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Nutrition Marketing on the Front-of-Package: 2007-2014

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To the Graduate Council:

I am submitting herewith a thesis written by Ana Elizabeth Hoffmann entitled "Nutrition Marketing on the Front-of-Package: 2007-2014." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

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Nutrition Marketing on the Front-of-Package: 2007-2014

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Ana Elizabeth Hoffmann

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DEDICATION

To my mother and father

John and Alma Hoffmann

my siblings

Justus, Tessa, and Emma Hoffmann

and my friends

Haleigh Gilbert and Julie Mathews

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ABSTRACT

***Objective*:** The objectives of this research were to describe the proportion of packaged foods with front-of package nutrition marketing or marketing to children that were high in saturated fat, sodium, and/or sugar content, and to delineate changes in the proportions of these foods from 2007 to 2014.

Methods: Front-of-pack nutrition marketing, child marketing, and nutrient criteria from the Nutrition Facts Label on all packaged food items in a large Midwestern supermarket were recorded in 2007 (n = 5,500) and again in 2014 (n = 6,324). Products were coded as high/not high in saturated fat, sodium, and/or sugar according to agreed upon guidelines. The data were weighted by number of product variations and chi-square analyses and frequency distributions were computed.

Results: The proportion of products with front-of-package nutrition marketing increased significantly from 49% in 2007 to 62% in 2014 ($p < 0.001$). Of those products with nutrition marketing in 2014, 44.7% had nutrition marketing and were high in saturated fat, sodium, and/or sugar, compared to 48% in 2007. Only 3.1% of all products were marketed towards children in 2014, compared to 16% in 2007; however, 78.1% of child marketed products also had nutrition marketing in 2014 compared with 71% in 2007. Of those child-marketed products with nutrition marketing, 71.3% were high saturated fat, sodium, and/or sugar, which was significantly higher than the 58.6% found in 2007 ($p < 0.001$). The presence of a food company symbol was the most commonly seen marketing tactic in all product categories.

Conclusions: Given the results, consumers should be advised to evaluate products based solely on the Nutrition Facts Label. Child products in 2014 were more likely to have front-of-package nutrition marketing and be high in saturated fat, sodium, and/or sugar. This may suggest that clinicians advise consumers to be weary of products marketed towards children.

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CHAPTER 1: LITERATURE REVIEW

Introduction

Two-thirds of American adults and one-third of American children are overweight or obese.[1] Obesity is associated with increased burdens of chronic diseases such as hypertension, atherosclerosis, and diabetes, as well as certain types of cancer.[2] As severely obese children and adolescents become more common, so do weight-related complications and associated costs.[3] Today, the total excess cost related to overweight and obesity is estimated to be $254 billion.[1] If rates continue to increase steadily, these costs could reach $861 to $957 billion by 2030.[1]

Over consumption of an unhealthy diet is a preventable risk factor for obesity.[4] By influencing purchasing and consumption behaviors, marketing may be a contributing factor in the obesity epidemic.[4] The Elaboration Likelihood Model of Persuasion provides a framework to understand potential influences of nutrition-related marketing.[5] This model proposes that there are central and peripheral routes to internalizing persuasive techniques. In the central route, the consumer plays an active role relying on previous knowledge to process the persuasion. In this route, it can be expected that behavior will be predictable and consumers will show increased resistance to counter persuasions. Conversely, in the peripheral route the consumer lacks the ability or prior knowledge to process the persuasion. Consumers with little previous knowledge about the subject will evaluate products using extrinsic cues, such as marketing, and the peripheral route.[5]

In regard to marketing, extrinsic cues refer to product-related information such as health claims.[6] Consumers with limited previous knowledge in the field will be more influenced by extrinsic cues than experts in a field.[5,6] Research has shown that the presence of nutrition-related labeling on a food product, regardless of the ingredients listed on the label, will positively influence a consumer with limited knowledge.[5,6] This positive influence will increase the consumer's product evaluation, leading to higher perceived quality and purchase intention ratings for the product.[6]

A rise in the marketing of non-nutrient-dense foods, especially to children, has sparked a debate about the rigor of food labeling policies.[7] Marketing of energy-dense, low-nutrient food products, specifically to children and adolescents, is a major contributing factor to the obesity epidemic.[8] Children and adolescents represent a large revenue opportunity for food companies as these age groups spend an estimated $200 billion per year, with the majority of that on food products.[8] From 2006-2008, the number of products with youth-oriented cross-promotions increased by 78%.[9] A cross-promotion is defined as an integrated campaign that combines many marketing forms including television, Internet and product packaging.[9] Marketing of unhealthy foods to children through media ads has been well studied.[10] In the United States, more than 98% of the television food ads seen by children, and 89% of those seen by adolescents are for products high in fat, sugar, and/or sodium.[10] In 2006, $745 million, or 46% of food marketing budgets were spent on television marketing.[10] However, the percentage of

marketing budgets allocated to television marketing has decreased in recent years as budgets for other media and marketing venues, such as food packaging, have increased.[10]

Nutrition and health marketing on food packaging, specifically the front-of-package (FOP), influences consumer food purchasing and consumption behavior.[11] In a Food and Drug Administration (FDA) study, 67% of respondents reported referencing FOP marketing often or sometimes when making purchasing decisions.[11] A FOP marketing tactic is called a scheme.[7] There have been numerous schemes printed on the fronts of food packages, by industry and government, in varied attempts to better inform consumers.[12-14] Without standardized FOP food labeling systems, consumers must interpret and evaluate the variety of FOP labeling schemes on their own.[7]

History of Food Labeling

In the early 1900's, the government's role in food labeling was to ensure fair competition among producers, increase consumer access to information, and reduce risks to individual consumer safety and health.[15] In 1906, The Federal Pure Food and Drugs Act and the Federal Meat Inspection Act authorized the Federal Government to regulate the safety and quality of food. These acts also prohibited selling misbranded or adulterated foods. In 1924, the Supreme Court ruled that the Food and Drugs Act condemns statements and designs that may mislead, misdirect, or deceive, even if technically true. In 1938, the Food and Drugs Act was replaced

with the Federal Food, Drug, and Cosmetic Act. This required the labeling of every processed, packaged food to contain the name of the food, its net weight, location of the manufacturer, and a list of ingredients in the food. This law also prohibited statements in food labeling that were false or misleading.[15]

In the late 1900's, the government's role in labeling began to target a new purpose, namely influencing individual consumption choices to align them with social objectives.[15] The Fair Packaging and Labeling Act of 1966, which required all consumer products to contain accurate information, and The White House Conference on Food, Nutrition, and Health, together represent the shift of the government's role in food labeling to align consumption choices with a social objective. Deficiencies in the American diet prompted the conference attendees to recommend that the Federal Government consider developing a system for identifying the nutritional qualities of food. In response, the FDA issued regulations in 1973 that required nutrition labeling on food containing one or more added nutrients or whose label or advertising included claims about the food's nutritional properties or its usefulness in the daily diet. Nutrition labeling was voluntary for almost all other foods.[15] By the late 1970's, a link between food labeling and consumer purchasing behaviors had been established.

The role of food in chronic diseases became an increasingly relevant issue in the 1980's.[15] A committee convened to consider how food labels could be improved to help consumers adopt or adhere to healthful diets. The Nutrition Labeling and Education Act of 1990 established mandatory nutrition labeling for most foods,

standardized serving sizes and provisions for authorization of health claims on food labels.[15] This Act made nutrition and health information easily available to consumers through nutrition marketing on food packaging. Despite these efforts, the proliferation of icons and schemes, and both authorized and questionable claims, stimulated several entities within the federal government to reassess labeling regulations to ensure that labels provide factual, non-misleading information to assist consumers.[7]

Nutrition marketing on food packaging can be defined as using health or nutrition information beyond minimum requirements;[4] by this definition health claims, dietary guidance statements, structure/function claims and nutrient content claims are all considered marketing. The FDA regulates health claims three ways:[16]

1. A health claim may be printed if it is an authorized claim regulated by the FDA after careful review of scientific evidence.
2. A health claim may be printed if it is based on an authoritative statement from a scientific body of the government or National Academy of Sciences.
3. A health claim may be printed if it is based on emerging evidence not yet strong enough for the FDA to issue authorizing regulation.

All health claims may be printed without consideration of the overall nutrient quality of the food product.[16]

Nutrition marketing has steadily increased over the past two decades.[17] From 1997 to 2010 food packages containing health claims and nutrient content

claims increased from 4% to 4.4% and 39% to 49.7%, respectively.[17] This increase was part of a massive proliferation of -of-package schemes.[17] Each scheme is based on different sets of nutrition criteria and developed by food companies, third-party organizations and retailers.[14] Examples include "Nutrition Highlights," "Smart Choices," and "Guiding Stars."[14] Diversity in labeling schemes leads to confusion in the marketplace.[14] In 2009, the Commissioner of Food and Drugs, Margaret Hamburg M.D., announced that, "Given the prevalence of obesity and diet-related disease in the United States, reliable nutrition labeling of food products is a top priority for the FDA."[16] In response, the FDA announced that they would soon propose guidance for the industry regarding nutrition labeling on the FOP that would help consumers identify healthy food options.[16]

WHERE WE ARE TODAY

With no standardized FOP scheme released, the food industry and third party organizations began printing their own versions. In August 2009, the 'Smart Choices' program was introduced in the United States.[12] The program was an industry-driven FOP nutrition labeling system, which placed a logo on approved food items. A study released in 2012 evaluated the extent to which products with the 'Smart Choices' logo could be classified as a healthy choice using the Nutrient Profile Model (NPM).[12] The NPM method is a thoroughly tested approach which assigns a numerical value to a product based on a reverse score point system where lower scores indicate a healthier product.[12] Points are assigned based on levels of calories, saturated fat, sodium, and total sugar. Products gain points for negative

nutritional qualities and lose points for positive nutritional components.[12] Foods considered less healthy have a score of greater than or equal to four.[12] The study found that more than 60% of the food and beverage products sampled did not meet Nutrient Profile Modeling standards for a healthy product.[12] These results sparked scrutiny of the food industries involvement in developing a FOP labeling scheme. In January 2011, the food industry announced a new, voluntary front-of-package nutrition-labeling system called 'Facts Up Front' (also known as 'Nutrition Keys'). The label would include information about calories, saturated fat, sodium, sugars, and up to two "nutrients to encourage," such as fiber or vitamin A.[13] A successful FOP scheme would be easily understood by consumers and influence them to purchase healthier food products.[7,18] Development of a successful FOP scheme by the food industry would weaken the argument for a government-developed scheme.[7]

The timing of the industry-driven schemes rivals the aforementioned announcement of a singular labeling scheme report from the FDA. Little publicly available research has evaluated the utility of the industries 'Facts Up Front' system.[19] It has been speculated that this system is not based upon research and would encourage food companies to fortify foods of questionable nutrition value to make their label appear more nutritious.[19] For that reason, a study conducted by Roberto and colleagues. compared the 'Facts Up Front' label to a modified version of the Traffic Light system to determine which label promotes better understanding of nutrition profiles of packaged foods.[19] The Traffic Light label was developed by the

United Kingdom Food Standards Agency and is used uniformly in the United Kingdom. It uses red, green, and yellow circles to indicate levels of fat, saturated fat, sugar and salt in foods. A large body of research supports this government-developed Traffic Light system.[19] The study conducted by Roberto and colleagues found that the Traffic Light label enabled participants to judge the levels of specific nutrients, saturated fat, sodium, and total sugar, more accurately as compared to the Facts Up Front label.[13] This suggests that the 'Facts Up Front' program is a less effective FOP labeling system. Additionally, the study discusses the potential concerns associated with the Facts Up Front label. For example, one potential concern is that companies could choose individual nutrients to highlight on the label without consideration of the total product quality.[13] This may allow less-healthy products to be marketed to appear healthier by highlighting specific vitamins. In an interview with Dr. Lisa Sutherland of Kellogg's, FOP labels are traditionally part of a food manufacturer's marketing scheme, allowing interface between the manufacturer and the consumer and to set their products apart from others.[18] These findings suggest that a uniform system would provide better information to consumers than multiple industry-developed systems.

Specifically related to child marketing, the Children's Food and Beverage Advertising Initiative (CFBAI), initiated in 2006, works with leading consumer packaged goods companies and quick serve restaurants to direct marketing at children under 12 years old to influence them to make healthier choices[20]. The system started with companies pledging to act according to their company-

generated specifications. A study released in 2011 by the Prevention Institute, looked at 84 food products marketed towards children on the list and if they met healthy criterion based off of the US Dietary Guidelines.[21] The results were disappointing as they found that 84% of the products did not meet criterion and would be considered unhealthy[21]. Since this study, the CFBAI has made multiple changes including uniform standards for all members instead of company-specific ones, and a 100% product commitment instead of 50% previously.[22] Additionally, according to a CFBAI presentation given to the White House in 2013, television food ads have decreased significantly from 2007 to 2013. While this is not directly related to FOP marketing, it does offer hope that similar trends will be observed.[22]

In May 2012, The Institute of Medicine and the Center for Disease Control and Prevention, in conjunction with the FDA, released recommendations for a FOP labeling scheme.[23] These recommendations included nutrients to be highlighted in the scheme, characteristics of the scheme, and components of the scheme. Nutrients to be highlighted were identified as calories, saturated and trans fats, sodium and sugar. The recommendations also identified four characteristics of a successful FOP system. These characteristics were that the scheme should be simple, interpretive, ordinal, easily identifiable and remembered by the general public. The scheme should also incorporate certain components including a standardized symbol, calorie amounts in common measurements and amounts of fat, sugar, and sodium. These nutrients should be ranked on a nominal scale of 0-3, with 3 representing the

most healthful option.[23] These results could provide a framework for a standardized FOP labeling scheme initiative.

Experts agree that FOP labels could allow consumers to more easily compare foods to make healthier choices.[18] However, when these labels appear on foods that are not "healthy" according to recent evidence, they may be misinforming consumers and misleading them towards purchasing less healthful options. As stated by Dr. David Katz, nutritionist and founding director of the Prevention Research Center at Yale University, "Food manufacturers use FOP labels to accentuate the positives and ignore the negatives (1).[18]" This literature review will summarize the current evidence of how FOP labels are being used and on which types of products.

Articles were gathered using PubMed and The Yale Rudd Center for Food Policy & Obesity Website section "Publications about Front-of-Package Labeling." Due to limited research of FOP nutrition-marketing on foods high in saturated fat, sodium and sugar, inclusion criteria were expanded to include studies about FOP schemes targeted towards kids and the frequency of nutrition marketing (nutrient claims, health claims) both internationally and nationally. Information about the history of food labeling and current regulations was also included providing relevance of the topic. Other sources were also included giving a history of food labeling and current regulations. Studies were excluded that studied consumer perceptions of marketing. Data from studies that were included was compiled into a spreadsheet to display their characteristics.

Food Marketing Is Everywhere

Food marketing is seen internationally and nationally. This review includes three international studies done in Ireland[24], Australia[25] and Canada,[26] which quantified nutrition marketing in supermarkets, and two national studies.[4,17] Overall, these studies concluded that about half of all packaged foods contain nutrition marketing. In addition, this review also includes three studies regarding the frequency of marketing on food products targeted towards children,[9] the use of sports references and athlete endorsements on food products,[27] and the influence of nutrition marketing on parents.[28]

International Studies

The first study was done in 2003 in the Sydney and Wollongong regions of Australia by Williams and colleagues.[25] A survey was conducted of the labels on packaged foods sold in supermarkets on 40 categories of foods. Surveys were conducted in four supermarket chains throughout the regions. Six of the researchers conducted the survey. The following information was recorded: manufacturer, brand name, flavor variants, number and quantity of available sizes, nutrient claims, other nutrition related claims, and endorsements by health related and other organizations. The study did not survey the use of health claims. Additionally, the study measured compliance of claims for energy, fat, fiber, sodium/salt, sugar, energy, cholesterol, %free, light/lite, diet and comparative claims against the criteria in the Code of Practice on Nutrient Claims (COPONC). The COPONC ensures

consistent and accurate information appears on the food labels in Australia about the nutrient content of food in order to enable consumers to make healthier choices.[25] The study had a sample size of 6,662 food products. More than half of all products carried a type of nutrition related claim and 36.2% carried at least one nutrient claim. Sports drinks carried the highest proportion of nutrient claims, followed by breakfast cereals. The study found that third party endorsement of products was uncommon. Not all food categories were surveyed due to time and resource limitations. Excluded food groups were frozen foods, noodles, pasta, confectionery, canned meat, cake and bread mixes, flour, sugars and syrups, dry beans, dried fruit, baby foods, spices and herbs and tea and coffee. Furthermore, a complete census of all products in the marketplace was not conducted. These limitations decrease generalizability. Additionally, the excluded food categories represent popular sources of excess energy such as frozen foods, pasta, cake and bread mixes, sugars, and coffee. Without a complete survey of all food groups, a major gap exists in the data.[25]

The second study was conducted in Dublin, Ireland in 2010 by Lalor and colleagues.[24] The objective of the study was to examine the use of nutrition and health claims on packaged foods commonly eaten in Ireland. A convenience sample was used in the study. Only packaged foods were included, similarly to the study conducted in Australia by Williams and colleagues in 2010. Three researchers collected the data in four food retail markets. The following information was recorded for each product: food category, name/brand of product; manufacturer,

presence/absence of a claim, the number of claims being made, the type of claim, and the exact text of each claim observed. Claims were categorized based on Regulation published by the European Commission in December 2007. The labels were examined by hand and information was recorded on a form designed for the study. The labels of 1,880 food products were examined. Approximately 47% of products carried one or more nutrition claim and 17.8% carried one or more health claims. Breakfast cereal was the category with the most number of nutrition and health claims. The most common nutrient-related claim was fat and saturated fat. There were limitations to this study. First, only commonly eaten foods were surveyed. Second, only four retailers from one region in Ireland were sampled. These limitations decreased the ability to generalize the results to all foods on the Irish market.[24]

The final international study was conducted by Schermel and colleagues in Canada, in 2010.[26] The study described the frequency of use of different forms of nutrition marketing and the nutrients and conditions that are the focus of nutrition marketing messages. Packaged foods with a Nutrition Facts table were collected from outlets of the three largest grocery chains in Canada. Food products were collected from 23 predefined food categories. Every food product with a Nutrition Facts table was collected and purchased. Information was then entered from each label into the Food Label Information Program (FLIP) including product name, universal product code, company, brand, price, container size, nutrient content claims, disease risk reduction claims, FOP schemes, nutrition facts table information

and date and location of purchase. The FLIP, developed by the University of Toronto, is a Canadian database that has quantified the usage of nutrition marketing on food labels and collected information on the nutritional compositions of foods from the Nutrition Facts Label.[26] The study surveyed 10,487 packaged food labels. Overall, 48.1% of food products had some form of nutritional information in addition to the Nutrition Facts Label. Forty-five percent carried at least one Health Canada approved nutrient content claim, Approximately 1.7% carried at least one disease risk reduction claim, and 18.9% carried at least one FOP scheme. Claims about total fat, trans fat and vitamins and minerals were made most often. The study contained similar limitations to the previous two studies including a region-restricted survey of food products.[26]

NATIONAL STUDIES

The FDA has studied product labels from the United States food supply through the Food Label and Package Survey (FLAPS) since the 1970s[17]. Data from the FLAPS characterize various aspects of the labeling of processed, packaged foods, including nutrition labeling and various types of label claims. In the 2000-2001 FLAPS, the FDA used a multistage, representative sample of food products from the Information Resources, Inc. 1999 supermarket database as the basis for the FLAPS sample. The final database consisted of 1,281 foods. The study found that 98.3% of FDA-regulated processed, packaged foods sold annually had nutrition labels. Approximately 4.4% of products contained health claims, 6.2% contained structure/function claims and 49.7% contained nutrient content claims.[17]

Another FLAPS survey was conducted in 2006-2007; however, these data are not readily accessible. The table below summarizes the prevalence of nutrition labeling found in the FLAPS studies, including the percentage from 2006-2007.[17]

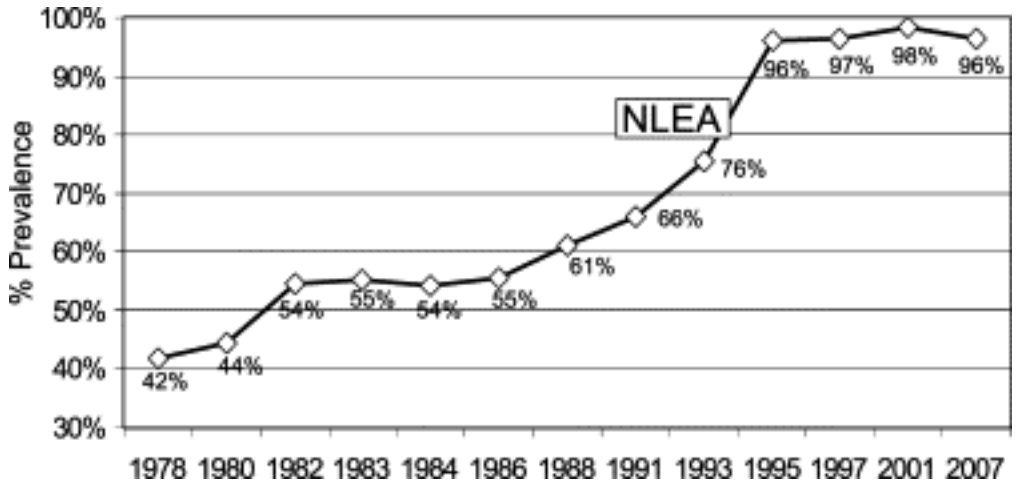

Figure 1. The Prevalence of Nutrition Labeling

Legault L, Brandt MB, McCabe N, Adler C, Brown AM, Brecher S. 2000-2001 food label and package survey: an update on prevalence of nutrition labeling and claims on processed, packaged foods. *Journal of the American Dietetic Association.* Jun 2004;104(6):952-958.

A study conducted by Colby and colleagues. in 2010 determined how often nutrition marketing was used on labels of food items that were high in saturated fat, sodium, and/or sugar.[4] The study surveyed all packaged products in all grocery stores in Grand Forks, North Dakota (ND). The sample size was 56,900 food products. The survey tool included product brand name, product variations, marketing strategies, select nutrient label information, whether the product was

fruit- or milk-based, target age, and shelf position. Marketing strategies were coded and categorized into statements of fact, structure/function claims, nutrient content claims, and/or US FDA health claims. Of the food labels surveyed, 49% contained nutrition marketing. Of those products, 48% had nutrition marketing and were high in saturated fat, sodium, and/or sugar. If a product contained greater than or equal to 20% of the Daily Value for saturated fat or sodium, or greater than or equal to 6 or 21 g of sugar for products not fruit- or milk-based or fruit or milk based, respectively, they were considered high in that nutrient. Therefore, 23% of all products contained both nutrition marketing and were high in saturated fat, sodium, and/or sugar. Of the products marketed to children, 71% had nutrition marketing. Of those products, 42% contained both nutrition marketing and were high in saturated fat, sodium, and/or sugar. The most commonly used nutrition marketing statements were: "good source of calcium," "reduced-fat/low-fat/fat-free," "food company's health symbol," "made with real…," and "reduced/low/trans fat-free."[4]

In the study conducted by Colby and colleagues, products that were high in certain nutrients were found to have nutrition-marketing statements.[4] On products high in saturated fat, the most commonly used nutrition marketing statements were: "made with real…," "food company's health symbol," "good source of calcium," "reduced/low/trans fat-free," and "natural." On products high in sodium, the most commonly used marketing statements were: "food company's health symbol," "good source of calcium," "made with real..," "reduced/low/trans fat-free," and "good source of protein." On products high in sugar, the most commonly used marketing

statements were: “good source of calcium,” “good source of vitamins and minerals,” ‘food company’s health symbol,” “contains whole grains,” and “reduced-fat/low-fat/fat-free.” Meals, entrees, side dishes and beverages were most likely to have nutrition marketing and be high in saturated fat and sodium.[4]

Food Marketing Targeted Towards Children

In Canada, one researcher aimed to study the nutritional content of “fun foods.”[9] These foods can be identified if the food package is marketed to children using direct claims referencing fun or play on the package, character usage or tie-ins with other media directed towards children. This study excluded commonly accepted junk food such as confectionery, soft drinks, cakes, potato chips, etc., as parents already associate those with poor nutritional quality. Of 397 products analyzed, 89% of products could be classified as “of poor nutritional quality.” Poor nutritional quality criterion was outlined by the Center for Science in the Public Interest for fat and sodium, and a unique set of criteria for sugar. These criterion were as follows: >35% of total calories from fat, >35% added sugars by weight, and >230 mg sodium per serving. This study concluded that due to the fact that 62.7% of products had one or more nutrition claims on the front of the box and were of poor nutritional quality, that ‘fun foods’ generally claim to be nutritious.[9]

The use of sports references and endorsements, which appear on the FOP, is becoming a major marketing technique geared toward children. For example, one study found that of products with a sports reference (character exercising,

professional sports entity), 34% were targeted towards children and had a median nutrition score of 36, where 100 is the healthiest, and 69.4% of beverages were 100% sugar-sweetened.[29] Another study found that of all professional athlete endorsements, 28.3% were for food and beverage products, 79% of which were energy-dense and nutrient-poor.[27]

In addition to influencing children, research suggests that misleading marketing is also influencing busy parents[28]. One study found that a majority of parents misinterpret the meaning of claims on the FOP of children's cereals.[28] Parents associated products with nutrition marketing as a more nutritious overall product than those products without nutrition marketing.[28] Therefore, parents were more likely to buy the cereals. This indicates that FOP nutrition-related claims can be misleading, especially when placed on products with high levels of nutrients to limit, such as sugar and sodium.[28]

Conclusion

GAPS IN THE RESEARCH

Specific marketing techniques used on FOP labels have been studied for frequency internationally and nationally. Only one broad study that quantified multiple nutrition marketing techniques on food that was high in saturated fat, sodium, and sugar was found. No studies were found that have compared food package marketing changes over a time period specific to FOP nutrition marketing on foods that are high in saturated fat, sodium, and/or sugar. Future research

should focus on quantifying nutrition marketing on food that is high in saturated fat, sodium, and/or sugar. Furthermore, future studies should compare the frequencies of current FOP nutrition marketing to those data from past studies. This research, to our knowledge, would be the first to describe how food package marketing has changed over a period of time. Additionally, given the changing political atmosphere of food labeling, this research is timely to provide evidence towards future labeling recommendations and Nutrition Facts Label changes. Baseline data is the first step to tracking longitudinal changes; this study would provide knowledge of how the food industry has responded to labeling criticism over the past eight years.

DISCUSSION

Nutrition concerns in the United States have transitioned from nutrient deficiencies to a combination of positive energy balance, nutrient imbalances, and overconsumption of food components associated with chronic, degenerative diseases.[23] As the obesity epidemic continues to grow, nutrition-related marketing will likely be recognized as a major point of intervention, education and prevention. From previous studies, it can be assumed that half of all foods that customers see in the supermarket will have nutrition marketing on the FOP.[4,24-26] Unfortunately, nutrition marketing is commonly used on products high in saturated fat, sodium and or/sugar and is more often used on products marketed toward children.[4] Because nutrition marketing may be used on the FOP despite poor overall nutrition quality, the current schemes are not helping consumers select foods low in saturated fat,

sodium or sugar. Therefore, the foods they are selecting may be contributing to poor dietary quality.

As obese children become obese adults, changing the food products marketed to children could play a part in reversing a generation of childhood overweight and obesity trends. Repeated data collection in the coming years will allow us to track longitudinal changes in nutrition marketing messages over time as food marketing, public heath, and consumer priorities evolve.[31] Marketing could be an effective tool to prevent and treat overweight and obesity; however, the right food products must be marketed towards children and adults alike.

CHAPTER TWO: MANUSCRIPT

Nutrition Marketing on the Front-of-Package: 2007-2014

Abstract

Objective: By influencing purchasing and consumption behaviors of consumers, marketing may be a contributing factor to the obesity epidemic. This research sought to compare how often nutrition marketing occurred on the front-of-packages of foods that are high in saturated fat, sodium, and/or sugar in 2007 and in 2014.

Design and setting: All packaged food products with Nutrition Facts Panels (N = 6,324) in the largest grocery store in Grand Forks, North Dakota were surveyed.

Main Outcome Measure(s): Marketing strategies used, nutrient label information, if the product was marketed towards children

Analysis: Frequency distributions were computed, chi-square analyses were performed.

Results: The proportion of products with front-of-package nutrition marketing increased significantly from 49% in 2007 to 62% in 2014 ($p < 0.001$). Of those products with nutrition marketing in 2014, 44.7% had nutrition marketing and were high in saturated fat, sodium, and/or sugar, compared to 48% in 2007. Only 3.1% of all products were marketed towards children in 2014, compared to 16% in 2007; however, 78.1% also had nutrition marketing in 2014 compared with 71% in 2007. Of those child-marketed products with nutrition marketing, 71.3% were high saturated fat, sodium, and/or sugar, which was significantly higher than the 58.6% found in 2007 ($p < 0.001$). The presence of a food company symbol was the most commonly seen marketing tactic in all product categories.

Conclusions: Given the results, consumers should be advised to evaluate products based solely on the Nutrition Facts Label. Child products in 2014 were more likely to have front-of-pack nutrition marketing and be high in saturated fat, sodium, and/or sugar. This may suggest that clinicians advise consumers to be weary of products marketed towards children. Current self-regulation of front-of-package marketing by the food industry may not be working.

Introduction

As obesity rates associated with comorbidities and costs related to overweight and obesity increase, understanding of mechanisms of influence, such as marketing and food industry responsibilities, are increasingly important.[1,2,4] Research shows that consumption of an unhealthy diet is a preventable risk factor for obesity.[4] As such, nutrition marketing has been shown to influence consumer purchasing and consumption behaviors.[5,6] Marketing of energy-dense, low-nutrient food products, specifically to children and adolescents, has been identified as a contributing factor to the obesity epidemic.[8] Nutrition marketing can be defined as any marketing of food or beverages using health or nutrition information beyond minimum requirements.[4] Therefore, health claims, dietary guidance statements, structure/function claims and nutrient content claims are all considered nutrition marketing.

Research shows that nutrition marketing on food packaging, specifically the front-of-package (FOP), influences consumer food purchasing and consumption behavior.[11] In a Food and Drug Administration (FDA) study, 67% of respondents reported referencing front-of-package nutrition marketing, defined as a claim such as "low-fat" on the FOP, often or sometimes when making purchasing decisions.[11] A FOP marketing tactic, including nutrition marketing, is called a scheme.[7] There have been numerous schemes printed on the fronts of food packages, by industry and government, in varied attempts to better inform consumers.[12-14] However, without

standardized FOP food labeling systems, consumers must interpret and evaluate the variety of FOP labeling schemes on their own.[7]

The Nutrition Labeling and Education Act of 1990 established mandatory nutrition labeling for most conventional foods and allowed for Nutrient Content Claims.[30] The Dietary Supplement Health and Education Act of 1994 established regulatory requirements and procedures for structure/function claim use.[30] Shortly after, in 1997, the FDA Modernization Act provided provisions for authorization of health claims on food labels in efforts to make nutrition and health information easily available to consumers.[15] However, most consumers lack the ability to correctly interpret food labels and label information.[7] The FDA regulates all three types of claims.[30] Nutrient content claims and structure/function claims are not regulated premarket, but must be in compliance with regulatory standards and wording specifications.[30] Health claims are regulated prior to market and are required to "not be misleading;" however, all health claims may be printed without consideration of the overall nutrient quality of the food product.[16,30] Therefore, consumers may be misled when purchasing a food product with perceived health benefits because a health or nutrient content claim is made on the FOP, despite the fact that the product may still be high in saturated fat, sodium, and/or sugar.[4]

In 2009, the Commissioner of Food and Drugs, Margaret Hamburg M.D., announced that, "Given the prevalence of obesity and diet-related disease in the United States (US), reliable nutrition labeling of food products is a top priority for the FDA."[16] In response to a call from Congress, the FDA announced that they would

propose guidance for industry regarding nutrition labeling on the FOP that would help consumers identify health food options.[16] Three years later, in 2012, the Institute of Medicine (IOM) and Centers for Disease Control and Prevention (CDC), in conjunction with the FDA and United States Departments of Agricultures (USDA) Center for Nutrition Policy and Promotion, released their recommendations for a uniform FOP labeling scheme, in two phases.[23] Recommendations from the first phase were based off FOP systems currently in use in the US and abroad reviews, merits, and scientific evidence. Phase one concluded that a front-of-package nutrition rating system should include calories, saturated fat, and trans fats, and sodium. Other nutrients such as total fat, cholesterol, added sugars, vitamins, and minerals other than sodium, showed insignificant evidence for inclusion. Phase two concluded that added sugars should be included and that the front-of-package nutrition rating system should be simple, interpretive (as opposed to factual), ordinal (as opposed to cardinal), and easily identifiable and remembered by the general public. Additionally, the committee suggested the system should display calories per household measure, and a measure of nutritional "points" based off of various nutrient component amounts.[23] However, no standardized scheme has been developed since.

In 2007, a study, conducted by Colby and colleagues, aimed to determine how often nutrition marketing was used on packaged food products that were high in saturated fat, sodium, and/or sugar.[4] This study showed that a majority of food products with nutrition marketing, including those marketed towards children,

were high in saturated fat, sodium, and/or sugar.[4] Research has indicated that nutrition marketing has steadily increased over the past two decades.[17] From 1997 to 2010 food packages containing health claims and nutrient content claims increased from 4% to 4.4% and 39% to 49.7%, respectively.[17] This increase was in part due to proliferation of FOP schemes.[17] Each scheme was based on different sets of nutrition criteria and developed by food companies, third-party organizations and retailers.[14] Examples include "Nutrition Highlights," "Smart Choices," and "Guiding Stars." Additionally, multiple studies have shown that these programs highlight food products that don't meet basic nutrition requirements.[12,18] Diversity in labeling schemes may lead to consumer confusion in the marketplace.[18]

Dr. David Katz, founding director of the Prevention Center at Yale University, stated that FOP labels are used by food manufacturers to emphasize the positives and ignore the negatives.[18] To our knowledge, no study has been done in the United States to determine how this observation has changed over time, if at all, in light of growing debate encouraging product reformulation and labeling reform. The purpose of this study was to repeat the study conducted by Colby et al., to determine how nutrition marketing on packaged food products changed over a seven year period, including changes in the frequency of nutrition marketing on products high in saturated fat, sodium, and/or sugar. Additionally, this study assessed how nutrition marketing was used on products targeted towards children and the nutritional quality of those foods.

Methods

All packaged food products (N = 6,324) in the largest grocery store in Grand Forks, North Dakota, which was one of the same stores used by Colby and colleagues in 2007[4], were documented using digital photographs. The store did not sell other department store items like clothing or shoes, gas, and was not a convenience store. The store was selected for use because it was the largest of the grocery stores in the area. Permission was obtained from the store manager to take photographs in the store. Although data were collected using photographs instead of a written survey document, to allow for comparisons between data sets all other methodology used was identical to that used by Colby and colleagues in 2007. Institutional review board approval was not required for this study because human subjects were not involved, as per US Department of Health and Human services guidelines.

The research team was trained on procedures for taking the photographs and determining variations. Product variations, which were defined as the same product in different sized packaging or different flavors with less than 20-calorie difference between variations, were recorded on a form sheet. For example, a cereal pastry with three flavors, identical calorie amounts, packaging and marketing would be recorded as one product with two variations. The Universal Product Code (UPC) was recorded and a digital photograph was taken of the first alphabetical product, i.e. chocolate with variations of strawberry and fudge. Digital photographs were taken of the front of the package, the Nutrition Facts Label, the UPC code, and the ingredients list.

Photographs were then uploaded to an online photo storage website and analyzed using an online survey process developed for use in this study for data entry. A second research team was trained on photograph analysis and coding. A team of 20 (working in groups of 2) analyzed the photographs using the online survey. The survey process documented product brand name, UPC code, target audience, marketing strategies, whether the product was fruit- or milk-based, and nutrient quality indicators of saturated fat, sodium, and sugar levels. Marketing strategies were coded as either a US FDA health claims, structure/function claims, nutrient content claims, and implied claims. The coding and categorization process used was the same as used by Colby and colleagues[4].

Nutrient quality indicators included the percentage of Daily Value (DV) for saturated fat and sodium. According to FDA designations for a high nutrient content percentage, DV percentages equal to or greater than 20% were considered high.[31] Products listing milk in the first two ingredients or a fruit-based product with fruit/juice listed in the first two ingredients or containing fruit/juice above 25% was designated as fruit- or milk-based. Using the operational definition from Colby and colleagues and recommendations for added sugars from the American Heart Association, products that were fruit- or milk-based were considered high in sugar if the product contained equal to or greater than 21 g sugar (allowing for 15 g of natural sugars), while products that were not fruit- or milk-based were considered high at equal to or greater than 6 g sugar[4].

Target audience guidelines were developed considering recommendations from the Centers for Science in the Public Interest and the Federal Trade Commission. In addition, guidelines were based on those used by Elliot and colleagues, in a recent study.[9] In order to consider a product marketed towards a child, it had to meet two of five identified marketing techniques. The categories used included 1) iconography pointedly directed to children, 2) cross-promotions, 3) foregrounding of shapes, colors, unconventional tastes, fonts, 4) puzzles, games, hidden words/messages on box advertised on the FOP, and 5) packaging.

Statistical Methods

Inter-rater reliability for the photograph team was determined using photographs of 20 food items selected by the primary investigator to represent a variety of food groups. Additionally, Kappa coefficients were determined for each photograph that team members took using the popcorn section of one aisle of a grocery store. Inter-rater reliability for the 20 food items ranged from .95 to 1.0. Kappa coefficients for the photograph team against the primary investigator ranged from .697 to .980. Inter-rater reliability for the coding team that analyzed the photographs and entered the data into the online survey was determined using photographs of 15 food items selected by the primary investigator to represent a variety of food groups. Inter-rater reliability for the coding team ranged from .987 to 1.00.

Once all the photographs were analyzed, the survey data were transferred into SPSS 21 Software. The data were weighted according to number of variations depending on matching UPC code. Frequency distributions of marketing approaches in 2014 were conducted and compared, using chi-square analyses, to the frequencies from 2007. A percentage change of greater than 2% and statistically significant was considered clinically significant for recommendation basis. An alpha level of 0.05 was used for all statistical tests.

Results

A total of 6,423 packaged food products were identified for analysis in 2014 compared to 5,500 from the same store in 2007. This study used the complete data set from 2007 for comparison. Of these products in 2014, 61.6% contained nutrition marketing. This was a significant increase compared to 49% of all products having nutrition marketing in 2007. Of those products with nutrition marketing, 44.7% had nutrition marketing and were high in saturated fat, sodium, and/or sugar in 2014, compared with 48% in 2007 **(Table 1.)** In 2014, 71% contained nutrition *and* nutrition-related marketing, which includes athlete endorsements, prizes, sweepstakes, etc. In 2007, only nutrition marketing was measured.

Only 3.1% of all products were marketed towards children in 2014, compared to 16% in 2007. Of the 201 products (3.1%) marketed towards children, 78.1% had nutrition marketing compared with 71% in 2007. Of those child-marketed products with nutrition marketing, 71.3% were high in saturated fat,

sodium, and/or sugar, which was significantly higher than the 58.6% found in 2007. In 2014, 100% of products had nutrition or nutrition-related marketing. The percentage of child products with nutrition marketing and high in sugar increased significantly between 2007 and 2014, from 49% to 66.2%, respectively. Significant changes were not seen in child products with nutrition marketing high in fat or sodium **(Table 1.)**.

Table 1. Comparison of percentages* of all products or child products with nutrition marketing overall, high in saturated fat, sodium, and/or sugar, high in fat, high in sodium, or high in sugar *with* nutrition marketing from 2007 to 2014

	Overall Products with Nutrition Marketing		High in saturated fat, sodium, and/or sugar with Nutrition Marketing		High in Fat with Nutrition Marketing		High in Sodium with Nutrition Marketing		High in Sugar with Nutrition Marketing	
	2007	2014	2007	2014	2007	2014	2007	2014	2007	2014
All Products 2007: n=56,900 2014: n=6,423	49	61.6	48.1	44.7	11.1	11.5	16.9	10.8	31.01	66.2
Child Products 2007: n=9,105 2014: n=201	71	78.1	58.6	71.3	13.4	8.6	13.5	13.9	48.95	31

*Percentages represent the percent of products high in the column nutrient(s) with nutrition marketing (i.e. "Of those products marketed towards a child and high in sugar in 2014, 31% had nutrition marketing")

The most commonly used nutrition-marketing statements on all products and those products marketed towards children in 2014 can be seen in **Table 2**. The top five statements seen in 2007 can be seen in **Table 3** with comparisons to those same statement percentages in 2014. Those statements with significant increases of clinical significance (>2% change) included: on all products food company symbol, and "All natural," on products high in sodium food company symbol, on products high in sugar "All natural, "food company symbol," and "Good source of vitamin C," on all children's products "food company symbol," "Made with real…," on children's products high in saturated fat "food company symbol," on children's products high

in sugar "food company symbol," and "Contains whole grains." Those statements with significant decreases of clinical significance (>2% change) included: on all products high in fat ""Good source of calcium," "Reduced, low, or trans fat-free," on all products high in sodium "Reduced-fat, low-fat, or fat-free," "Reduced, low, or trans fat-free," on all products high in sugar "Reduced-fat, low-fat, or fat-free," and "Good source of calcium."

Table 2. Most Common Nutrition Marketing Statements by percentage on All Products High in Saturated Fat, Sodium, and/or Sugar, High in Fat, High in Sodium, High in Sugar or Child Products High in Saturated Fat, Sodium, and/or Sugar, High in Fat, High in Sodium, High in Sugar in 2014

	Marketing Approach	% Using Marketing Approach*
Overall Top Statements on Products with Nutrition Marketing and High in Saturated Fat, Sodium, and/or Sugar	Food Company Symbol	39%
	All natural- natural	17%
	All natural- Made with real…	12%
	Contains whole grains	10%
	All natural- no preservatives	9%
Top Statements on All Products High in Fat	Food Company Symbol	12%
	All natural- natural	11%
	All natural- Made with real…	11%
	Gluten Free	7%
	All natural- no preservatives	5%
Top Statements on All Products High in Sodium	Food Company Symbol	19%
	All natural- no preservatives	8%
	All natural- Made with real…	6%
	All natural- no MSG	5%
	All natural- natural	5%
Top Statements on All Products High in Sugar	Food Company Symbol	30%
	All natural- natural	11%
	Contains whole grains	9%
	Good source of Vitamin C	8%
	All natural- Made with real…	8%

Table 2. Continued

	Marketing Approach	% Using Marketing Approach*
Overall Top Statements on Child Products with Nutrition Marketing and High in Saturated Fat, Sodium, and/or Sugar	Good source of Vitamin C	27%
	Contains whole grains	22%
	Reduced, low or saturated fat free	17%
	All natural- Made with real…	12%
	Less or no added sugar	10%
Top Statements on Child Products High in Fat	Food Company Symbol	42%
	Good source of Vitamin C	26%
	All natural- Made with real…	19%
	Reduced, low or saturated fat free	14%
	Contains whole grains	13%
	All natural- natural	11%
	Less or no added sugar	10%
Top Statements on Child Products High in Sodium	Food Company Symbol	39%
	Contains whole grains	32%
	Good source of Protein	6%
	Good source of Calcium	6%
	Reduced, low or fat free	3%
Top Statements on Child Products High in Sugar	Food Company Symbol	58%
	Good source of Vitamin C	29%
	Contains whole grains	20%
	Reduced, low or saturated fat free	18%
	All natural- Made with real…	13%
	Less or no added sugar	11%

*Percentages represent the number of products from the subset in the left column with the nutrition marketing statement (i.e. 58% of child products high in sugar contain the statement "Food company symbol")

Of products in 2014 with the claim "Lower calories, reduced calories" 24% were high in saturated fat, sodium, and/or sugar; "Gluten Free" 37.7% were high in saturated fat, sodium, and/or sugar, "Low or sodium free" 23.2% were high in saturated fat, sodium, and/or sugar; "Made with real…" 53.3% were high in saturated fat, sodium, and/or sugar; "food company symbol" 52.8% were high in saturated fat, sodium, and/or sugar; and "Heart Healthy" 36.1% were high in saturated fat, sodium, and/or sugar.

Products in 2014 with a "Less or no added sugar" claim were significantly more likely (77.8%) to be high in saturated fat, sodium, or sugar when marketed towards children compared to non-child marketed items (33.5%). Products with a "Good source of vitamin C" claim were significantly more likely (82.6%) to be high in saturated fat, sodium, and/or sugar when marketed towards children compared to non-child marketed items (53.7%). Products with a "Contains whole grains" claim were significantly more likely (91.2%) to be high in saturated fat, sodium, and/or sugar when marketed towards children compared to non-child marketed items (43.9%). Products with a "food company symbol" claim were significantly more likely (89.9%) to be high in saturated fat, sodium, and/or sugar compared to non-child marketed items (50.1%).

Unique claims to 2014 included "No high fructose corn syrup," "Weight Watchers," a Charity logo (Feeding America, No Child Hungry, Rainforest Alliance), and "Box Tops for Education/Labels for Education." Of the products (1.2%) labeled with "No high fructose corn syrup," 57% were high in saturated fat, sodium, and/or

sugar. Of the products (0.8%) labeled with "Weight Watchers," 34% were high in saturated fat, sodium, and/or sugar. Of the products (0.8%) labeled with a charity claim, 66% were high in saturated fat, sodium, and/or sugar. Of the products (1.2%) labeled with a "Box Tops for Education/Labels for Education," 54.5% were high in saturated fat, sodium, and/or sugar.

A chi-square test indicated a significant difference between nutrition marketing in those products high in saturated fat, sodium, and/or sugar and those products not high in saturated fat, sodium, and/or sugar. Nutrition marketing appeared more on products that were not high in saturated fat, sodium, and/or sugar (63.2%) compared to those that were high in saturated fat, sodium, and/or sugar (59.8%). A second chi-square test indicated products marketed towards children were significantly more likely to have a nutrition marketing claim (78.1%) compared to non-child marketed products (61.1%).

Table 3. Percentage* comparisons of the Top Five Statements from 2007 and Those Same Statements in 2014				
	Nutrition Marketing Statement	**2007 Percentage**	**2014 Percentage**	****p value**
Overall top 5 nutrition marketing approaches used on all products	**Reduced-fat, low-fat, or fat-free**	**8.70%**	**6.80%**	**<.001**
	Food Company Symbol	**5.70%**	**20.60%**	**<.001**
	All-Natural	**5.70%**	**12.10%**	**<.001**
	Reduced, low, or trans fat-free	5.60%	6.00%	0.145
	Lower Calories	**5.00%**	**7.30%**	**<.001**
All products high in fat	**Good Source of Calcium**	**14.80%**	**2.00%**	**<.001**
	Food Company Symbol	13.00%	12.30%	0.635
	Made with real…	12.60%	10.60%	0.131
	All-Natural	11.60%	10.80%	0.575
	Reduced, low, or trans fat-free	**9.40%**	**4.30%**	**<.001**
All products high in sodium	**Reduced-fat, low-fat, or fat-free**	**10.70%**	**4.70%**	**<.001**
	Reduced, low, or trans fat-free	**8.30%**	**4.30%**	**<.001**
	Food Company Symbol	**8.00%**	**18.70%**	**<.001**
	No Preservatives	7.00%	8.40%	0.082
	Made with real…	6.50%	5.90%	0.474
All products high in sugar	**Reduced-fat, low-fat, or fat-free**	**6.80%**	**3.90%**	**<.001**
	Good Source of Calcium	**6.60%**	**3.50%**	**<.001**
	All-Natural	**5.60%**	**11.00%**	**<.001**
	Food Company Symbol	**4.90%**	**29.60%**	**<.001**
	Good Source of Vitamin C	**4.60%**	**7.70%**	**<.001**
Overall top 5 nutrition marketing approaches used on children's products	Good Source of Calcium	7.60%	6.00%	0.499
	Reduced-fat, low-fat, or fat-free	7.30%	7.00%	1.000
	Food Company Symbol	**7.20%**	**44.30%**	**<.001**
	Made with real…	**6.90%**	**17.40%**	**<.001**
	Reduced, low, or trans fat-free	6.80%	4.50%	0.253

Table 3. Continued				
	Nutrition Marketing Statement	**2007 Percentage**	**2014 Percentage**	****p value**
Children's products high in saturated fat	Made with real…	17.20%	4.80%	0.235
	Food Company Symbol	**16.10%**	**66.70%**	**<.001**
	Good source of Calcium	15.60%	9.50%	0.759
	Reduced, low, or trans fat-free	13.80%	0.00%	0.099
	All-Natural	5.80%	0.00%	0.628
Children's products high in sodium	**Food Company Symbol**	**16.30%**	**38.70%**	**0.003**
	Good Source of Calcium	15.70%	6.50%	0.211
	Made with real…	**11.10%**	**0.00%**	**0.041**
	Reduced, low, or trans fat-free	8.10%	3.20%	0.507
	Good Source of Protein	7.40%	3.20%	0.722
Children's products high in sugar	Good source of calcium	9.60%	10.40%	0.723
	Good source of vitamins and minerals	**7.80%**	**1.50%**	**0.004**
	Food Company Symbol	**7.10%**	**57.60%**	**<.001**
	Contains whole grains	**6.50%**	**19.70%**	**<.001**
	Reduced-fat, low-fat, or fat-free	**6.30%**	**0.80%**	**0.005**
***Percentages represent the number of left column products with the marketing statement **An alpha level of 0.05 was used for all statistical tests. Statistically significant changes of >2% are bolded.**				

Discussion

The overall number of products in the supermarket increased from 5,500 products in 2007 to 6,423 in 2014. In the past seven years, nutrition marketing increased significantly, from 49% to 61.6% for all products and from 71% to 78.1% for child marketed products. The overall percentage of child marketed products decreased significantly from 16% to 3.1%. While it is a positive change that less

products are marketed towards children overall, 71.3% of these child products were high in saturated fat, sodium, and/or sugar in 2014, an increase from 58.6% in 2007. Additionally, child products high in sugar increased from 49% to 66.2%. These results are higher than previous studies, which determined that roughly half of all packaged food products would contain nutrition marketing.[4,17,24-26]

While nutrition marketing did appear more on products not high in saturated fat, sodium, and/or sugar, it still appeared on 59.8% of products that were high in saturated fat, sodium, and/or sugar. Dr. Lisa Sutherland of Kellogg's, states that FOP labels are part of a food manufacturer's marketing scheme, allowing the manufacturer to communicate with the consumer.[18] This is concerning when despite the presence of a claim the product remains high in saturated fat, sodium, and/or sugar. For example, if a clinician counseled a patient to look for heart healthy foods, and this client purchased a product with a "Heart Healthy" claim, there would be a 36.1% chance that this product would be high in saturated fat, sodium, and/or sugar.

Despite the FDA's recommendations for a singular front of package labeling scheme, food companies continue to print company-specific schemes such as the Facts Up Front model.[13,23] This study found that 52.8% of products with a "food company symbol" printed on the FOP were high in saturated fat, sodium, and/or sugar. Additionally, the "food company symbol" was the most frequently used claim overall, appearing on 39% of products. As Table 3 demonstrates, self-regulation by the food industry may not be working like the FDA and nutrition experts would like,

because percent increases of food company symbols on products high in saturated fat, sodium and/or sugar of up to 50% were observed between 2007 and 2014. Sixty-seven percent of US consumers reference FOP marketing often or sometimes when making purchasing decisions and the presence of this marketing leads the consumer to perceive a higher quality and increase their purchase intentions of the product.[11] Given that current FOP marketing schemes are based on differing criteria, consumers are often left to interpret these differing schemes on their own.

The Children's Food and Beverage Advertising Initiative (CFBAI), initiated in 2006, works with leading consumer packaged goods companies and quick serve restaurants to direct marketing at children under 12–years-old to influence them to make healthier choices.[20,22] The system started with companies pledging to act according to their company-generated specifications. A study released in 2011 by the Prevention Institute, looked at 84 food products marketed towards children on the list and if they met healthy criterion.[21] The results were disappointing as they found that 84% of the products did not meet criterion and would be considered unhealthy.[21] Since that study, the CFBAI made multiple changes including uniform standards for all members instead of company-specific ones, and a 100% product commitment instead of 50% previously.[20] Additionally, according to a CFBAI presentation given to the White House in 2013, television food ads have decreased significantly from 2007 to 2013.[20] A parallel trend to this decrease was found in this study with the decrease in the percentage of overall products marketed towards children using front-of-package marketing. Clinicians should be advised that while

there are fewer products marketed towards children currently in the supermarket, there is a greater chance those products are high in saturated fat, sodium, and/or sugar. Additionally, given that parents are more likely to purchase a product for their children if it contains a nutrition-marketing claim, parents should be educated to evaluate a product using the Nutrition Facts Label.[28]

Although this study rigorously evaluated a large number of products, there were limitations. Only products that were currently in stock and on the shelves on the day of data collection were included. Additionally, the guidelines for determining whether a product was marketed towards children inherently contained subjectivity. Efforts were made to decrease this subjectivity by using input from multiple respectable institutions and basing the guidelines on those used in another published study.

Implications for Research and Practice

This study highlights the importance for practitioners to educate consumers on potential misleading nutrition marketing on the front of food packages. In the absence of government regulated front-of-package symbols, practitioners may need to focus on educating consumers on how to evaluate food products using the Nutrition Facts Panel. It may be advisable to go so far as to advise consumers to be weary of products containing front-of-package nutrition marketing, especially terms such as "made with real," "all natural," "no preservatives," "contains whole grains,"

or a “food company symbol.” This may be an even more appropriate nutrition education message for products marketed toward children.

Additionally, as Nutrition Facts Label requirement changes are being proposed, continuing to monitor nutrition marketing on the front-of-package will be critical. Nutrient content claims may be printed if the specified nutrient meets a percentage threshold of the DV.[30] In the proposed changes the daily values would be revised and serving sizes, based on Reference Amounts Customarily Consumed, would be changed to reflect current consumption amounts.[32] These changes would alter the percentage thresholds required to be met to print a nutrient content claim potentially leading to an increase in the number and variety of claims printed.[33] Nutrition-marketing does work to influence consumer purchasing, and practitioners should be prepared and educated to aide clients in making food choices.

CHAPTER THREE: EXPANDED METHODS

Project Overview

The goal of this project was to obtain an overview of current front-of-package (FOP) nutrition-related marketing usage on packaged food products. The project met three aims: 1) determined the frequency of FOP nutrition-marketing on packaged food products high in saturated fat, sodium, and/or sugar, 2) analyzed the frequency of FOP nutrition-marketing on products marketed towards children vs. adults, and 3) determined differences in nutrition marketing from 2007 to 2014. Additionally, the results of this project were compared to a previous study[4], allowing for analysis of food package marketing changes since 2007. Background information and relevant studies and resources were extracted and summarized through a review of the literature. Guidelines were then developed to determine high levels of saturated fat, sodium, and sugar and to differentiate packaged food products marketed towards children vs. towards adults.

The largest grocery store in Grand Forks, North Dakota was identified and every packaged food product in the store was included in data collection and analysis. A research team was gathered, trained, and inter-rater reliability was determined. The research team took digital photographs of all packaged food products in one grocery store in Grand Forks, North Dakota and uploaded them to an online storage website. FOP nutrition-related schemes, claims, and characteristics were coded and used during photograph analysis using an online

survey by the data analysis team. Data were then entered into SPSS 21 and chi-square analyses and a logistic regression were run to test the hypotheses. Codes were modeled off of ones used in the previous study.[4]

Research Team

The research team was comprised of individuals with an interest in food marketing. The primary researcher has served as a graduate teaching assistant and has experience working with children through assisting in teaching classes for the iCook-4H program, which is a program promoting health for 9-10-year-olds and their primary meal provider through cooking lessons, physical activity education, and promotion of family meals. Additionally, the primary researcher served as the nutrition team leader and counselor at an accredited weight loss camp for children and adolescents.

The research advisor, Dr. Sarah Colby, has over 15 years of research experience.[34] Her research is focused on obesity prevention and health communication using novel nutrition education strategies such as marketing, arts, and technology.[34] She also served as the primary investigator for the comparison study, "Nutrition Marketing on Food Labels.[4]" Additionally, Dr. Colby is a registered dietitian and a member of the Healthy Campus Research Consortium (HCRC). The HCRC is a multi-state research team with expertise in food choice behaviors and marketing.[34]

Research scientists and staff from the United States Department of Agriculture's Grand Forks Human Nutrition Research Center in Grand Forks, North Dakota assisted in procedure development and data collection. Graduate students from The University of Tennessee, Knoxville and undergraduate students from The University of Tennessee, Knoxville and the University of North Dakota assisted with the data collection and data entry. Research assistants were recruited using emails through student organizations related to the project at both universities.

Procedures

LITERATURE REVIEW

A literature review was conducted using the PubMed Database and The Yale Rudd Center for Food Policy & Obesity Front-of-Package Labeling website. Due to the fact that, to the best of our knowledge, limited data were available on the subject, inclusion criterion were expanded to include studies on FOP marketing schemes targeted towards children and the frequency of nutrition marketing both internationally and nationally. Information about the history of food labeling and current regulations were also included to provide relevance of the topic. Studies were excluded that studied consumer perceptions of marketing.

GUIDELINES DEVELOPMENT

Methodology was identical to that used by Colby et al., to allow for comparisons between data sets[4], except that data were collected using digital photographs instead of a survey document.

Saturated Fat

Guidelines for saturated fat levels were based on the 2010 Dietary Guidelines recommendations, which suggest consuming less than 10% of calories from saturated fat.[35] Using a 2,000 kcal/day diet as baseline, any product containing equal to or greater than 20% the Daily Value for saturated fat was considered high per FDA standards for a nutrient to be considered high.

Sodium

Guidelines for sodium levels were based on the 2010 Dietary Guidelines recommendations of restricting intake to 2,300 mg/day for most individuals.[35] Per FDA guidelines for a nutrient to be considered high, if 20% or greater of the Daily Value for sodium is present in the product, it was considered high in sodium.

Sugar

Guidelines for determining a product high in sugars were based off of recommendations from the American Heart Association.[36] Per recommendations, 6 teaspoons for women and 9 teaspoons for men were used as cut-offs for a high level of added sugar. Initially, the product was determined fruit or milk based. If a product was fruit or milk based, a baseline of 15 grams of sugar was assumed and 6 grams of additional sugar categorized the product as high in sugar. This was based off of FDA standards for a nutrient to be considered high as >20% of the Daily Value.

Thus, if a product had greater than 21 grams of sugar it was considered high in sugar. Conversely, if the product was not fruit or milk based, no baseline for sugar was considered and greater than 6 grams of sugar, per FDA guidelines, was considered high in sugar.

MARKETING TECHNIQUES DIRECTED TOWARDS CHILDREN

A set of guidelines was developed considering recommendations from the Centers for Science in the Public Interest and the Federal Trade Commission.[37] In addition, guidelines were based off of those used by Elliot et al., in a recent study.[9] Five categories of marketing techniques were identified. For a food package to be marked as targeted towards children, at least two of the five categories must have been present on the FOP. The categories that were used are as follows:

1. Iconography: pointedly directed to children
    a. Cartoons, licensed characters, company characters, celebrity endorsements, athlete endorsements
2. Cross-promotions:
    a. Popular TV, movie, book references
    b. Referrals to websites, video games, code entries
    c. Premiums, prizes, toys, contests/sweepstakes, coupons, collectibles
    d. Merchandise
    e. Theme parks, other entertainment venues
    f. Limited edition foods
3. Foregrounding of shapes, colors, unconventional tastes, fonts
4. Puzzles, games, hidden words/messages on box advertised on the FOP
5. Packaging:
    a. Package shapes (Mickey Mouse head, etc…)
    b. For school (Lunchables, etc…)

Two exceptions to these guidelines were identified as, cartoon images on the package as the brand label such as Jolly Green Giant and Betty Crocker, and

predetermined "kids foods," were not automatically considered eligible unless they met the outlined guidelines, for example, Macaroni & cheese, Chef Boyardee.

Data Collection

Digital photographs were taken of the FOP, Nutrition Facts, and Universal Product Code (UPC) labels of each packaged food product in one grocery store in Grand Forks, North Dakota. Photographs were then analyzed and coded by trained research assistants using a Qualtrics© survey. The data were entered into databases in SPSS 21 Software. Databases were created prior to data collection.

IDENTIFICATION OF GROCERY STORES

Grocery stores were identified in Grand Forks, North Dakota using Google Maps. Convenience and corner stores, supermarkets, and international markets were not included. Only the largest grocery store in Grand Forks, North Dakota was included in data collection.

RESEARCH TEAM TRAINING

The research team was trained prior to data collection in Grand Forks, North Dakota. Research assistants were trained on the data collection process by the primary investigator. The training familiarized the team with the study aims and taught the research team appropriate protocol for documenting the front-of-package, Nutrition Facts, and UPC code panels using a digital camera to take

photographs. The research team was shown how to operate the digital cameras, insert the memory cards, upload the photographs to the computer and how to upload the photographs onto the online storage website. Additionally, the training taught the research team how to distinguish unique food products. A unique food product was defined as one for which no previous identical product had been recorded in the same grocery store within 20 calories and presented identical nutrition marketing on the FOP. In the training, the primary investigator showed the research team a series of ten packaged food products from different food groups and went through the process of determining unique food products using a PowerPoint Presentation. The research team was able to ask any questions about the process during the training. The team was then shown twenty food packages, from various food groups, and was asked to identify the number of unique food products individually. Photographs of the front-of-packages of 20 different food packages were printed and arranged on a table in a format similar to how products will be viewed in the grocery store. The research team then was given a sheet of paper with blank lines representing each individual product. The individual marked and "x" or a check mark to indicate whether they would take a picture of the product. Inter-rater reliability (IRR) was then measured, against a key made by the primary investigator, and 80% agreement was reached before beginning data collection. (See Appendix A for training documents). If all research assistants did not reach 80% agreement, those assistants not reaching 80% would have been retrained and IRR would be determined a second time. If 80% agreement was not reached the second time, the assistant would be removed from the research team.

Additionally, all research assistants analyzed one section of the same aisle of a selected grocery store to determine a secondary IRR, with 80% agreement, and Kappa coefficients between the numbers of unique photographs indicated by each research assistant was determined against the primary investigator. Research assistants followed the same protocol as above, marking an "x" or a checkmark to indicate if they would take a picture of the product. If 80% agreement was not reached, the research assistant would be retrained and IRR would be determined a second time. If the research assistant did not meet 80% agreement the second time, they would have been removed from data collection.

Data Collection in Grocery Stores

The research team worked to collect data in the grocery store in Grand Forks, North Dakota. The team documented each unique food product using digital photographs. The store manager was contacted prior to data collection to obtain permission to take photographs. The primary investigator spoke to the manager of the store and obtained a signature of agreement with the listed objectives, time estimates, and protocols (See Appendix B).

The research team split the aisles between research assistants for analysis. The aisles were analyzed starting at the end closest to the front of the store and working towards the back of the store, starting with the aisle to the left of the store and ending with the aisle to the right of the store. Photographs of all products were taken unless the product was identical to another product already recorded with a

calorie difference of <20 kcal and presented identical nutrition marketing. The assistant documented store and aisle criterion including assistant name, store name, date and time, and aisle number and took a photograph of the criterion prior to photographing any food products on that aisle (See Appendix C). Then, the assistant photographed the FOP, Nutrition Facts, and UPC code labels including the ingredients list. If a product was not a unique food product, the UPC code of the unique food product photographed was recorded and the number of variations was written down on a form sheet (See Appendix D). The first alphabetical product in a variation group was photographed and recorded. At the end of an aisle, the assistant photographed a sheet of paper with the identical criterion as above, indicating the end of the aisle. Once an assistant started an aisle, the aisle was finished. Assistants reviewed all photographs taken that day at the end of the day to ensure all photographs showed the entire label and were not blurry. Assistants then uploaded all photographs taken that day. If there was an issue with the photographs, the assistant retook the photographs.

All research assistants were given the primary investigator's cell phone number, allowing the assistants to live text the primary investigator with any questions throughout the data collection process. Additionally, all research assistants were given a direction sheet including important points summarized from the training (Appendix A).

Analysis

After data collection, product information and codes were entered into an online survey. The survey was created specifically for this project. The survey collected the following data: brand name, item description, UPC code, target audience, categorized code claims, additional claims, fruit- or milk-based or not, and nutrient content levels of saturated fat, sodium, and sugar (See Appendix E for categorized claim codes). Each research assistant was given a unique survey link. The primary investigator trained the research team on protocols for analyzing the photographs using an online YouTube© video. The training was a three-step process. First, the research team was shown one packaged food product and the primary investigator went through a detailed thought process for coding the food product. Second, a different packaged food product was shown and the research assistants coded the front-of-package individually, pausing the video as needed. If an individual had a question- they paused the video and emailed or texted the primary investigator to get an immediate answer. Finally, the research team was shown fifteen packaged food products and coded each product individually using the online survey. The survey was identical to the one used for data collection, with the exception that all research assistants were given the same link so that IRR could be calculated. A supplemental document was available to all research assistants summarizing all of the guidelines (See Appendix F). IRR was determined for the third step and 80% agreement was reached before data analysis continues. IRR was determined against the key of the primary investigator. If one assistant did not

reach 80%, they were retrained and IRR was re-determined. If IRR still did not reach 80% the assistant was removed from the research team.

The research team then worked in pairs to analyze each photograph and enter the information into the survey. Once all of the products were analyzed, the data was transferred from the survey into SPSS 21. The data were weighted according to number of variations dependent on matching UPC code.

Chi-square analyses and a logistic regression were conducted to test the hypotheses. An alpha level of 0.05 was used for all statistical tests.

Hypothesis 1: Nutrition marketing is used more commonly on the front-of-package of foods that are high in saturated fat, sodium, and/or sugar than those products that are not high in saturated fat, sodium, and/or sugar.

A chi-square test was calculated comparing if nutrition marketing appears more on products high in saturated fat, sodium, and/or sugar than those not high in saturated fat, sodium, and/or sugar.

Hypothesis 2: Products that are targeted toward children contain more nutrition marketing than products targeted towards adults.

A chi-square test was done comparing if nutrition marketing appears more on products targeted towards children or towards adults. A chi-square test was completed comparing if nutrition marketing on products targeted towards children appeared more on products high in saturated fat, sodium,

and/or sugar or those products not high in saturated fat, sodium, and/or sugar. Logistic regression determined the likelihood that a product would have nutrition marketing on the front-of-package based on target audience and be high in saturated fat, sodium, and/or sugar. Logistic regression was not a good representation of the data given the small sample size of child-marketed products.

In the study conducted by Colby and colleagues[4], frequency distributions were calculated for individual label claims, for the claim categories for all food items and for those items marketed toward children, and for label claims for all food groups. The percentage results from Colby and colleagues were recorded into an Excel spreadsheet and used to compare against percentages from the current study using Chi-square analyses to determine if the data were statistically different. Frequency distributions were also conducted to determine top claims, food groups, and claims unique to 2014. The data were summarized in tables.

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APPENDICES

Appendix A

Data Collection Directions

1. Ask for a store manager to inform him/her that you will be in the store collecting data using digital photographs as described and permitted earlier
2. Record aisle criterion on sheet of paper and photograph
    a. Your name
    b. Today's date
    c. Store name
    d. Aisle number
    e. Write "Beginning of aisle"
3. Photograph all unique food products on one entire aisle
    a. A unique food product is one in which no previous identical product has been recorded in the same grocery store within 20 kcal and presenting identical nutrition marketing on the FOP
4. At the end of one aisle photograph a sheet of paper with the same aisle criterion from step 2 except criteria 2e should read "End of aisle"
5. Walk back down the aisle just photographed to be sure you did not forget any products
6. After you are finished with data collection for one day, review all photographs taken to ensure each is not blurry and contains the entire label.
7. Upload all photographs taken from that day to the SmugMug profile account
8. Email Ana Hoffmann the aisles you have completed and that the photographs have been uploaded at _____.

Photograph Uploading Procedures

1. Go to SmugMug.com
2. Log in
    a. Username:
    b. Password:
3. Click “Create” & Select “Gallery”
4. Title your gallery using your “Store Name, Aisle #, and the left or right side of the aisle

Store Name	**Aisle #**	**Left or Right Side**
Hugo13, HugoColumbia, HugoWashington, Hugo32	As indicated on store map	Indicate which side of the aisle you are documenting from standing at the front of the store
SuperOne		

    a. Examples: “Hugo13A4R” “SuperOneA12L”

5. Set privacy setting to “Only Me”
6. Select “Create” at the bottom right of the window to create the Galler
7. Upload the aisle photographs to the newly created gallery
8. Email anaehoffmann@gmail.com once completed

Appendix B

Assessing Current Front-of-Package Nutrition Marketing in Grocery Stores in Grand Forks, ND

Hypothesis: Nutrition marketing is used more commonly on the front-of-package of foods that are high in saturated fat, sodium, and/or sugar than those products that are low in saturated fat, sodium, and/or sugar. Secondly, products that are targeted toward children contain more nutrition marketing than products targeted toward adults. Finally, comparing results (from data collected in Grand Forks, ND eight years ago on the frequency of nutrition marketing on front-of-packages with current frequencies) will show an increase in the percentage of products with nutrition marketing.

The project:

- Replication of study done by Dr. Sarah Colby in Grand Forks, ND 8 years ago
- Collaboration with Grand Forks Human Nutrition Research Center
- All packaged food products in five grocery stores in Grand Forks, ND *will be photographed* and then analyzed for nutrition marketing

Grocery Store Participation

- Undergraduate UND student volunteers would go into the five grocery stores in Grand Forks, ND and take photographs, using a digital camera or Smartphone, of the front-of-package and Nutrition Facts Table panels of all packaged food products
- Timeline
    - We anticipate data collection to take ~40 hours per store
    - One student will be assigned per store and will work at times convenient for the store if necessary

Although verbal permission has been obtained from a store manager over phone, this form will serve as written permission for the student to be in the store in case a different manager is unaware that permission has already been granted. Thank you for your cooperation, without you this project could not proceed!

_____

Store Manager Name, Printed

_____

Store Manger Name, Signed

_____

Date and Time

For more information please contact: Ana Hoffmann at ahoffma8@utk.edu or 919-422-0705

Appendix C

Your Name: _____

Store Name: _____

Aisle Number: _____

Date: _____

Time: _____

Circle One: Beginning/End

Appendix D

UPC Code: 12345678905

UPC CODE	VARIATION #

Appendix E

FDA Approved Health Claims- characterizes the relationship of any substance to a disease or health-related condition. Implied health claims include those statements, symbols, vignettes, or other forms of communication that suggest, within the context in which they are presented, that a relationship exists between the presence or level of a substance in the food and a disease or health-related condition, health claims are limited to claims about disease risk reduction

Calcium and osteoporosis
Sodium and hypertension
Dietary fat and cancer
Dietary saturated fat and cholesterol and risk of coronary heart disease
Fiber containing grain products, fruits and vegetables and cancer
Fruits, vegetables and grain products that contain fiber and risk of coronary heart disease
Fruits and vegetables and cancer
Folate and neural tube defects
Dietary sugar alcohol and dental caries
Soluble fiber from certain foods and risk of coronary heart disease
Soy protein and risk of coronary heart disease
Plant sterol/stanol esters and risk of coronary heart disease

FDAMA- Approved By Authoritative Statement
Whole grain foods and risk of heart disease and certain cancers
Whole grain foods with moderate fat content and risk of heart disease
Potassium and risk of high blood pressure and stroke
Fluoridated water and reduced risk of dental carries
Saturated fat, cholesterol, trans fat, and reduced risk of heart disease
Substitution of saturated fat in the diet with unsaturated fatty acids and reduced risk of heart disease

Qualified Health Claims

.8 mg folic acid and neural tube birth defect
B vitamins and vascular disease
Selenium and cancer
Antioxidant vitamins and cancer
Phosphatidylserine and cognitive dysfunction and dementia
Nuts and heart disease
Walnuts and heart disease
Omega-3 fatty acids and coronary heart disease
Monounsaturated fatty acids from olive oil and coronary heart disease
Green tea and cancer
Chromium picolinate and diabetes
Calcium and colon/rectal cancer and calcium and recurrent colon/rectal polyps
Calcium and hypertension, pregnancy-induced hypertension and preeclampsia
Tomatoes and/or tomato sauce and prostate, ovarian, gastric and pancreatic cancer
Unsaturated fatty acids from canola oil and reduced risk of coronary heart disease
Corn oil and corn oil containing products and reduced risk of heart disease
100% whey protein partially hydrolyzed infant formula and atopic dermatitis

Nutrient Content Claims- directly or by implication characterizes the level of a nutrient in the food (low fat, high in oat bran, contains 100 calories)

All natural- natural
All natural- no artificial sweeteners
All natural- no preservatives
All natural- no additives
All natural- no MSG
All natural- no artificial flavors
Good source of Calcium
Good source of Iron
Good source of Folic acid
Good source of Protein
Good source of/high in Fiber
Good source of Vitamin A
Good source of Vitamin B/Riboflavin/Thiamine
Good source of Vitamin C
Good source of Vitamin D
Good source of Vitamin E
Good source of Vitamin A, B, C, D, E
Good source of Vitamin A, C, E
Good source of potassium
Good source of Magnesium
Good source of Zinc
Good source of Vitamins & minerals
100& Juice- 100% Fruit
Packed in Water
Packed in 100% Juice
Packed in Light Syrup
Reduced, low or fat free
Reduced, low fat or cholesterol/no hydrogenation
Reduced, low or trans fat free
Reduced, low or saturated fat free
Lower calories: less, fewer or % reduced, lite
Gluten Free
Caffeine free
Lactose Free
Protein
No silicon
No alcohol
Low or sodium free
Low carb
Less or no added sugar
Splenda
Stevia
Naturally sweetened
Healthy
100 Calories

Structure/Function Claims - describes the effect that a substance has on the structure or function of the body and does not make a reference to a disease

Calcium builds strong bonds
Fiber maintains bowel regularity
Antioxidants maintain cell integrity
Other: please list

Implied Claims

All natural- made with real…
All natural- all white meat
All natural- organic
All natural- allergens
Good source of antioxidants
Good source of beta carotene
Good source of omega 3 fatty acids
Good source of lycopene
Good source of soy protein
Good source of isoflavins
Weight control
Helps burn fat
Contains whole grains
Multigrain/grain/oat bran
Sugar- ADA approved
Low glycemic
Gives energy
Hydrates, with electrolytes or thirst quencher
MyPlate
Smart choice/Facts Up Front/Multiple Traffic Light/emblems/Health tags
Heart healthy
Easy to digest
Great for infants
Health professionals recommended
Green Tea
Healthy
No GMO's
Vegan
Kosher
Vegetarian

Dietary Guidance Statements- An example of dietary guidance, which does not refer to a specific substance but rather refers to a broad class of foods without an expressed or implied connection to a specific substance that is present the class of foods is: "Consuming at least 3 or more ounce-equivalents of whole grains per day can reduce the risk of several chronic diseases

Carrots are good for your health
Calcium is good for you

Other

Facebook, Twitter, Instagram, Pinterest
Sweepstakes, contest
QR Codes

Kettle Cooked

Made in "Country/State"

Reference to Restaurant

Reference to Food Brand

Convenience “Pop-up bag, Only takes __ Minutes, On the go”

New

Better Taste, Taste Preferred Over, etc…

Food Groups

Dairy and egg products

Spices and herbs

Baby food

Fats and oils

Poultry products

Soups, sauces, and oils

Sausages and luncheon meats

Breakfast cereals

Fruit and fruit juices

Pork products

Vegetables and vegetable products

Nut and seed products

Beef products

Finfish and shellfish products

Legume and legume products

Lamb, veal, and game products

Baked products

Sweets

Grains and pastas

Meals, entrees, and side dishes

Snacks

Appendix F

Analyzing Supplement

SmugMug Account Information:

Username: anaehoffmann@gmail.com
Password: Marketing

Determining if a food is marketed towards a child:

The product must meet two of the below guidelines.

1. Iconography: pointedly directed to children
    a. Cartoons, licensed characters, company characters, celebrity endorsements, athlete endorsements
2. Cross-promotions:
    a. Popular TV, movie, book references
    b. Referrals to websites, video games, code entries
    c. Premiums, prizes, toys, contests/sweepstakes, coupons, collectibles
    d. Merchandise
    e. Theme parks, other entertainment venues
    f. Limited edition foods
3. Foregrounding of shapes, colors, unconventional tastes, fonts
4. Puzzles, games, hidden words/messages on box advertised on the FOP
5. Packaging:
    a. Package shapes (Mickey Mouse head, etc…)
    b. For school (Lunchables, etc…)

Two exceptions to these guidelines will be identified as, cartoon images on the package as the brand label such as Jolly Green Giant and Betty Crocker, and predetermined "kids foods," will not automatically be considered eligible unless they meet the outlined guidelines, for example, Macaroni & cheese, Chef Boyardee.

Determining if a product is fruit- or milk-based:

Any product listing milk in the first 2 ingredients or a fruit-based product with fruit/juice listed in the first 2 ingredients or containing fruit/juice above 25% will be designated as fruit or milk based.

VITA

Ana Hoffmann graduated from Ravenscroft High School in 2009. She earned her Bachelor of Science in Food Science with a concentration in Human Nutrition and Dietetics and a minor in Chemistry from Clemson University in Clemson, South Carolina in 2013. During her undergraduate career, Ana worked as a volunteer for many university and community research projects. Additionally, she had opportunities to work as a counselor and nutrition team leader at a weight loss camp for children and serve as a volunteer for the ClemsonLIFE program where she taught nutrition and cooking skills to special needs students. Ana began the graduate program at the University of Tennessee, Knoxville in Fall 2014, and is currently earning her Master's of Science in Nutrition with a concentration in Public Health Nutrition. She is expected to graduate in August 2015. Ana works as a Graduate Teaching Assistant at the University of Tennessee and has had the pleasure of assisting with two unique undergraduate classes. She will begin the dietetic internship in January 2015 in Knoxville, TN.