rates in children and adolescence in countries where national data was provided as having “large variations in secular trends,” and these variations relating to urbanization and economic development. The obesity epidemic is attributed to the accessibility to calorically dense food products and beverages, the employment of food marketing strategies in several forms of media, and an increase in the usage of various forms of screen-time products. According to previous literature, television usage may be associated with a decrease in physical activity, while advertisements promote the overconsumption of foods containing large amounts of fat and sugar (Gregori et al., 2014). This study provides evidence supporting the concept that the media children are exposed to and the act of simply being exposed to this form of media (television) may cause an unhealthful dietary intake.

Government Regulations in Food Marketing

In 2004, the World Health Organization’s Global Strategy on Diet, Physical Activity and Health (DPAS) considered the regulations surrounding marketing food products towards children. According to “Marketing Food to Children: Changes in the
Global Regulatory Environment 2004-2006,” by Hawkes (2007), DPAS identified six issues regarding the marketing of food products toward children. These issues include:

- Development of self-regulatory codes by the advertising and food industries

- Slower development of statutory regulation by some governments, despite strong advocacy by public health and consumer groups for legal restrictions on the volume of food marketing experienced by children

- Concentration of this activity in high-income countries and relatively little in middle- and low-income countries, even though this is where advertising and promotional activities are growing faster and potentially have a greater impact

- Focus of the regulatory activity on television advertising, although with more attention given to other marketing techniques compared to the situation before 2004

- More attention paid to the monitoring and enforcement of existing and new regulations, but remaining inadequate in terms of measuring the impact of regulation on the quantity and quality of food promotions experienced by children, and the associated impact on children’s diets

- Despite these regulatory developments, the continued growth of traditional advertising techniques in middle- and low-income countries, partly stimulated by the liberalization of advertising services
markets, and, in all countries, an apparent increase in the use of non-traditional marketing techniques (Hawkes, p. 9).

These concerns expressed by DPAS advocate an increased awareness of the role the food industry plays in promotion of products towards children, and requests this promotion be more tightly regulated. The “key stakeholders,” as described by the DPAS, have pursued other actions,

- With a united front, private industry has been developing self-regulatory codes, mainly in Europe. At the same time, companies have continued to proactively market their products using a wide range of techniques and lobbied against any proposals to legally restrict food marketing to children

- Governments have supported self-regulatory developments, and some have voiced support or developed forms of statutory regulation, particularly in schools. Some governments have also said that they will implement statutory restrictions if self-regulation fails to address the issue

- Consumer groups have stepped up their campaigns to support the development of statutory restrictions on all forms of marketing activities that encourage unhealthy dietary practices among children (p. 9-10).
Because different stakeholders possess opposing standards and considerations of the constitutions of regulatory practices in the marketing of food products towards the adolescent population, there is an ongoing debate regarding the need for regulation.

Private industry, for its own self-interest, has proposed self-regulation in its marketing of food products toward children. With the support of international advertising, communications, and food industries, the International Chamber of Commerce (ICC) published a Framework for Responsible Food and Beverage Communications in 2004. Likewise, the Confederation of the Food and Drink Industries of the EU (CIAA) produced similar guidelines. These publications sought to “emphasize that food and drink marketing should not mislead children, nor undermine the importance of a healthy diet” (Hawkes, p. 10). These concepts of self-regulation contribute to the concerns of DPAS, as they have identified the self-regulation of advertising and food industries as an issue in the Marketing Food to Children: Changes in the Global Regulatory Environment 2004-2006,” report.

Asian, Australasian, European, and North American governments have supported the development of self-regulation; however, “some of these regulatory authorities have also stated that, if the advertising and food industries fail to act within a specified time period, they will implement tighter statutory restrictions” (Hawkes, p. 10).

Considering the advertising and marketing of food and beverage products to children, Hawkes (2007) claims the United States have made some developments in recent years. These developments include: 1) “new statutory rules for the application of the Children’s Television Act,” 2) “introduction of federal bills which refer to marketing
to children,” 3) “release of reports by IOMNAS,” and 4) “discussions and developments in the self-regulatory system” (Hawkes, p. 27). These efforts are intended to minimize the amount of content advertised and marketed to children.

The Children’s Television Act is a legal document produced in 1990, enacted by Congress, with the intentions of providing children with more educational and informational programming via television (Federal Communications Commission [FCC], 2014). Also included in this act is the minimization of time allotted for broadcasters and cable operators to use for airing advertisements during the children’s programs. To expand upon these limitations, the FCC designates a maximum of ten and one-half minutes of advertisements per hour of child programming on the weekends, and 12 minutes of advertisements per hour of child programming on weekdays. Television broadcasters, cable operators, and satellite providers are all required to meet these expectations. Commercial television broadcasters are, however, self-regulated; they are only required to place in “their local public inspection files certification that they have complied with the commercial time limits.” (https://www.fcc.gov). Commercial television broadcasters are also required to report “overages” of these time allotments. The Children’s Television Act also mandates that, in instances where television programs are intended for children 12 years old or younger, “program material be separated from commercials by intervening and unrelated program material.” Additionally, the FCC states “[t]he purpose of this separation policy is to protect young children who have difficulty distinguishing between commercial and program material and are therefore more vulnerable to commercial messages. If a program fails to adequately separate
program and commercial material, the entire duration of the program may be counted as commercial material (a “program-length commercial”).” The efforts of the Children’s Television Act are to minimize the content children are exposed to when viewing television programming.

Other acts introduced in an attempt to develop a statutory regulation of food marketing to children were the Healthy Lifestyles and Prevention (HeLP) America Act, the Prevention of Childhood Obesity Act, and the Children and Media Research Advancement Act; however, “[t]he FTC [Federal Trade Commission] chairperson stated in July 2005 that ‘based on years of experience with advertising, a government ban on children’s food advertising is neither wise nor viable’” (Hawkes, p. 28). The FTC was asked to submit a report to the U.S. Congress in 2006, detailing “marketing activities’ and the expenses of the food industry designated for these marketing practices focused towards the youth population. According to the “Marketing Food to Children: Changes in the Global Regulatory Environment 2004-2006,” the FTC is still looking into these items. Congress had also requested a report on the policy options to prevent childhood obesity from IOMNAS in 2005. In 2006, a second report was issued from IOMNAS, entitled “Food Marketing to Children and Youth: Threat or Opportunity?” According to Hawkes (2007), the IOMNAS reported “the food, beverage, restaurant and marketing industries should work with government, scientific, public health, and consumer groups to establish and enforce the highest standards for the marketing of foods, beverages and meals to children and youth (p. ES-10).”
CHAPTER III
METHODOLOGY

The purpose of this study was to investigate whether acute media exposure to a brief animated video clip influences the snack choices of preschool children. This study was a non-experimental, post-test, observational, comparative 2 x 3 factorial ANOVA design. Quantitative data was collected. The independent variable was the group assignment (treatment I, treatment II, and control groups) and gender of each participant. The dependent variables were snack choice and the dietary intake of snack(s), more specifically, grams of macronutrients, kilocalories, kilocalories per gram from fat, vitamin content (A and C), dietary fiber and sodium. Participants were divided into three groups: a treatment I group (HSV), who were exposed to a short animated video clip depicting a character consuming a healthful snack; a treatment II (USV) group, who was exposed to a short animated video clip depicting a character consuming an unhealthful snack; and the control group, who underwent no media exposure. Participants were asked to choose from seven snack foods varying in nutritional content and self-selected portions. Data collection commenced on February 27, 2015 and ended March 20, 2015. This study was approved by the Institutional Review Board of Kent State University (see Appendix B).

Sample

Participants were 62 preschool children enrolled in four Ohio early childhood education centers. Non-probability convenience sampling was used to select participants. Recruitment consisted of contacting four Ohio early childhood education center directors.
and receiving permission to perform the study at each site. Assent to perform the study was acquired from participants, and waivers for directors and parents were completed. Inclusion criteria consisted of children four to six years of age, enrolled in an Ohio early education center, and enrolled in the pre-kindergarten class. Exclusion criteria included children below the age of four years, above the age of six years, not enrolled in an Ohio early education center, and not enrolled in the pre-kindergarten class. Each site was visited between February 2, 2015 and March 20, 2015. Data collection occurred at New Dawn Child Care Center in Dover, Ohio; Buckeye Career Center Child Care in New Philadelphia, Ohio; the Moravian Early Learning Center in Gnadenhutten, Ohio; and St. John’s Pre-kindergarten School in Dover, Ohio.

Instruments of Measure The nutritional content of snack options available to the participants were categorized based on the Go, Slow, and Whoa food categorizations (Appendix A). The Nemours Foundation (2014) describes “Go” foods as those typically beneficial to consume at any time, these foods are considered the most healthful. “Slow” foods are those acceptable to consume at times, these food items are restricted to “several times a week.” “Whoa” food products are of the least nutritional value, and are suggested to only be consumed “once-in-a-while.”

Digital photography was used to measure the snack foods selected by participants, the serving size of each food item, and plate waste. Utilizing the digital photography method to measure food consumption has been confirmed as an accurate way for dietitians to approximate macronutrient intake (Salley, 2013). A Sony Bloggie Touch MHS-TS20 was affixed to a tripod, angled downward to photograph the plates prior to
and following snack food consumption. Photographs of each plate were taken while simultaneously recording video footage of the snack choices, providing reference material for data analysis purposes. Each plate was placed on a table in front of the camera and tripod prior to and following snack food consumption to ensure each plate was a consistent distance from the camera. Participants who chose to consume additional plates were required to use the same plate, with the same label.

**Procedures**

Each group was assigned a letter (A), and each child was assigned a number (1). Snack choices for each child and their respective group number were documented by ticketing their plate (Ex: A-1). Permission was obtained from each director of the Ohio early education centers via a consent form. Participants were also granted permission to participate in the study from their parents, utilizing a parental consent form. At the first site, participants were divided into the three groups: HSV, USV, and the control group. The next two sites were each designated as either an HSV or USV group. The final site had three preschool classes, and each class was designated a group assignment (HSV, USV, or control). The nutritional content of the snack options were analyzed utilizing Food Processor SQL, version 10.8.0, following data collection. Kilocalories, grams, milligrams, international units, cups, and ounces were used to quantify the nutritional content of the snacks. Following the “Go” and “Whoa” categories of the "Slow, Go, and Whoa” foods classification, snack choices included the following: bananas, red bell peppers, grapes, apples, mini donuts, mini muffins, and potato chips. “Go” foods included: bananas, red bell peppers, grapes, and apples; “Whoa” foods: mini donuts, mini
muffins, and potato chips. If placed in either the HSV or the USV groups, children were exposed to acute video media. All participants were given free access to the snack foods, which were provided during the designated snack time of each facility. Documentation was performed by digitally photographing each plate containing the snack choices of each child, and categorizing these choices by group, prior to consumption. Once children were finished, plates were photographed a second time, to measure food selection, serving sizes, and plate waste. Data was analyzed using SPSS version 2.0.

**Materials**

The HSV group was exposed to a brief animated clip from Netflix, 11 minutes and 56 seconds in length, entitled “Juicy George.” This clip depicts its main character drinking a juice composed of fruits and vegetables. The USV group was exposed to a brief animated clip from Netflix, also 11 minutes and 56 seconds in length entitled “Zero to Donuts,” depicting the same main character consuming donuts. The control group was not exposed to any media.

Snack foods categorized using "Go, Slow, Whoa" food classifications were provided to participants. Snack options included four items from the “Go” category, and three items from the “Whoa” category. The “Go” foods that were provided were bananas, red bell peppers, grapes, and apples. The “Whoa” snack foods that were provided included mini muffins, mini donuts, and potato chips. Children were informed of the snack food options available. Snack food items were selected and served using large spoons and tongs by the participant. Trays presenting snack food options were
identical in size and of neutral color, as the use of bold and colorful colors are a marketing technique used towards children (Alvy & Calvert, 2008).

Plates were tagged with each participant's group assignment letter and number using a marker and recording this information on the plate. The animated clips were accessed utilizing Netflix via a Toshiba Satellite C5S-A laptop and an HDMI cable was connected to either a projector or television at each site.

Data Analysis

This study was a two (gender) x three (treatment group) Factorial design. The factors included gender, and the three groups: HSV, USV, and the control group. The independent variables of this study were HSV, USV, and control group assignments. The dependent variables of this study were snack choice and the dietary intake of the snack choice(s), measured in grams of macronutrients, kilocalories, kilocalories per gram from fat, vitamin content (A and C), dietary fiber, and sodium. Kilocalories, grams, milligrams, international units, cups, and ounces were used to quantify the nutritional content of snacks. Nutritional content of snack options were analyzed utilizing Food Processor SQL, version 10.8.0. Data was analyzed using SPSS version 22.0. Tukey HSD multiple comparisons testing was used to analyze significant results among group treatment variables The means and standard deviations were calculated on all variables, as well as the $p$-value, or significance, established at $p \leq 0.05$. Significance between each snack choice and media exposure, or lack thereof, was investigated.
CHAPTER IV
ANALYSIS OF THE FINDINGS

Introduction

The CDC (2014) reports the majority of American children are not meeting dietary recommendations, such as the established guideline of consuming two-and-a-half to six-and-a-half cups of fruits and vegetables per day, or the recommendation of consuming two- to three-ounces of whole grains per day. American children are also exceeding the maximum daily sodium intake, consuming nearly half of their daily caloric intake from empty calorie sources, and consuming more sweetened-carbonated beverages than milk. According to the CDC (2014), many factors influence the dietary behaviors of children, these factors include “families, communities, schools, child care settings, medical care providers, faith-based institutions, government agencies, the media, and the food and beverage industries and entertainment industries.”

The media, food and beverage industries, and entertainment industries are of particular interest considering their influential abilities. According to the American Academy of Child and Adolescent Psychiatry (AACAP, 2011), “Young children are impressionable and may assume that what they see on television is typical, safe, and acceptable. As a result, television also exposes children to behaviors and attitudes that may be overwhelming and difficult to understand.” The media children are exposed to may influence dietary behavior factors such as food choices. As discussed in the 2006 publication, “Food Marketing to Children and Youth: Threat or Opportunity?” by the Committee on Food Marketing and the Diets of Children and Youth, “[c]hildren and
youth represent an important demographic market because they are potential customers, they influence purchases made by parents and households, and they constitute the future adult market” (p. 138). The food industry does, in fact, try to capitalize on this opportunity and provides advertisements depicting their products. These products are typically calorically dense, high in sugar or fat, and of little nutritional value (Committee on Food Marketing and the Diets of Children and Youth, p. 139). A review by Gregori et al. (2014) highlights previous literature as suggesting economic development and urbanization as factors associated with adiposity rates in children and adolescence (p. 563). Also described, television usage is a proposed association to decreased physical activity levels, as advertising promotes the overconsumption of foods containing large amounts of fat and sugar (Gregori et al., p. 563).

Considering the influence advertising has on the dietary intake of children, Alvy and Calvert (2008) discuss the marketing strategies employed by food and beverage companies on popular children's websites. These strategies include the usage of animation, bold and colorful texts, and dynamic images, and were prominent specifically in the “advertisements, advergames, and integrated marketing pages” of these websites. Story and French (2004) describe the motivation for the marketing of food products towards the child population as “the desire to develop and build brand awareness/recognition, brand preference and brand loyalty.” This seems to be an effective method of increasing revenue for food and beverage companies, as Nestle (2006) reports “candies, soft drinks, and snack foods” are among the foods marketed
most to the adolescent population, and that approximately $30 billion are spent by American children each year on these types of food products marketed towards children.

**Methodology**

The purpose of this study was to investigate whether acute media exposure to a brief animated video clip influences the snack choices of preschool children. This study was a non-experimental, post-test, observational, comparative 2 x 3 factorial ANOVA design. Quantitative data was collected. The independent variable was the group assignment (treatment I, treatment II, and control groups) and gender of each participant. The dependent variables were snack choice and the dietary intake of snack(s), more specifically, grams of macronutrients, kilocalories, kilocalories per gram from fat, vitamin content (A and C), dietary fiber and sodium. Participants were divided into three groups: a treatment I group (HSV), who were exposed to a short animated video clip depicting a character consuming a healthful snack; a treatment II (USV) group, who was exposed to a short animated video clip depicting a character consuming an unhealthy snack; and the control group, who underwent no media exposure. Participants were asked to choose from seven snack foods varying in nutritional content and self-select portions.

Data collection commenced on February 27, 2015 and ended March 20, 2015. This study was approved by the Institutional Review Board of Kent State University.

**Sample**

Participants were 62 preschool children enrolled in four Ohio early childhood education centers. Non-probability convenience sampling was used to select participants. Recruitment consisted of contacting four Ohio early childhood education center directors
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The nutritional content of snack options available to the participants were categorized based on Go, Slow, and Whoa food categorization (Appendix A). The Nemours Foundation (2014) describes “Go” foods as those typically beneficial to consume at any time, these foods are considered the most healthful, “Slow” foods are those acceptable to consume at times, these food items are restricted to “several times a week.” “Whoa” food products are of the least nutritional value, and are suggested to only be consumed “once-in-a-while.”

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**Materials**

The HSV group was exposed to a brief animated clip from Netflix, 11 minutes and 56 seconds in length, entitled “Juicy George.” This clip depicts its main character drinking a juice composed of fruits and vegetables. The USV group will be exposed to a brief animated clip from Netflix, also 11 minutes and 56 seconds in length entitled “Zero to Donuts,” depicting the same main character consuming donuts. The control group was not exposed to any media.

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Results

Although 62 preschool students participated in the study, four were excluded due to incomplete data. Among the 58 who participated, 29 students were female, and 29 were male. Among the 58 who participated, 21 students were placed in the HSV group, 22 were placed in the USV group, and 15 were placed in the Control group.

Table 1 compares the macronutrient and micronutrient means and standard deviations ($\bar{x} \pm SD$) based on the snack food consumption between HSV, USV, and Control groups. There was no significant (p > 0.05) difference among groups in total kilocalories, carbohydrates, total sugars, protein, total fat, saturated fat, trans fat, monounsaturated fat, polyunsaturated fat, kilocalories from fat, dietary fiber, vitamin C, vitamin A, and sodium.

<table>
<thead>
<tr>
<th>Variables</th>
<th>HSV (n=21)</th>
<th>USV (n=22)</th>
<th>Control (n=15)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Kilocalories</td>
<td>286.28 ± 204.24</td>
<td>307.41 ± 135.40</td>
<td>249.62 ± 146.47</td>
<td>0.586</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>47.08 ± 26.82</td>
<td>52.24 ± 24.57</td>
<td>44.03 ± 31.56</td>
<td>0.651</td>
</tr>
<tr>
<td>Total Sugars (g)</td>
<td>23.99 ± 16.63</td>
<td>27.77 ± 17.14</td>
<td>24.48 ± 23.60</td>
<td>0.780</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>3.81 ± 2.89</td>
<td>4.05 ± 2.00</td>
<td>3.40 ± 1.90</td>
<td>0.708</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>10.95 ± 13.33</td>
<td>10.95 ± 7.02</td>
<td>8.28 ± 5.54</td>
<td>0.650</td>
</tr>
<tr>
<td>Saturated Fat (g)</td>
<td>1.43 ± 1.54</td>
<td>1.59 ± 0.90</td>
<td>1.06 ± 0.63</td>
<td>0.377</td>
</tr>
<tr>
<td>Trans Fat (g)</td>
<td>0.71 ± 0.82</td>
<td>1.08 ± 0.81</td>
<td>0.50 ± 0.37</td>
<td>0.058</td>
</tr>
<tr>
<td>Monounsaturated Fat (g)</td>
<td>5.08 ± 7.26</td>
<td>4.35 ± 3.78</td>
<td>3.91 ± 3.14</td>
<td>0.790</td>
</tr>
<tr>
<td>Polyunsaturated Fat (g)</td>
<td>2.57 ± 3.62</td>
<td>2.22 ± 1.88</td>
<td>1.99 ± 1.57</td>
<td>0.793</td>
</tr>
<tr>
<td>Kilocalories from Fat (kcal)</td>
<td>95.86 ± 121.45</td>
<td>102.69 ± 63.33</td>
<td>74.54 ± 49.91</td>
<td>0.616</td>
</tr>
<tr>
<td>Dietary Fiber (g)</td>
<td>6.34 ± 12.33</td>
<td>4.13 ± 2.18</td>
<td>3.55 ± 3.24</td>
<td>0.505</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>13.99 ± 18.45</td>
<td>25.95 ± 44.26</td>
<td>17.17 ± 36.63</td>
<td>0.514</td>
</tr>
<tr>
<td>Vitamin A (IU)</td>
<td>160.09 ± 416.66</td>
<td>446.20 ± 1082.67</td>
<td>268.61 ± 909.44</td>
<td>0.541</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>189.58 ± 238.83</td>
<td>182.33 ± 123.48</td>
<td>141.57 ± 98.65</td>
<td>0.682</td>
</tr>
</tbody>
</table>

*p ≤ 0.05 demonstrates significant difference in intake between HSV, USV, and Control groups.
Table 2 compares the types of foods chosen between groups, and the snack food amount $\bar{x} \pm SD$ of snack food consumption among HSV, USV, and Control groups. The USV group consumed significantly ($p < 0.05$) higher amounts of mini donuts versus the HSV and Control groups. There was no significant ($p > 0.05$) difference in the consumption of bananas, red bell peppers, grapes, apples, mini muffins, and potato chips among groups.

Table 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>$\bar{x} \pm SD$ HSV (n=21)</th>
<th>$\bar{x} \pm SD$ USV (n=22)</th>
<th>$\bar{x} \pm SD$ Control (n=15)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas (medium)</td>
<td>0.56 ± 0.17</td>
<td>0.73 ± 0.33</td>
<td>0.88 ± 0.25</td>
<td>0.135</td>
</tr>
<tr>
<td>Red Bell Peppers (cups)</td>
<td>0.19 ± 0.09</td>
<td>0.42 ± 0.14</td>
<td>0.50 ± -</td>
<td>0.215</td>
</tr>
<tr>
<td>Grapes (cups)</td>
<td>0.70 ± 0.49</td>
<td>0.70 ± 0.35</td>
<td>0.75 ± 0.38</td>
<td>0.949</td>
</tr>
<tr>
<td>Apples (cups)</td>
<td>0.33 ± 0.23</td>
<td>0.39 ± 0.25</td>
<td>0.88 ± 0.88</td>
<td>0.152</td>
</tr>
<tr>
<td>Mini Donuts (per item)</td>
<td>2.49 ± 2.04</td>
<td>3.08 ± 1.48</td>
<td>1.42 ± 0.67</td>
<td>0.024$^{1,2}$</td>
</tr>
<tr>
<td>Mini Muffins (per item)</td>
<td>2.61 ± 2.08</td>
<td>2.91 ± 1.84</td>
<td>2.38 ± 1.51</td>
<td>0.783</td>
</tr>
<tr>
<td>Potato Chips (cups)</td>
<td>1.34 ± 1.36</td>
<td>0.88 ± 0.59</td>
<td>0.75 ± 0.49</td>
<td>0.195</td>
</tr>
</tbody>
</table>

$^1$ $p \leq 0.05$ demonstrates significant difference in intake between HSV, USV, and Control groups.

$^2$ Tukey HSD Multiple Comparisons testing was used to analyze significant results among group treatment variables. The significance is found only between the USV and Control group, and is 0.018.

Significant differences in food consumption were determined between genders. Females consumed significantly ($p \leq 0.05$) lower amounts of kilocalories, carbohydrates, protein, saturated fat, and trans fat compared to males. There was no significant difference ($p > 0.05$) in total sugars, total fat, monounsaturated fat, polyunsaturated fat, kilocalories from fat, dietary fiber, vitamin C, vitamin A, and sodium. Table 3 compares
the macronutrient and micronutrient means and standard deviations based on the snack food consumption of females versus males.

Table 3
*Macronutrient and micronutrient $\bar{x} \pm SD$ based on snack food consumption among preschool girls versus boys.*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$\bar{x} \pm SD$ Females (n=29)</th>
<th>$\bar{x} \pm SD$ Males (n=29)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Kilocalories</td>
<td>227.95 ± 119.91</td>
<td>341.67 ± 185.10</td>
<td>0.007†</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>39.21 ± 21.74</td>
<td>57.29 ± 29.08</td>
<td>0.010†</td>
</tr>
<tr>
<td>Total Sugars (g)</td>
<td>21.07 ± 14.47</td>
<td>30.03 ± 21.26</td>
<td>0.066</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>3.06 ± 1.83</td>
<td>4.53 ± 2.53</td>
<td>0.014†</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>7.99 ± 5.81</td>
<td>12.53 ± 11.73</td>
<td>0.067</td>
</tr>
<tr>
<td>Saturated Fat (g)</td>
<td>1.05 ± 0.65</td>
<td>1.74 ± 1.39</td>
<td>0.019†</td>
</tr>
<tr>
<td>Trans Fat (g)</td>
<td>0.54 ± 0.41</td>
<td>1.06 ± 0.82</td>
<td>0.008†</td>
</tr>
<tr>
<td>Monounsaturated Fat (g)</td>
<td>3.66 ± 3.34</td>
<td>5.34 ± 6.42</td>
<td>0.215</td>
</tr>
<tr>
<td>Polyunsaturated Fat (g)</td>
<td>1.86 ± 1.66</td>
<td>2.71 ± 3.20</td>
<td>0.207</td>
</tr>
<tr>
<td>Kilocalories from Fat (kcal)</td>
<td>73.07 ± 55.62</td>
<td>112.81 ± 105.55</td>
<td>0.078</td>
</tr>
<tr>
<td>Dietary Fiber (g)</td>
<td>5.15 ± 10.66</td>
<td>4.40 ± 2.55</td>
<td>0.714</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>18.36 ± 31.66</td>
<td>20.33 ± 37.91</td>
<td>0.831</td>
</tr>
<tr>
<td>Vitamin A (IU)</td>
<td>306.25 ± 781.30</td>
<td>287.11 ± 915.44</td>
<td>0.932</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>136.51 ± 103.80</td>
<td>212.31 ± 209.99</td>
<td>0.087</td>
</tr>
</tbody>
</table>

†$p \leq 0.05$ demonstrates significant difference in intake between females and males.

Table 4 compares the types of foods chosen between genders, and the snack food amount $\bar{x} \pm SD$ of snack food consumption between females and males. Females consumed significantly ($p \leq 0.05$) lower amounts of mini donuts compared to males. There was no significant ($p > 0.05$) difference in the consumption of bananas, red bell peppers, grapes, apples, mini muffins, and potato chips.
Table 4
Snack food amount $\bar{x} \pm SD$ based on snack food consumption among preschool girls versus boys.

<table>
<thead>
<tr>
<th>Variables</th>
<th>$\bar{x} \pm SD$ Females (n=29)</th>
<th>$\bar{x} \pm SD$ Males (n=29)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bananas (medium)</td>
<td>0.65 + 0.34</td>
<td>0.72 + 0.25</td>
<td>0.574</td>
</tr>
<tr>
<td>Red Bell Peppers (cups)</td>
<td>0.28 + 0.16</td>
<td>0.50 + 0.00</td>
<td>0.137</td>
</tr>
<tr>
<td>Grapes (cups)</td>
<td>0.67 + 0.36</td>
<td>0.75 + 0.44</td>
<td>0.559</td>
</tr>
<tr>
<td>Apples (cups)</td>
<td>0.33 + 0.22</td>
<td>0.56 + 0.51</td>
<td>0.225</td>
</tr>
<tr>
<td>Mini Donuts (per item)</td>
<td>1.66 + 0.72</td>
<td>3.19 + 1.98</td>
<td>0.001†</td>
</tr>
<tr>
<td>Mini Muffins (per item)</td>
<td>2.24 + 1.34</td>
<td>3.13 + 2.15</td>
<td>0.132</td>
</tr>
<tr>
<td>Potato Chips (cups)</td>
<td>0.78 + 0.66</td>
<td>1.23 + 1.08</td>
<td>0.094</td>
</tr>
</tbody>
</table>

†p ≤ 0.05 demonstrates significant difference in intake between females and males.

The data depicted males tending to consume larger amounts of each snack food, contributing to higher intakes of kilocalories, carbohydrates, protein, saturated fat, and trans fat. Differences in macro- and micro-nutrient intake, servings, and portion size were greater between gender, as opposed to treatment and control groups.

**Discussion**

According to the results of this study, the brief animated media exposure did not appear to significantly influence the snack choices of the preschool children who viewed the video media clips, nor did the subsequent nutritional content of the snack choices significantly differ among treatment or control groups, rejecting the first hypothesis. To investigate the impressionability of a preschool child to popular animated characters and their dietary choices, the HSV and USV groups were exposed to an animated media video depicting a popular children’s animated character consuming a snack food. The HSV group video depicted this character consuming a healthful vegetable juice drink comprised of nutritious foods. The USV group video depicted the same popular
character consuming a donut. The only significant results yielded from examining differences among groups were the difference in the consumption of mini donuts. There were no statistical differences regarding the nutritional value of the snack choices.

Although the data did not yield significant differences in the nutritional content of the snack choices between treatment and control groups, the control group possessed the lowest mean amounts of kilocalories, carbohydrates, protein, total fat, saturated fat, trans fat, monounsaturated fat, polyunsaturated fat, kilocalories from fat, dietary fiber, and sodium. When considering the serving sizes of the particular food choices the control group made, it appears these nutrients may have been lower as the control group, on average, consumed the greatest portions of the “Go” foods (bananas, red bell peppers, grapes, apples), and the smallest portions of the “Whoa” foods (mini donuts, mini muffins, and potato chips) among all three groups. These results support previous literature suggesting a positive relationship between television usage and the nutritional content of dietary intake. A study conducted by Harris and Bargh (2009) examined the proposed relationship between television usage and poor dietary choices. Harris and Bargh discuss how children internalize what they see on television, and when children view television they “learn that calorie-dense foods that are high in fat and sugar taste great and are extremely rewarding to consume” (p. 661). Children are influenced by what they witness on television; however, the duration of exposure is not clearly identified.

Another study conducted by Kraak and Story (2014) discusses the influence popular animated characters have on the dietary choices of children. Kraak and Story
describe the dietary influence these characters have upon children as a “parasocial relationship,” as children develop emotional relationships with characters they view as attractive and internalize the messages these characters deliver. A study entitled “Influence of licensed characters on children's taste and snack preferences” (Roberto, Baik, Harris, & Brownell 2010) investigated whether these types of animated characters influenced the dietary choices of preschool-aged children. Their results found children preferred and selected snack food items at a greater frequency when a licensed character appeared on the packaging of the food product.

Although there were no statistically significant differences in the snack choices, and one statistically significant difference in the serving sizes of the participants when considering their group assignment, two children placed in the USV group did inquire whether donuts would be provided when they learned they would be provided a snack, and viewing of the animated clip had commenced. Despite the data reflecting no significant differences, this must be noted. Additionally, two other children placed in the USV group claimed they were going to choose mini donuts as a snack food, as donuts were depicted in the video. This demonstrated that, for a few of the children, the animated character’s snack choices did influence their dietary choices, as they were more diligent about the foods they chose based upon the program they viewed.

When considering the nutritional content of the snack choices between treatment groups, although not significant, the HSV consumed smaller mean amounts of total kilocalories, carbohydrates, total sugar, saturated fat, trans fat, and kilocalories from fat, versus the USV group. The HSV group also consumed greater mean amounts of
monounsaturated fat, polyunsaturated fat, and dietary fiber, versus the USV group. The results also confirmed the HSV group on average consumed lesser amounts of each food item, except potato chips, versus the USV group. The HSV did, however, consume lesser mean amounts of protein, vitamin C, and vitamin A, as well as a greater mean amount of sodium, versus the USV group. These results suggest that the acute media exposure to a video of an animated character consuming a healthful snack food may have had a more positive influence on the snack choices of the preschool children.

The results of this study confirmed the snack choices, consumption amounts, and subsequent nutritional content of the snack choices differed among gender, thus supporting this hypothesis. Upon examining the results of this study, males consumed greater portions and less nutritionally dense snack food choices versus their female counterparts. In this investigation, gender had a greater impact upon the eating behaviors of preschool children than brief animated media exposure.

**Gender Differences**

Gender influences the food choices, nutritional content, and serving sizes of food consumption. This may be attributed to several factors, including physiological differences, differences in health behaviors, socially constructed gender roles, females actively engaging in more weight-controlling behaviors (attributed to greater body-consciousness), and differences in the belief of following dietary guidelines in order to lead a healthful lifestyle. In this study, females consumed significantly less kilocalories, carbohydrates, protein, saturated fat, and trans fat, versus males.
While males consume greater portions and less nutritionally dense snack foods versus females, it is also true men require larger amounts of certain nutrients. This fact may innately enable males to consume more than females, as their bodies hunger for more nutrients than females. Another factor that may explain the increased dietary intake and consumption of more unhealthy foods among the males of this study may be attributed to the impressionability of the participants, children who are four to six years of age. Children both witness and observe the types of foods their parents consume. Young males typically view their fathers as role models, thus learning their behaviors from him. The same is true for young females and their mothers. From a sociological perspective, male-dominated activities such as football, basketball, baseball, etc. depict commercials of men consuming high-calorie, nutrient-lacking foods. These foods may be wings, pizza, nachos, etc. The TV dinner Hungry-Man depicts large portions of calorically dense, nutritionally poor foods, but men consume these products, as they are portrayed as foods of high masculinity. Not only did the preschool males who participated in this study consume less nutritious food items, but they also consumed larger portions. An article by Wardle et al. (2004) mentions numerous studies indicating men typically engage in riskier health behaviors, and less health-promoting activities versus their female counterparts. These behaviors contribute to the less nutritious dietary intake of males, as they are less concerned with the long-term health implications their dietary practices impose upon their health.

In a similar manner, adolescent females view the eating behaviors and witness the nutritional content of the dietary intake of their mothers. Females tend to be the gender
of choice when depicting healthy foods in the media. Often portrayed in the media is a mother shopping at the grocery store trying to make the healthiest decision for her family, as well as women who are trying “slim down” or “rid themselves of extra body fat.” Females also experience increased body image issues versus males, feeling pressure to maintain a “proper” figure. This pressure encourages women to be more conscious of the types of foods they consume, as well as increases awareness of how much they are consuming. A study regarding gender differences and social bias in dietary self-report (Hebert et al., 1997) found social desirability created a bias in the dietary data of females, but was not so for males. This means women were reluctant to report their dietary intake, possibly being fearful of how they would appear from a social-aspect, if they were ashamed of their dietary intake. This heightened awareness of the foods we consume, the social aspect of dietary intake and gender, seems to play a significant role in the snack choices of children.

There are many factors contributing to the dietary behaviors of children. Gender seems to more heavily influence the dietary intake of a person versus media exposure, whether rooted in social roles and expectations, body image issues, or physiological differences.

Limitations

Limitations of this study included differences in the allotted snack time per group of children. The various facilities provided different amounts of time to consume snacks according to their school regimens; however, snack times and data were cut-off following data collection to maintain consistency, and children were allowed 10-20 minutes
depending on the facility. Because this study was only a single-exposure treatment, this limits the strength of the findings. Some of the participating children may not have paid close attention to the program, as they were excited about the snack foods, etc.

Additionally, the children may have consumed larger amounts than typical, simply because they were enthusiastic about watching an animated clip and enjoying a “treat day” because they served themselves, possibly skewing the data from what is typical of the participants’ snacking behaviors even when exposed to animated media. Another limitation noted in this study is that data was eliminated when photographs for participants were not taken prior to self-serving and when participants disposed of their plates before they were photographed--creating missing data.

**Strengths**

Each group was provided the same seven types of snacks, all ranging in nutritional value. Exposure to media for treatment groups was similar in length and produced a consistent, unbiased procedure. The group sampling consisted of 58 participants, and the groups were divided relatively equally. This allowed for a good representation of the snack choices of this particular age group, regardless of group assignment or facility. This study also provided data to the body of literature concerning the dietary differences between genders.

**Applications**
Despite the lack of significant results when examining the dependent variables among treatment groups, the control group who was not exposed to any media consumed the lowest mean amounts of kilocalories, carbohydrates, protein, total fat, saturated fat, trans fat, monounsaturated fat, polyunsaturated fat, kilocalories from fat, dietary fiber, and sodium. Additionally, when considering the serving sizes of the particular food choices the control group made, it appears these nutrients may have been lower because the control group, on average, consumed the greatest portions of the “Go” foods (bananas, red bell peppers, grapes, apples), and the smallest portions of the “Whoa” foods (mini donuts, mini muffins, and potato chips) among all three groups. This provides support for previous literature that television usage influences the dietary intake of children, as the groups who were exposed to a brief animated media clip made poorer decisions versus those who were not.

Also interesting, although not significant, upon consideration of the nutritional content of the snack choices between treatment groups, the HSV consumed smaller mean amounts of total kilocalories, carbohydrates, total sugar, saturated fat, trans fat, and kilocalories from fat, versus the USV group. The HSV group consumed greater mean amounts of monounsaturated fat, polyunsaturated fat, and dietary fiber, versus the USV group. The results also confirmed that the HSV group on average consumed lesser amounts of each food item, except potato chips, versus the USV group. The HSV did, however, consume lesser mean amounts of protein, vitamin C, and vitamin A, as well as a greater mean amount of sodium, versus the USV group. Considering these results, perhaps animators and writers should depict beloved animated children’s characters
consuming more healthful food choices, inspiring the audience to consume these foods as well. Preschool children are of the age where they are impressionable and view these characters as their role models. The results of this study suggest acute media exposure to a video of an animated character consuming a healthful snack food may have had a more positive influence on the snack choices of the preschool children. If children are viewing television, perhaps taking advantage of the role-modeling qualities these animated characters possess and promoting healthful foods is key to encouraging children to consume a more healthful diet.

The results also indicated an overconsumption of snack food items among all groups. The preschool children were permitted to self-select snack foods, and the means kilocalorie intake was reflected as follows: the HSV group consumed an average of 286.28 kcal; the USV group consumed an average of 307.41 kcal; and the control group consumed an average of 249.62 kcal. When considering the Dietary Guidelines for Americans 2010, a reference suggesting a young child consume approximately 1,000 to 2,000 kilocalories each day for proper growth and development, these amounts are approximately one-third to one-sixth of what a preschool child is suggested to consume in a day, and it is only a snack. There were participants who consumed two, even three, plates of snack foods. Perhaps we should incorporate some type of education regarding moderation and portion control into early childhood education programs, educate parents on teaching their children how to treat themselves without overindulgence, or include these types of lessons in educated animated children's television program, to educate children to make more healthful decisions when in control of their food choices.
Conclusion

Despite the lack of significant results yielded between treatment groups, it must be noted the group who was not exposed to any media consumed the healthiest snacks and the least unhealthy snacks. Additionally, the HSV group appeared to make more positive food choices versus the USV group. There is no doubt television plays a role in the dietary behaviors of children, and this study provides evidence of the harm television usage imposes on the dietary choices of children; however, if children are to view animated media, perhaps animators, writers, and healthful food industries must take advantage of this behavior by depicting healthful food choices to encourage and create a healthier child population.

Although the results did not depict the predicted outcome of acute media exposure on the snack choices of preschool children, the results did reflect strong dietary intake differences between genders. The differences in dietary intake in gender may be attributed to several other factors, such as sociological, environmental, and physiological factors. Short-term media exposure did not seem to influence the snack choices of the majority of the participating children; however, the media, society, and the environment mold the dietary preferences of adults, and translates into the preferences of children.

Gender influences the snack choices, consumption amounts, and subsequent nutritional content of the snack choices of preschool children. This study demonstrates there is more to dietary behaviors and preferences than simply short-term media exposure, and gender is a considerable factor in the formation of these habits. The
influence of adults on the dietary behaviors of children appear at a young age, specifically, children of the same gender as the parent.
APPENDIX A
GO, SLOW, AND WHOA FOODS
APPENDIX A
GO. SLOW. AND WHOA FOODS

![Image](image1.png)

Go Foods
Slow Foods
Whoa Foods

Go foods are foods that are good to eat almost any time because they are the healthiest ones.

Slow foods aren’t off-limits, but they shouldn’t be eaten every day. At most, eat them a few times a week.

Whoa foods are foods that should make you say exactly that – Whoa! Should I eat that? Whoa foods are the least healthy and the most likely to cause weight problems, especially if a person eats them all the time. That’s why Whoa foods are once-in-a-while foods.

<table>
<thead>
<tr>
<th>GO (almost anytime)</th>
<th>SLOW (sometimes)</th>
<th>WHOA (once in a while)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby carrots</td>
<td>100% fruit juice</td>
<td>French fries</td>
</tr>
<tr>
<td>Celery sticks</td>
<td>Fruits canned in light syrup</td>
<td>Fried hamburgers</td>
</tr>
<tr>
<td>Snap peas</td>
<td>Fried fruits</td>
<td>Pepperoni</td>
</tr>
<tr>
<td>Apples</td>
<td>White bread</td>
<td>Chicken nuggets</td>
</tr>
<tr>
<td>Cherries</td>
<td>French toast, waffles and pancakes</td>
<td>Cookies</td>
</tr>
<tr>
<td>Oranges</td>
<td>2% milk</td>
<td>Chips</td>
</tr>
<tr>
<td>Peaches</td>
<td>Biscuits</td>
<td>Ice cream</td>
</tr>
<tr>
<td>Whole grain breads</td>
<td>Ham</td>
<td></td>
</tr>
<tr>
<td>Low fat and skim milk</td>
<td>Peanut butter</td>
<td></td>
</tr>
<tr>
<td>Chicken and turkey</td>
<td>Nuts</td>
<td></td>
</tr>
<tr>
<td>without skin</td>
<td>Tuna canned in oil</td>
<td></td>
</tr>
<tr>
<td>Lower fat cheese</td>
<td>Sports drinks</td>
<td></td>
</tr>
<tr>
<td>and yogurt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Go to [www.StepUpFoodie.org](http://www.StepUpFoodie.org) for more information!

This flyer was adapted from [let’sGo! 5210](http://letsgo5210.org).
APPENDIX B
IRB APPROVAL FORM
APPENDIX B
IRB APPROVAL FORM

Parental Consent

Study Title: ANIMATED MEDIA EXPOSURE AND SNACK CHOICES OF PRESCHOOL CHILDREN

Principal Investigator: Natalie Caine-Buh, Ph.D., R.D., L.D.
Contact Information: phone: (330)672-2197
email: nccaine@kent.edu

Your child is being invited to participate in a research study. This consent form will provide you with information on the research project, what your child will need to do, and the associated risks and benefits of the research. Your child's participation is voluntary. Please read this form carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document to take with you.

Purpose: To expand upon the literature and increase awareness of the impact of marketing food products towards children. Tighter regulation of the types of foods marketed and increased marketing of healthful foods towards children, may increase the health and overall quality of living in our adolescent population.

Procedure:

Your child will be placed into one of three groups: a control group, a treatment 1 group, and a treatment 2 group. The control group will not view any media. The treatment 1 group will be exposed to a brief animated clip, with the characters depicting healthful eating habits. The treatment 2 group will be exposed to a brief animated clip, with the characters depicting unhealthy eating habits. Participants will then have a choice of seven different snack foods. Snack foods and their nutritional content will be determined by “Go, Slow, and Whoa!” foods classification. Four snack foods from the “Go” group will be provided, as well as three foods from the “Whoa!” foods classification. “Go” foods will consist of apples, bananas, grapes, and red peppers, while “Whoa!” foods will be mini donuts, potato chips, and mini muffins. Graduate student or assistants will oversee the serving of foods. Each group will be assigned a letter (A), and each child will be assigned a number (1). Participants will be assigned a letter and number to ensure anonymity. Snack choices for each child in groups and their respective group number will be documented by ticking their plate (Ex: A-1). Documentation will be performed by digitally photographing each plate containing the snack choices of each child, and categorized by group, prior to and following consumption. No child will be photographed. Once children are finished, plates will be photographed a second time, to measure food selection, serving sizes, and plate waste. The nutritional content of snack options will be analyzed utilizing Diet Analysis Plus 10.0, a dietary analysis software program, following the study. Nutritional content will be quantified by grams of micronutrients, kilocalories, kilocalories per gram from each macronutrient, and serving size. This study will occur on a single occasion, and may take from 60 to 90 minutes to perform. Verbal assent from children will be inquired.
Photography:
Digital photography will be used to measure the snack foods selected by participants, the serving size of each food item, and plate waste. The digital camera will be angled downward using a tripod to digitally photograph each plate containing the snack choices of each child, and categorized by group, prior to and following consumption. No children will be photographed.

Benefits
The potential benefits of participating in this study may include a fun experience for the children, as some of them will be viewing an animated media clip, and all of the children are able to make various snack selections. Additionally, your participation in this study will help us to better understand the implications of animated media exposure on the snack choices of preschool children.

Risks and Discomforts
There are no anticipated risks beyond those encountered in everyday life.

Privacy and Confidentiality
Each group will be assigned a letter (A), and each child will be assigned a number (1). Participants will be assigned a letter and number to ensure anonymity. Snack choices for each child in groups and their respective group number will be documented by ticking their plate (Ex. A-1). No identifying information will be collected. Your signed consent form will be kept separate from your study data. Data will be stored at Kent State University.

Voluntary Participation
Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty. You will be informed of any new, relevant information that may affect your health, welfare, or willingness to continue your study participation.

Contact Information
If you have any questions or concerns about this research, you may contact Caitlin Mathews at (330) 204-5416. If you have any questions about your rights as a research participant or complaints about the research, you may call the Kent State University Institutional Review Board at (330) 672-2704.

Consent Statement and Signature
I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to grant permission for my child to participate in this study. I understand that a copy of this consent will be provided to me for future reference.
ANIMATED MEDIA EXPOSURE AND SNACK CHOICES OF PRESCHOOL CHILDREN
REFERENCES
REFERENCES

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