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In-store Marketing Campaign to Promote the Purchase of Healthy Foods and Beverages at Convenience Stores in Rural Kentucky

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IN-STORE MARKETING CAMPAIGN TO PROMOTE THE PURCHASE OF HEALTHY FOODS AND BEVERAGES AT CONVENIENCE STORES IN RURAL KENTUCKY

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in Nutrition and Food Systems in the
College of Agriculture, Food and Environment
at the University of Kentucky

By

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ABSTRACT OF THESIS

IN-STORE MARKETING CAMPAIGN TO PROMOTE THE PURCHASE OF HEALTHY FOODS AND BEVERAGES AT CONVENIENCE STORES IN RURAL KENTUCKY

The prevalence of obesity is greater in rural communities, and current health promotion interventions have not shown broad positive impacts on dietary patterns in these areas. Focusing community-based efforts on unconventional food retailers is a unique avenue to encourage healthier food choices in rural populations. This study used shelf-wobblers to market healthier snack and beverage items at convenience stores (n=5) in a rural Kentucky county. Selection of healthy snacks and beverages from the store inventory was conducted using the CDC *Food Service Guidelines for Federal Facilities* calculator. Items were sorted into four categories: meal replacement snacks, high-protein snacks, low-fat carbohydrate snacks, and no-calorie drinks. Monthly sales data was collected to measure baseline sales and post-intervention sales. This data was analyzed using a difference-in-differences economic model, which assessed percent changes in sales within and among the five stores. This study found an overall increase in healthier snack and beverage purchases after implementation of the marketing wobblers. The findings of this study provide unique insight into community-based efforts for health promotion in unconventional food retailers in the Appalachian region.

KEYWORDS: Food Environment, Rural, Obesity, Marketing, Behavioral Nudges

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10/25/2021
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CHAPTER 1. INTRODUCTION

1.1 Background

An individual's dietary intake impacts quality of life and health outcomes. There is significant research documenting diet quality and its role in chronic disease prevention (Cena & Calder, 2020). Chronic diseases like obesity, cardiovascular disease, diabetes, and some cancers can be managed or prevented with a healthful diet consisting of fruits, vegetables, and quality fats (Cena & Calder, 2020). Conversely, overconsumption of processed foods that are calorie-dense and nutrient-poor has been associated with metabolic diseases such as diabetes and obesity (Statovci et al., 2017). Highly processed foods containing added sugars and hydrogenated oils have been increasing in popularity over the years. American households are progressively buying more packaged food products each year (Stern, Ng, & Popkin, 2016). These highly processed foods are easily accessible and made readily available, especially in food retailers like convenience stores.

In rural areas, access to fresh produce from grocery stores and supermarkets can be limited. Barriers to food access in rural areas include geographic isolation, poverty, underemployment, and low educational attainment (Decker & Flynn, 2018). Facing food insecurity, many individuals rely on local convenience stores or gas stations to provide food for themselves and their households. While these venues may offer healthy snack and beverage options, a considerable amount of shelf space is used to display highly processed candies, chips, and sodas. In some rural areas, 100% of convenience stores were found to sell sodas and candies while only 33% offered fresh fruits or vegetables (Sharkey, Dean, & Nalty, 2012).

A potential method to improve food and beverage choices at gas stations is through visual marketing. A large body of research has shown effective marketing can greatly influence consumer purchases (Sharkey et al., 2012). Drawing attention to healthier food and beverage options at local gas stations may influence consumer choices and improve dietary quality of individuals who depend on these stores for nourishment.

1.2 Problem Statement

Those living in rural and geographically isolated areas often rely on convenience stores and gas stations to purchase food products. These stores tend to have limited options for healthy food choices while emphasizing unhealthy snack options with in-store marketing. Limited research exists on the effectiveness of promoting consumer purchases of food items at these small, rural convenience stores. This study evaluates the impact of in-store marketing on food and beverage purchases in one rural Appalachian county.

1.3 Statement of Purpose

The purpose of this study is to understand if an in-store marketing campaign influences total purchases of healthy and unhealthy foods and beverages at convenience stores in a rural Appalachian community.

1.4 Research Aims

Aim 1: Determine if an in-store marketing campaign utilizing visual materials to promote healthier food choices will increase total purchases of healthy foods and beverages in five convenience stores within a rural Kentucky county.

Aim 2: Determine if an in-store marketing campaign utilizing visual materials to promote healthier food choices will decrease total purchases of unhealthy foods and beverages in five convenience stores within a rural Kentucky county.

1.5 Hypothesis

Hypothesis 1: An in-store marketing campaign will increase total sales of healthy food and beverage items in rural convenience stores.

Hypothesis 2: An in-store marketing campaign will decrease total sales of unhealthy food and beverage items in rural convenience stores.

1.6 Justification

A healthful diet of fruits, vegetables, and quality sources of fat can help prevent chronic diseases and improve quality of life (Cena & Calder, 2020), while a diet of highly processed foods and inadequate amounts of fruits and vegetables has been associated with increased risk of preventable diseases and a lower quality of life (WHO, 2020). These highly processed foods are especially abundant in convenience stores and gas stations, which play an important role in food access within rural communities. The marketing of more healthful food options at nontraditional food retailers provides an opportunity for health promotion in underserved regions of the United States.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

Food choices and diet quality play an important role in promoting health and well-being. Over the past decades in the US, a large body of research has documented the role that dietary quality plays in prevention of chronic disease (Cena & Calder, 2020). A healthy diet, composed of fruits, vegetables, and quality fat can help manage and prevent chronic diseases and conditions like obesity, cardiovascular disease, diabetes, and some cancers (Cena & Calder, 2020). Conversely, poor diet quality, such as inadequate intake of fruits and vegetables and high intake of refined and processed foods, is associated with increased risk of preventable diseases and lower quality of life (WHO, 2020). In the US, poor diet quality contributes directly to over a quarter of deaths every year (Bhupathiraju & Hu, 2016). Although everyone may benefit from improved dietary choices, certain sub-populations have a higher disparity with diet quality compared to others (Parker, Tovar, McCurdy, & Vadiveloo, 2020). In rural, geographically isolated areas in the US, individuals often have limited access to the healthful foods that contribute to longevity and high qualities of life (Kariburyo, Andress, Collins, & Kinder, 2020). Those living in rural areas frequently rely on local convenience stores and gas stations to purchase much of the food to feed their households (Thatcher et al., 2017).

Using a healthy food availability index (HFAI) to analyze foods offered in rural areas, gas stations were found to have the lowest HFAI, meaning these stores offered the least number of healthy food options (Campbell et al., 2017). Many small food retailers also tend to display and market less healthy food choices like candies and salty snacks; 98% of retailers display unhealthy food items at their cash registers (Barnes et al., 2016).

In rural communities, gas station convenience stores play a critical role in total calories purchased and consumed (Thatcher, Johnson, Zenk, & Kulbok, 2017). Thus, targeted efforts are needed to address how to provide affordable and healthy options in these type of food venues for rural customers.

2.2 The Socioecological Model

An individual's dietary intake can be affected by many different aspects of their environment and personal circumstance. When utilizing the socioecological model (SEM), one can assess important factors that contribute to individual behaviors. This theoretical model considers spheres of influence including individual, interpersonal, organizational, community, and policy (CDC, 2020). The SEM facilitates analysis of these outside influences on an individual's choices and decision making.

Figure 1: The Socioecological Model (adapted from CDC, 2020)

When deciding what foods to purchase to feed themselves and their households, an individual's food choices may be influenced by personal beliefs, experiences, preferences, values, and perceptions. An individual's food purchases may also be affected by cooking skills, demographic, and income. Interpersonal relationships can impact food purchasing trends as well. This level of the SEM examines how close relationships within families and peer groups influence individual choice. The food patterns to which an individual is introduced at a young age can greatly influence his or her food choices into adulthood. For example, young adults from households that limited sugar-sweetened beverages (SSBs) consumed fewer SSBs after leaving the home to attend college than those young adults from households with less strict SSB limitations (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2015). This modelling behavior can impact other eating behaviors like types of food purchased, the preparation of meals at home, and frequency of fruit and vegetable intake. One's social support also plays a role in influencing diet choices. An individual is more likely to consume healthy foods if they are encouraged by others and are surrounded by friends or family members who consume healthier meals as well (Freedman et al., 2019).

The organizational level of the SEM includes the built environment where people purchase and consume foods. This level of influence incorporates the home, workplace, restaurants, supermarkets, convenience stores, and food availability. In rural areas, the built environment can be much more limiting to individual food choices. When an area is geographically isolated, trips to supermarkets and traditional grocery stores may be infrequent. Those living in these areas frequently rely on local convenience stores to purchase food (Thatcher et al., 2017). The price of healthy foods is another barrier for the

individual when procuring food items. Pricing interventions have been shown to increase the purchasing and consumption of healthy foods and improve the availability of healthier options at food retailers (Gittelsohn, Trude, & Kim, 2017). Taking action to improve food availability, especially for rural areas, is promising to improve diet quality for those who face food insecurity.

The community level of the SEM framework comprises the relationships between organizations, neighborhoods, and other groups within a society. This level includes the many individuals and their interpersonal relationships that work together to build a community (CDC, 2020). The community level of organization presents opportunities to develop and implement programs that are unique to the specific social needs of an area.

The final outer ring of the SEM includes policy, which may be at the local, state, or federal levels. Policies created and withheld by these systems can have great influences on health behaviors. Areas affected by policy include food affordability through resources like the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and farmer's market vouchers. Product marketing, food safety, and food distribution are also affected by policies made by government agencies. These matters can impact the availability of foods, perception of food products, and purchasing trends by consumers. Each level of the SEM plays a role in the decision-making process of the individual when choosing what foods will feed themselves and their families.

2.3 Dietary Patterns

Diet quality is a modifiable risk factor that can either contribute to the prevention of disease or to the progression of chronic disease (Cena & Calder, 2020). In the US, "dietary risks" contribute to 26% of deaths and 14% of disability adjusted life years (Bhupathiraju & Hu, 2016). The diets of those living in modern countries have progressively transformed to a diet focused on convenience foods, which often contain unfavorable nutritional additives. This rapid shift in dietary patterns has been associated with the development of nutrition-related noncommunicable diseases (NR-NCD), which is theorized to be related to rapid economic, technological, and social transitions (Popkin, 2004). Americans have begun consuming a "westernized diet," which is defined as a diet high in sugar and saturated fats while being low in fiber (Statovci, Aguilera, MacSharry, & Melgar, 2017). These sugars and fats are key ingredients of processed foods, which have been growing in popularity and consumption (Stern, Ng, & Popkin, 2016). This deficiency of healthful nutrients and overconsumption of less healthy foods is contributing to metabolic diseases like obesity and diabetes (Statovci et al., 2017).

An overall increase in portion sizes and frequency of meals and snacks is also contributing to poor dietary patterns amongst those living in the developed world. The average American adult consumes 570 more kilocalories per day now when compared to 30 years ago (Bhupathiraju & Hu, 2016). The American diet also contains larger amounts of added sugars and hydrogenated oils, which increase the caloric content of foods while also prolonging the shelf life. These oils and sweeteners have become increasingly available over the years with the overabundance of commodity crops like soybeans and corn (Bhupathiraju & Hu, 2016). Currently in the US, high fructose corn syrup (HFCS) is

the sole sweetener for carbonated beverages (Bhupathiraju & Hu, 2016). Consumption of these SSBs is a large contributor to the increase in daily calories and obesity in the US. American adults and adolescents consume an average of ~150 kilocalories per day from SSBs including juices and sodas (Bhupathiraju & Hu, 2016). These calorically dense foods with low nutritive value are leading to an overweight but undernourished populace.

According to the *Dietary Guidelines for Americans 2020-2025*, the dietary patterns and health of Americans can be improved by consuming more daily fruits and vegetables, which can help prevent chronic diseases like diabetes, heart disease, and obesity (USDA & HHS, 2020). Currently in the US, most citizens do not consume the daily recommended amounts of fruits and vegetables (USDA & HHS, 2020). For ideal health, adults should consume at least 1 ½ to 2 cups of fruit and 2 to 3 cups of vegetables daily while limiting added sugars and processed fats (USDA & HHS, 2020). Only 10% of Americans consume the recommended intake of vegetables while approximately 20% of Americans meet their daily recommended fruit intake (USDA & HHS, 2020). Foods containing large amounts of refined grains are another area of concern in westernized diets. Many products are stripped of fiber and nutrients, which can be beneficial for health, to create a highly palatable product but with low nutritional value. Americans tend to have no trouble meeting their daily grain intake, however, 74% of Americans exceed their intake of refined grains while falling short of meeting recommendations for whole grains (USDA & HHS, 2020). Increasing the intake of these healthful foods can help reduce the instance of chronic diseases. Cardiovascular disease is the leading cause of death in America, and research has shown that this disease can be effectively prevented and managed with lifestyle change and healthful dietary patterns (USDA & HHS, 2020). Decreased dietary intake of refined

grains, trans fats, and saturated fats has been associated with decreasing risk of cardiovascular disease (Yu et al., 2016). Improving access to food retailers and promoting availability of healthy foods can play a large role in reducing morbidity and mortality in the US.

2.4 Healthy Foods Help Reduce Chronic Disease

Individuals can be supported in consuming a healthful diet consisting of fruits, vegetables, lean meat and dairy, and whole grains by having these foods readily available and affordable within their communities. Fruits and vegetables tend to be low in calories and high in fiber and phytonutrients that help prevent chronic diseases (Slavin & Lloyd, 2012). Promoting the sale and consumption of these foods is an important step in managing rising rates of obesity and metabolic diseases in America today.

Markers for obesity such as body mass index (BMI), waist circumference, and insulin resistance have been associated with larger portion sizes and diets higher in total caloric intake (Vernarelli, Mitchell, Rolls, & Hartman, 2015). Modern food additives like HFCS and hydrogenated oils play a role in increasing the energy density of popular processed foods. With the established fact that households are buying more processed foods than ever (Stern, Ng, & Popkin, 2016), the United States is subject to easily available and ready-to-eat high calorie foods.

Decreasing total daily calorie intake is a key component of sustainable weight loss outcomes. Choosing foods that are lower in energy density helps prevent weight gain. Including foods higher in protein and fiber in one's daily diet encourages prolonged satiety, discouraging further snacking and overeating (Smethers & Rolls, 2018). Many food

options offered at convenience stores and gas stations are ultra-processed food items that are not high in protein or fiber. Most of these foods do not meet standards for a healthful diet and can contribute to harmful health conditions related to poor dietary intake.

2.5 Access to Healthy Foods in Rural Areas

In rural areas, consumption of fruits and vegetables is often lower than other areas of the United States (CDC, 2018). Across the United States, 95% of adults consume vegetables at least once daily, and 67% consume at least one fruit on any given day (Ansai & Wambogo, 2021). In Kentucky, 25% of adults ate vegetables less than once per day and 46% ate fruit less than once daily (CDC, 2018). Rural and geographically isolated areas often face food insecurity due to issues like poverty, lower educational attainment, and underemployment (Decker & Flynn, 2018) and therefore have less access to the produce and healthful foods recommended to promote good health and quality of life. In addition to limited resources for purchasing healthy foods, individuals living in rural areas often have fewer food retail options. In a study of food retailers in rural Appalachia, 50 stores were mapped from a geographic area, and 24 of these were convenience stores (Thatcher et al., 2017). Issues like geographic isolation, lack of personal or public transportation, and limited tax revenue for local communities create another barrier for food access in rural areas, causing many residents to rely on nearby convenience stores and gas stations as food retailers (Dean, Johnson, & Sharkey, 2012). Overall, access to food retailers offering a variety of healthy foods is a significantly limiting factor in diet quality.

Rural areas in America typically have a larger percentage of residents living in poverty. In 2017, the poverty rate for rural areas in the US was 16.4% compared to 12.9%

in urban areas (USDA, 2018). Lower incomes and greater rates of unemployment leave many rural households with more difficulty affording food (Decker & Flynn, 2018). The price and short shelf-life of fresh produce become even greater barriers for individuals trying to feed their families when budgets are tight (Gittelsohn, Trude, & Kim, 2017). With limited access to healthy foods, those living in rural areas are at greater risk for developing health conditions related to poor diet quality (Cena & Calder, 2020).

In rural areas, the instance of chronic disease is higher than urban or suburban areas (James et al., 2017). Higher rates of obesity in rural areas have been theorized to be in part related to the high availability of energy dense, low nutrition convenience foods (Decker & Flynn, 2018). Research shows that areas deemed to be "cold spots" (i.e., having few food retailers) have greater rates of diet-related disease than "hot spot" areas, which have abundant food retailers (Kariburyo et al., 2020). Conversely, the availability of supermarkets and other food retailers offering a variety of healthful foods has been associated with favorable dietary outcomes (Timperio, Crawford, Leech, Lamb, & Ball, 2018). Frequent use of convenience stores has also been linked with low quality diets and an increase in the prevalence of hypertension among adults (Kaji et al., 2019). When looking at a variety of food retailers, gas stations have been found to offer the lowest selection of healthy foods (Campbell et al., 2017). Soda and high-calorie snack foods take up a significant amount of shelf space in convenience stores. A study of convenience stores in rural Texas found that 100% of these stores sold sodas and candies while only one in three stores sold fresh fruit or vegetables (Sharkey et al., 2012). Increased accessibility to these convenience stores has been associated with increased consumption of SSBs (Hearst, Pasch, & Laska, 2012). Frequent use of convenience stores has also been associated with

an overall decrease in healthy food purchasing and increase in unhealthy food purchasing (Carroll-Scott et al., 2013). While these stores are important aspects of a community's food environment, overreliance on their limited food variety is not ideal for prolonged health promotion.

2.6 Purchasing Trends of Healthy and Unhealthy Foods

In recent years, American households have begun purchasing greater amounts of packaged food products (Stern et al., 2016). These packaged foods are often shelf stable products with food additives like HFCS and hydrogenated oils, which can have detrimental effects on human health. The convenience and high palatability of these foods make them desirable to individuals who wish to save time and still enjoy a high flavor payoff. The large amounts of sugar, salt, and fat in these foods produce intense flavors that can prove addictive for many consumers (Stojek, Fischer, & MacKillop, 2015).

When unhealthy snacks and beverages are the main options available at these convenience stores, consumers are more likely to purchase them. With limited healthy options presented at gas stations, individuals buying food at these locations must resort to packaged foods and sugary drinks. A cross-sectional analysis of U.S. household food purchases found that 35% of calories purchased at convenience stores came from candies and gum (Stern, Ng, & Popkin, 2016). These snack foods are typically displayed prominently at a gas station's point-of-sale, promoting unplanned purchases by consumers. Using food dollars on these nutrient-poor food products is not ideal for health, especially for those facing food insecurity and limited household resources.

2.7 Food Marketing Encourages Purchasing

The food industry has grown substantially over the last several decades. America has transformed from a land of small farmers to a society that relies on commercial and large-scale farming to grow food that is shipped around the globe. Because of the vast variety of foods available today, marketing is important for companies to sell and promote their products. Food marketing has been shown to greatly influence consumer purchases, especially when it comes to children and adolescents (Smith, Kelly, Yeatman, & Boyland, 2019). A study of rural convenience stores in Oklahoma showed an increase in the total sales of fruits and vegetables after an intervention utilizing product placement and visual marketing (Williams et al., 2020). The foods and beverages sold at gas stations and convenience stores are often found in brightly colored packaging and near the point-of-sale to entice consumers to purchase these products. Many products at convenience stores are also offered as part of sales that promote the purchases of more than one product. Sales like these promote larger portion sizes and higher caloric intake of less healthy processed foods. Pricing interventions can promote the purchasing, stocking, and consumption of healthier foods and beverages as well (Gittelsohn, Trude, & Kim, 2017).

Along with pricing interventions and visual marketing, digital nudges have been shown to have an impact on the sales of healthful foods. A study of worksite cafeterias showed an increase in the purchases of healthy foods when employees were sent digital health promotions on their smartphones (Velema, Vyth, Hoekstra, & Steenhuis, 2018). Consumers can also be influenced inside food retailers by the arrangement of food products. When healthier foods were placed near the entrance and at the point-of-sale in convenience stores, consumers were found to buy these foods more often (Bucher et al.,

2016). Drawing attention to these healthier options is imperative in promoting sales of food and beverages that are better for an individual's health. With marketing materials, attentions can be drawn to these items while encouraging consumers that buying these products is better for their health. In these small convenience stores and gas stations, consumers do not typically spend great amounts of time browsing snack and drink selections. Instead, there is an opportunity with food marketing to draw the eye to healthful foods and help consumers choose healthy options when making purchasing decisions.

2.8 Summary

Studies have shown that poor diet quality has been associated with chronic disease, mortality, and decreased quality of life. Rural areas in America face disparities that contribute to an individual's access to the beneficial foods that help prevent diseases and improve health. Many of these rural areas have a disproportionate number of convenience stores and gas stations, which offer the least healthy food options of all food retailers. Individuals who shop most frequently at these types of food stores tend to have poorer health outcomes. There is an opportunity at these rural convenience stores to promote healthier snack and beverage options. Food marketing is known to increase product sales. A visual marketing intervention bringing attention to healthier foods and drinks at convenience stores has potential to improve the diet quality and access to healthy foods for those living in rural areas.

CHAPTER 3. METHODOLOGY

3.1 Study Design and Setting

This study utilized a quasi-experimental time series design to implement an in-store visual marketing intervention and measure any differences seen in total sales for healthier food and beverage items in five rural convenience stores. This intervention was part of a five-year project through the Centers for Disease Control High Obesity Program (HOP) and facilitated by University of Kentucky Cooperative Extension Service and research team. This program concentrates on communities with obesity rates >40% and supports efforts of health promotion by partnering with land grant universities. This study describes an intervention in Martin County, Kentucky where the current obesity rate is 65% (Kentucky Health Facts, 2020), compared to the United States average of 41.4% (Hales et al., 2017). With community support, an intervention was developed to promote improved quality of dietary intake throughout the county.

Martin County is a rural community located in the Appalachian Mountains of eastern Kentucky. With a population of fewer than 12,000 citizens (U.S. Census Bureau, 2019), this Kentucky county has limited options when it comes to commercial food retailers that offer the typical variety of grocery store food options. Many residents of Martin County rely on convenience stores and smaller grocery retailers (Family Dollar, Save-A-Lot, IGA, etc.) to supply meals for themselves and their families. The geography of a mountainous county can be an obstacle for transportation and access to even nearby stores. In these areas, vehicles are a necessary tool for grocery trips. This contributes to the financial burden of daily life in a geographically isolated area.

Martin County faces socioeconomic issues with a poverty rate of 34.4%, nearly double that of the Kentucky average (18.3%) and more than triple that of the United States (10.5%) (U.S. Census Bureau, 2019). These issues contribute to food insecurity in the area. In Martin County, 21.6% of residents are enrolled in SNAP (Food Research and Action Center, 2019). Reliance on federal programs like SNAP and WIC is imperative for many in this community. While citizens may receive supplemental benefits, they can still be limited in their options due to limited food availability. Therefore, a need was identified to promote the healthier food and beverage options available at local, unconventional food retailers in this community.

3.2 Selection of Healthy Food and Beverage Options

In Fall 2020, University of Kentucky Cooperative Extension professionals obtained food and beverage inventory for local convenience stores (n=5) located in Martin County, Kentucky. The geographic locations of these five stores are illustrated on a map of Martin County in Figure 2. These gas-mart convenience stores were assessed by NEMS-CS audits and selected through community partnerships facilitated by the University of Kentucky Cooperative Extension utilizing the HOP. Extension professionals along with one graduate student assessed the store inventories (n=1255) to select the healthiest food and drink options offered by the stores. For this task, the *Food Service Guidelines for Federal Facilities* calculator tool was utilized. This tool was developed by the CDC to support HOP activities by determining foods that meet the standards in the *Food Service Guidelines for Federal Facilities* (Kuester, 2020). Google search engine was used to determine the nutritional facts for the items listed in the store inventory. This nutrition label information was then entered into the calculator tool, utilizing an Excel spreadsheet with pre-

established limits for different nutrients. Areas of nutritional content analyzed were total calories, saturated fat, carbohydrates, added sugar, sodium, and first ingredient listed. Judgement by nutrition professionals was made to include some food items not quite meeting every guideline. For example, some foods like snack nuts exceeded the less-than-200-calorie guideline but were still included as a healthier snack choice in relation to their nutrient content and exclusion of added sugars or other food additives. After healthier food and beverage items were selected (n=66), a master list of these "Smart Snack" products was created to aid in placement of marketing materials inside the convenience stores.

This list of qualifying foods and beverages consisted of only 5.26% of all the inventory items offered and was sorted into four categories: no-calorie beverages, high protein snacks, low-fat carbohydrate snacks, and meal replacement snacks. No-calorie beverages were drinks reporting zero calories on the nutrition label, including plain or flavored waters (diet sodas were excluded from the campaign). The high protein category included foods with a protein food listed as the first ingredient on the nutrition label. These snacks included nuts, seeds, and lower-sodium meat jerkies. Meal replacement snacks included items such as protein bars and tuna or chicken salad kits, which had multiple protein foods listed as ingredients. Lastly, low-fat carbohydrate foods included snacks with the primary ingredient of enriched flour, whole wheat flour, or potatoes with <4.5g saturated fat per serving. A list of individual snack and beverage items with caloric contents can be found in Appendix A.

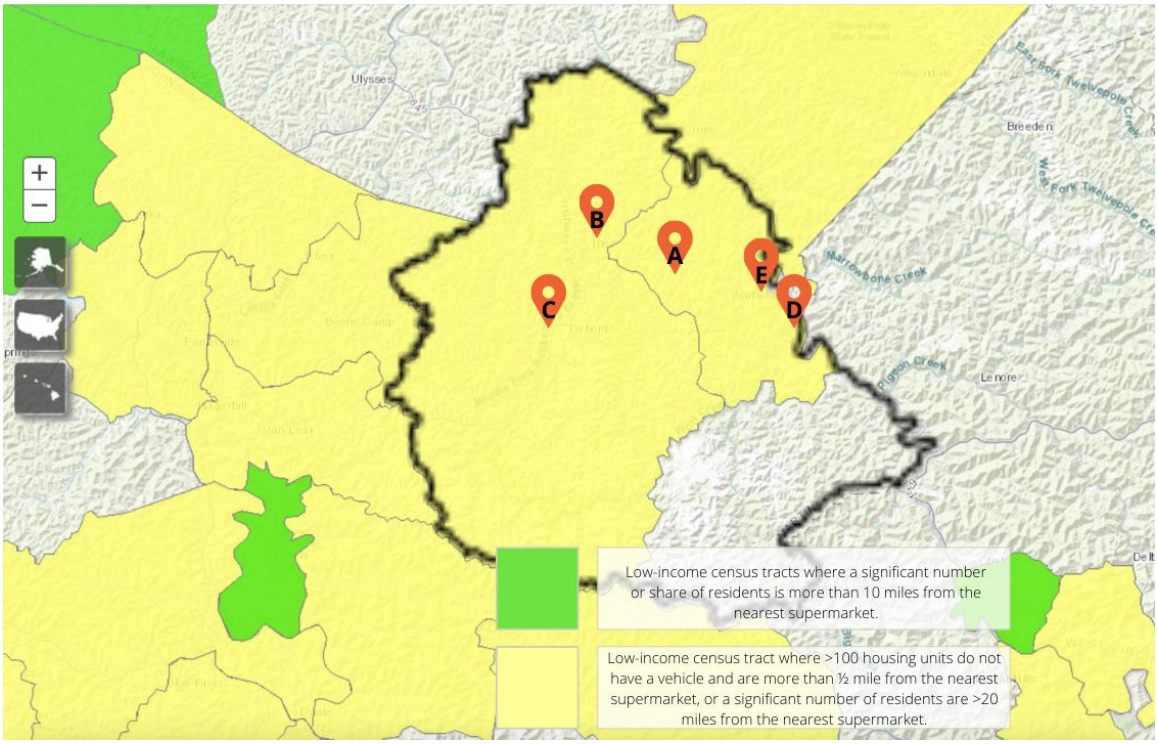

Figure 2: Map of Martin County, KY with Store Locations (n=5)

3.3 Distribution of Marketing Materials

The marketing materials used in this intervention were developed through the HOP initiative in conjunction with the study team and the Martin County Health Coalition, whose members include community residents, key stakeholders, and elected county officials. The graphic created for the study included the Health Coalition graphic, the term "Smart Snack," and the slogan "nourish your body fuel your life." The graphic depicts the state of Kentucky and images of mountains to relate to the Appalachian region where the study takes place. The signage also shows images of different individuals with which many residents would identify themselves. The final design can be viewed in Figure 3.

To implement the Smart Snack signage in the stores, marketing shelf-wobblers were designed with the final Smart Snack logo. In October 2020, the Project Director and graduate student visited each store and marketing wobblers were installed to market the snacks and beverages chosen for the study (Appendix A). Food and beverage items denoted with the marketing wobblers were recorded during each store visit. After placement of visual marketing aids, individual store lists were created to document the specific snacks marketed at each location, as each store did not have the same inventory. Another visit was made to the stores in November 2020 to replace any damaged or missing wobblers. Most wobblers remained in place and had stayed in good condition. A small number of new wobblers were added to Smart Snack items. Master lists for each store were also delivered to store managers for reference when restocking items.

Figure 3: Smart Snack shelf-wobbler placed in stores (n=5)

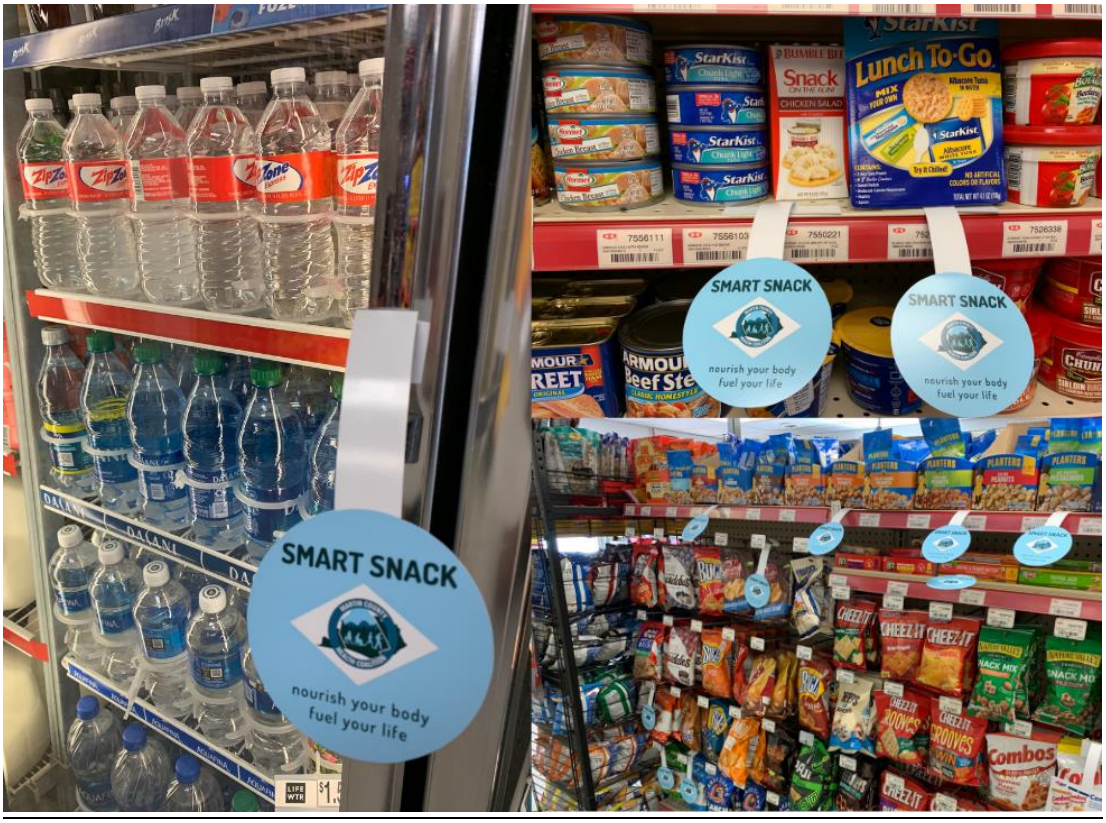

Figure 4: Shelf-wobbler installation in stores (n=5)

3.4 Data Collection and Analysis

Data for the total sales of the convenience stores was collected for the six months of August 2020-January 2021. Baseline sales prior to wobbler installation were included in the months of August, September, and October. Sales for the months of November, December, and January were collected post-wobbler installation to determine changes in purchase patterns of Smart Snack items. Sales data was documented for the Smart Snacks within each individual store and for the total Smart Snack sales for all five stores. Monthly mean and total sales were calculated for each of the six time points for the study.

Statistical analysis used descriptive statistics such as mean to compare monthly snack and beverage sales. Percent change within each store and across all stores was

analyzed across the six months of the study by creating a percent change variable for the mean and total monthly sales of each Smart Snack category. The difference-in-differences econometric model was used to examine the data of monthly sales trends of the Smart Snack categories. This technique measured significant differences in monthly mean and total monthly sales for Smart Snack categories within individual stores and among all stores (n=5) included in the intervention. Data was analyzed using Stata SE 16.0 (Stata Corp, LLC, College Station, TX, USA).

CHAPTER 4. RESULTS

Of the total food and beverage items (n=1255) in the inventory for the five stores, 66 healthier options – approximately 5% of the total inventory – were identified. These healthier options were separated into four categories: high protein (n=9), low fat (n=23), meal replacements (n=12), and no-calorie beverages (n=12). Table 1 shows the mean total monthly sales for these categories across the six months of the visual marketing study. At the end of the six months, mean total sales for high protein snacks across the five stores was $107.00. Low-fat snacks had $45.62 in mean monthly sales. Meal replacement snacks had the smallest total for mean sales with $7.05, and no-calorie beverages had the greatest mean sales with $447.00. Table 2 displays the percentage of Smart Snack category sales relative to total Smart Snack sales, while Table 3 shows total sales for each of the snack categories and total sales across all Smart Snacks. Of all the healthy snack and beverage items selected, meal replacement snacks made up the least percentage of sales at 6.7%. Low-fat snacks made up 7.1% of total sales, high protein snacks contributed 16.3% of total sales, and no-calorie beverages had the greatest total sales percentage at 69.9%.

Table 1: Mean Total Sales Across All Stores

Mean Total Sales Across All Stores		
Category	**Mean Total Sales**	**SE**
High Protein Snacks	$107.00	10.07
Low-Fat Snacks	$45.62	3.02
Meal Replacement Snacks	$7.05	1.73
No-Calorie Beverages	$447.00	21.08

Table 2: Percentage of Smart Snacks/Total Smart Snacks Purchased

Percentage of Smart Snacks/Total Smart Snacks Purchased	
High Protein Snacks	16.3%
Low-Fat Snacks	7.1%
Meal Replacement Snacks	6.7%
No-Calorie Beverages	69.9%

Table 3: Total Sales (n=5)

Total Sales (n=5)	
High Protein Snacks	$3,127.10
Low-Fat Snacks	$1,368.68
Meal Replacement Snacks	$1,278.78
No-Calorie Beverages	$13,429.60
All Sales	$19,204.20

Table 4: Change in Total Sales Across All Stores (n=5)

Change in Total Sales Across All Stores (n=5)	
Store A	1.42 (-2.93, 5.79)
Store B	1.22 (-3.73, 6.18)
Store C	-1.00 (-7.36, 5.35)
Store D	1.79 (-1.20, 4.79)
Store E	-4.00 (-13.09, 5.84)

Table 4 shows the total changes in sales across all five stores in this study. All stores showed a change in healthy snacks sales over the six months of the study. Three locations (stores A, B, and D) experienced increases in total sales across all Smart Snack categories, while two locations (stores C and E) experienced decreases in total sales of the Smart Snack items. Table 5 indicates percent changes in mean and total sales for Smart Snack items

within individual stores and across all stores during the six months of the study. No-calorie beverages exhibited the largest change in mean sales across all stores with a 17.23% increase. Store B demonstrated a statistically significant increase of 44.58% with mean sales of low-fat snacks. Store D showed statistical significance with increases in mean sales of high protein snacks and no-calorie beverages at 21.38% and 61.56%, respectively. Across all five stores, no-calorie beverages showed a significant increase of 1.06% in total sales over the six months of the study. Store A was the only location to display significant decreases in mean sales of Smart Snack items throughout the study.

Table 5: Percent Change in Mean and Total Sales over Time within and between Stores

	Percent Change in Mean Sales Store A	**Percent Change in Mean Sales Store B**	**Percent Change in Mean Sales Store C**	**Percent Change in Mean Sales Store D**	**Percent Change in Mean Sales Store E**	**Percent Change in Mean Sales Across All Stores**
Mean Sales on High Protein Snacks	-9.25 (-25.04, 6.04)	2.96 (-23.34, 29.31)	10.81 (-26.72, 48.33)	**21.38 (15.91, 38.68)***	.40 (-72.69, 73.43)	1.97 (-10.08, 14.03)
Mean Sales on Low-Fat Snacks	-5.61 (-55.98, 44.76)	**44.58 (28.94, 128.12) ***	-7.17 (-35.04, 20.03)	4.23 (-29.18, 37.66)	20.02 (-55.48, 95.54)	.55 (-14.72, 15.83)
Mean Sales on Meal Replacement Snacks	**-65.01 (-110.01, -20.04)***	48.92 (-90.59, 188.43)	7.46 (-155.65, 170.59)	61.88 (-136.75, 260.49)	N/A	15.05 (-35.11, 65.21)
Mean Sales on No-Calorie Beverages	**-65.39 (-110.61, -20.11)***	32.79 (-98.08, 163.89)	7.27 (-155.46, 170.02)	**61.56 (36.46, 159.29) ***	-15.67 (-28.98, 33.54)	17.23 (-31.34, 65.80)
	Percent Change in Total Sales Store A	**Percent Change in Total Sales Store B**	**Percent Change in Total Sales Store C**	**Percent Change in Total Sales Store D**	**Percent Change in Total Sales Store E**	**Percent Change in Total Sales Across All Stores**
Total Sales on High Protein Snacks	15.84 (-27.81, 59.49)	5.47 (-13.17, 24.11)	8.93 (-55.06, 72.92)	**40.43 (14.20, 95 .06)***	33.64 (-80.96, 148.26)	9.60 (-2.18, 21.39)

Total Sales on Low-Fat Snacks	-11.84 (-94.32, 72.04)	**5.49 (1.10, 10.65)***	-10.24 (-55.96, 35.84)	4.29 (-38.64, 47.24)	7.95 (-157.99, 173.89)	-.46 (-14.27, 13.34)
Total Sales on Meal Replacement Snacks	**-10.21 (-158.06, -137.65)***	18.13 (-268.21, 304.97)	27.01 (-133.72, 79.02)	.42 (-.99, 5.63)	N/A	-6.41 (-53.43, 40.73)
Total Sales on No- Calorie Beverages	-3.56 (-25.53, 18.39)	4.08 (-21.01, 29.18)	.01 (-18.03, 18.07)	**8.56 (4.83, 21.95)***	-2.59 (-23.17, 17.35)	**1.06 (.26, 1.85)***

*Indicates $p<0.05$

CHAPTER 5. DISCUSSION

5.1 Study Overview

The purpose of this study was to assess the impact of visual marketing aids on consumer purchases of healthy snack and beverage items at rural convenience stores. The overall results of this study varied by store, with three locations seeing an increase in Smart Snack sales while two stores experienced a decrease in sales of these items. Similar research in the area of health promotion at food retailers has shown significant increases in the sales of healthful food items using strategies such as product placement with visual marketing aids (Williams et al., 2020) and pricing interventions (Gittelsohn et al., 2017). Marketing plays a large role in businesses, especially within the food industry. Research supports the effectiveness of food marketing on increasing consumer purchases (Smith et al., 2019). This study found similar positive outcomes in three stores but conflicting results within two stores. These mixed findings are potentially associated with limited resources and food availability in rural areas, store location, and environmental limitations such as COVID-19 and inclement weather.

This study shines light on the limited access to healthy foods offered to residents in this rural Appalachian community. This also provides insight into food availability in similar rural, geographically isolated communities across the US. Areas for improvement were identified in local gas station convenience stores after conducting NEM-CS audits. The NEM-CS audits verified a food environment within the convenience stores that was not conducive to promoting healthy food and beverage choices. The promotional materials were developed and selected by community stakeholders joined together in a health coalition, which is unique to this research study. Previous research comparing community-

supported marketing campaigns to outsider-developed initiatives has shown that programs developed by local community members tend to be more effective (Ruane, 2014).

To reduce obesity and promote health and wellness, public health movements have focused on encouraging healthy shopping and purchasing habits (Chapman et al., 2019). The setting of this study provided an apt opportunity to research the influence of promotional materials within a rural convenience store setting. The marketing material was used in this study as an attempt to nudge consumer toward healthier and better-for-you food products and beverages. Previous research has shown consumer nudges to be effective in promoting healthier food and beverage choices (Bucher et al., 2016 & Velema et al., 2018). The findings of this study provide evidence for the receptiveness of individuals in this geographic area to in-store visual marketing campaigns.

5.2 Store Observations

Figure 2 shows a map of Martin County, Kentucky and depicts the five store locations where the intervention was conducted. Store B was in the county's city seat of Inez, and Store E is in the county's other official city of Warfield. While these two stores were in official cities within the county, they did not perform as well as Store D located in the eastern-most corner of the county where the state borders West Virginia. Store D had the largest number of total sales and showed the most significant increases in healthy snack and beverage sales across multiple categories. This store was in an area with many surrounding businesses and was noted to be frequented by several local employees during visits made to install the Smart Snack marketing materials. Store D could also attract customers from the neighboring state of West Virginia as the closest food outlet to those

living in the area. Store C is located on a larger highway and is combined with a fast-food sandwich restaurant. This store, however, did not show any significant increase in Smart Snack sales and had a slight decrease in total sales within the store. This decrease in sales emphasizes the difficulties faced by businesses located within isolated regions in Appalachia and underscores social issues like poverty, unemployment, and outmigration. The lack of impact from the Smart Snack marketing campaign in these stores could be attributed to the limited resources available to individuals within this community.

5.3 Public Health Implications

This study assessed the impact of visual marketing displays on purchases of healthy snacks and beverages at rural convenience stores in a Kentucky county with an obesity rate greater than 40%. Improving dietary quality is protective against chronic diseases like diabetes, heart disease, and some forms of cancer (Cena & Calder, 2020). These health conditions are even more prevalent in rural areas (Decker & Flynn, 2018), where the rates of unemployment, poverty, and food insecurity are higher than national averages (James et al., 2017). This study emphasizes the limited availability of healthy foods within reasonable travel distance to individuals living in rural areas. The findings of this study support further efforts focused on marketing methods to promote healthier food choices at nontraditional food retailers. Additional promotion of healthier food choices along with increasing availability of these healthful foods has the potential to improve the health of individuals who regularly utilize nontraditional food retailers.

5.4 Recommendations for Sustainability and Future Research

To ensure continued benefit from this marketing campaign, it is important to address the sustainability of the promotion. This study utilized one type of marketing material in the "Smart Snack" wobbler. Including a variety of marketing materials that are customized for specific food and beverage items would be beneficial in directing consumer attention to the desired snacks. For example, adhesive decals for the beverage coolers would have been more ideal for drawing attention to the no-calorie beverages offered at the stores. Additionally, encouraging the involvement of convenience store staff would be key in the longevity of this health promotion campaign. Training store employees on maintaining signage and answering questions from customers would be important in the continuation of this project. Providing employees with information on the program background and healthy snack selection would be important to ensure the most effective implementation of the program. Lastly, increasing community involvement with local organizations like Cooperative Extension, health clinics, and schools would help increase awareness of the program and, ideally, effectiveness of the campaign.

Future research in the field of healthy food availability and shopping habits should study the growing popularity of online grocery shopping practices. In April 2020 during the COVID-19 pandemic, Kentucky took part in a pilot program with the USDA to promote redemption of SNAP assistance dollars through online grocery platforms (USDA, 2020). Including the use of SNAP benefits extends the use of online grocery platforms to a greater number and variety of grocery shoppers. With an increase in online grocery shopping, there is opportunity for digital methods of marketing healthier food and beverage options to consumers. Previous research has shown an increase in healthier food choices at grocery

stores by providing marketing nudges and price lowering strategies (Coffino et al., 2020 & Hoenink et al., 2020). This body of research would provide a good reference to begin studies on virtual marketing campaigns for online grocery shopping. Additionally, further research focused on convenience stores and other nontraditional food retailers is pivotal in health promotion and increasing food access in rural areas. Convenience stores and gas stations accept SNAP benefits for select food and beverage items, making them viable grocery choices for many SNAP participants. Further research into the purchasing choices made by consumers is an important consideration for the endeavor to improve food access and overall health in rural regions.

5.5 Limitations

This study faced various limitations, beginning with a narrow time frame of six months to collect research data. As Martin County is part of the CDC HOP, however, there is ample opportunity for further health promotion within this community. When installing marketing wobblers within the stores, some food and beverage items were in locations that proved difficult to highlight with the visual marketing materials. Some wobblers had to be placed directly on the box the snack was in, which would likely be discarded upon restocking. Other wobblers had to be wrapped around metal bars on shelves and had trouble remaining in place. With marketing materials tailored more specifically to the stores, greater outcomes may be seen in positive shopping influences among customers.

Situational limitations related to snow, ice, and flooding delayed post-intervention data collection and analysis for this study. A large uncontrollable factor during this study was the COVID-19 pandemic, which has far-reaching effects that doubtlessly impacted

consumer food purchasing tendencies. As a result of the pandemic, the county involved in this study had an estimated 20.4% food insecurity rate and 9.3% unemployment rate for the year 2021 (Feeding America, 2021 & Kentucky Center for Statistics, 2021). The COVID-19 pandemic also prevented researchers from assessing consumer reception of the displayed marketing wobblers and limited the study to analyzing monthly sales data alone. The research team was delayed in retrieving sales data from local points-of-contact as the residents of this county experienced weather-related events of ice storms and severe flooding during the six months of this study as well. This study was not able to analyze the personal food choices or dietary behaviors of individual consumers who shopped at these local gas stations. These areas of interest are planned to be investigated in future research conducted in this area of Appalachia. With a more cohesive timeline and fewer social restrictions, greater involvement could have been encouraged from store employees, customers, and local community members. This would have allowed researchers greater insight into the customer reception and day-to-day logistics with the participating stores.

APPENDIX

APPENDIX A: SMART SNACK AND BEVERAGE LIST

High Protein Snack Items

- Planters Salted Peanuts (49 g) (290 kcal)
- Planters Tube Cashews (49 g) (240 kcal)
- Planters Tube Trail Mix Chocolate (48 g) (250 kcal)
- Planters Tube Pistachios (49 g) (150 kcal)
- Jack Links Beef Jerky (35 g) (100 kcal)
- Jack Links Teriyaki Beef Jerky (35 g) (100 kcal)
- Munchies Salted Peanuts (46 g) (270 kcal)
- Nut Harvest Fruit and Nut (28 g) (150 kcal)
- Nut Harvest Almonds (28 g) (180 kcal)
- Nut Harvest Cashews (28 g) (160 kcal)
- Nut Harvest Pistachios (28 g) (140 kcal)
- Planters Honey Roasted Peanuts (56 g) (320 kcal)
- Planters Heat Peanuts (29 g) (290 kcal)
- Nut Harvest Deluxe Mixed Nuts (30 g) (180 kcal)

Low-Fat Carbohydrate Snack Items

- Keebler Club and Cheddar (51 g) (250 kcal)
- Keebler Cheese and Peanut Butter (51 g) (240 kcal)
- Snyder Mini Pretzel (28 g) (110 kcal)
- Sunbelt Oats & Honey Granola Bar (27 g) (120 kcal)
- Sunbelt Sweet & Salty Peanut Granola Bar (30 g) (150 kcal)
- Snyder EatSmart Veggie Crisps Sea Salt (35.4 g) (160 kcal)
- Sunbelt Chocolate Chip Granola Bar (30 g) (140 kcal)
- Sunbelt Fudge Chocolate Chip Granola Bar (32 g) (160 kcal)

• Sunbelt Fudge Coconut Granola Bar (29 g) (150 kcal)
• Munchies Cheddar Cheese Crackers (39 g) (210 kcal)
• Munchies Nacho Cheese Crackers (39 g) (200 kcal)
• Munchies Peanut Butter Crackers (40.2 g) (210 kcal)
• Nature Valley Oats and Honey (42 g) (190 kcal)
• Nature Valley Peanut Butter Granola Cups (38 g) (200 kcal)
• Nature Valley Sweet & Salty Peanut Butter (35 g) (170 kcal)
• Gardetto's Crisps Original (30 g) (130 kcal)
• Gardetto's Crisps Peppercorn Ranch (30 g) (130 kcal)
• Baked Lays Original (28 g) (120 kcal)
• Smartfood White Cheddar Popcorn (18 g) (100 kcal)
• Nature Valley Sweet & Salty Peanut Bar (25 g) (170 kcal)
• Snack Factory Pretzel Crisps (28 g) (110 kcal)
• Chex Bold Party Mix (29 g) (120 kcal)
• Chex Mix Original (29 g) (120 kcal)

Meal Replacement or Protein Bar Snack Items

• Clif Protein Bar Peanut Butter Chocolate (68 g) (260 kcal)
• Kind Dark Chocolate Nut and Sea Salt (40 g) (180 kcal)
• Bumble Bee Chicken Salad Kit (99 g) (220 kcal)
• Bumble Bee Tuna Salad Kit (99 g) (230 kcal)
• Kellogg's Special K Bar Double Chocolate (45 g) (180 kcal)
• Special K Chocolate Peanut Butter Protein Bar (45 g) (180 kcal)
• Quest Peanut Butter Cookie (58 g) (220 kcal)
• Quest Cookies and Cream (60 g) (180 kcal)
• ONE Birthday Cake Protein Bar (60 g) (220 kcal)
• Quest White Chocolate Raspberry (60 g) (190 kcal)
• Quest S'mores (60 g) (180 kcal)

• Starkist Tuna Chunk Light in Water (74 g) (70 kcal)

Zero Calorie Beverage Items

• Smartwater (700 mL) (0 kcal)

• LifeWater (20 oz) (0 kcal)

• Dasani Lemon (20 oz) (0 kcal)

• Dasani Water (20 oz) (0 kcal)

• Smartwater (1 L) (0 kcal)

• LifeWater (700 mL) (0 kcal)

• Aquafina Water (20 oz) (0 kcal)

• Propel Fit Strawberry Kiwi (16.9 oz) (0 kcal)

• Propel Watermelon Water (20 oz) (0 kcal)

• Propel Fit Grape (16.9 oz) (0 kcal)

• Zip Zone Water 0.5 Liter (16.9 oz) (0 kcal)

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