

Understanding How Nutrition Is Promoted to Children in Schools: Content Analysis of Nutrition  
Marketing in Arizona School Cafeterias

by

Raevyn Francine Xavier

A Thesis Presented in Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

Approved February 2021 by the  
Graduate Supervisory Committee:

Meg Bruening , Chair  
Marc Adams  
Cori Lorts

ARIZONA STATE UNIVERSITY

May 2021

## ABSTRACT

**Objective:** To conduct a content analysis of nutrition marketing in school cafeterias in Arizona to understand how nutrition concepts are currently marketed to students. This is the first study to investigate the content of nutrition marketing in school cafeterias, and also the first to compare content across elementary, middle, and high schools.

**Methods:** Photographs of marketing materials on display in school cafeterias were obtained from a convenient sample of 13 elementary schools, 12 middle schools, and 12 high schools. In total, n=284 examples of nutrition marketing were collected. The photographs were sorted by grade level and then coded quantitatively and qualitatively based on their purpose, visual aspects, marketing strategies used, and language and literacy aspects. Given the multiple comparisons, statistical significance was assessed with a Bonferroni adjustment of  $p < 0.0006$ .

**Results:** The average number of nutrition marketing materials within the school cafeterias was  $7.7 \pm 7.2$ . The purpose of the marketing materials ranged from promoting selection and consumption of fruits and vegetables, promoting nutrition and physical activity together, food safety, and educating about healthy eating. The sample of nutrition marketing materials emphasized selecting F/Vs over consumption of F/Vs. However, the opposite was found in marketing that exclusively promoted fruits and vegetables. The most common type of marketing in school cafeterias were flyers and most the materials were small in size. The sample demonstrated a lack of implementation of marketing appeals in half of the sample, but the half that did utilized techniques that are known to be appealing to child and adolescent demographics, such as use of cartoons, humor, and social media/websites. 98.9% of the nutrition marketing with text were written in English and only 1.1% of the materials (n=3) were written in Spanish.

**Conclusion:** The nutrition marketing sample demonstrated some use of social marketing principles but does not compete with the scale and scope of the child-directed food and beverage marketing that students encounter in their environment. More research is needed to better understand how to best target nutrition marketing to child and adolescent student populations.

## DEDICATION

I dedicate this thesis to the incredible support system that has kept me grounded, passionate, and driven through my entire thesis writing process. I offer my sincerest gratitude to my parents, grandparents, mentors, friends, extended family, and chosen family. Thank you all for believing in me. I especially want to dedicate this thesis to my Bubbe Gail, for always inspiring me with your brilliant mind, appreciation for community, and endless grandmotherly support.

## ACKNOWLEDGMENTS

I would like to acknowledge my incredible mentor, Meg Bruening, for her unwavering support and guidance through the lifespan of this thesis project. She's helped me push my potential and ignite my passion for the field. Thank you to Marc Adams and Cori Lorts for serving on my thesis committee and providing valuable insight throughout this process. I also want to acknowledge Chanel Haifley for her dedication to coding this data with me, despite an 8-hour time difference, and her loving investment in supporting me through all of my accomplishments. Lastly, a special acknowledgement to Joy Ren for being the most supportive best friend I could ever ask for. Her unwavering compassion for me every step of the way is the reason completing this thesis was possible.

## TABLE OF CONTENTS

	Page
CHAPTER	
1 INTRODUCTION .....	1
Study Purpose and Research Aims .....	3
Definition of Terms .....	4
2 REVIEW OF LITERATURE .....	5
Adverse Effects of Poor Diet in Child Populations.....	5
Typical Diet of School-Aged Children .....	6
Improving Child Diet Quality.....	8
School's Influence on Children's Diets.....	9
Variation in School's Approach to Improving Diet Quality of Students.....	11
Comparison of Child Directed Marketing Efforts .....	13
School Nutrition and Health Promotion Strategies .....	19
Evaluation of Effectiveness of Nutrition Marketing .....	25
Review of Literature Summary.....	28
3 METHODS .....	29
Study Design and Sample.....	29
Procedure and Measures.....	29
Statistical Analysis.....	34
4 RESULTS .....	36
Average Prevalence of Nutrition Marketing and School Demographics .....	36
Interrater Reliability of Content Analysis .....	37
Prevalence of Marketing Strategies within Nutrition Marketing Sample.....	38
Prevalence of Marketing Strategies within F/V Only Nutrition Marketing Sample.....	47

	Page
CHAPTER	
5 DISCUSSION .....	54
Study Strengths and Study Limitations .....	63
6 CONCLUSION & APPLICATIONS .....	64
REFERENCES .....	65
APPENDIX	
A [MARKETING CONTENT ANALYSIS CODEBOOK REFERENCE GUIDE].....	74

## LIST OF TABLES

Table		Page
1.	[Content Variables Assessed in Nutrition Marketing Materials] .....	44
2.	[Summary of School Demographic Information] .....	49
3.	[Percent Agreement Among Coders] .....	51
4.	[Purpose of Nutrition Marketing Materials] .....	54
5.	[Visual Aspects of Nutrition Marketing Materials] .....	56
6.	[Marketing Strategies of Nutrition Marketing Materials] .....	58
7.	[Language/Literacy Aspects of Nutrition Marketing Materials] .....	60
8.	[Purpose of Nutrition Marketing Materials FV Only] .....	61
9.	[Visual Aspects of Nutrition Marketing Materials FV Only] .....	62
10.	[Marketing Strategies of Nutrition Marketing Materials FV Only] .....	64
11.	[Language/Literacy Aspects of Nutrition Marketing Materials FV Only] .....	65

## CHAPTER 1

### INTRODUCTION

Many Americans can recall nostalgic characters from their childhoods such as “the Kool-Aid man”, “Captain Crunch”, and “Ronald McDonald” and likely their associated jingle. These characters are classic examples of marketing tactics strategically designed and developed by food companies to encourage children to consume their products. Unfortunately, the nutritional quality of the foods many of these icons helped promote to children are energy dense, high in sugar, and nutrient poor.<sup>1</sup> Excess consumption of these foods contributes to the poor diet quality observed in children in the U.S. and has been associated with adverse developmental outcomes, including childhood obesity,<sup>2-6</sup> chronic disease risk,<sup>7,8</sup> and reduced academic performance.<sup>9-12</sup> Additionally, children in the U.S. are not meeting the RDA for adequate intake of fruits and vegetables,<sup>13</sup> consumption of which has been associated with decreased risk of such outcomes,<sup>14</sup> Advertisements for health promoting produce items are much less common. One study found that over a four day period, children were exposed to over twice as much unhealthy “non-core” food product marketing as healthy “core” food marketing.<sup>15</sup>

The imbalance between the promotion of foods that are “core” and “non-core” to a healthy diet can be attributed to the financial resources’ large food corporations, whom primarily promote “non-core” food products, can allocate towards child-directed marketing efforts<sup>1</sup>. The most recent cost-analysis of child-directed food marketing expenditures indicates that 1.8 billion dollars was invested into marketing efforts *directly* targeted at children and teens by 48 different food and beverage companies between 2006-2009, despite significant government regulation of child-directed marketing<sup>1</sup>. Regulation was implemented following declarations by the World Health Organization (WHO) stating that child-directed marketing is incredibly effective at influencing child food preferences and that it is a strong predictor of childhood obesity.<sup>16,17</sup> In comparison to what large food companies invest into child-directed marketing expenditures, Team Nutrition, an initiative funded by the United States Department of Agriculture (USDA) to support school nutrition programs,<sup>18</sup> was only granted \$15 million to spend on training, assistance to school food service operations, and nutrition and physical activity education for schools and



communities.<sup>18,19</sup> While it is well understood that child-directed marketing of unhealthy food products negatively impacts diet quality of U.S. children, it is not understood if increasing the prevalence of nutrition promoting content could encourage children to make healthier food choices. It may be possible that using quality nutrition marketing stimuli in the child's environment the same way commercial food companies have for decades may improve child dietary consumption.

Because the National School Lunch Program (NSLP) is designed to deliver nutritious lunches to over 30 million students a day,<sup>20</sup> the school setting may be an ideal location to investigate how to increase consumption of nutritious foods via nutrition marketing techniques. In the school setting, policies have been passed to limit the availability of junk food products and increased availability of healthier items through the NSLP, soda bans, and the Federal Fruit and Vegetable Program (FFVP).<sup>21</sup> However, little has been done to encourage students to consume the healthier items beyond increasing availability. Furthermore, no previous studies have analyzed the content of existing nutrition marketing in school settings and how it might be altered to encourage children to engage in healthier behaviors. It is also unknown whether the effectiveness of nutrition promoting strategies varies across grade levels or age groups. It may be possible that existing nutrition marketing in schools fails to maintain its effectiveness across all stages of development. Additionally, existing research has not yet investigated the prevalence of marketing materials among elementary, middle, and high schools, and therefore, the degree of student exposure to such messaging remains unclear.

While efforts are being made to understand how to increase fruit and vegetable consumption and encourage lifelong healthy habits in child populations, little is known about how best to engage children through nutritional messaging. This serves to widen the disparity between the harmful impacts of traditional food and beverage marketing and the curative potential of health-focused nutrition marketing efforts. Given that children are highly susceptible to the high-dollar marketing campaigns of large food and beverage companies encouraging them to consume considerably less healthy food and beverage items, thus increasing risk of costly and restricting health consequences, there is a dire need to find strategies that can counter-market

unhealthy dietary behaviors and reinforce positive health behaviors. The field of social marketing aims to do just that by applying marketing theory frameworks to health messaging,<sup>21–24,22,23</sup> but the literature on nutrition specific social marketing campaigns in school settings is limited.<sup>24–26</sup> The few studies that have assessed implementation of social marketing framework in nutrition marketing campaigns effectiveness in changing health behavior show promising results,<sup>24–26</sup> but many questions remain about how to design nutrition marketing in schools to most effectively encourage long term behavior change. Existing literature suggests the need for multifaceted approaches that complement one another and encourage long term behavior change by incorporating nutrition education, exposing students to social marketing, and health campaigns as well as designing the school environment to support healthy choices by incorporating behavior economics.<sup>27,24,28–31</sup>

Addressing social nutrition marketing efforts to child and adolescent demographics is a major undertaking. However, ensuring that food-related messages displayed in school cafeterias are purposeful and meaningful to students may be a step in the right direction. Findings from this research will help build the narrative for researching, developing, and improving nutrition marketing strategies that will better promote healthy dietary choices within the school environment.

### **Study Purpose and Research Aims:**

#### *Study Purpose*

The objective of this study is to examine the content of nutrition marketing materials that exist within elementary, middle, and high school cafeterias in Arizona in order to understand the current strategies being used to promote nutrition concepts (with an emphasis on fruits and vegetables to children and compare across grade levels. Photographs of the nutrition marketing materials were sorted by grade level and then coded quantitatively and qualitatively for their purpose, visual components, strategies used and relevance.

#### *Research Questions*

This study aims to address gaps that exist in the literature on nutrition marketing to child audiences in schools by answering the following questions:

1. what content variables (i.e., purpose, visual aspects, marketing strategy, literacy/language) are prevalent within any nutrition marketing materials in Arizona school cafeterias?;
2. what content variables (i.e., purpose, visual aspects, marketing strategy, literacy/language) are prevalent within marketing materials that only promote fruits and vegetables in Arizona school cafeterias?;
3. how do the content variables (i.e., purpose, visual aspects, marketing strategy, literacy/language) prevalent within nutrition marketing materials in Arizona school cafeterias compare across grade level (elementary, middle, high)?

#### **Definition of Terms**

*Nutrition marketing* – social marketing materials (i.e., paper flyers, table tents, PA announcements, taste testing stations, banners, etc.) created to promote healthy dietary behaviors to a target audience.

*Child-directed marketing* – CFBAI (Children’s Food and Beverage Advertisement Initiative) defines advertising that is ‘child directed’ as advertising during programs for which children make up 35% or more of the viewing audience<sup>32</sup>.

*Social marketing* – The Social Marketing National Excellence Collaborative defines social marketing as the use of marketing principles to influence human behavior in order to improve health or benefit society.<sup>23</sup>

## CHAPTER 2

### REVIEW OF LITERATURE

The current body of knowledge displays an overall lack of research analyzing the effectiveness of child directed nutrition marketing. Therefore, the first step in understanding how nutrition marketing approaches can be improved to encourage students towards making healthier selections is identifying what marketing already exists. The following literature review will synthesize research that examines the effects of poor dietary intake on child populations, how schools are affecting the diets of their students, and the relationship between marketing directed towards children and their diet outcomes. Current approaches to nutrition marketing and the effectiveness of these marketing tools will be assessed by comparing the prevalence of nutrition marketing within elementary, middle, and high schools. The review will also juxtapose the availability of healthy nutrition promotion to the alternative food products being marketed to children and explore the implications of using nutrition marketing as a tool to improve the health outcomes of today's youth.

#### **Childhood Obesity, Decreased Academic Performance and Other Adverse Effects of Poor Diet in Child Populations**

Childhood obesity is a public health epidemic of increasing concern that has continued to rise dramatically over the past decade.<sup>13</sup> Several studies have shown that diet quality is independently associated with weight status.<sup>2,4,6,8</sup> The 2017-2018 National Health and Nutrition Examination Survey (NHANES) suggests that the prevalence of obesity among U.S. 6-11-year-old school aged children is 20.3% and 21.2% in adolescents ages 12-19.<sup>33</sup> Clear disparities exist in prevalence of childhood obesity across ethnic groups with prevalence being higher in nonwhite populations due to implications of social determinants of health such as socio-economic status, environment, parent's education and access to healthy food<sup>34</sup>. Reaching obesity (<95<sup>th</sup> BMI percentile) as a child increases the risk of negative health outcomes such as insulin resistance, cardiovascular disease,<sup>6-8</sup> diabetes,<sup>7,8</sup> metabolic syndrome,<sup>7,8</sup> sleep apnea,<sup>7</sup> disordered eating,<sup>6</sup> and other undesirable conditions.<sup>6</sup>

Obesity is merely one potential diet-related outcome in child populations as a result of poor dietary intake. Another consideration is the effect a poor diet can have on a child's academic success, as decreased diet quality has also been associated with decreased academic performance.<sup>9-12</sup> One study found that students with a higher reported diet quality were less likely to fail the literacy examinations that were provided than those with a lower quality diet. Specifically, students with higher intakes of fruits and vegetables and lower intakes of fat were even less likely to fail the assessments.<sup>9</sup> Another study of food insufficiency within populations of American school-aged children also supports the connection between inadequate diet quality and the effects on a child's cognitive, academic, and psychosocial development. Both children and teens within this study scored lower in measures of cognitive and academic performance including school attendance, disciplinary issues, emotional problems, behavioral issues, and ability to make friends. Overall, a correlation was found between incidents of these academic, emotional, and behavioral measures and children who consumed a less quality diet.<sup>10</sup> Results were found to be being more dramatic in teenagers.<sup>10</sup> Additionally, children and teenagers who were food insufficient were twice as likely to repeat a grade and missed significantly more school compared to food sufficient kids.<sup>10</sup> Although there is a lack of evidence regarding long-term relationships between nourishment and academic success, a longitudinal study within a large sample of Filipino children found a causal relationship between better nourishment and improved academic performance.<sup>12</sup> Thus, improving diet quality in children is a feasible preventative approach in mediating the risk of early onset of disease and increasing the likelihood of success within an academic environment.

### **Typical Diet of School-Aged Children**

An important aspect of understanding factors that support healthy diets among youth is identifying sources of nutrients that are linked to negative consequences when consumed in excess: solid fats, added sugar, and overall energy-dense foods with minimal nutrient content.<sup>5</sup> The food environment of a child can be overly saturated with junk foods, which tend to be readily available to children and adolescents at convenience stores, fast food restaurants, grocery stores, sporting events, and even at home or at school.<sup>35-38</sup> The appeal of these junk food items

can be enhanced by convenient availability, social modeling of consumption by peers or family members, and through aggressive child directed marketing techniques employed by food and beverage companies.<sup>39,40</sup> Understanding existing influences on child consumption of these foods can assist in creating strategies towards encouraging them towards healthier selections.

A primary strategy in improving the diet quality of children involves increasing the number of fruits and vegetables available and encouraging their desire to eat them. By increasing consumption, critical and often under consumed nutrients, such as folate, magnesium, potassium, dietary fiber, vitamins A, vitamin C, and vitamin K, are more frequently incorporated into a child's diet.<sup>14,41</sup> These vital nutrients have been shown to greatly reduce their risk of contracting heart disease, cancer, stroke, and other debilitating conditions.<sup>14,41</sup> Additionally, frequent intake of fruits and vegetables allows for children to develop healthier eating patterns as adults.<sup>42</sup> The 2015-2020 US Dietary Guidelines display that both male and female children ages 4-17 are not meeting their recommended daily intake of vegetables, additionally, male and female children ages 9-17 are not meeting their daily recommended intake of fruit.<sup>21</sup> The reality is that children are not consuming enough fruits and vegetable and are instead replacing them with foods that are nutrient poor and contain excessive amounts of high-sugar, thus compromising their health outcomes. To mediate the health hazards created by this consumption pattern, action must be taken to encourage children to integrate more fruits and vegetables into their diet.

Sugar intake of children is a rising concern and has been shown to have negative effects on a child's consumption of essential food groups such as fruit, vegetables, and dairy.<sup>43-46</sup> Alarming, average daily intake of added-sugars has been shown to be a significant contributor of total energy intake in child and adolescent populations, particularly sugar-sweetened beverages which offer little beneficial nutrition.<sup>43,46</sup> Increased consumption of sweets also correlated with a significant decrease in intake of essential nutrients such as iron, fiber, calcium, vitamin A, and vitamin E.<sup>44,45</sup> Additionally, saturated fat intake is positively associated with intake of added sugar. Some studies suggest that children who consumed high amounts of sugar sweetened beverages had dramatically lower fruit and vegetable consumption.<sup>5,35,36</sup> Overall, among all categories of added sugar in a child's diet, sugar sweetened beverages have been

shown to have the most harmful effect on their intake of nutrients and vital food groups.<sup>44</sup> A study in Crete, Greece echoed similar findings and also found that children who consumed high amounts of added sugar in this sample had higher BMI's and double the risk of being overweight or obese compared to non or low consumers of added sugar.<sup>45</sup> Overall, excessive intake of added sugar is associated with increased energy intake, increased adiposity, increased central adiposity, and increased dyslipidemia, which are all CVD risk factors.<sup>47</sup>

### **Improving Child Diet Quality**

There are a variety of factors that influence fruit and vegetable consumption that change as a child grows. Influences on young children's fruit and vegetable consumption include parental consumption, parental rules, exposure to diverse fruit and vegetable options, as well as overall taste preference.<sup>48</sup> Research has reported that the main factors that impact 9-18 year-old adolescent fruit and vegetable consumption also include availability of the food in home environments and overall taste preferences. Thus, suggesting that parents still have a role in influencing their food choices.<sup>49</sup> Low income families may face additional obstacles to eating enough fruits and vegetables, which include environmental constraints such as access to grocery stores, cost of produce, and availability of correct storage options.<sup>36-38,50</sup>

To effectively influence children to make healthier food selections, like fruits and vegetables, we must understand why they consume the food that they do. In many instances, children are able to comprehend what is generally healthy or unhealthy for them. A study looking specifically at a child's perception of sugar-sweetened beverages (SSB) using focus groups found that the children generally had a comprehensive understanding of the health effects of consuming sugar-sweetened beverages like soda and energy drinks, and that they understood that milk and fruit juice were healthier options. They accredited the "healthy" or "unhealthy" nature of sugar-sweetened beverages to its sugar content and effect on weight and hyperactivity. Regardless of this knowledge, the primary reason the children chose to drink SSB was taste and preference.<sup>51</sup> This study presents the notion that even though the kids understood that sugar-sweetened beverages are unhealthy, they choose to drink them anyways. Numerous other studies also support the notion that child taste preferences and exposures are a strong predictor of eating

behaviors. Therefore, regardless of understanding dietary quality of foods, increased exposure and preference towards high sugar, energy dense-nutrient poor food products are predictive of poor dietary patterns.

While there isn't extensive evidence regarding recent exploration of child perception of nutrition messages, historical data shows that children as young as kindergarten-age were able to conceptualize nutrition concepts. The proficiency of this skill improved as the children got older<sup>52</sup>. Understanding how children perceive nutrition messages and what causes them to select particular food items can help identify the barriers in getting children to independently make healthier selections more often.

The issue of excessive consumption of unhealthy food may not be entirely centered in a lack of understanding and comprehension around nutrition and health, but rather a need to change the children's preferences and encourage an attraction towards fruits, vegetables, and other healthful items. Particularly as autonomy of choice increases as the child ages and they make more food choices independently. Food marketing may be a major key in understanding what causes a child to want a particular food more than another. Just as large food companies market products like soda, chips, and candy to make these unhealthy items more appealing to children, healthy food and nutrition concepts should be promoted in a similar manner.

### **Schools' Influence on Children's Diets**

For many children, the meals provided at school may be their primary source of food. According to the USDA, 13.1 million children lived in food-insecure households in 2015.<sup>53</sup> Data from 2014-2015 displayed that 84% of school-aged children from low-income food-insecure households use free or reduced lunch from the National School Lunch Program.<sup>53</sup> The National School Lunch Program (NSLP) is a federally assisted meal program whose aim is to make nutritionally balanced school meals accessible for all students, regardless of family income.<sup>20,53</sup> This program functions under the National School Lunch Act which was enacted in 1946 and allows for qualifying children to get school lunch and breakfast at a free or reduced rate.<sup>20</sup> The program now serves over 30 million children and has undergone many changes to accommodate goals of improving student health outcomes.<sup>20</sup> In 2012, policy changes in accordance with the



Healthy Hunger Free Kids Act (HHFKA) were implemented to nutritional standards for NSLP participating school meals that mandated the selection of three out of five of the following components to be selected for a meal in order to be considered reimbursable: a fruit, a vegetable, a meat/meat alternative, a whole grain item, and milk.<sup>20</sup> In accordance with NSLP guidelines, participating schools must offer all five components and ensure that nutritious food items are available to students every day, yet the concern lies in whether students are actually consuming them.<sup>20</sup>

Research sponsored by the USDA has found that children on free or reduced lunch consume less empty calories and more fiber, milk, fruit, and vegetables than eligible students who don't participate.<sup>53,54</sup> Additionally, a study of a small sample of ethnically diverse, low socioeconomic status 4-6 grade children found that while 80% of the children consumed less than 5 servings of fruits and vegetables daily, on average over half of their intake of fruits and vegetables were eaten during school meals.<sup>54</sup> Students with the lowest reported fruit and vegetable intake actually consumed the greatest amount of fruits and vegetables at school.<sup>54</sup> Larger studies have also evaluated the effect of daily school meals on dietary intake. NHANES found that of children between the ages of 4-15 who ate school breakfast daily also ate more fruit, vegetables, and legumes daily.<sup>13</sup> This information indicates the significant contribution school meals may have on the overall diet quality of the children being served.

Conflicting research is present regarding school lunch's role in childhood obesity and weight status. Recent evidence shows that the nutrition quality of school lunches has significantly improved since nutrition standards were updated in 2012 in response to the Health Hunger Free Kids Act.<sup>55</sup> Historically, some literature suggests that the NSLP-eligible students do, in fact, display worse health outcomes, such as obesity and related complications, than their qualifying peers that do not participate in the program.<sup>56</sup> However, it is challenging to isolate the relationships that have created this pattern. Other literature argues that children in food-insecure households are already predisposed to health problems, such as frequent headaches, stomachaches, chronic illnesses, and iron deficiency anemia<sup>56</sup>. Therefore, it may be that these exterior factors are putting the children at risk for further health complications, not the food being

served at school lunch.<sup>56,57</sup> On the contrary, Millimet's long term analysis on the effects of SBP (School Breakfast Program) and NSLP (National School Lunch Program) on health outcomes of young children found that while school lunches lead to some improvement of nutrient intake such as protein, calcium, iron, Vitamin A, and Vitamin C; the lunches also provided higher portions of fat-related calories which may be the contributing factor to increased weight status over time.<sup>56</sup> In addition, many school cafeterias have á la carte options where students can purchase items like chips, ice cream, pizza and other energy dense items that may be more desirable to students<sup>46,58</sup>. The most recent evidence shows that the nutrition quality of school lunches has significantly improved since nutrition standards were updated in 2012<sup>55</sup>. As previously noted, the issue may not lie with the availability of healthy food items, but instead with the behavioral choice's students are making to consume them or not. Overall, more research must be done to understand whether causation lies in socioeconomic factors or in the contents of school meals. In the meantime, efforts need to continue to be made to improve the diet quality of students by limiting intake of energy-dense-nutrient-poor foods and encouraging kids to consume more fruits and vegetables.

#### **Variation in School's Approach to Improving Diet Quality of Students**

There are current and emerging school policies to both prevent junk food advertisements and junk food availability as well as to encourage healthier choices. However, differing characteristics of schools, school districts and their student demographics influence the ability to implement these types of policies and affect the effectiveness of the interventions in improving healthy behaviors. The Center for Disease Control and Prevention (CDC) found that larger school districts prohibited advertisement of junk food or fast food restaurants on school grounds, reduced their disbursement to students and prohibited junk foods from being sold at fundraisers significantly more than small and medium-sized districts.<sup>59</sup> Overall, higher percentages of large school districts restricted unhealthful food marketing more than small districts.<sup>59</sup> This may be due to, small districts having fewer resources than large districts to focus on efforts of food marketing and promotion, in addition to large districts having more resources to devote towards training and professional development for staff on topics of health and healthy food promotion. It was also

noted that urban school districts had more engagement in restricting unhealthy food marketing policies and more promotion of healthy food compared to suburban and rural districts.<sup>59</sup>

Nationally representative data exploring the relationship between schools' food environments and student nutritional intake found that salad bar availability was associated with increased regular consumption of green vegetables and greater overall fruit and vegetable accessibility was associated with increased consumption of fruit and green vegetable consumption in middle and high school students.<sup>58</sup> However, more access to candy and regular-fat snacks was related to lower fruit and vegetable consumption among middle schoolers which are commonly available via school cafeteria à la carte and vending machines which was available to 73% of middle schoolers and 96% of high schoolers.<sup>58</sup> This study also displayed that Caucasian populations of high school students reported significantly higher fruit and green vegetable consumption than African-American or Hispanic middle and high school students.<sup>58</sup>

Another tactic in improving the diets of students is to simply offer meals with even more healthy options. However, a barrier to this deceptively simple notion is the increased cost associated with schools meeting more standards for healthier meals.<sup>60</sup> The USDA already provides schools with funding and commodities to offset the cost of the NSLP and SBP<sup>60</sup> but schools must maintain a tight budget to ensure that government reimbursements cover free and reduced meal costs. There is conflicting evidence on the matter of costs increasing nutrition standards, with some research showing that healthier meals are more expensive and others displaying that increasing nutrition standards does not have a significant impact on the cost of school meals.<sup>61</sup> Newman et al. found that school lunches that meet more inclusion standards for vegetables and low-fat milk were significantly more expensive,<sup>61</sup> while Trevino et al. did not find a statistically significant difference in cost between intervention schools who had meals designed around improved nutrition standards and the control schools.<sup>60</sup> The difference in meal cost may be attributed to varying price and availability of produce to schools on an individual basis.

Because NSLP is already mandated to serve nutrient-rich items like fruits and vegetables, it should be reiterated that the attention should be directed towards encouraging the consumption of healthy items that are already available within school cafeterias. There are efforts

being made and strategies being researched to combat the effects of unhealthy food marketing on children. Swinburn and Egger have written about preventative strategies against weight gain and obesity relating to three categories of the epidemiological triangle; host, vectors, and environments. Vectors that affect obesity such as energy dense, high fat foods, high sugar drinks, and large portion sizes are very accessible within the environment of children and therefore, limiting this access is one important strategy. Previously mentioned examples of school policies to restrict the unhealthy food items available have shown effectiveness and are important in the overall picture of preventative strategies. However, promoting the autonomy of children and adolescents to independently make better decisions surrounding what they eat, and drink may encourage healthier lifelong eating habits. School settings are a natural place to influence the food and physical activity environment of children in order to encourage the students to independently make educated, healthy choices. Considering that the appeal of products in today's society are enhanced by diverse arrays of marketing tactics, marketing healthy food to children in schools could be approached in a similar manner. This concept will be explored by evaluating what types of food products are already being marketed to children. An understanding of the implications of existing marketing will contribute to efforts to promote quality nutritional content and aims to increase fruit and vegetable consumption in child populations.

### **Comparison of Food and Beverage Company Child Directed Marketing to Child-Directed Health Promotion Efforts**

An important consideration in understanding why children choose food items that they understand to be less healthful for them is not only the bombardment of food marketing that they are exposed to, but also the market research food and beverage companies sponsor, conduct, and commission to carefully target their food advertisements to be as enticing as possible.<sup>62</sup> The disparity between the quality and quantity of unhealthy food marketing compared to healthful food marketing is an alarming predictor of negative health implications for children.<sup>17,15</sup> Child and adolescent demographics are appealing for marketers due to the fact that they spend billions of their own dollars annually,<sup>63</sup> have the ability to influence how additional billions are spent by their

family, and are developing preferences for their future purchases as adults.<sup>36,63,64</sup> Food and beverage corporations market directly to child and teen demographics via promotion within restaurants, fast food chains, grocery stores, TV, the internet, social media, radio, and even within schools and apply ample marketing research to ensure their advertising is effective in creating brand awareness.<sup>1,63,65,66,62</sup> Strategies include offering toys and other incentives with specific kids' meals, images of cartoon characters or endorsement from celebrities, use of appealing imagery and production features, indoor and exterior play areas in restaurant buildings, and more.<sup>65,66</sup> A study conducted in an Australia supermarket found that 75% of the sample grocery aisle's child-oriented products were "non-core" (unhealthy) food products.<sup>66</sup> A particularly interesting finding within this study is that the common health and nutrition claims to promote foods were not only found on healthy foods, but also found on 55% of unhealthy counterpart food items.<sup>66</sup> Additionally, the products marketed to children were shown to be high in saturated fat, sugar, sodium, and less nutrient-dense than products marketed to older demographics.<sup>66</sup> These findings are congruent with the understanding that these marketing efforts are effective in persuading children and adolescents to desire these nutrient-poor foods.

The World Health Organization (WHO) addressed concerns regarding the contribution of child directed marketing to diet-related diseases.<sup>17</sup> Their analysis of international efforts concludes that there are many countries placing regulations on marketing food to children but, overall, there is variability globally in how these regulatory efforts are being carried out which impacts the effectiveness of limiting food companies' influence on child health.<sup>17</sup> It is stated that regulations around television and advertising in school environments are the primary focus in the developed world but there is limited effort being made on regulating non-traditional forms of marketing such as promotional activities and social media advertising,<sup>17</sup> which children are frequently exposed to in their day to day lives. The Council of Better Business Bureaus' Children's Food and Beverage Advertising Initiative (CFBAI) has updated its nutritional criteria for child directed marketing.<sup>67</sup> Participating companies have agreed to regulate nutrition content of the food and beverage products that are advertised more strictly, meaning 40% of food currently on CFBAI's product list will require reformulation by January 2020.<sup>67,68</sup> Products will be required to

meet USDA standards for “low sodium” and lower the overall amounts of added sugar including cereals and yogurts.<sup>67,68</sup> However, The Center for Science in the Public Interest comments that CFBAI has not ensured that the products advertised provide significant amounts of healthy components such as fruits, vegetables, and whole grains.<sup>67</sup> Additionally, while child directed junk-food marketing had dropped within the first decade CFBAI has been organized, unhealthy food advertisements still dominate children’s television networks. For example, Nickelodeon has decreased their percentage of unhealthy food ads 23% since 2005, but 65% of their food advertisements continue to promote unhealthy food products.<sup>67</sup> Research on the effects of child directed marketing regulations on child dietary patterns is well warranted in order to understand whether these restrictions are effective strategies in improving child health outcomes, or if additional action is called for.<sup>17</sup> Regardless, increased efforts towards understanding how nutrition marketing in schools can combat the magnitude of child directed unhealthy food marketing’s effect on diet would be a significant asset in combating diet-related diseases in young populations.

While restrictions have been applied to how companies can market food products to children, substantial funds are still allocated to child-directed food-marketing. In 2012, The Federal Trade Commission (FTC) released a report that documented food and beverage marketing expenditures to children and adolescents in response to government concerns about dramatic increases in rates of childhood obesity.<sup>62</sup> The FTC report cited that 48 reporting companies spent \$1.79 billion directly marketing to children in 2009.<sup>1</sup> This allocation was in spite of regulatory efforts made to reduce money spent on child directed marketing, including a \$304-million reduction in food and beverage marketing expenditures target towards children and teens from 2006-2009. The report also stated that \$1 billion was directed towards 2-11 year old children, \$1 billion directed towards teens ages 12-17, and an overlap of \$263 million between the two age groups.<sup>62</sup> The FTC also cited that \$9.65 billion was spent on marketing to *all* audiences, which implies that children were exposed to even more persuasive marketing targeted both directly and indirectly because marketing directed to all audiences are not under the same regulations, even though children and teens still make up a significant part of the viewing

audience.<sup>16,63,64</sup> Powell & Harris et al. put these numbers in context with commentary on how the expenditures relate to youth exposure to food marketing.<sup>1</sup> They state that although the reports cites a 19.4% reduction in TV marketing expenditures, expenditures put towards new digital forms of marketing, such as internet ads and social media, skyrocketed by 50.7%.<sup>62</sup> They also critique the CFBAI, citing that the regulatory efforts are limited in scale and effectiveness and allow for expenditures on many marketing techniques to remain unregulated such as product placement, athletic sponsorship, celebrity fees, events, and philanthropy.<sup>1</sup> Most alarmingly, their commentary states that the current industry regulation standards set forth by the CFBAI do not protect children older than age 11 and that consequently, some of the marketing seemed to shift to adolescent demographic after regulations were imposed.<sup>1</sup> Powell et al. called for continued monitoring of child-directed food expenditures and improvements to the nutritional quality of food products marketed to child and adolescent populations, but a similar cost analysis has not been conducted since this 2012 report.<sup>1</sup>

There is substantial evidence that this consistent exposure to food product marketing has a direct effect on the food preferences, purchasing patterns, and consumption patterns of youth which creates a causal influence on diet-related health.<sup>16,69-72</sup> Television is considered the dominating medium for advertising, with children and teens seeing about 12-16 TV advertisements per day,<sup>1</sup> but marketers are developing new ways to market to youth by integrating subtle ads into frequently viewed environments like social media or product placement in movies, websites and television shows,<sup>63,69</sup> Companies allocate significant funds towards researching child behavior on these platforms by utilizing technologies like tracking software and spyware in order to best cater the marketing to make their products more appealing to young consumers,<sup>63</sup> The effectiveness of marketing campaigns to child populations relies on maintaining their engagement with the target message, making them desire a product, recognizing and remembering it at locations where it is available and from there, purchasing it or encouraging someone else to purchase it for them.<sup>63</sup> Numerous studies have displayed that the marketing efforts of food and beverage companies quite literally pay off due to a strong relationship between

cumulative exposure to television food advertising and other food marketing platforms and influence on dietary behaviors.<sup>17,29,68</sup>

While the effects of marketing derived from food and beverage companies that promote non-nutritious food and the money they invest into doing so is well understood, there is a significant lack of knowledge of how healthy nutrition promotion affects child dietary behaviors and what fiscal resources are allocated to said nutrition promotion. The USDA funds government programs to support the goal of providing access to safe, nutritious, and balanced meals to all American children.<sup>19</sup> This objective includes promoting healthy diet and physical activity behaviors.<sup>19</sup> However, there are no specific measures of how much funding is allotted to nutrition marketing efforts. The USDA's Team Nutrition, an initiative to support Child Nutrition programs via training, food service assistance, school, and community support for healthy eating and physical activity and nutrition education for children, was funded a mere 15 million dollars in 2012.<sup>18,19</sup> These funds were distributed among the many programs and efforts created and conducted by Child Nutrition, making it is unclear how much money was being delegated specifically to nutrition marketing and evaluation of promotion efforts. Even so, this budget information is the closest available data to compare to the report put out by the Federal Trade Commission in 2012 and displays a massive disparity between the fiscal resources available to food and beverage companies to market to children and the resources allotted to health organizations to encourage children towards healthier food decisions. The 2019 USDA Budget Summary does not mention Team Nutrition and only displays information on total budget for all Child Nutrition programs including the National School Lunch Program, School Breakfast Program, Summer Food Service Program, Child and Adult Care Food Program, Fresh Fruit and Vegetable Program, and Special Milk Program.<sup>18,20</sup> This only adds to the ambiguity around understanding the allotment of USDA funds towards nutrition marketing efforts to children after other systematic costs are accounted for.

This FTC report on child directed food marketing also contains extensive information detailing corporate food and beverage company child-directed marketing expenditures, nutrition analysis of food products marketed to youth, and market research to understand how to target



advertisements and promotional activities towards child and teen demographics.<sup>62</sup> The report contains a section detailing advertising and promotional activities that take place in schools such as: offering pizza and deserts as rewards for school reading programs; free meals for honor students, sponsoring supplemental programing (i.e., summer reading programs, safe driving for high school students, culture specific music program etc.); promotional activities such as activity calendars, stickers, and posters; motivational speakers and sweepstakes for celebrity guest coaches for sports practices; college scholarships and cash grants to schools; fundraisers for schools; redemption of product labels for points toward books or classroom supplies; school vending machines with displayed names and logos for flavored milk, juice, water, carbonated beverages, and sports drinks; sponsorship on sports scoreboards, yearbooks, and athletic programs; distributed of branded classroom calendars, signs and banners for gymnasiums; discount coupons for adventure parks; and sport drink samples for high school athletic practice with hydration information and branded products (coolers, water bottles, cups, ice chests, towels, table covers, and staff apparel<sup>62</sup>.

Some examples of in-school corporate food marketing activities do include promotion of healthy behaviors such as fresh fruit growers providing samples to elementary schools and various companies providing nutrition information to schools.<sup>62</sup> However, these seemingly altruistic initiatives to promote healthy behaviors like healthy eating and physical activity by food and beverage companies in schools often have ulterior motives. Research shows that food companies often use healthy lifestyle messages in child- directed advertising to create what's known by public health professionals as a health halo effects for nutrient-poor food and beverages, which has been shown to convolute children's understanding of whether a food product is healthy or not.<sup>73</sup> Harris et al. found that promoting healthy lifestyle messaging in child-directed advertisements increased children's perception of the perceived healthfulness of the food product being promoted.<sup>73</sup> Considering that despite regulatory efforts, food and beverage companies continue to infiltrate the school setting with promotion of unhealthy food products both directly and indirectly, a sense of urgency is needed for optimizing the presence of health

promotion in schools that promotes food and behaviors that are truly healthy for child and adolescent populations.

### **School Nutrition Marketing and Health Promotion Strategies**

There are nutrition marketing practices and policies that exist within schools that aim to restrict the amount of unhealthy food and beverage items that are available to students. Previously mentioned examples included no-pour right contracts (aka Soda Ban), NSLP guidelines, and offering greater availability of fruit and vegetables at lunch. Now the question is what is being done to promote nutrition to children and encourage them to make healthy dietary choices? Behavioral economics, social marketing and health campaigns are healthy behavior promoting strategies that have been implemented in the school setting. While the overall prevalence of literature in this area is limited, the studies that have been conducted display promising results that must be further investigated.

#### *Behavioral Economics*

Behavioral economics is one strategy in encouraging students to independently make healthier meal selections. Because the goal of marketing is to encourage a particular behavior, the relationship between these two concepts is important to consider when evaluating strategies to persuade children and adolescents to make healthier choices. A study evaluating the yearlong effect of “choice architecture” on food choice and food consumption in middle and high school cafeterias evaluated 2,309 lunch trays of students from the intervention school group and the control school group.<sup>29</sup> Choice architecture strategies implemented included: displaying desired food items in attractive containers; pre-cutting fruit; using creative names and signs; placing items strategically; and prompting from staff. Overall, the choice architecture appeared to encourage healthy food selection but did not necessarily facilitate consumption.<sup>29</sup> Another behavioral economics approach evaluated the effects of positive online behavioral nudges while pre-ordering lunch on NSLP participant’s food item selection.<sup>30</sup> They found that students who received the behavioral nudges chose significantly more fruits, vegetables, and low-fat milk compared to the

control group. However, we again see that the effects on consumption of these items was shown to be inconclusive.<sup>30</sup>

### *Social Marketing*

The Social Marketing National Excellence Collaborative (SMNEC) states that social marketing is the use of marketing principles to influence human behavior with the intent of improving public health.<sup>23</sup> SMNEC also describes behavior change as a non-linear process that requires the effort of multiple change agents and is best achieved by changing community norms.<sup>23</sup> Because people do not alter their behaviors easily, social marketing professionals understand that groups of people are more likely adopt a new idea if it has a relative advantage (e.g., gain-frame message structure, visual appeals, marketing appeals), it is compatible with social norms (e.g., celebrity endorsement, antecedents), it is not too complicated (e.g., literacy, language), can be tested before being committed to (e.g., formative research), and when other people are seen modeling the target behavior (e.g., social modeling).<sup>23</sup> In 2002, Alan R. Andreasen set forth a framework for social marketing development which consists of six guiding benchmarks designed to enhance success and limit failures of social marketing interventions. This framework was developed to provide structure for social marketing development and improve effectiveness by propelling the field with operationalized benchmarks.<sup>22,25</sup> The framework uses concepts that have a history of effectiveness in commercial marketing fields such as consumer orientation, exchange theory, audience segmentation, competition, a marketing mix (also known as the four “P’s” of marketing: product, price, place, promotion and sometimes policy), and continuous monitoring.<sup>22,25,26,74</sup> The premises include: 1. keep behavior-change central to marketing project design and evaluation (e.g., behavior change theme, F/V behavior target); 2. conduct consumer/formative research on the target audience; 3. focus careful attention on unique characteristics of target audiences (e.g., demographic data, grade level, language, literacy) and target the marketing messaging accordingly to ensure maximum efficiency and effectiveness, especially in the use of scarce resources (e.g., message structure, message framing, message specificity); 4. focus the design on promoting attractive and motivational exchanges (tangible or

intangible) with the target group (e.g., marketing strategy, visual appeals, proximal v. distal message); 5. integrate the use of all four (sometimes five) “Ps” of the traditional marketing (e.g., product = F/Vs, price = cost of school lunch & barriers to behavior change, place = school cafeteria, promotion = cafeteria nutrition marketing materials, policy = nutrition guidelines and school health policies); 6. maintain awareness of the competing choices of the desired behavior and employ strategies to minimize the competition (e.g., child-directed food and beverage marketing).<sup>22</sup> The implementation of these six premises collectively in the development of social marketing is sometimes referred to as consumer-oriented and external (competition) focused research.<sup>22,25</sup>

Some systematic reviews have provided evidence that social marketing is a framework for facilitating behavior change across a wide range of health topics such as physical activity, reproductive health alcohol, tobacco, illicit drug use, and nutrition. There are a number of social marketing interventions that are nutrition specific.<sup>17,18(p),19–26</sup> and targeted towards child populations.<sup>28,75–87</sup> However, the number of studies targeted towards adolescent populations<sup>88–90</sup> and take place in the school setting<sup>75,82,84,88</sup> are limited. The most recent systematic review of nutrition based social marketing interventions conducted between 2000-2012 by Carins & Rundle-Thiele used Andreasen’s social marketing benchmarks to analyze the effectiveness of two subsets of nutrition based social marketing research studies.<sup>25</sup> Subset 1 consisted of 16 studies that demonstrated strong consumer oriented and external focused research integration in the intervention. Subset 2 consisted of 18 studies that were self-labeled as social marketing interventions because of selected use of social marketing premises, but were re-classified as social advertising by the authors due to the intervention’s focus on promotion, communication, or advertising materials instead of integration of social marketing benchmarks.<sup>25</sup> Subset 1 contained significantly more studies proportionately that improved the targeted nutrition behavior than Subset 2.<sup>25</sup> These findings provide evidence that integration of social marketing premises in nutrition social marketing interventions have consistently shown to improve behavior change target outcomes.<sup>25</sup> However, only five of the interventions that were nutrition specific and targeted towards child populations in the school setting demonstrated strong application of all six social

marketing premises.<sup>25</sup> In adolescent school populations, only one intervention demonstrated strong application of all six social marketing premises.<sup>25</sup> While this review was valuable in providing evidence in support of using social marketing framework in nutrition promotion to children and adolescents, the number of nutrition specific social marketing interventions pale in comparison to corporate child directed food marketing research and consequential precision in targeting behavior change such as brand recognition and product purchasing.<sup>62</sup> Therefore, it is imperative to get a sense of how existing nutrition marketing in school cafeterias compares to evidence based social marketing practices by investigating the content of the school nutrition marketing materials.

Nonetheless, experts in the field cite that there is strong evidence that the field of social marketing can be an effective tool in combatting obesity globally but that the field is an evolving “work in progress” that requires interdisciplinary insight, and will adapt and change as the fields of public health and obesity prevention do.<sup>26,91</sup> While guidelines such as those provided by the SMNEC and Andreasen exist to support public health professionals in developing effective social marketing, little research has been done to investigate the effectiveness of nutrition social marketing in child and adolescent populations in the school setting. Employing concepts of this social marketing framework in school settings may help promote healthier nutrition outcomes in student populations.

### *Health Campaigns*

Health campaigns are a form of social marketing that concentrate efforts into promoting specific health behaviors in large populations and can produce both positive changes or prevent negative outcomes directly and indirectly.<sup>28,88,92,93</sup> They produce mass amounts of informational materials that provide education and additional resources to support the promotion of the target message and behavior change. This can be in the form of television ads, radio announcements, visual materials such as posters, banners, social media ads or large displays, and other creative outreach techniques.<sup>28,85,88,92,93</sup> This form of social marketing can be a tool in countering media

messaging that promotes unhealthy behaviors, like excess consumption of high sugar, high fat, and energy dense food items.<sup>28,88,92</sup>

An example of a well-researched health campaign that was created to promote nutrition to children and adolescents include California's "5 a Day for Better Health!". This mass media campaign was organized in the 1990's to promote the message of consuming five servings of fruits and vegetables a day to reduce the risk of cancer. It was adopted as a national initiative by the National Cancer Institute and the Produce for Better Health Foundation.<sup>88</sup> A significant rise in public awareness of the connection between fruits and vegetables and reduced cancer risk was noted, which is the first step in encouraging health behavior changes. However, the study found that it was more challenging to change the populations beliefs towards associating five servings of fruits and vegetables a day with good health.<sup>88</sup> The campaign displayed the ability for nutrition campaigns supported by local and national health organizations to not only be effective in promoting the relationship between dietary change to reduced risk of diet-related diseases, but also signals a continual need for research on the effectiveness of campaigns in creating behavior change. Evaluation of this campaign found strengths and weaknesses within their strategies. For example, surveys revealed that campaign material was not always displayed frequently enough and was sometimes placed in areas that consumers were less likely to notice.<sup>88</sup> Corporate partners recommended providing a greater variety of materials and providing training to the grocery stores on how to display and best utilize the material.<sup>88</sup> It is feedback like this that can be noted and applied to other nutrition promoting efforts, like marketing in school cafeterias.

Similar social marketing campaigns such as 5-4-3-2-1 Go!, VERB: It's What You Do, and Gimme 5 have been since been developed to promote healthy nutrition and physical activity behaviors to children and adolescents.<sup>28,85,93-95</sup> Every campaign battles a unique set of circumstance and variables, but it was noted in reflections of all three examples that changing nutrition and physical activity behaviors was challenging, results of the campaign were promising, and that further exploration was needed to measure true impact.<sup>28,85,93-95</sup> Promoting dietary change is particularly challenging because it involves making ongoing choices day to day, meaning that messages need to encourage habitual behavior change which is more challenging

than encouraging a change in behavior during occasional and specific situations.<sup>92</sup> The general consensus is that nutrition campaigning exposes people to important messaging, but behavior change is a slow process. Short term change is often achieved within nutrition promotion, but it is challenging to sustain long term impact after the campaign is completed. Environmental factors, such as convenient access to unhealthy food products high in fat, sugar, and calories, as well as the complexity of evolving nutrition recommendations are barriers in creating long-term behavior change within populations.<sup>28,92</sup> Lack of funding, parental support, communication, leadership, support from food service staff, and lack of time are additional factors that can impact effectiveness of campaigns.<sup>94</sup> Due to the fact that the media environment can be unpredictable, research, planning, and testing of campaign content is critical to ensure the target audiences are exposed to messages they resonate with. The same considerations should be made for promoting nutrition in school settings.

Reflections from health campaigns suggest that success increases with use of multiple interventions and when the resources needed to change the behavior are available.<sup>28,92</sup> If fruits and vegetables are not available to the communities receiving nutrition messaging, then they do not have the opportunities to change their dietary choices. This is a prime reason why schools are an ideal environment to promote fruits vegetables consumption because multiple interventions could be organized within the controlled space of a cafeteria with the requirement of kids to choose fruit and vegetables in the lunchroom. This could encourage behavior change within student populations because the messages of consuming more fruits and vegetables would be marketed in the same environment in which the produce is accessible for them.

Funding has been noted as an additional barrier to institutionalizing large campaigns and support of these campaigns is necessary to make it the effective outreach tool that it has the potential to be.<sup>28,88,92</sup> Corporations can rely on their own revenue to support their marketing, but health organizations often require funding from government agencies in order to run a campaign. Additional challenges include the persuasive marketing of competing products, such as food and beverage marketing from large corporations, social norms within schools, the culture of children and adolescents, and even addiction of products, like the sugar in unhealthy products.<sup>28,88,92</sup> The

goal of providing school lunch is not to make a profit, but rather to remain within budget so the schools can continue to provide lunch for their students.<sup>94</sup> This suggests that it is unlikely that many schools have the fiscal resources to boost their nutrition marketing efforts on their own and would benefit from the assistance of grants and sponsorships. Incentive for local and national governments to support campaigns, besides improving health outcomes in child populations, is the possibility that produce sales would increase through school partnerships, thus supporting local agriculture economy.<sup>88,94</sup>

Behavioral economic strategies, social marketing, and health campaign interventions are examples of efforts being made to market and encourage youth towards healthy food items to counteract media that promotes unhealthy dietary consumption. This research is critical to increase the understanding of what kinds of nutrition focused marketing tactics have a positive effect on student food choices in order to compete with the scope and effectiveness of unhealthy food marketing. Longitudinal research needs to be conducted on nutrition specific social marketing campaigns, especially in school lunch environments.

### **Evaluation of Effectiveness of Nutrition Marketing within Elementary, Middle and High School Cafeterias**

In the context of school nutrition, the cafeteria is the ideal place for marketing behavior change because it's the location where students are actively making dietary choices daily. Through federal programs such as the National School Lunch Program and the Fresh Fruit and Vegetable Program, the price of healthy options can be reduced, but familiarity, taste preference and social stigma are additional barriers to consider<sup>27,53,56,94</sup>. Healthy food choices, especially consumption of fruits and vegetables, are clearly the product and behavior change being promoted. As mentioned, there have been numerous policies implemented in an effort to improve the quality of student dietary consumption. Now, the understanding of how to best apply the concept of promotion in schools is the final piece of the school nutrition promotion puzzle. Some researchers are bringing attention towards understanding the effects of nutrition promotion within school environments. The intervention Gimme 5- A Fresh Nutrition Concept for Students utilized



media campaigns, class workshops, school meal modifications, and parental support to promote increasing daily servings of fruits and vegetables in high school students.<sup>95</sup> The results found no notable effect on consumption of fruits and vegetables but did find an increase in knowledge scores and awareness which is congruent with other campaign findings that behavior change is harder to achieve than messaging, but is nonetheless a critical first step.<sup>95</sup> Existing literature also suggests the need for multifaceted approaches that complement one another and encourage long term behavior change by incorporating nutrition education, exposing students to social marketing, and health campaigns as well as designing the school environment to support healthy choices by incorporating behavior economics.<sup>27,24,28-31</sup>

Blitstein et al. conducted a study that compared the effect of a school-based nutrition education program in Iowa (BASICS) and the same nutrition program with an added social marketing campaign (BASICS Plus) directed towards 3<sup>rd</sup> grade students and their parents.<sup>24</sup> The social marketing intervention used community activities in locations near participating schools, such as supermarkets, as well as around the school sites themselves to promote fruits and vegetables as snacks to both the parents and their children while encouraging parents to give fat free/low fat milk to their children.<sup>24</sup> The study found that students in the BASICS Plus group consumed significantly more fruits and vegetables than the control group that received no intervention, while the BASICS group consumed significantly more fruit than the control group. This signifies that added social marketing materials may support nutrition education efforts in influencing nutrition behaviors and improving fruit and vegetable consumption. The study also saw that students in the BASICS PLUS intervention group were more likely to use low-fat/fat-free milk, signifying that targeting parents with additional social marketing may have improved dietary choices in the household.<sup>24</sup> These results are promising, but many more questions remain in terms of whether the results of this study are replicable across schools and whether demographic factors such as student age, race, and socioeconomic status affect behavior outcomes. Gordon et al. conducted a systematic review to evaluate the effectiveness of social marketing interventions for health improvement and the findings concluded that social marketing provides a promising framework for improving health at the individual and community level which can be

catered to different target groups and settings.<sup>96</sup> Of the 31-nutrition based social marketing interventions, 9 were based in the school setting. When looking at nutrition social marketing interventions, they found that of the 18 interventions that aimed to increase fruit and vegetable consumption, 10 suggested a positive effect and six had mixed or moderate effects<sup>96</sup>.

Although efforts are being made to understand how to increase fruit and vegetable consumption and encourage lifelong healthy habits in child populations, more research is needed on how to increase engagement and integration of nutrition messaging. The lack of investigation into the marketing materials used to promote nutrition focused messages widens the disparity between the understood impact of food and beverage marketing and the understood impact of nutrition marketing. Thus, presenting a logical rationale for children to gravitate towards less healthy options due to the fact that their environment is catered to encourage them towards those choices. Increased efforts should be made to uncover strategies to alter student eating environment and perceptions around food in order to counter the marketing of unhealthy behavior.

While current nutrition marketing techniques such as behavioral economics and social marketing campaigns can provide insight to the current knowledge base of healthy advertising to children, there is limited literature that has analyzed content of the marketing and how it can be altered to engage children in healthier behaviors. Similarly, there is no literature that has compared the effectiveness of nutrition promoting strategies across grade levels which creates a lack of understanding of what tactics work best for different age groups. There may be existing nutrition marketing within schools that is ineffective because the messages and materials used are not relevant to the students. Additionally, the current evidence does not exhibit the prevalence of marketing among elementary, middle, and high schools and how that could be affecting student's exposure to the messaging. It is a large undertaking to address overall nutrition marketing efforts but making the messages within school cafeterias purposeful and meaningful to students may be a step in the right direction through a localized lens.

## **Review of Literature Summary**

It is understood that the high prevalence of high sugar, high fat, and calorie dense foods and lack of fruits and vegetables in a child's diet increases their risk of chronic diseases. The saturation of aggressive unhealthy food and beverage product marketing and availability in a child's environment are contributors to this public health concern. Efforts are being made by schools and public health organizations to promote counter-behaviors of eating more fruits and vegetables that has historically displayed some evidence of increasing awareness of health messages but has not had a large-scale impact on fruit and vegetable consumption. Schools are an ideal place to start implementing more nutrition promoting interventions due to the guaranteed availability of produce and concentrated environment of students that can be reached. Multiple gaps in the understanding of child-directed nutrition marketing exists such as existing persuasive content and comparison of marketing strategies across grade levels.

The primary research questions of this study aimed to assess what content variables are prevalent in existing marketing materials in schools and how the content relates to the purpose, visual aspects, marketing strategies and literacy/language aspects of the materials. More specifically, this study aimed to assess what content is prevalent in nutrition marketing that promotes fruits and vegetables in schools. In addition, the study sought to explore how the content differed within elementary, middle, and high school's nutrition marketing. Findings from this study can be compared to these social marketing principles and used to further research on how to effectively promote healthy eating with child directed nutrition marketing.

## CHAPTER 3

### METHODS

#### **Study Design and Sample**

This secondary research study is a content analysis of existing nutrition marketing within 37 schools in Arizona including elementary (n=13), middle (n=12), and high schools (n=12). These schools were recruited as a convenience sample to participate in the primary study and were randomly assigned into intervention groups. The photographs of the nutrition marketing materials were captured during baseline data collection of student meal consumption for the primary study and during routine site visits prior to interventions for the primary study. Site visits were conducted by trained student research assistants (RAs). To meet inclusion criteria, the materials photographed by the RAs were required to be a promotional material visible to the students within the cafeteria related to food and/or nutrition concepts. The nutrition concepts could be presented in the form of text or images.

The ASU IRB approved all study protocols [STUDY0000582]. The photos were coded by three coders and analyzed for their content, prevalence, and perceived effectiveness in encouraging children to consume more fruits and vegetables. Agreement was found among all three coders.

#### **Procedures and Measures**

Observational coding classifications were created specifically for the analysis of these materials. Photos were first sorted based on grade level: elementary (n=108), middle (n=89), high school (n=87). A total of n=284 nutrition marketing materials were coded and analyzed. The coding classifications were designed to capture content associated with purpose, visual aspects, marketing strategies, and literacy/language aspects of school cafeteria nutrition marketing. The purpose and definitions of these coding classifications are as follows:

**Purpose.** The content variables in the “purpose” coding classification aim to show what food products, behaviors and/or information are being promoted (behavior change theme, f/v behavior target, food groups, educational themes); the tone of how the product or behavior is being

promoted (message structure); and who's promoting the product, behavior and/or information (association with health campaign).

**Visual Aspects.** The content variables associated with the “visual aspects” coding classification aim to show what type of media is being used to deliver the nutrition message (type of marketing), what size the marketing media is (size), what visual elements are used to catch the audience's attention, and the frequency of these elements per material (visual appeals).

**Marketing Strategies.** The content variables associated with the “marketing strategies” coding classification aim to show the types of antecedents of behavior used (antecedents); the way messages were framed to communicate a behavior target (message framing); the proximity of any health messages present in the marketing in relation to the child audience (proximal v. distal health outcome message); the specificity of the marketing appeal (message specificity); and any marketing techniques that were comparable to other child directed promotional efforts such as cartoons, celebrity/athlete endorsement, social media/websites, emotional appeals, humor, brand appeal, etc. (marketing strategies).

**Literacy/Language Aspects.** The content variables associated with the “literacy/language aspects” coding classification aim to show whether the reading level of the text incorporated in the marketing material is appropriate for the target grade level. The target grade level was dependent on the grade level of the school the marketing material was located in (elementary, middle school, high school) and reading level was determined Flesch-Kincaid score.

Table 1 provides an overview of the specific content variables assessed in each nutrition marketing piece. Due to the subjective nature of some of these characteristics (specificity of messaging, message structure, visual appeals, etc.), a *Marketing Content Analysis Codebook Reference Guide* [Appendix A] was created by the authors of this paper with explanations of each classification and examples. The Marketing Content Analysis Codebook Reference Guide [Appendix A] was created by qualitatively evaluating a smaller subset of school nutrition marketing materials and identifying common themes and characteristics. Drafts of the marketing codebook were reviewed and revised by the thesis chair and committee chairs numerous times prior to being utilized for data analysis in this study. This guidebook was created to operationalize the coding

procedure and create consistency among coders but has not been validated as a tool for coding nutrition marketing material content.

Table 1: Content variables assessed in each nutrition marketing piece by respective coding classification (purpose, visual aspect, marketing strategies, literacy/language aspects from Appendix A

Purpose	Visual Aspects	Marketing Strategies	Literacy and Language Aspect
<p><b><u>Behavior Change Theme</u></b></p> <ul style="list-style-type: none"> <li>• Nutrition</li> <li>• Nutrition + Physical Activity</li> <li>• Food Safety</li> </ul>	<p><b><u>Type of Marketing</u></b></p> <ul style="list-style-type: none"> <li>• Flyer</li> <li>• Poster</li> <li>• Sticker</li> <li>• Table Tent</li> <li>• Decals</li> <li>• Banner</li> <li>• Cafeteria Decoration</li> <li>• Technological Display</li> </ul>	<p><b><u>Antecedents</u></b></p> <ul style="list-style-type: none"> <li>• Associative (paired) learning<sup>3</sup></li> <li>• Social Modeling<sup>4</sup></li> </ul>	<p><b><u>Reading Level Appropriateness<sup>2</sup></u></b></p> <ul style="list-style-type: none"> <li>• Reading level appropriate for target audience</li> <li>• Reading level NOT appropriate for target audience (too high)</li> <li>• Reading level NOT appropriate for target audiences (too low)</li> </ul>
<p><b><u>Message Structure</u></b></p> <ul style="list-style-type: none"> <li>• Command</li> <li>• Encouragement</li> <li>• Reminder</li> <li>• Slogan</li> </ul>	<p><b><u>Size</u></b></p> <ul style="list-style-type: none"> <li>• Small (~&lt;8.5x11")</li> <li>• Medium (~&gt;8.5x11" &lt;36x72")</li> <li>• Large (~&gt;36x72")</li> </ul>	<p><b><u>Message Framing</u></b></p> <ul style="list-style-type: none"> <li>• Gain-framed (positive)/positive reinforcement</li> <li>• Gain-framed (negative)/negative reinforcement</li> <li>• Loss-framed (positive)/positive punishment</li> <li>• Loss-framed (negative)/negative punishment</li> </ul>	<p><b><u>Language</u></b></p> <ul style="list-style-type: none"> <li>• English</li> <li>• Spanish</li> <li>• Other</li> </ul>
<p><b><u>F/V Behavior Target</u></b></p> <ul style="list-style-type: none"> <li>• Selection of F/V<sup>1</sup></li> <li>• Consumption of F/V<sup>1</sup></li> </ul>	<p><b><u>Visual Appeals</u></b></p> <ul style="list-style-type: none"> <li>• Word Art</li> <li>• Eye-catching patterns and textures</li> <li>• Diagrams</li> <li>• 3-D displays</li> <li>• Eye-catching photos of F/V<sup>1</sup></li> </ul>	<p><b><u>Proximal v. Distal Health Outcome Message</u></b></p> <ul style="list-style-type: none"> <li>• Proximal</li> <li>• Distal</li> </ul>	
<p><b><u>Educational Themes</u></b></p> <ul style="list-style-type: none"> <li>• Fruit</li> <li>• Vegetable</li> <li>• Vitamin/Mineral</li> </ul>		<p><b><u>Marketing Strategy</u></b></p> <ul style="list-style-type: none"> <li>• Celebrity/Athlete endorsements</li> <li>• Cartoon Characters</li> </ul>	

<ul style="list-style-type: none"> <li>• <i>USDA NSLP Meal Guidelines</i></li> <li>• <i>Portion Sizes</i></li> <li>• <i>MyPlate</i></li> <li>• <i>Sustainability</i></li> <li>• <i>Sustainability</i></li> <li>• <i>Seasonal Fruits/Vegetables</i></li> </ul>		<ul style="list-style-type: none"> <li>• <i>Social Media/Websites</i></li> <li>• <i>Interactivity</i></li> <li>• <i>Humor</i></li> <li>• <i>Emotional Appeal</i></li> <li>• <i>Brand Appeal</i></li> </ul>	
<p><b><u>Food Groups</u></b></p> <ul style="list-style-type: none"> <li>• <i>Fruit</i></li> <li>• <i>Vegetable</i></li> <li>• <i>Dairy</i></li> <li>• <i>Grain</i></li> <li>• <i>Meat/Meat Alternative (Protein)</i></li> </ul>		<p><b><u>Message Specificity</u></b></p> <ul style="list-style-type: none"> <li>• <i>Specific<sup>5</sup></i></li> <li>• <i>Broad<sup>6</sup></i></li> </ul>	
<p><b><u>Association with Health Campaign</u></b></p> <ul style="list-style-type: none"> <li>• <i>Fuel Up to Play 60</i></li> <li>• <i>Healthy Harvest for Arizona Schools</i></li> <li>• <i>Champions for Change</i></li> <li>• <i>Triple Play</i></li> <li>• <i>Dig in!</i></li> <li>• <i>Got Milk?</i></li> <li>• <i>Arizona Grown</i></li> <li>• <i>National Dairy Council</i></li> <li>• <i>USDA</i></li> </ul>			

<sup>1</sup>**F/V** = fruits and vegetables

<sup>2</sup>**Reading Level Appropriateness**= determined by Flesch-Kincaid score

<sup>3</sup>**Associative (Paired) Learning**= pairs food item with other stimuli (existing products, well-known people, funny words) that already elicit positive emotions.

<sup>4</sup>**Social Modeling**= an antecedent technique used to demonstrate the target behavior by integrating a relatable person, celebrity, animated character, or social group who “models” a target behavior.

<sup>4</sup>Paired

<sup>5</sup>**Specific**= marketing had to either be focused on a specific action, item, or topic (i.e., eat 5 servings of fruits and vegetables a day, eating oranges is great a great way to boost your immunity).

<sup>6</sup>**Broad**= promoted a broad message (i.e., “eat your fruits and vegetables” or “eat seasonally”)



#### *Agreement Between Coders*

Due to the subjective elements of the qualitative coding design, three coders were used. Each coder reviewed the coding guidebook and independently coded each photograph accordingly. Any emergent codes were discussed and agreed upon by all coders and then verified by the principal investigators. After the first two coders completed the data set, disagreements were assessed. Discrepancies were then discussed and if agreement could not be found, a third coder made the final decision.

#### **Statistical Analysis**

This is a descriptive study that combines quantitative and qualitative analysis of the marketing material content variables. Interrater reliability (kappa) was assessed to determine agreement between coders on each variable, and then averaged across each category of content (i.e., behavior change theme, message structure, f/v behavior change, educational themes, food groups, association with health campaign, type of marketing, size, visual appeals, antecedents, message framing, marketing strategy, reading level appropriateness, language). Content variables are presented in percentages, and qualitative examples are presented in quotations. To compare prevalence of content variables across grade level, a simple binary logistic regression was used to detect significant differences in prevalence of content across elementary-, middle- and high school. A logistic regression was then run on the sample again with elementary school data used as the referent category to detect whether the content variable differed significantly in middle schools or high schools as compared to elementary schools. After applying a Bonferroni adjustment for the number of statistical tests run ( $n=80$ ), significance was detected at or below a p-value of 0.0006. Analysis on text specific variables (i.e., message structure, message framing, message specificity etc.) were only run on the sample of nutrition marketing that contained text (total sample  $n=269$ , elementary  $n=108$ , middle  $n=80$ , high school  $n=81$ ).

#### *Fruit or Vegetable Only Sub Analysis*

A sub-sample of materials that promoted fruits and/or vegetables was analyzed quantitatively and qualitatively to see how the content of nutrition marketing that exclusively promoted fruits and vegetables compared to the overall sample. The analysis looked at a sub-group that promoted a fruit or a vegetable (n=98), a fruit and a vegetable (n=44), fruit only (n=28) and vegetables only (n=26). Presence of content variables are presented in percentages, and qualitative examples are presented in quotations. Because of the small sample sizes, no additional statistical tests were run on this sub analysis.

## CHAPTER 4

### RESULTS

#### ***Average Prevalence of Nutrition Marketing and Arizona School Demographic Information***

The average number of nutrition marketing materials within a school cafeteria was  $7.7 \pm 7.2$  (Table 2). Elementary schools made up the largest proportion of the marketing sample (38%), followed by middle schools (31%) and high schools (31%). The average student racial demographics across all 37 schools were 26% White, 5% Black or African American, 1% Asian, 3% American Indian or Alaskan Native, and 59% Hispanic/Latino. The average free and reduced lunch rate was 64%. In terms of location, 75% of the schools were located in urban areas and 24% located rurally.

Table 2: Summary of school demographic information of participating elementary, middle, and high schools

	All Schools (n=37)	Elementary School (n=13)	Middle School (n=12)	High School (n=12)
Free/Reduced Lunch Rates	64% $\pm$ 29%	68% $\pm$ 27%	61% $\pm$ 29%	62% $\pm$ 32%
Percent of total Marketing Sample %(n)		38% (108)	31% (89)	31% (87)
Number of marketing materials per school	7.7 $\pm$ 7.2	8.3 $\pm$ 8.4	7.4 $\pm$ 6.7	7.3 $\pm$ 6.6
<b>Race</b>				
White	26% $\pm$ 27%	30% $\pm$ 27%	28% $\pm$ 26%	21% $\pm$ 29%
Black or African American	5% $\pm$ 6%	7% $\pm$ 8%	5% $\pm$ 3%	3% $\pm$ 4%
Asian	1% $\pm$ 2%	1% $\pm$ 2%	1% $\pm$ 1%	1% $\pm$ 1%
American Indian or Alaskan Native	3% $\pm$ 6%	2% $\pm$ 3%	4% $\pm$ 9%	2% $\pm$ 3%
Native Hawaiian or other Pacific Islander	0% $\pm$ 1%	0% $\pm$ 1%	1% $\pm$ 2%	0% $\pm$ 0%
Hispanic/Latino	59% $\pm$ 29%	54% $\pm$ 26%	59% $\pm$ 30%	65% $\pm$ 32%
Other	2% $\pm$ 2%	3% $\pm$ 2%	2% $\pm$ 3%	1% $\pm$ 1%
<b>Urban or Rural</b>				
Urban	76% (28)	77% (10)	75% (9)	75% (9)
Rural	24% (9)	23% (3)	25% (3)	25% (3)

### ***Interrater Reliability of Content Analysis***

The percent agreement between coders was strong at 93.1%  $\pm$  6.4% (kappa = 0.79  $\pm$  0.16; Table 3). A kappa value above 0.90 indicates nearly perfect agreement, a kappa value of 0.80-0.90 indicates strong levels of agreement, and a kappa value of 0.60-0.79 indicates moderate agreement. The only content categories that had an average kappa value below 0.60 were visual appeals (kappa = 0.51), message structure (kappa = 0.53) and message specificity (kappa = 0.55).

Table 3: Percent Agreement Among Coders for Marketing Content Descriptive Variables

<b>Descriptive Variable</b>	<b>% Agreement Among Coders</b>	<b>Average Kappa (Range)</b>
Behavior Change Target	96.6%	.85 (.78 - .89)
Fruit/Vegetable Behavior	92.8%	.84 (.83 - .85)
Educational Components	91.6%	.75 (.58 - .94)
Food Groups Present	95.8%	.91 (.92 - .96)
Message Structure	82.0%	.53 (.44 - .61)
Associated Campaign/Organization	98.6%	.94 (.71 - 1.0)
Type of Marketing	96.4%	.86 (.68 - 1.0)
Size of Marketing	92.6%	.87 (.84 - .93)
Visual Appeals	85.3%	.51 (.20 - .70)
Antecedents	96.1%	.83 (.82 - .84)
Message Framing	98.4%	.89 (.75 - 1.0)
Marketing Strategy	93.8%	.69 (.48 - .93)
Proximal v. Distal Message	92.6%	.69 (.66 - .71)
Message Specificity	77.6%	.55 (.36 - .74)
Reading Level Appropriateness	100.0%	1.0 (1.0 - 1.0)
Language	100.0%	1.0 (1.0 - 1.0)
<b>Average % Agreement</b>	<b>93.1% <math>\pm</math> 6.4%</b>	<b>.79 <math>\pm</math> .16</b>

### ***Prevalence of Marketing Strategies within Nutrition Marketing Material Sample***

After examining the *purpose* of the marketing materials, it was found that 80.3% of the materials promoted a nutrition behavior change, 13% promoted a nutrition and physical activity behavior change and 1.3% promoted a food safety behavior change (Table 4). Nutrition marketing materials that encouraged taking a fruit or vegetable (47.5%) were more prevalent than materials that encouraged consuming a fruit or vegetable (28.2%). To add, 40.1% of the marketing didn't encourage taking or consuming a fruit or vegetable at all.

Education on portion sizes (36.6%) and USDA NSLP guidelines (25.7%) were most the common educational themes. However, 45.4% of the marketing materials did not contain any education. The USDA campaigns were the most prevalent source of nutrition marketing materials across the total sample (34.9%) and across grade level (elementary=36.1%, middle = 19.1%, high school=49.4%), followed by other campaigns such as Fuel Up to Play 60 (6.3%) or Healthy Harvest for AZ Schools (8.3%).

Prevalence of content variables in the nutrition marketing sample was also compared across grade level (elementary, middle, and high school). The prevalence of educational components about vitamins ( $p < .00001$ ) and seasonal vegetables ( $p < .00001$ ) differed significantly across grade level, and prevalence of these educational components were significantly higher in high schools compared to elementary schools ( $p < .00001$ ). Presence of materials created by the Healthy Harvest for Arizona Schools campaign differed significantly across grade level ( $p < .00001$ ) and were significantly more prevalent in high schools ( $p < .00001$ ). There were no other statistically significant results across grade level for the analysis of *purpose*.

Table 4: Purpose<sup>1</sup> of nutrition marketing materials (n=284) by elementary, middle, and high school in Arizona

	All Schools (n=284)	Elementary School (n=108)	Middle School (n=89)	High School (n=87)	p-value
<b>Behavior Change Theme %(n)</b>					
Nutrition	80.3% (228)	78.7% (85)	75.3% (67)	87.4% (76)	0.1572
Nutrition and Physical Activity	13.0% (37)	21.3% (23)	9.0% (8)	6.9% (6)	0.0032
Food Safety	1.4% (4)	3.7% (4)	0.0% (0)	0.0% (0)	0.9940
<b>F/V Behavior Target %(n)</b>					
Taking a F/V	47.5% (135)	41.7% (45)	48.3% (43)	54.0% (47)	0.0853
Consuming a F/V	28.2% (80)	34.3% (37)	11.2% (10) *	37.9% (33)	0.7595
Neither	40.1% (114)	41.7% (45)	43.8% (39)	32.2% (28)	0.2003
<b>Educational Themes %(n)</b>					
Fruits	11.3% (32)	11.1% (12)	2.2% (2)	20.7% (18)	0.0604
Vegetables	14.8% (42)	15.7% (17)	2.2% (2)	26.4% (23)	0.0675
Vitamins/Minerals	14.8% (42)	8.3% (9)	2.2% (2)	35.6% (31) <sup>b</sup>	0.0000 <sup>a</sup>
USDA NSLP Meal Guidelines	25.7% (73)	19.4% (21)	39.3% (35)	19.5% (17)	0.8181
Portion Sizes	36.6% (104)	33.3% (36)	28.1% (25)	49.4% (43)	0.0291
Seasonal Produce	9.2% (26)	4.6% (5)	1.1% (1)	23.0% (20) <sup>b</sup>	0.0001 <sup>a</sup>
USDA MyPlate	19.7% (56)	15.7% (17)	11.2% (10)	33.3% (29)	0.0041
Sustainability	0.4% (1)	0.9% (1)	0.0% (0)	0.0% (0)	0.9945
None	45.4% (129)	50.9% (55)	51.7% (46)	29.9% (26)	0.0048
<b>Food Group Presence %(n)</b>					
Fruit	68.3% (194)	72.2% (78)	66.3% (59)	65.5% (57)	0.3043
Vegetable	66.2% (188)	75.0% (81)	61.8% (55)	59.8% (52)	0.0224
Dairy	48.2% (137)	47.2% (51)	59.6% (53)	37.9% (33)	0.2580
Grain	45.1% (128)	42.6% (46)	52.8% (47)	40.2% (35)	0.8244
Meat/Meat Alternative (Protein)	40.1% (114)	35.2% (38)	44.9% (40)	41.4% (36)	0.3460
<b>Message Structure %(n)</b>					
Command	22.7% (61)	16.7% (18)	38.8% (31)	14.8% (12)	0.7943
Encourage	39.4% (112)	38.9% (42)	31.3% (25)	55.6% (45)	0.0978
Remind	11.3% (32)	12.0% (13)	16.2% (13)	7.4% (6)	0.2940

Slogan	43.0% (122)	46.3% (50)	31.3% (25)	58.0% (47)	0.3821
Campaign %(n)	(n=284)	(n=108)	(n=89)	(n=87)	
Fuel Up to Play 60	6.3% (18)	11.1% (12)	5.6% (5)	1.1% (1)	0.0080
Healthy Harvest for Arizona Schools	8.1% (23)	3.7% (4)	0.0% (0)	21.8% (19) <sup>b</sup>	0.0001 <sup>a</sup>
Champions for Change	2.8% (8)	2.8% (3)	5.6% (5)	0.0% (0)	0.3044
Triple Play	0.4% (1)	0.9% (1)	0.0% (0)	0.0% (0)	0.9945
Dig in!	3.9% (11)	9.3% (10)	1.1% (1)	0.0% (0)	0.0150
Got Milk?	1.1% (3)	0.0% (0)	3.4% (3)	0.0% (0)	0.8761
Arizona Grown	1.1% (3)	0.9% (1)	0.0% (0)	2.3% (2)	0.4056
National Dairy Council	4.9% (14)	8.3% (9)	3.4% (3)	2.3% (2)	0.0573
USDA	34.9% (99)	36.1% (39)	19.1% (17)	49.4% (43)	0.0886

<sup>1</sup> Purpose: content variables associated with the product or behavior being promoted, including how the message is promoted and who it is promoted by

<sup>a</sup>statistically significant difference across grade levels ( $p \leq .0006$ )

<sup>b</sup>statistically significant difference ( $p \leq .0006$ ) compared to elementary school (referent)

After analyzing the sample of nutrition marketing photos for *visual aspects*, posters (40.1%) and flyers (25.0%) were found to be the most common type of nutrition marketing and most were small (39.4%) or medium (37.3%) sized (Table 5). It was found that the most common visual appeals utilized were eye-catching photos of fruits and vegetables (47.2%) and word art (40.8%). Many marketing materials only utilized one visual appeal (44.3%), but most utilized at least two visual appeals (45.1%).

When the prevalence of visual appeals in the sample was compared across grade level, the prevalence of large marketing materials differed significantly across grade level ( $p < .0000$ ). Large materials were present in middle and high school cafeterias significantly more than elementary schools ( $p < .00001$ ). In addition, the prevalence of marketing materials that contained one visual appeal differed significantly across grade level ( $p < .0000$ ), and high schools had the highest prevalence of materials that contained only one visual appeal ( $p < .0000$ ). There were no other statistically significant results across grade level for the analysis of *visual aspects*.

Table 5: Visual aspects<sup>2</sup> present in nutrition marketing materials (n=284) by elementary, middle, and high school in Arizona

	All Schools	Elementary	Middle	High School	p-value
Type of Marketing % (n)	(n=284)	(n=108)	(n=89)	(n=87)	
Flyer	25.0% (71)	24.1% (26)	30.3% (27)	20.7% (18)	0.6480
Poster	40.1% (114)	50.0% (54)	23.6% (21) <sup>b</sup>	44.8% (39)	0.3356
Sticker	1.8% (5)	0.0% (0)	5.6% (5)	0.0% (0)	0.8399
Table tent	2.5% (7)	5.6% (102)	1.1% (0)	0.0% (0)	0.0471
Decals	9.2% (26)	11.1% (12)	7.9% (7)	8.0% (7)	0.4441
Banner	4.9% (14)	1.9% (2)	11.2% (10)	2.3% (2)	0.7312
Cafeteria Decoration	13.0% (37)	7.4% (8)	19.1% (17)	13.8% (12)	0.1527
Technological Display	3.5% (10)	0.0% (0)	1.1% (1)	10.3% (9)	0.0101
Size of Material % (n)	(n=284)	(n=108)	(n=89)	(n=87)	
Small	39.4% (112)	45.4% (49)	44.9% (40)	26.4% (23)	0.0096
Medium	37.3% (106)	44.4% (48)	24.7% (22)	41.4% (36)	0.5362
Large	23.2% (66)	10.2% (11)	30.3% (27) <sup>b</sup>	32.2% (28) <sup>b</sup>	0.0002 <sup>a</sup>



Visual Appeals %(n)	(n=284)	(n=108)	(n=89)	(n=87)	
Word Art	40.8% (116)	43.5% (47)	52.8% (47)	25.3% (22)	0.0179
Eye-catching patterns and textures	24.6% (70)	34.3% (37)	20.2% (18)	17.2% (15)	0.0055
Diagrams	33.1% (94)	32.4% (35)	36.0% (32)	31.0% (27)	0.8726
3-D displays	1.8% (5)	3.7% (4)	0.0% (0)	1.1% (1)	0.1798
Eye-catching photos of fruits and vegetables	47.2% (134)	53.7% (58)	38.2% (34)	48.3% (42)	0.3806
Frequency of Visual Appeals %(n)	(n=284)	(n=108)	(n=89)	(n=87)	
One appeal	44.3% (128)	32.4% (35)	43.8% (39)	62.1% (54) *	0.0000 <sup>a</sup>
Two appeals	26.0% (75)	34.3% (37)	23.6% (21)	19.5% (17)	0.0194
Three appeals	10.4% (30)	10.2% (11)	16.9% (15)	4.6% (4)	0.2658
>Three appeals	8.7% (25)	15.7% (17)	4.5% (4)	4.6% (4)	0.0069
None	9.0% (26)	7.4% (8)	11.2% (10)	9.2% (8)	0.6320

<sup>2</sup>Visual Aspects: content variables associated with the visual elements used to promote the product or behavior

<sup>a</sup>statistically significant difference across grade levels ( $p \leq .0006$ )

<sup>b</sup>statistically significant difference ( $p \leq .0006$ ) compared to elementary school (referent)

Analysis of *marketing aspects* embedded in the nutrition marketing materials indicated that gain-frame message framing with positive reinforcement appeared most frequently in the sample of nutrition marketing with textual messages (19.3%), followed by gain-framed with negative reinforcement (1.5%), loss-framed with negative punishment (1.1%) and loss-framed with positive punishment (0.4%) (Table 6). The remaining marketing photos with text did not follow the textual structure of a gain or loss framed message (77.7%). Approximately 20% of the marketing contained health messages that were proximal to student health outcomes (i.e., “eating fiber during lunch will help keep you full and full of energy through the day”) compared to 13% that contained health messages that were distal to student health outcomes (i.e., “drink milk to for strong bone health”); 66.9% indicated no time frame. The most common marketing strategies employed across the sample were social media/websites (24.6%) and use of cartoon characters (16.5%). Almost half of the nutrition marketing didn’t utilize a marketing strategy at all (49.6%), 27.3% of the utilized only one marketing strategy and 22.1% of the materials used two more strategies.

When the prevalence of marketing aspects in the sample was compared across grade level, marketing strategies such as social modeling, cartoon characters and humor differed significantly across grade level ( $p < .00001$ ) and the prevalence of cartoons differed significantly in middle schools compared to high schools ( $p < .00001$ ). The amount of marketing materials that used one marketing strategy differed significantly across grade level ( $p < .00001$ ) and used significantly more in high schools ( $p < .00001$ ). There were no other statistically significant results across grade level for the analysis of *marketing aspects*.

Table 6: Marketing strategies<sup>3</sup> present in nutrition marketing materials (n=284) by elementary, middle, and high school in Arizona

	All Schools	Elementary	Middle	High School	p-value
Antecedents %(n)	(n=284)	(n=108)	(n=89)	(n=87)	
Associative (paired) learning	9.2% (26)	17.6% (19)	1.1% (1)	6.9% (6)	0.0080
Social Modeling	16.9% (48)	27.8% (30)	11.2% (10)	9.2% (8)	0.0006 <sup>a</sup>

Message Framing % <i>(n)</i>	( <i>n</i> =269)	( <i>n</i> =108)	( <i>n</i> =80)	( <i>n</i> =81)	
Gain-framed (positive) / positive reinforcement	19.3% (52)	16.7% (18)	8.8% (7)	33.3% (27)	0.0183
Gain-framed (negative) / negative reinforcement	1.5% (4)	0.0% (0)	0.0% (0)	4.9% (4)	0.9934
Loss-framed (positive) / positive punishment	0.4% (1)	0.0% (0)	0.0% (0)	1.2% (1)	0.9940
Loss-framed (negative) / negative punishment	1.1% (3)	2.8% (3)	0.0% (0)	0.0% (0)	0.9941
Proximal v. Distal Health Outcome Message % <i>(n)</i>	( <i>n</i> =269)	( <i>n</i> =108)	( <i>n</i> =80)	( <i>n</i> =81)	
Proximal	20.1% (54)	21.3% (23)	20.0% (16)	18.5% (15)	0.4633
Distal	13.0% (35)	10.2% (11)	2.5% (2)	27.2% (22)	0.0039
Marketing Strategy % <i>(n)</i>	( <i>n</i> =284)	( <i>n</i> =108)	( <i>n</i> =89)	( <i>n</i> =87)	
Celebrity/Athlete endorsements	5.3% (15)	7.4% (8)	7.9% (7)	0.0% (0)	0.0350
Cartoon Characters	16.5% (47)	31.5% (34)	10.1% (9) <sup>b</sup>	4.6% (4) <sup>b</sup>	0.0000 <sup>a</sup>
Social Media/Websites	24.6% (70)	25.9% (28)	10.1% (9)	37.9% (33)	0.0909
Interactivity	7.0% (20)	4.6% (5)	5.6% (5)	11.5% (10)	0.0743
Humor	7.0% (20)	14.8% (16)	4.5% (4)	0.0% (0)	0.0006 <sup>a</sup>
Emotional Appeal	15.1% (43)	19.4% (21)	14.6% (13)	10.3% (9)	0.0794
Brand Appeal	7.7% (22)	10.2% (11)	6.7% (6)	5.7% (5)	0.2432
Frequency of Marketing Strategies % <i>(n)</i>	( <i>n</i> =284)	( <i>n</i> =108)	( <i>n</i> =89)	( <i>n</i> =87)	
One strategy	27.3% (79)	22.2% (24)	15.7% (14)	47.1% (41) <sup>b</sup>	0.0003 <sup>a</sup>
Two strategies	14.2% (41)	21.3% (23)	9.0% (8)	11.5% (10)	0.0440
Three strategies	5.5% (16)	10.2% (11)	5.6% (5)	0.0% (0)	0.0059
>Three strategies	2.4% (7)	4.6% (5)	2.2% (2)	0.0% (0)	0.0654
None	49.6% (141)	41.7% (45)	67.4% (60)	41.4% (36)	0.8375
Message Specificity % <i>(n)</i>	( <i>n</i> =269)	( <i>n</i> =108)	( <i>n</i> =80)	( <i>n</i> =81)	
Broad	31.6% (85)	42.6% (46)	26.3% (21)	22.2% (18)	0.0007
Specific	65.4% (176)	54.6% (59)	66.3% (53)	79.0% (64)	0.0080

<sup>3</sup>Marketing Strategies: content variables associated with the promotional techniques used to promote the product or behavior

message which includes communication messages and marketing techniques

<sup>a</sup>statistically significant difference across grade levels ( $p \leq .0006$ )

<sup>b</sup>statistically significant difference ( $p \leq .0006$ ) compared to elementary school (referent)

The last content category investigated were the *literacy and language aspects* of the nutrition marketing sample. Most of the nutrition marketing contained text that was at or below an appropriate level for the target grade level (83.3%), as determined using the Flesch Kincaid readability tool (Table 7). The average reading level of the nutrition marketing materials with text across the sample was 5.1. However, 16.7% of the marketing contained text that was too high for the target grade level. Lastly, 98.9% of the nutrition marketing with text were written in English and only 1.1% of the materials (n=3) were written in Spanish.

When the prevalence of literacy and language aspects in the sample were compared across grade level, appropriateness of reading level for the target grade level, as determined using the Flesch Kincaid readability tool, differed significantly across grade level ( $p < .0000$ ) and reading levels differed significantly in middle and high schools compared to elementary schools. There were no other statistically significant results across grade level for the analysis of *literacy and language aspects*.

Table 7: Literacy and language aspects<sup>4</sup> present in nutrition marketing materials (n=284) by elementary, middle, and high school in Arizona

	All Schools	Elementary	Middle	High School	p-value
Reading Level Appropriateness %(n)	(n=269)	(n=108)	(n=80)	(n=81)	
Reading level appropriate for target audience (at or below grade level)	83.3% (224)	63.0% (68)	96.2% (77) <sup>b</sup>	97.5% (79) <sup>b</sup>	0.0000 <sup>a</sup>
Reading level NOT appropriate for target audience (too high for grade level)	16.7% (45)	37.0% (40)	3.8% (3) <sup>b</sup>	2.5% (2) <sup>b</sup>	0.0000 <sup>a</sup>
reading level not appropriate					
Average Reading Level	(n=269)	(n=108)	(n=80)	(n=81)	
	5.1	5.2	4.6	4.7	
Language %(n)	(n=269)	(n=108)	(n=80)	(n=81)	
English	98.9% (266)	99.1% (107)	98.8% (79)	98.8% (80)	0.0362

Spanish	1.1% (3)	0.9% (1)	1.2% (1)	1.2% (1)	0.8761
Other	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	

---

<sup>4</sup>Literacy and language aspects: content variables associated with appropriateness of the literacy/language of the text in the marketing material for the target age group and demographic

<sup>a</sup>statistically significant difference across grade levels ( $p \leq .0006$ )

<sup>b</sup>statistically significant difference ( $p \leq .0006$ ) compared to elementary school (referent)

**Prevalence of Marketing Strategies within Fruit or Vegetable Only Nutrition Marketing**

The following sub analysis describes the content of the nutrition marketing that exclusively promoted fruit or vegetable food groups (F/V only). Marketing materials that promoted fruits and vegetables in addition to other food groups (grain, dairy, protein) were excluded from this analysis. Of the 98 materials reviewed, we found that 52% of the marketing encouraged consumption of a fruit or vegetable, and 36.7% encouraged taking a fruit or vegetable as the targeted behavior change (Table 8). Materials utilized message structures such as encouragements (43.3%) and slogans (46.7%) to promote fruits and vegetables.

Table 8: Purpose<sup>1</sup> of nutrition marketing materials with only fruits and vegetables only

	Fruit or Vegetable	Fruit and Vegetable	Fruit Only	Vegetable Only
<b>%(n) Total Sample</b>	<b>(n=289)</b>	<b>(n=289)</b>	<b>(n=289)</b>	<b>(n=289)</b>
	34.5% (98)	15.5% (44)	9.9% (28)	9.2% (26)
<b>Behavior Change Theme %(n)</b>	<b>(n=98)</b>	<b>(n=44)</b>	<b>(n=28)</b>	<b>(n=26)</b>
Nutrition	74.5% (73)	84.1% (37)	53.6% (15)	80.8% (21)
Nutrition and Physical Activity	8.2% (8)	15.9% (7)	0.0% (0)	3.9% (1)
Food Safety	1.0% (1)	0.0% (0)	3.6% (1)	0.0% (0)
<b>F/V Behavior Target %(n)</b>	<b>(n=98)</b>	<b>(n=44)</b>	<b>(n=28)</b>	<b>(n=26)</b>
Take	36.7% (36)	34.1% (15)	28.6% (8)	50.0% (13)
Consume	52.0% (51)	50.0% (22)	35.7% (10)	73.1% (19)
Neither	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
<b>Educational Themes %(n)</b>	<b>(n=98)</b>	<b>(n=44)</b>	<b>(n=28)</b>	<b>(n=26)</b>
Fruits	24.5% (24)	29.5% (13)	39.3% (11)	0.0% (0)
Vegetables	29.6% (29)	31.8% (14)	0.0% (0)	57.7% (15)
Vitamins/Minerals	25.5% (25)	11.4% (5)	28.6% (8)	46.2% (12)
USDA NSLP Meal Guidelines	5.1% (5)	11.4% (5)	0.00% (0)	0.00% (0)
Portion Sizes	24.5% (24)	15.9% (7)	21.4% (6)	42.3% (11)
Seasonal Produce	21.4% (21)	6.8% (3)	21.4% (6)	46.2% (12)
USDA MyPlate	13.3% (13)	2.3% (1)	14.3% (4)	30.8% (8)
Sustainability	1.0% (1)	2.3% (1)	0.0% (0)	0.0% (0)
<b>Message Structure %(n)</b>	<b>(n=90)</b>	<b>(n=43)</b>	<b>(n=22)</b>	<b>(n=25)</b>
Command	7.8% (7)	9.3% (4)	9.1% (2)	4.0% (1)
Encourage	43.3% (39)	27.9% (12)	50.0% (11)	64.0% (16)
Remind	7.8% (7)	14.0% (6)	4.5% (1)	0.00% (0)

Slogan	46.7% (42)	41.9% (18)	36.4% (8)	64.0% (16)
Campaign %(n)	(n=98)	(n=44)	(n=28)	(n=26)
Fuel Up to Play 60	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Healthy Harvest for Arizona Schools	18.4% (18)	2.3% (0)	21.4% (6)	42.3% (11)
Champions for Change	5.1% (5)	11.4% (5)	0.0% (0)	0.0% (0)
Triple Play	1.0% (1)	2.3% (1)	0.0% (0)	0.0% (0)
Dig in!	10.2% (10)	13.6% (6)	0.0% (0)	15.4% (0)
Got Milk?	0.0% (0)	0.0% (1)	0.0% (0)	0.0% (0)
Arizona Grown	3.1% (3)	6.8% (1)	0.0% (0)	0.0% (0)
National Dairy Council	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
USDA	32.7% (32)	20.5% (9)	25.0% (7)	61.5% (16)

When analyzing the *visual aspects* used in the F/V only materials, posters (46.9%) and cafeteria decorations (16.3%) were the most common type of F/V only marketing and most of these materials were medium sized (43.9%) (Table 9). Similar to the overall sample of marketing, the most prevalent visual appeals used within the F/V only marketing were eye-catching photos of fruits and vegetables (84.7%) and word art (34.7%). In terms of the number of visual appeals used per marketing material, half of the F/V only marketing utilized one (50.0%) visual appeal and 42.8% of the materials integrated two or more visual appeals.

Table 9: Visual<sup>2</sup> aspects present in nutrition marketing materials with fruits and vegetables only

	Fruit or Vegetable	Fruit and Vegetable	Fruit Only	Vegetable Only
Type of Marketing % <i>(n)</i>	<i>(n=98)</i>	<i>(n=44)</i>	<i>(n=28)</i>	<i>(n=26)</i>
Flyer	10.2% (10)	13.6% (6)	10.7% (3)	3.8% (1)
Poster	46.9% (46)	38.6% (17)	35.7% (10)	73.1% (19)
Sticker	5.1% (5)	11.4% (5)	0.0% (0)	0.0% (0)
Table tent	3.1% (3)	0.0% (0)	3.6% (1)	7.7% (2)
Decals	8.2% (8)	11.4% (5)	7.1% (2)	3.8% (1)
Banner	4.1% (4)	9.1% (4)	0.0% (0)	0.0% (0)
Cafeteria Decoration	16.3% (16)	4.5% (2)	39.3% (11)	11.5% (3)
Technological Display	6.1% (6)	11.4% (5)	3.6% (1)	0.0% (0)
Size of Marketing % <i>(n)</i>	<i>(n=98)</i>	<i>(n=44)</i>	<i>(n=28)</i>	<i>(n=26)</i>
Small	33.7% (33)	45.5% (20)	32.1% (9)	15.4% (4)
Medium	43.9% (43)	31.8% (14)	35.7% (10)	73.1% (19)
Large	22.4% (22)	22.7% (10)	32.1% (9)	11.5% (3)
Visual Appeals % <i>(n)</i>	<i>(n=98)</i>	<i>(n=44)</i>	<i>(n=28)</i>	<i>(n=26)</i>
Word Art	34.7% (34)	38.6% (17)	28.6% (8)	34.6% (9)
Eye-catching patterns and textures	23.5% (23)	25.0% (11)	21.4% (6)	23.1% (6)
Diagrams	7.1% (7)	15.9% (7)	0.0% (0)	0.0% (0)
3-D displays	2.0% (2)	0.0% (0)	0.0% (0)	7.7% (2)
Eye-catching photos of fruits and vegetables	84.7% (83)	81.8% (36)	78.6% (22)	96.2% (25)
Frequency of Visual Appeals % <i>(n)</i>	<i>(n=98)</i>	<i>(n=44)</i>	<i>(n=28)</i>	<i>(n=26)</i>



One appeal	50.0% (49)	38.6% (17)	57.1% (16)	61.5% (16)
Two appeals	20.4% (20)	25.0% (11)	21.4% (6)	11.5% (3)
Three appeals	7.1% (7)	6.8% (3)	7.1% (2)	7.7% (2)
> Three appeals	15.3% (15)	18.2% (8)	7.1% (2)	19.2% (5)
None	7.1% (7)	11.4% (5)	7.1% (2)	0.0% (0)

This sub-analysis also explored marketing strategies used in F/V only marketing. We found that like the overall sample, gain-frame with positive reinforcement message framing appeared most frequently in the sample of F/V only marketing (30.0%), followed by gain-framed with negative reinforcement 2.2% (Table 10). Proximity of the health message to the student population showed that 25.6% of the F/V only marketing contained health messages that were distal to student health, compared to 20% that contained health messaging that were proximal to student health, this is the opposite of what was found in the overall sample of nutrition marketing. Looking again at the frequency of marketing strategies employed, most didn't contain a marketing strategy at all (46.9%), much of the F/V only marketing sample only used one marketing strategy (35.7%) and 17.4% of the materials contained two or more marketing strategies.

Table 10: Marketing<sup>3</sup> strategies present in nutrition marketing materials with fruits and vegetables only

	Fruit or Vegetable	Fruit and Vegetable	Fruit Only	Vegetable Only
Antecedents %(n)	(n=98)	(n=44)	(n=28)	(n=26)
Associative (paired) learning	16.3% (16)	18.2% (8)	10.7% (3)	19.2% (5)
Social Modeling	11.2% (11)	11.4% (5)	10.7% (3)	11.5% (3)
Message Framing %(n)	(n=90)	(n=43)	(n=22)	(n=25)
Gain-framed (positive) / positive reinforcement	30.0% (27)	20.9% (9)	27.3% (6)	48.0% (12)
Gain-framed (negative) / negative reinforcement	2.2% (2)	2.3% (1)	4.5% (1)	0.0% (0)
Loss-framed (positive) / positive punishment	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Loss-framed (negative) / negative punishment	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Proximity of Health Outcome Message %(n)	(n=90)	(n=43)	(n=22)	(n=25)
Proximal	20.0% (18)	32.6% (14)	9.1% (2)	8.0% (2)
Distal	25.6% (23)	9.3% (4)	31.8% (7)	48.0% (12)
Marketing Strategy %(n)	(n=98)	(n=44)	(n=28)	(n=26)
Celebrity/Athlete endorsements	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Cartoon Characters	18.4% (18)	18.2% (8)	17.9% (5)	19.2% (5)
Social Media/Websites	20.4% (20)	9.1% (4)	21.4% (6)	38.5% (10)
Interactivity	6.1% (6)	11.4% (5)	3.6% (1)	0.0% (0)
Humor	12.2% (12)	13.6% (6)	7.1% (2)	15.4% (4)

Emotional Appeal	14.3% (14)	20.5% (9)	14.3% (4)	3.8% (1)
Brand Appeal	2.0% (2)	0.0% (0)	7.1% (2)	0.0% (0)
Frequency of Marketing Strategies %(n)	(n=98)	(n=44)	(n=28)	(n=26)
One strategy	35.7% (35)	38.6% (17)	42.9% (12)	46.2% (12)
Two strategies	14.3% (14)	0.0% (0)	14.3% (4)	15.4% (4)
Three strategies	3.1% (3)	0.0% (0)	0.0% (0)	0.0% (0)
>Three strategies	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
None	46.9% (46)	61.4% (27)	42.9% (12)	38.5% (10)
Message Specificity %(n)	(n=90)	(n=43)	(n=22)	(n=25)
Broad	30.0% (27)	39.5% (17)	27.3% (6)	16.0% (4)
Specific	66.7% (60)	62.8% (27)	63.6% (14)	76.0% (19)

For the literacy and language aspects of the sub-analysis, most of the FV only nutrition marketing contained text that was at or below an appropriate reading level, as determined using the Flesch Kincaid readability tool, for the target grade level (83.3%) but 16.7% of the marketing contained text that was too high for the target grade level (Table 11). This perfectly mirrors the results from the overall sample. Lastly on the topic of literacy and language content, 100% of the F/V only nutrition marketing with text were written in English.

Table 11: Literacy and language aspects<sup>4</sup> present in nutrition marketing materials with fruits and vegetables only

	Fruit or Vegetable (n=90)	Fruit and Vegetable (n=43)	Fruit Only (n=22)	Vegetable Only (n=25)
Reading Level Appropriateness %(n)				
Reading level appropriate for target audience (at or below grade level)	83.3% (75)	81.4% (35)	90.9% (20)	84.0% (21)
Reading level NOT appropriate for target audience (too high for grade level) reading level not appropriate	16.7% (15)	18.6% (8)	13.6% (3)	16.0% (4)
Language %(n)	(n=90)	(n=43)	(n=22)	(n=25)
English	100.0% (90)	100.0% (43)	100.0% (22)	100.0% (25)
Spanish	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Other	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)

## CHAPTER 5

### DISCUSSION

The purpose of this content analysis was to build an understanding of how current nutrition marketing may promote healthy eating behaviors among children and adolescents in Arizona schools. We analyzed the content of nutrition marketing materials located in school cafeterias and compared content variables (i.e., behavior change theme, f/v behavior target, educational themes, food group presence, message structure, campaigns, type of marketing, size of material, visual appeals, frequency of visual appeals, antecedents, message framing, proximal v. distal health outcome message, marketing strategy, frequency of marketing strategies, message specificity, reading level appropriateness, language) across grade level. A sub-analysis was also carried out on a subgroup of nutrition marketing that exclusively promoted fruits or vegetables. The overall purpose of the marketing materials ranged from promoting selection and consumption of fruits and vegetables, promoting nutrition and physical activity, food safety, and educating about healthy eating. The sample of nutrition marketing materials emphasized the behavior target of selecting F/Vs over consumption of F/Vs. However, marketing that exclusively promoted fruits and vegetables demonstrated an emphasis on consumption of F/Vs. We found that the most common type of marketing in school cafeterias were flyers and most of the materials were small in size. The F/V only marketing tended to be medium sized and predominantly delivered via poster designs. In terms of promotion, the sample demonstrated a lack of implementation of marketing appeals in half of the sample, but the half that did utilized techniques that are known to be appealing to child and adolescent demographics, such as use of cartoons, humor and social media/websites<sup>62,65,97</sup> This novel study is the first to code content of nutrition marketing in school cafeterias and compare prevalence of content across grade level.

While some existing literature has assessed the effect of nutrition based social marketing, such as health campaigns, on child and adolescent health behaviors, evidence on best practices for nutrition social marketing practices for improving dietary consumption of fruits and vegetables in the school setting is limited.<sup>75,78,88,98,99</sup>

In addition, while nutrition promotion materials are provided to school nutrition staff to put on display for their students, little is known about how these materials are designed to engage student populations. This study sought to address this literature gap and ignite a conversation about establishing best practices in child nutrition marketing in the cafeteria setting by providing quantitative and qualitative data on the purpose, visual aspects, marketing strategies and literacy/language aspects of current nutrition marketing in Arizona school cafeterias. The implications of these findings will be discussed in reference to social marketing framework set forth by Andreasen (2002), which were developed to enhance the success and limit shortcomings of social marketing interventions.<sup>22</sup> There is research to suggest that integration of Andreasen's social marketing premises in nutrition social marketing interventions may improve behavior change target outcomes.<sup>25</sup> While the aim of this study was not to assess the effectiveness of current nutrition marketing in Arizona school cafeterias for improving student dietary behaviors, important implications for the field of school nutrition promotion can be drawn from comparing the nutrition marketing content found in this study to the six premises presented in Andreasen's social marketing framework.

*Premise 1: Behavior-change central to nutrition marketing design*

The first premise outlined by Andreasen focuses on keeping the targeted behavior change at the center of the marketing design and evaluation.<sup>22</sup> The cafeteria nutrition marketing in the total sample emphasized the action of taking a fruit or vegetable more often than consuming a fruit or vegetable across all grade levels, and a large proportion of the nutrition marketing did not demonstrate a fruit or vegetable behavior target at all. This may be because of prioritization of promoting other components of a healthy diet, such as dairy, whole grains and lean proteins or an emphasis on nutrition education instead of behavior change. On the contrary, the sub analysis of F/V only materials displayed the opposite and instead emphasized the behavior target of consuming fruits or vegetables more often than selection of fruits or vegetables. In addition, all F/V only marketing materials integrated a specific F/V behavior target (selection or consumption). Schools participating in the National School Lunch Program (NSLP) require their students to take

fruits and vegetables during lunch to qualify for a reimbursable meal under the Healthy Hunger Free Kids Act,<sup>55</sup> and the marketing in this sample contained many materials that prompted students to do so. The marketing sample in this study clearly aligns with NSLP requirements to select fruits and vegetables during lunch. However, a primary goal of policies such as the Healthy Hunger Free Kids Act is to increase student fruit and vegetable consumption.<sup>55</sup> To optimize student engagement with this behavior change target, nutrition promotion associated with consumption of fruits and vegetables should be prioritized in the design of school cafeteria marketing. The FV only marketing demonstrated this well by displaying clear prioritization of messaging about consumption of fruits or vegetables.

To optimize student engagement with nutrition behavior targets, a clear behavior change message should be central to the design of every piece of nutrition marketing placed in the cafeteria environment. In this sample, the overall purpose of the marketing materials ranged from promoting selection and consumption of fruits and vegetables, promoting nutrition and physical activity together, food safety, and educating about healthy eating. These are consistent with, and also expand upon, behavior target themes found in other nutrition social marketing interventions targeted towards children<sup>75,78,88,98,99</sup>. Findings from the current study show that nutrition marketing in Arizona school cafeterias display a wide array of health behavior topics and show how prevalence of topics compare across grade level. More research is needed to better understand how to develop effective nutrition marketing that cater to specific behavior change targets; whether the promotion is affective in meeting these targets; and whether the promotion of different behavior targets is more successful in some age groups than others.

*Premise 2: Conduct consumer/formative research on the target audience*

The second premise outlined by Andreasen highlights the importance of conducting formative audience research, routinely pretesting intervention elements before they are implemented, and monitoring interventions as they are rolled out.<sup>22</sup> Doing so can prevent investing in promotion and messaging that does not appeal to the target audience. Conducting formative research within the

school setting may help target messaging to different grade levels (elementary, middle, and high school) as well as the unique characteristics of student populations.

For example, the presence of educational themes varied across grade level. Nutrition education on vitamins and seasonal produce were used significantly more in high schools than elementary schools and nearly every educational theme evaluated in this study was used more often in high schools than elementary and middle schools. Students of all ages should be exposed to nutrition education concepts that complement each other in a way that will build the students' understanding of health. If they aren't continuously exposed to credible information on how to live a healthy lifestyle, they may develop poor eating habits or receive inaccurate information from other sources.<sup>24,73,94</sup> School nutritionists and wellness educators possess the skills to help bridge the gap of information that is missing from nutrition marketing content<sup>100</sup>. However, they may not be considering the unique nuances of their student audiences (e.g., culture, preferences, social norms) before implementing nutrition promotion.

Corporate food companies set a strong example of integrating formative consumer research into their advertisements that ensure the appeals they use are effective for child and teen audiences.<sup>62</sup> These consumer research studies use a variety of qualitative research techniques including focus groups, online surveys, and in-person interviews<sup>62</sup>. Integrating similar formative research strategies in the school setting prior to implementing nutrition education and complementary social marketing campaigns may improve student receptivity to targeted dietary behavior changes, such as increased consumption of fruits and vegetables. Carins & Rundle-Thiele systematic review cited 16 social marketing interventions aimed at children in school/childcare settings, with only seven that demonstrated strong application of social marketing premises. The same review found only three interventions aimed at adolescents, with only one demonstrating strong application of social marketing framework.<sup>25</sup> To add, the interventions were not nutrition specific, showing that evidence on nutrition focused social marketing targeted towards children is limited, especially in adolescent populations.<sup>25</sup>

Encouraging school health and nutrition professionals to conduct pre-assessments of their student populations, such as administering surveys or conducting child focus groups, can help



gather information about the likes, dislikes, preferences, and motivations of their students. This information can help reflect the uniqueness of each school's social demographics and culture into the nutrition marketing materials placed in the school cafeterias.

*Premise 3: Clearly tailor the nutrition marketing design and implementation to the target audience*

According to Andreasen, the central element of any social influence strategy is creating attractive and motivational exchanges by designing marketing efforts to highlight what is most appealing to the target audience in order to increase the likelihood that the target behavior will be adopted.<sup>22</sup> There is substantial research to show that ethnic and cultural influences affect food-related beliefs, preferences, and behaviors.<sup>101,102,103(p),104</sup> These factors are essential to consider when aiming to effectively target nutrition social marketing to students in the school setting. The location of a school itself may drive differences in student demographics. A study by Kirby et al used Social Cognitive Theory (SCT) and social marketing principles in focus group sessions with fourth and fifth graders, their parents, teachers, and food service workers in three regions to study how environmental, personal, and behavioral influences affect fruit and vegetable intake. They compared across socioeconomic status (SES), region, urban-rural locations, and age (adult or child)<sup>105</sup> and found substantial differences, especially when evaluating environmental factors. Middle and high SES groups reported higher variety of F/V availability in the home environment. Lower SES groups reported higher use of canned F/Vs or only one favorite F/V that parents knew their child would eat.<sup>105</sup> The study was published in 1995 and provides valuable insight that can be applied to social marketing development, but little qualitative research that looks specifically at targeting f/v social marketing to child populations has been conducted since.<sup>105</sup> Further research is needed to assess how these regional and socioeconomic indicators may affect student dietary behaviors and what type of messaging is most effective in promoting desired behavior targets. Relating to premise 2, qualitative interviews and discussion groups, such as those demonstrated by Kirby et al, could be applied to more school settings in order to add to the body of knowledge on what drives nutrition behaviors in elementary, middle, and high school populations and how findings can be applied to social marketing in school cafeterias. Future areas of research in this

area include assessing whether student appeal towards nutrition based social marketing differ across grade level, ethnic and racial groups as well as urban vs. rural school settings.

The population of students that attended the schools in this were predominantly Hispanic/Latino, had high participation in free/reduced-priced lunch through the National School Lunch Program, and most live-in urban settings. In addition, 2016-2017 data from the Arizona Department of Education show that 7% of Arizona students are dual language learners, including 10% of 1<sup>st</sup>-5<sup>th</sup> graders,<sup>106</sup> yet nearly all of the total marketing sample with textual content, and all of the F/V only subsample, was written in English. This alone suggests comprehension of nutrition messaging in the cafeteria marketing differs among this population, which may affect likelihood to enact behavior change, specifically consumption of fruits and vegetables. In a commentary on overcoming consumer inertia to adopting dietary guidance, Web & Byrd-Bredbenner cite the role of health educators to bring clarity to often convoluted nutrition guidelines and empower consumers with nutrition messages that are realistic, positive, easy to understand and actionable.<sup>107</sup> In an editorial style guide designed to provide guidance on the use of language in social health marketing, Lorts (2019) highlights guiding principles such as making messages clear by carefully considering limited literacy and health literacy of the audience, as well as enhancing cultural appropriateness of messages by using linguistic terms common to the target audience and translating messaging to their native language.<sup>108</sup> Currently there is not a style guide that exists for developing communications directed towards child and adolescent populations, but the development, testing, and implementation of one may aid in better targeting of nutrition social marketing and advertising to student populations.

*Premise 4: Focus nutrition marketing design on the creation of attractive and motivational exchanges (promoting incentives) to the target group*

Andreasen's fourth premise of social marketing focuses on promoting attractive and motivational incentives, both tangible or intangible, to the target group.<sup>22</sup> In this study, we found that the most common type of marketing in school cafeterias were flyers and most the materials were small in size. The F/V only marketing tended to be medium sized and predominantly

delivered via poster designs. Students may walk by these familiar two-dimensional flyers and posters without noticing the content. In addition, most marketing materials in the sample only used one or two visual appeals, while common food directed marketing utilizes numerous appeals to increase visibility and engagement of their advertisement.<sup>22,62</sup> To increase the overall visual appeal and get more student eyes on the material, more effort can be made to layer enticing visual content as other child-directed ads do.

The goal of making the marketing piece visually attractive is to maintain the attention of the students so that they repeatedly engage with the messaging. In order to facilitate actual behavior change, an target audience centered incentive must also be offered.<sup>23</sup> In the school nutrition marketing sample, gain-framed messages with positive reinforcement were used most often, but in less than 20% of the total marketing sample and 30% of F/V only marketing. In addition, almost half of the nutrition marketing materials did not contain a clear marketing strategy. These findings suggest that the school marketing was not designed to emphasize the visual appeal of the marketing material or the incentives of engaging in the target behavior change promoted. Experts in marketing design could be an ally in developing enticing marketing appeals that portray the incentives of the target nutrition behavior in a visually appealing. For example, VisualLZ is a graphic design company that designs specialty graphics for schools and public health.<sup>109</sup>

*Premise 5: Nutrition Marketing uses all Four Ps of Traditional Marketing (Products, Price, Place, Promotion)*

The four P's of marketing help to ensure that a marketing promotion portrays attractive benefits (products), minimizes barriers to adopting the target behavior (price), is located in a place where the behavior change can be easily adopted or contemplated (place), and communicates messages through media that is appealing to the target audiences (promotion).<sup>22,23,25</sup> Schools that participate in NSLP demonstrate application of price by offering school meals at a free/reduced-priced lunch to qualifying students, but content in the marketing sample did not suggest any other promotional tactics used to overcome barriers to nutrition

behavior change (i.e. eating more fruits and vegetables) such as taste preferences.<sup>101-103</sup> Taste testing stations are an example of a nutrition based social marketing intervention that could help overcome lack of taste preference for healthier food items such as fruits and vegetables.<sup>110</sup> School cafeterias are an ideal location (place) to increase the amount of nutrition materials, and consequently targeted health behavior messages, that students interact with because it is where students are making dietary decisions frequently throughout the school week.<sup>21</sup> In terms of promotion, the sample demonstrated a lack of implementation of marketing appeals in half of the sample, but the half that did used techniques that are known to be appealing to child and adolescent demographics (e.g., cartoons, humor and social media/websites).<sup>62,65,97</sup> More research on the efficacy of application of the four P's of marketing targeted towards improving student dietary behaviors is warranted.

*Premise 6: Careful attention is paid to competing behavior choices in respect to the target behavior change*

The last of Andreasen's social marketing premise spotlights paying careful attention to competition, meaning the alternative behavior choice an audience has when contemplating the adoption of the target health behavior. When nutrition behaviors are promoted to children, the children have a choice to alter their dietary choices to healthier options or continue to choose what they're familiar with, which are often less nutritious options. Due to personal, systemic and environmental factors, health promoting behaviors are often harder to make.<sup>21,101,111</sup> In the context of child-directed food marketing, corporate food and beverage marketing is a clear competing entity to nutrition promotion. Findings from this study show that the prevalence of nutrition marketing among the sample of Arizona schools is limited compared to the exposure to outside food and beverage marketing children are experience on a regular basis through numerous channels.<sup>15,72,112,112,113</sup> This study sample had an average prevalence of about eight nutrition marketing materials located in their cafeterias, and as previously noted, little research exists on whether the marketing is effective at conveying the target behavior changes. Web & Byrd-Bredbenner credit the general lack of operationalization of nutrition promotion guidelines for

consumers to the overall lack of theory-driven, evidence-based programs that deliver clear, actionable nutrition messages that have been tailored to needs, interests, and sensibilities of specific consumer groups.<sup>107</sup> By comparison, corporate food companies are very skilled at applying marketing theory and invest in designing their promotions to be as appealing to child and adolescent specific populations as possible.<sup>15,32,62,72,112-114</sup> Corporate food marketing clearly demonstrates centralization of their behavior targets, targeted messages to the audience, delivery of advertising through channels that are appealing and attractive to target audience, and display of incentives for consumption of their food products. This is evidenced in extensive detail by the 2012 Federal Trade Commission report on child-directed food advertising, which cites that many companies invest in audience extensive market research to gain insight into promotional techniques that inform their decisions about advertising.<sup>62</sup> Some corporate food companies use consumer profile research to better understand the needs and behaviors of their target consumer, and collected general consumer research, such as media usage rates for children and teens.<sup>62</sup> The report contains an exhaustive list of the promotional tactics food and beverage companies use specifically in the school setting such as: sponsoring supplemental programming (i.e., summer reading programs, safe driving for high school students, culture specific music program etc.); promotional materials such as activity calendars, stickers, and posters; motivational speakers and sweepstakes for celebrity guest coaches for sports practices; college scholarships and cash grants to schools; sport drink samples for high school athletic practice and branded products (coolers, water bottles, cups, ice chests, towels, table covers, and staff apparel) to name a few.<sup>62</sup> The data collected in this study does not come near to reflecting the scope of marketing tactics implemented by corporate food marketers in the school setting. While corporate food marketing often promotes food products that are not conducive to healthy child nutrition and are correlated to exacerbating child obesity risk,<sup>5,101,113,115</sup> they exhibit an effective model that nutrition, health and school professionals can look towards when designing nutrition social marketing and promotion.

### ***Study Strengths and Study Limitations***

There is little evidence on the topic of content (or effectiveness of content) in child-directed nutrition marketing, which makes the information collected by this novel study a valuable baseline. Until this study, no evidence on the contents of nutrition marketing materials in a school cafeteria setting existed, nor how the content compared across grade level. Many variables were integrated into this study to create a cohesive study design that captured content associated with the purpose, visual aspects, marketing strategies and literacy/language aspects of the marketing sample. Additionally, the schools within this study were low-income schools which suggests a potential for the results to be more valuable for underserved populations. The photographs of nutrition marketing materials were taken in school across the state of Arizona in both urban and rural settings. The information provided by this study is valuable for developing future research, which will be critical for continuing a dialogue that can foster the development of best practices for nutrition based social marketing.

Limitations of this study include the use of a convenience sample of schools recruited by the primary study. A sample of nutrition marketing located in a larger, randomized sample of schools will allow for generalizability and stronger correlations between the presence of content variables across grade level. The Arizona school system has many K-8 and K-12 schools, but the data in this study did not include K-8 or K-12 distinctions in the analysis. In addition, the content analysis codebook was created for this study and therefore has not been validated as an assessment tool. In addition, the specific location within the cafeteria environment that the nutrition marketing was located was not recorded. This study does not draw any direct correlations or causation between content variables and therefore, the impact of marketing materials on selection, consumption and waste of fruits and vegetables is unknown. In addition, the images of nutrition marketing in this study were taken at one time point, and therefore any changes or rotations of the materials over time was not detected.

## CHAPTER 6

### CONCLUSION & APPLICATIONS

In conclusion, the general understanding of the content and effects of nutrition marketing in school cafeterias on child and adolescent eating behaviors has yet to be built. This study provides insight on the purpose, visual aspects, strategies, and literacy/language aspects of a sample of nutrition marketing within elementary, middle, and high schools in Arizona. The overall purpose of the marketing materials ranged from promoting selection and consumption of fruits and vegetables, promoting nutrition and physical activity together, food safety, and educating about healthy eating. The sample of nutrition marketing materials emphasized the behavior target of selecting F/Vs over consumption of F/Vs. However, marketing that exclusively promoted fruits and vegetables demonstrated an emphasis on consumption of F/Vs over just taking them during lunch. We found that the most common type of marketing in school cafeterias were flyers and most of the material was small in size. The F/V only marketing tended to be medium sized and predominantly delivered via poster designs.

In terms of promotion, the sample demonstrated a lack of implementation of marketing appeals in half of the sample, but the half that did used techniques that are known to be appealing to child and adolescent demographics (i.e., cartoons, humor and social media/websites.<sup>62,65,97</sup> Overall, the data collected in this study does not come near to reflecting the scope of marketing tactics implemented by corporate food marketers in the school setting. The school nutrition marketing used promotion, communication and advertising materials that integrated some, but not all, of Andreasen's social marketing benchmarks, which suggests that the content of the materials are likely less effective than strategically designed nutrition social marketing efforts<sup>25</sup>. This conclusion demonstrates an urgent need for further research in numerous areas of school nutrition marketing including: the design, formative research process, effects of implementation, and long-term evaluation in order to better compete with child-directed food and beverage marketing.

## REFERENCES

1. Powell LM, Harris JL, Fox T. Food Marketing Expenditures Aimed at Youth: Putting the Numbers in Context. *American Journal of Preventive Medicine*. 2013;45(4):453-461. doi:10.1016/j.amepre.2013.06.003
2. Jennings A, Welch A, van Sluijs EMF, Griffin SJ, Cassidy A. Diet Quality Is Independently Associated with Weight Status in Children Aged 9–10 Years. *The Journal of Nutrition*. 2011;141(3):453-459. doi:10.3945/jn.110.131441
3. Ogden CL, Carroll MD, Fakhouri TH, et al. Prevalence of Obesity Among Youths by Household Income and Education Level of Head of Household - United States 2011-2014. *Morbidity and mortality weekly report MMWR* /. 67(6):186-189.
4. Cunningham SA, Kramer MR, Narayan KMV. Incidence of Childhood Obesity in the United States. *N Engl J Med*. 2014;370(5):403-411. doi:10.1056/NEJMoa1309753
5. Anderson PM, Butcher KF. Childhood Obesity: Trends and Potential Causes. *The Future of Children*. 2006;16(1):19-45.
6. Kelly A, Barlow S, Rao G, Inge T. Severe Obesity in Children and Adolescents: Identification, Associated Health Risks, and Treatment Approaches: A Scientific Statement From the American Heart Association. *Circulation* 128(15):1689-1712. Published online October 8, 2013.
7. Van der Aa MP, Farsani F, Knibbe AJ, de Boer A, Van der Vorst MJ. Population-Based Studies on the Epidemiology of Insulin Resistance in Children,. *Journal of Diabetes Research*. 2015;2015:9.
8. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. *Journal of family medicine and primary care*. 4(2):187-192.
9. Florence MD, Asbridge M, Veugelers PJ. Diet Quality and Academic Performance\*. *Journal of School Health*. 2008;78(4):209-215. doi:10.1111/j.1746-1561.2008.00288.x
10. Alaimo K, Olson CM, Frongillo EA. Food Insufficiency and American School-Aged Children's Cognitive, Academic, and Psychosocial Development. *Pediatrics*. 2001;108(1):44.
11. Bellisle F. Effects of diet on behaviour and cognition in children. *British Journal of Nutrition*. 2004;92(S2):S227-S232. doi:10.1079/BJN20041171
12. Glewwe P, Jacoby HG, King EM. Early childhood nutrition and academic achievement: a longitudinal analysis. *Journal of Public Economics*. 2001;81(3):345-368. doi:10.1016/S0047-2727(00)00118-3
13. Hales C, Carroll M, Fryar C, Ogden C. *CDC National Center for Health Statistics (NCHS) Data Brief*. CDC; 2017.
14. McGuire S. U.S. Department of Agriculture and U.S. Department of Health and Human Services, Dietary Guidelines for Americans, 2010. 7th Edition, Washington, DC: U.S. Government Printing Office, January 2011. *Advances in nutrition*. 2011;2(3):293-294.



15. Signal LN, Stanley J, Smith M, et al. Children's everyday exposure to food marketing: an objective analysis using wearable cameras. *The international journal of behavioral nutrition and physical activity*. 2017;14(1):137.
16. Harris JL, Pomeranz JL, Lobstein T, Brownell KD. A Crisis in the Marketplace: How Food Marketing Contributes to Childhood Obesity and What Can Be Done. *Annu Rev Public Health*. 2009;30(1):211-225. doi:10.1146/annurev.publhealth.031308.100304
17. Hawkes Corinna, World Health Organization. *Marketing Food to Children: The Global Regulatory Environment.*; 2004.
18. USDA. Team Nutrition. Food and Nutrition Service. Accessed January 15, 2020. <https://www.fns.usda.gov/tn/team-nutrition>
19. U.S. DEPARTMENT OF AGRICULTURE. *FY 2012 BUDGET SUMMARY AND ANNUAL PERFORMANCE PLAN.*; 2012. <https://www.ocfo.usda.gov/docs/FY12budsum.pdf>
20. USDA. *School Meals. n.d. Food and Nutrition Service.*; 2018. <https://www.fns.usda.gov/school-meals/nutrition-standards-school-meals>,
21. STORY M, NANNEY MS, SCHWARTZ MB. Schools and Obesity Prevention: Creating School Environments and Policies to Promote Healthy Eating and Physical Activity. *The Milbank quarterly*. 2009;87(1):71-100.
22. Andreasen AR. Marketing Social Marketing in the Social Change Marketplace. *Journal of Public Policy & Marketing*. 2002;21(1):3-13. doi:10.1509/jppm.21.1.3.17602
23. Pirani S, Reizes T. The Turning Point Social Marketing National Excellence Collaborative: Integrating Social Marketing Into Routine Public Health Practice. *Journal of Public Health Management and Practice*. 2005;11(2). [https://journals.lww.com/jphmp/Fulltext/2005/03000/The\\_Turning\\_Point\\_Social\\_Marketing\\_National.6.aspx](https://journals.lww.com/jphmp/Fulltext/2005/03000/The_Turning_Point_Social_Marketing_National.6.aspx)
24. Blitstein JL, Cates SC, Hersey J, et al. Adding a Social Marketing Campaign to a School-Based Nutrition Education Program Improves Children's Dietary Intake: A Quasi-Experimental Study. *Journal of the Academy of Nutrition and Dietetics*. 2016;116(8):1285-1294. doi:10.1016/j.jand.2015.12.016
25. Carins JE, Rundle-Thiele SR. Eating for the better: a social marketing review (2000–2012). *Public Health Nutrition*. 2014;17(7):1628-1639. doi:10.1017/S1368980013001365
26. Cairns G, Stead M. Session 5: Nutrition communication Obesity and social marketing: works in progress: Symposium on 'The challenge of translating nutrition research into public health nutrition.' *Proceedings of the Nutrition Society*. 2009;68(1):11-16. doi:10.1017/S0029665108008768
27. Langford R, Bonell C, Jones H, Campbell R. Obesity prevention and the Health promoting Schools framework: essential components and barriers to success. *International Journal of Behavioral Nutrition and Physical Activity*. 2015;12(1):15. doi:10.1186/s12966-015-0167-7
28. Evans WD. Social Marketing Campaigns and Children's Media Use. *The Future of Children*. 2008;18(1):181-203.

29. Quinn EL, Johnson DB, Podrabsky M, Saelens BE, Bignell W, Krieger J. Effects of a Behavioral Economics Intervention on Food Choice and Food Consumption in Middle-School and High-School Cafeterias. *Preventing chronic disease*. 2018;15:E91.
30. Miller GF, Gupta S, Kropp JD, Grogan KA, Mathews A. The effects of pre-ordering and behavioral nudges on National School Lunch Program participants' food item selection. *Journal of Economic Psychology*. 2016;55:4-16. doi:10.1016/j.joep.2016.02.010
31. Gustafson A, Ng SW, Jilcott Pitts S. The association between the "Plate it Up Kentucky" supermarket intervention and changes in grocery shopping practices among rural residents. *Translational Behavioral Medicine*. 2019;9(5):865-874. doi:10.1093/tbm/ibz064
32. BBB National Programs, Inc. *Children's Food and Beverage Advertising Initiative (CFBAI)*. <https://bbbprograms.org/programs/cfbai/about-cfbai>
33. Ogden CL, Fryar CD, Martin CB, et al. Trends in Obesity Prevalence by Race and Hispanic Origin—1999-2000 to 2017-2018. *JAMA*. 2020;324(12):1208-1210. doi:10.1001/jama.2020.14590
34. Caprio S, Daniels SR, Drewnowski A, et al. Influence of Race, Ethnicity, and Culture on Childhood Obesity: Implications for Prevention and Treatment: A consensus statement of Shaping America's Health and the Obesity Society. *Diabetes Care*. 2008;31(11):2211-2221. doi:10.2337/dc08-9024
35. Bowman SA, Gortmaker SL, Ebbeling CB, Pereira MA, Ludwig DS. Effects of Fast-Food Consumption on Energy Intake and Diet Quality Among Children in a National Household Survey. *Pediatrics*. 2004;113(1):112. doi:10.1542/peds.113.1.112
36. Carroll-Scott A, Gilstad-Hayden K, Rosenthal L, et al. Disentangling neighborhood contextual associations with child body mass index, diet, and physical activity: The role of built, socioeconomic, and social environments. *Social Science & Medicine*. 2013;95:106-114. doi:10.1016/j.socscimed.2013.04.003
37. Galvez MP, Hong L, Choi E, Liao L, Godbold J, Brenner B. Childhood Obesity and Neighborhood Food-Store Availability in an Inner-City Community. *Academic Pediatrics*. 2009;9(5):339-343. doi:10.1016/j.acap.2009.05.003
38. Lee H. The role of local food availability in explaining obesity risk among young school-aged children. *Social Science & Medicine*. 2012;74(8):1193-1203. doi:10.1016/j.socscimed.2011.12.036
39. Birch LL, Fisher JO, Grimm-Thomas K. The development of children's eating habits. In: Meiselman HL, MacFie HJH, eds. *Food Choice, Acceptance and Consumption*. Springer US; 1996:161-206. doi:10.1007/978-1-4613-1221-5\_4
40. Birch L, Savage J, Ventura A. Influences on the Development of Children's Eating Behaviours: From Infancy to Adolescence. *Can J Diet Pract Res*. Published online May 7, 2007.
41. DeSalvo KB, Olson R, Casavale KO. Dietary Guidelines for Americans. *JAMA*. 2016;315(5):457-458. doi:10.1001/jama.2015.18396

42. Due P, Krølner R, Rasmussen M, et al. Pathways and mechanisms in adolescence contribute to adult health inequalities. *Scand J Public Health*. 2011;39(6\_suppl):62-78. doi:10.1177/1403494810395989
43. Reedy J, Krebs-Smith SM. Dietary Sources of Energy, Solid Fats, and Added Sugars among Children and Adolescents in the United States. *Journal of the American Dietetic Association*. 2010;110(10):1477-1484. doi:10.1016/j.jada.2010.07.010
44. Frary CD, Johnson RK, Wang MQ. Children and adolescents' choices of foods and beverages high in added sugars are associated with intakes of key nutrients and food groups. *Journal of Adolescent Health*. 2004;34(1):56-63. doi:10.1016/S1054-139X(03)00248-9
45. Linardakis M, Sarri K, Pateraki M-S, Sbokos M, Kafatos A. Sugar-added beverages consumption among kindergarten children of Crete: effects on nutritional status and risk of obesity. *BMC public health*. 2008;8(1):279.
46. Winpenny EM, Corder KL, Jones A, Ambrosini GL, White M, van Sluijs EMF. Changes in diet from age 10 to 14 years and prospective associations with school lunch choice. *Appetite*. 2017;116:259-267. doi:10.1016/j.appet.2017.05.012
47. Vos Miriam B., Kaar Jill L., Welsh Jean A., et al. Added Sugars and Cardiovascular Disease Risk in Children: A Scientific Statement From the American Heart Association. *Circulation*. 2017;135(19):e1017-e1034. doi:10.1161/CIR.0000000000000439
48. Jones LR, Steer CD, Rogers IS, Emmett PM. Influences on child fruit and vegetable intake: sociodemographic, parental and child factors in a longitudinal cohort study. *Public Health Nutrition*. 2010;13(7):1122-1130. doi:10.1017/S1368980010000133
49. Neumark-Sztainer D, Wall M, Perry C, Story M. Correlates of fruit and vegetable intake among adolescents: Findings from Project EAT. *Preventive Medicine*. 2003;37(3):198-208. doi:10.1016/S0091-7435(03)00114-2
50. Reicks M, Randall JL, Haynes BJ. Factors affecting consumption of fruits and vegetables by low-income families. *Journal of the Academy of Nutrition and Dietetics*. 1994;94(11):1309-1311. doi:10.1016/0002-8223(94)92467-8
51. Battram DS, Piché L, Beynon C, Kurtz J, He M. Sugar-Sweetened Beverages: Children's Perceptions, Factors of Influence, and Suggestions for Reducing Intake. *Journal of Nutrition Education and Behavior*. 2016;48(1):27-34.e1. doi:10.1016/j.jneb.2015.08.015
52. Lytle LA, Eldridge A I., Kotz K, Piper J, Williams S, Kalina B. Children's Interpretation of Nutrition Messages. *Journal of Nutrition Education*. 1997;29(3):128-136. doi:10.1016/S0022-3182(97)70177-8
53. USDA ERS. *USDA's National School Lunch Program Reduces Food Insecurity*. Accessed October 22, 2018. <https://www.ers.usda.gov/amber-waves/2017/august/usda-s-national-school-lunch-program-reduces-food-insecurity/>.
54. Robinson-O'Brien R, Burgess-Champoux T, Haines J, Hannan PJ, Neumark-Sztainer D. Associations Between School Meals Offered Through the National School Lunch Program and the School Breakfast Program and Fruit and Vegetable Intake Among Ethnically Diverse, Low-Income Children. *Journal of School Health*. 2010;80(10):487-492. doi:10.1111/j.1746-1561.2010.00532.x

55. Gearan EC, Fox MK. Updated Nutrition Standards Have Significantly Improved the Nutritional Quality of School Lunches and Breakfasts. *Journal of the Academy of Nutrition and Dietetics*. 2020;120(3):363-370. doi:10.1016/j.jand.2019.10.022
56. Dunifon R, Kowaleski-Jones L. The Influences of Participation in the National School Lunch Program and Food Insecurity on Child Well-Being. *The social service review*. 2003;77(1):72-92.
57. Gundersen C, Kreider B. Bounding the effects of food insecurity on children's health outcomes. *Journal of Health Economics*. 2009;28(5):971-983. doi:10.1016/j.jhealeco.2009.06.012
58. Terry-McElrath YM, O'Malley PM, Johnston LD. Accessibility Over Availability: Associations Between the School Food Environment and Student Fruit and Green Vegetable Consumption. *Childhood Obesity*. 2014;10(3):241-250.
59. Merlo CL, Michael S, Brener ND, et al. Differences in Food and Beverage Marketing Policies and Practices in US School Districts, by Demographic Characteristics of School Districts, 2012. *Preventing chronic disease*. 2016;13:E169.
60. Treviño RP, Pham T, Mobley C, Hartstein J, Ghormli LE, Songer T. HEALTHY Study School Food Service Revenue and Expense Report. *Journal of School Health*. 2012;82(9):417-423. doi:10.1111/j.1746-1561.2012.00717.x
61. Newman C. The Food Costs of Healthier School Lunches. *Agricultural and resource economics review*. 2012;41(1):12-28.
62. Federal Trade Commission. A Review of Food Marketing to Children and Adolescents: Follow-Up Report. Published online 2012:356.
63. Calvert SL. Children as Consumers: Advertising and Marketing. *The Future of Children*. 2008;18(1):205-234.
64. Zollo P. Wise Up to Teens: Insights into Marketing and Advertising to Teenagers. *Adolescence*. 1997;32(125):250.
65. Ohri-Vachaspati P, Isgor Z, Rimkus L, Powell LM, Barker DC, Chaloupka FJ. Child-Directed Marketing Inside and on the Exterior of Fast Food Restaurants. *American Journal of Preventive Medicine*. 2015;48(1):22-30. doi:10.1016/j.amepre.2014.08.011
66. Mehta K, Phillips C, Ward P, Coveney J, Handsley E, Carter P. Marketing foods to children through product packaging: prolific, unhealthy, and misleading. *Public Health Nutrition*. 2012;15(9):1763-1770. doi:10.1017/S1368980012001231
67. Wootan MG, Almy J, Ugalde M, Kaminski M. How Do Nutrition Guidelines Compare for Industry to Market Food and Beverage Products to Children? World Health Organization Nutrient Profile Standards versus the US Children's Food and Beverage Advertising Initiative. *Childhood Obesity*. 2019;15(3):194-199.
68. Enright M, Eskenazi L. *The Children's Food & Beverage Advertising Initiative Category-Specific Uniform Nutrition Criteria, 2nd Ed. 2018 White Paper.*; :1-42.

69. Cairns G, Angus K, Hastings G, Caraher M. Systematic reviews of the evidence on the nature, extent, and effects of food marketing to children. A retrospective summary. *Appetite*. 2013;62:209-215. doi:10.1016/j.appet.2012.04.017
70. Bolton RN. Modeling the Impact of Television Food Advertising on Children's Diets. *Current Issues and Research in Advertising*. 1983;6(1):173-199. doi:10.1080/01633392.1983.10505338
71. Hill AB. The environment and disease: association or causation? *J R Soc Med*. 2015;108(1):32-37. doi:10.1177/0141076814562718
72. Buijzen M, Schuurman J, Bomhof E. Associations between children's television advertising exposure and their food consumption patterns: A household diary-survey study. *Appetite*. 2008;50(2):231-239. doi:10.1016/j.appet.2007.07.006
73. Harris JL, Haraghey KS, Lodolce M, Semenza NL. Teaching children about good health? Halo effects in child-directed advertisements for unhealthy food: Halo effects in children's food advertising. *Pediatric Obesity*. 2018;13(4):256-264. doi:10.1111/ijpo.12257
74. Grier S, Bryant CA. SOCIAL MARKETING IN PUBLIC HEALTH. *Annu Rev Public Health*. 2004;26(1):319-339. doi:10.1146/annurev.publhealth.26.021304.144610
75. Hoffman JA, Morris V, Cook J. The Boston Middle School-Corner Store Initiative: Development, implementation, and initial evaluation of a program designed to improve adolescents' beverage-purchasing behaviors. *Psychology in the Schools*. 2009;46(8):756-766. doi:10.1002/pits.20414
76. Cork S. Beating the Barriers to Social Marketing. *Social Marketing Quarterly*. 2008;14(1):37-49. doi:10.1080/15245000701849161
77. Richards J, Hackett A, Duggan B, Ellis T, Forrest D, Grey P. An evaluation of an attempt to change the snacking habits of pre-school children using social marketing. *Public Health*. 2009;123:e31-e37. doi:10.1016/j.puhe.2009.07.001
78. Lefebvre RC, Olander C, Levine E. The Impact of Multiple Channel Delivery of Nutrition Messages on Student Knowledge, Motivation and Behavior: Results from the Team Nutrition Pilot Study. *Social Marketing Quarterly*. 1999;5(3):90-98. doi:10.1080/15245004.1999.9961070
79. Bellows LL, Davies PL, Anderson J, Kennedy C. Effectiveness of a Physical Activity Intervention for Head Start Preschoolers: A Randomized Intervention Study. *American Journal of Occupational Therapy*. 2013;67(1):28-36. doi:10.5014/ajot.2013.005777
80. Borys J -M., Le Bodo Y, Jebb SA, et al. EPODE approach for childhood obesity prevention: methods, progress, and international development. *Obesity Reviews*. 2012;13(4):299-315. doi:10.1111/j.1467-789X.2011.00950.x
81. Raju S, Rajagopal P, Gilbride TJ. Marketing Healthful Eating to Children: The Effectiveness of Incentives, Pledges, and Competitions. *Journal of Marketing*. 2010;74(3):93-106. doi:10.1509/jmkg.74.3.093
82. Foster GD, Karpyn A, Wojtanowski AC, et al. Placement and promotion strategies to increase sales of healthier products in supermarkets in low-income, ethnically diverse

- neighborhoods: a randomized controlled trial. *The American Journal of Clinical Nutrition*. 2014;99(6):1359-1368. doi:10.3945/ajcn.113.075572
83. Sanigorski AM, Bell AC, Kremer PJ, Cuttler R, Swinburn BA. Reducing unhealthy weight gain in children through community capacity-building: results of a quasi-experimental intervention program, Be Active Eat Well. *Int J Obes*. 2008;32(7):1060-1067. doi:10.1038/ijo.2008.79
  84. Duggan AK, McFarlane EC, Windham AM, et al. Evaluation of Hawaii's Healthy Start Program. *The Future of Children*. 1999;9(1):66-90. doi:10.2307/1602722
  85. Stahl CE, Necheles JW, Mayefsky JH, Wright LK, Rankin KM. 5-4-3-2-1 Go! Coordinating Pediatric Resident Education and Community Health Promotion to Address the Obesity Epidemic in Children and Youth. *Clin Pediatr (Phila)*. 2010;50(3):215-224. doi:10.1177/0009922810385106
  86. Pempek TA, Calvert SL. Tipping the Balance: Use of Advergaming to Promote Consumption of Nutritious Foods and Beverages by Low-Income African American Children. *Archives of Pediatrics & Adolescent Medicine*. 2009;163(7):633-637. doi:10.1001/archpediatrics.2009.71
  87. Eisenman DP, Adams RM, Lang CM, et al. A Program for Local Health Departments to Adapt and Implement Evidence-Based Emergency Preparedness Programs. *Am J Public Health*. 2018;108(S5):S396-S398. doi:10.2105/AJPH.2018.304535
  88. Foerster SB, Kizer KW, DiSogra LK, Bal DG, Krieg BF, Bunch KL. California's "5 a Day—for Better Health!" Campaign: An Innovative Population-Based Effort to Effect Large-Scale Dietary Change. *American Journal of Preventive Medicine*. 1995;11(2):124-131. doi:10.1016/S0749-3797(18)30488-4
  89. Millar L, Kremer P, de Silva-Sanigorski A, et al. Reduction in overweight and obesity from a 3-year community-based intervention in Australia: the 'It's Your Move!' project. *Obesity Reviews*. 2011;12(s2):20-28. doi:10.1111/j.1467-789X.2011.00904.x
  90. Fotu KF, Millar L, Mavoa H, et al. Outcome results for the Ma'alaha Youth Project, a Tongan community-based obesity prevention programme for adolescents. *Obesity Reviews*. 2011;12(s2):41-50. doi:10.1111/j.1467-789X.2011.00923.x
  91. Stead M, Gordon R, Angus K, McDermott L. A systematic review of social marketing effectiveness. *Health Education*. 2007;107(2):126-191. doi:10.1108/09654280710731548
  92. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *The lancet : a journal of British and foreign medicine, surgery, obstetrics, physiology, chemistry, pharmacology, public health, and news*. 2010;376(9748):1261-1271.
  93. Huhman M, Potter LD, Wong FL, Banspach SW, Duke JC, Heitzler CD. Effects of a Mass Media Campaign to Increase Physical Activity Among Children: Year-1 Results of the VERB Campaign. *Pediatrics*. 2005;116(2):e277. doi:10.1542/peds.2005-0043
  94. Cho H, Nadow MZ. Understanding Barriers to Implementing Quality Lunch and Nutrition Education. *Journal of community health*. 2004;29(5):421-435.

95. Nicklas TA, Johnson CC, Myers L, Farris RP, Cunningham A. Outcomes of a High School Program to Increase Fruit and Vegetable Consumption: Gimme 5 — A Fresh Nutrition Concept for Students. *Journal of School Health*. 1998;68(6):248-253. doi:10.1111/j.1746-1561.1998.tb06348.x
96. Gordon R, McDermott L, Stead M, Angus K. The effectiveness of social marketing interventions for health improvement: What's the evidence? *Public Health*. 2006;120(12):1133-1139. doi:10.1016/j.puhe.2006.10.008
97. Story M, French S. Food advertising and marketing directed at children and adolescents in the US. *The international journal of behavioral nutrition and physical activity*. 2004;1(1):3.
98. McDermott RJ, Berends V, Brown KRM, Agron P, Black KM, Barnes SP. Impact of the California Project LEAN School Board Member Social Marketing Campaign. *Social Marketing Quarterly*. 2005;11(2):18-40. doi:10.1080/15245000500214575
99. Siega-Riz AM, El Ghormli L, Mobley C, et al. The effects of the HEALTHY study intervention on middle school student dietary intakes. *Int J Behav Nutr Phys Act*. 2011;8(1):7. doi:10.1186/1479-5868-8-7
100. Agron P, Berends V, Ellis K, Gonzalez M. School Wellness Policies: Perceptions, Barriers, and Needs Among School Leaders and Wellness Advocates\*. *Journal of School Health*. 2010;80(11):527-535. doi:10.1111/j.1746-1561.2010.00538.x
101. Kumanyika SK. Environmental influences on childhood obesity: Ethnic and cultural influences in context. *Physiology & Behavior*. 2008;94(1):61-70. doi:10.1016/j.physbeh.2007.11.019
102. Cervellon M-C, Dubé L. Cultural influences in the origins of food likings and dislikes. *Food Quality and Preference*. 2005;16(5):455-460. doi:10.1016/j.foodqual.2004.09.002
103. Borah-Giddens J, Falciglia GA. A meta-analysis of the relationship in food preferences between parents and children. *Journal of Nutrition Education*. 1993;25(3):102-107. doi:10.1016/S0022-3182(12)80565-6
104. Fagard J, Dahmen R. Cultural influences on the development of lateral preferences: A comparison between French and Tunisian children. *Laterality*. 2004;9(1):67-78. doi:10.1080/13576500342000167
105. Kirby SD, Baranowski T, Reynolds KD, Taylor G, Binkley D. Children's fruit and vegetable intake: Socioeconomic, adult-child, regional, and urban-rural influences. *Journal of Nutrition Education*. 1995;27(5):261-271. doi:10.1016/S0022-3182(12)80794-1
106. Arizona Department of education. *ADE EL Demographics 2016-2017*. Arizona Department of education; 2016. <https://www.azed.gov/oelas/el-demographics-2016-2017>
107. Webb D, Byrd-Bredbenner C. Overcoming Consumer Inertia to Dietary Guidance. *Advances in Nutrition*. 2015;6(4):391-396. doi:10.3945/an.115.008441
108. Lorts C. *The Language of Health: An Editorial Style Guide to Effectively Communicate to the Public*. Arizona Department of Health Services; 2019. <https://www.zonadesaludaz.org/pdf/style-guide-language-of-health.pdf>

109. VisualZ. Educational resources and specialty graphics for schools and public health. [https://getvisualz.com/?utm\\_campaign=Visualz&utm\\_medium=email&\\_hsmi=108072979&\\_hsenc=p2ANqtz-\\_UHRD3XGVFy5RmahXAuLhEDJzOnwN9bK4tsoU62NonfY3mrz0QiZUbZuqmQkYO1aDeN3FSZcvZsEjZjklNlo4psp1FQ&utm\\_content=108072979&utm\\_source=hs\\_email](https://getvisualz.com/?utm_campaign=Visualz&utm_medium=email&_hsmi=108072979&_hsenc=p2ANqtz-_UHRD3XGVFy5RmahXAuLhEDJzOnwN9bK4tsoU62NonfY3mrz0QiZUbZuqmQkYO1aDeN3FSZcvZsEjZjklNlo4psp1FQ&utm_content=108072979&utm_source=hs_email)
110. Gold A, Larson M, Tucker J, Strang M. Classroom Nutrition Education Combined With Fruit and Vegetable Taste Testing Improves Children's Dietary Intake. *Journal of School Health*. 2017;87(2):106-113. doi:10.1111/josh.12478
111. Gregson J, Foerster SB, Orr R, et al. System, Environmental, and Policy Changes: Using the Social-Ecological Model as a Framework for Evaluating Nutrition Education and Social Marketing Programs with Low-Income Audiences. *Journal of Nutrition Education*. 2001;33:S4-S15. doi:10.1016/S1499-4046(06)60065-1
112. Scully M, Wakefield M, Niven P, et al. Association between food marketing exposure and adolescents' food choices and eating behaviors. *Appetite*. 2012;58(1):1-5. doi:10.1016/j.appet.2011.09.020
113. Andreyeva T, Kelly IR, Harris JL. Exposure to food advertising on television: Associations with children's fast food and soft drink consumption and obesity. *Economics & Human Biology*. 2011;9(3):221-233. doi:10.1016/j.ehb.2011.02.004
114. Batada A, Seitz MD, Wootan MG, Story M. Nine out of 10 Food Advertisements Shown During Saturday Morning Children's Television Programming Are for Foods High in Fat, Sodium, or Added Sugars, or Low in Nutrients. *Journal of the American Dietetic Association*. 2008;108(4):673-678. doi:10.1016/j.jada.2008.01.015
115. Boyland EJ, Halford JCG. Television advertising and branding. Effects on eating behaviour and food preferences in children. *Appetite*. 2013;62:236-241. doi:10.1016/j.appet.2012.01.032



APPENDIX A  
MARKETING CONTENT ANALYSIS CODE BOOK REFERENCE GUIDE  
DATA CODED MAY 2020-AUGUST 2020

APPENDIX A

[MARKETING CONTENT ANALYSIS CODE BOOK REFERENCE GUIDE]

Evaluation focus:

- Visuals - What visual elements are utilized to promote healthy behaviors?
- Purpose - What product or behavior is being promoted (change in diet, selection of a specific food item, change in physical activity, etc.) . How is the message is promoted and who it is promoted by?
- Strategy - What strategies are being utilized to promote healthy behaviors?
- Language/Literacy - Are the visuals, purpose, and strategies of the marketing relevant to the population of the school they are located at? (age, demographic, etc.)


Purpose:



Behavior Change Theme	Definition/Examples
Nutrition behavchg_ntr	<p>Marketing promotes nutrition-related behavior change. Message must be associated with an action that can be taken. A marketing material that has nutrition related images (such as fruits and vegetables) but does not convey a specific behavior change does <b>not</b> count.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• Eat more fruits and vegetables</li> <li>• Eat Healthy!</li> <li>• Eat the colors of the rainbow!</li> <li>• Snack on!</li> <li>• Crunch a carrot</li> <li>• Grab a milk with every school meal</li> </ul>
Physical activity behavchg_pa	<p>Marketing promotes physical-activity related behavior change. Message must be associated with an action that can be taken. A marketing material that has physical activity related images (such as characters playing sports or dancing) but does not convey a specific behavior change does <b>not</b> count.</p> <ul style="list-style-type: none"> <li>• Play outside 60 minutes a day</li> <li>• Be active</li> <li>• Fruits and vegetables will help you be your best at school and play</li> <li>• Keep on moving</li> <li>• Play on and off the field</li> </ul>
Food safety behavchg_fs	<p>Marketing encourages food-safety related behavior change. Message must be associated with an action that can be taken. A marketing material that</p>

	<p>has food safety related images (such as fruits and vegetables) but does not convey a specific behavior change does <b>not</b> count.</p> <ul style="list-style-type: none"> <li>• “Wash your hands before eating lunch”</li> <li>• Expiration date reminders</li> <li>• Equipment reminders (i.e. gloves, hairnet, etc.)</li> </ul>
--	--

F/V Behavior Target	Definition/Examples
Taking a fruit or vegetable fv_take	<p>Marketing promotes the <b>selection</b> of fresh (or frozen or canned) fruits and/or vegetables.</p> <ul style="list-style-type: none"> <li>• Take 3 fruits or vegetables</li> <li>• Include at least ½ cp fruit, ½ cup vegetable</li> <li>• Make half your plate fruits and vegetables</li> <li>• Choose dark-green veggies at meals and snacks</li> <li>• Prominent MyPlate Logo (text is not a necessity)</li> </ul>
Consuming a fruit or vegetable fv_consume	<p>Marketing promotes <b>consumption</b> of fresh (or frozen or canned) fruits and/or vegetables.</p> <ul style="list-style-type: none"> <li>• Eating fruit gives you energy all day long</li> <li>• Savor a sweet potato</li> <li>• Taste a tomato</li> <li>• Be sure to eat all of your fruits and vegetables!</li> <li>• Eating an apple a day keeps the doctor away</li> </ul>

Educational Themes	Definition/Examples
*The education components may include charts, picture-based diagrams or written explanations	
Fruit educ_fruit	<p>Marketing contains educational information about fruit such as a fact, infographic or Q&amp;A.</p> <ul style="list-style-type: none"> <li>• There are 200 seeds in the average strawberry.</li> <li>• A fruit is the part of the plant that develops from the flower</li> <li>• Citrus fruit, green peppers, and tomatoes belong to the fruit group</li> <li>• Fruit contains dietary fiber that will keep you full and satisfied.</li> </ul>
Vegetable educ_veg	<p>Marketing contains educational information about vegetables such as a fact, infographic or Q&amp;A</p> <ul style="list-style-type: none"> <li>• In the United States, more tomatoes are consumed than any other single fruit or vegetable!</li> <li>• Vary your veggies color to ensure a variety of vitamins and minerals</li> </ul>

	<ul style="list-style-type: none"> <li>Peppers have vitamins A, C, and potassium</li> </ul>
Vitamin/Mineral edu_vitmin	<p>Marketing contains educational information about a vitamin or mineral such as a fact, infographic or Q&amp;A. Marketing that mentions that a food item provides/contains/is a good source of etc. a vitamin or mineral also counts.</p> <ul style="list-style-type: none"> <li>Oranges contain Vitamin C, Calcium in milk makes your bones strong, fruits and vegetables contain lots of vitamins and minerals to keep you healthy</li> <li>The nutrients found in spinach are iron, calcium, and vitamin K.</li> <li>Vitamin C helps keep your teeth and gums healthy</li> <li>Potassium helps you maintain a healthy blood pressure</li> </ul>
USDA NSLP Meal Guidelines edu_nslp	<p>Marketing contains educational information about or related to USDA NSLP Meal Guidelines such as a fact, infographic or Q&amp;A. In the <b>NSLP</b>, schools must offer five food components (milk, fruits, vegetables, grains, meat/meat alternates). Students are allowed to decline 2 of the 5 required food components under Offer vs. Serve (OVS) at <b>lunch</b></p> <ul style="list-style-type: none"> <li>You must take 3 of 5 food items for a complete meal</li> <li>Diagrams that explain what each student must take</li> <li>This logo alongside educational material. Note that not all marketing containing this logo contain educational components</li> </ul>  <ul style="list-style-type: none"> <li></li> </ul>
Portion Sizes edu_portion	<p>Marketing piece contains information about portion sizes such as a fact, infographic or Q&amp;A.</p> <ul style="list-style-type: none"> <li>A serving of protein should be about the size of the palm of your hand, fruits and vegetables should take up half of your plate</li> <li>Find your balance between food and fun (with a plate of fruit, vegetable, grains, and protein)</li> <li>All meals come with a ½ serving of fruit or vegetable</li> </ul>
Seasonal Fruits/Vegetables edu_seasonal	<p>Marketing pieces contains information about seasonal fruits and vegetables such as a fact, infographic or Q&amp;A.</p> <ul style="list-style-type: none"> <li>Winter Squash is an excellent source of vitamins A and C. A one-cup serving of winter squash provides about half of the daily requirement of vitamin C, and 4.5 times the daily requirement of vitamin A</li> <li>Buy vegetables in season when flavors and prices are the best</li> <li>Arizona grown vegetables and fruits taste best and cost less when purchased in season</li> </ul>
MyPlate edu_myplate	<p>Marketing piece provides information about MyPlate.</p> <ul style="list-style-type: none"> <li>features a picture of MyPlate Diagram, an activity where the students take pictures of food and place them on a MyPlate</li> </ul>

	<p>Diagram, “Make half your plate fruits and vegetables” next to a MyPlate diagram.</p> 
Sustainability edu_sustain	<p>Marketing piece refers to or provides information about sustainable food practices</p> <ul style="list-style-type: none"> <li>• Eat what you take so you don't waste food</li> <li>• Food waste is not cool</li> <li>• Eating local produce helps our environment</li> <li>• A plant-based diet is better for the earth</li> <li>• Eat more Arizona grown</li> <li>• Healthy harvest for Arizona schools or any marketing with the following logo</li> </ul> 

<b>Food Group Promoted</b>	<b>Definition/Examples</b>
Fruit foodgroup_fruit	Marketing contains pictures of fruit(s) or descriptions about fruit
Vegetable foodgroup_veg	Marketing contains pictures of vegetable(s) or descriptions about vegetable(s)
Dairy foodgroup_dairy	Marketing contains pictures of dairy product(s) or descriptions about dairy product(s)
Whole Grain foodgroup_grain	Marketing contains pictures of whole grain food product(s) or descriptions about whole grain food product(s)
Meat/Meat Alternative (Protein) foodgroup_meat	Marketing contains pictures of meat/meat alternative(s) or descriptions about meat/meat alternative(s) *beans/legumes contribute to both vegetables and meat/meat alternative for NSLP *eggs count as meat/meat alternative for NSLP

<b>Message Structure (Command, Encourage, Remind, Slogan)</b>	<b>Definition/Examples</b> *These codes are not mutually exclusive of one another. A marketing material may contain an encouragement and reminder .
Food directed command is present food_command	Marketing is directly instructing (commanding) student(s) to engage in a food-based action (i.e. take or consume a F/V). The language is assertive, and the message implies the student must follow the command. The message is often phrased as a rule that must be followed. Examples: <ul style="list-style-type: none"> <li>• You must take 3 fruits and vegetables</li> <li>• Do not take more food than you can eat from the salad bar.</li> <li>• Wash your hands before eating</li> <li>• You must have 4 food groups on your lunch tray.</li> <li>• You must take a fruit and vegetable for a reimbursable lunch.</li> </ul>
Food directed encouragement is present food_encourage	Marketing encourages students to do a food-based action using 'soft' language but does NOT directly instruct nor remind the student(s) to complete a food-based action but encourages them towards making a specific choice. Examples: <ul style="list-style-type: none"> <li>• Be brave and try some new food</li> <li>• Consider adding more fruits and veggies to your plate</li> <li>• Strawberries are delicious, try some today!</li> <li>• Eating more fruits and veggies will make you play hard and feel great.</li> </ul>
Food directed reminder is present food_remind	Marketing reminds students to engage in a food-based action using 'soft' language. Often uses language such as, "don't forget, remember to, please be aware", etc. Examples: <ul style="list-style-type: none"> <li>• Don't forget to wash your hands before eating.</li> <li>• Be sure to take a fruit and vegetable at lunch.</li> <li>• Remember to wash your hands before eating</li> <li>• Remember to eat fruits and vegetables with every meal!</li> </ul>
Food directed slogans present Food_slogan	Marketing contains a phrase that can be categorized as a slogan. This can be checked by inputting the phrase into a google search and seeing if nutrition promotion materials come up. Examples: <ul style="list-style-type: none"> <li>• Start Simple with MyPlate</li> <li>• Eat Well, Live Well</li> <li>• Eat Better Feel Better</li> <li>• Fuel Up to Play 60</li> </ul>

<b>Associated Campaign/Organization</b>	<b>Definition/Examples</b>
Fuel Up to Play 60 campaign_fuelup60	Marketing is associated with a campaign or organization. The campaign/organization logo is usually present. Often, marketing materials are produced by different campaigns/organizations.

	
<p>Healthy Harvest for Arizona Schools Campaign_azhealthyharvest</p>	
<p>Champions for Change (3) campaign_champchang</p>	
<p>Triple Play (4) Campaign_tripleplay</p>	
<p>Dig in! (5) campaign_digin</p>	

Got Milk? (6)  
campaign\_gotmilk

# got milk?<sup>®</sup>



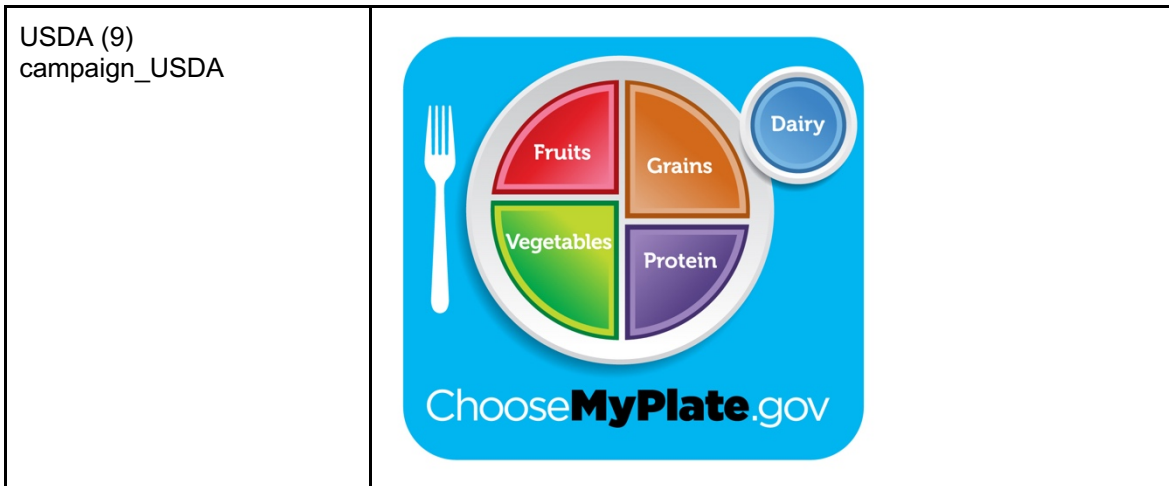
Arizona Grown (7)  
campaign\_azgrown





National Dairy Council (8)  
campaign\_dairyco













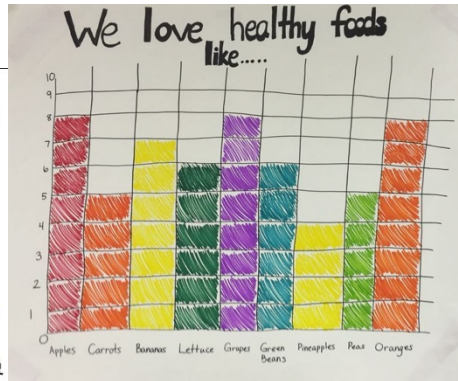
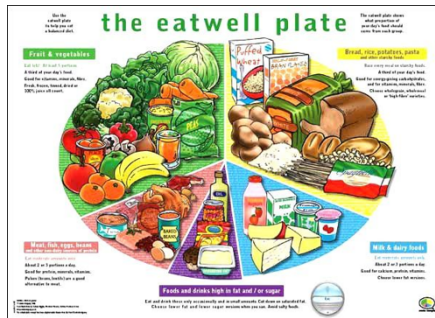
**Visuals:**

Type of marketing	Definition/Examples
Paper flyer type_flyer	Marketing is approx. 8inx11in, the size of a printer piece of paper.
Poster type_poster	Marketing is a poster of any size as long as it is bigger than a standard paper flyer. This can be handmade or printed
Sticker type_sticker	<p>Marketing is a small sticker, an adhesive label or notice, generally printed or illustrated.</p> 
Table Tent type_tabletent	<p>Marketing is a self-standing promotional unit created from printed and folded cardstock. As the name implies, table tents are designed to be placed on tables...as well as counters, desks, or any other horizontal surface.</p> 
Decals type_decals	Marketing is a decal that easily sticks and peels back off of surfaces. Normally present on sneeze guards in the cafeteria line.

	
Banner type_banner	<p>Marketing is a large vinyl banner; the material is thicker than a poster and usually much bigger than a standard poster.</p> 
misc. Cafeteria decoration type_cafedec	 <p>Any marketing that cannot be described as a flyer, poster, sticker, table tent, decal, banner or technological display should be categorized as 'miscellaneous cafeteria decoration'</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• f/v images on cooler</li> <li>• food images on service line equipment</li> <li>• decorations created by the students</li> </ul>
Technological display type_tech	<p>Marketing is presented on a computer output surface and projecting mechanism that shows text and often graphic images.</p>  <p>Ex:</p> <ul style="list-style-type: none"> <li>• TVs in the cafeteria</li> <li>• Touch screen monitors in the cafeteria</li> </ul>

Size of Marketing	Definition/Examples
Small size_small	8x11 flyers (or smaller) , table tents, stickers
Medium size_med	24x36 poster, small TV display, poster board
Large size_large	banner, large poster, large display that takes up more room than a ~24x36 poster


Visual appeals	Definition/Examples
<p>Word art visual_wor dart</p>	<p>Marketing contains eye-catching word art that draws attention to the text. The text is different than standard type font and is emphasized artistically.</p> 
<p>Eye-catching patterns and textures visual_patt ern</p>	<p>Marketing contains eye-catching patterns and textures.</p> 
<p>Diagrams visual_diag ram</p>	<p>Marketing contains information that is diagrammed visually such as a pie chart, bar graph, lunch tray diagram etc. MyPlate images count as a diagram. The diagram must be a focus in the marketing piece, MyPlate logos in the corner of the marketing do not count.</p>



3-D displays visual\_3D

Marketing is presented three-dimensionally.



<p>Eye-catching photos of fruits and vegetables visual_fv</p>	<p>Marketing contains images of fruits and vegetables that are portrayed decoratively, are visually appealing and emphasizes the fruits and vegetables. Images of fruit(s) and/or vegetable(s) that are in the background do not count.</p> 
---	--

**Strategy**

Antecedents	Definition/Examples
<p>Associative (paired) learning antedeced_paired_learn</p>	<p>Marketing pairs food item with other stimuli (existing products, well-known people, funny words) that already elicit positive emotions. A particular FV may be paired visually with another brand or attractive people having a good time. Typically, there is no educational component. Ex: Placing carrots and celery in McDonalds fry boxes, pairing known brands with a specific food item (e.g. cartoon brands with FV), pairing celebrities with a food item (note that if a celebrity is modeling a behavior such as eating the FV item, see social modeling).</p>
<p>Social Modeling antedeced_socialmodel</p>	<p>Marketing piece contains an antecedent technique used to demonstrate the target behavior(s) to be emulated. A student who matches their own behavior to a real person, celebrity, animated character or social group who “models” a target behavior can result in similar implied or explicit consequences. The real person, character, group, celebrity or animated character must be modeling the target behavior highlighted in the messaging of the marketing.</p>

Message Framing	
<p>Gain-framed (positive) / positive reinforcement frame_gain_pos /</p>	<p>Gain frame: when a message is framed to focus on a positive outcome of engaging in the target behavior.  Positive reinforcement: Gaining something positive by engaging in target behavior.  Marketing emphasizes a positive consequence the student will gain by following the nutrition message. The marketing is framed in a way</p>

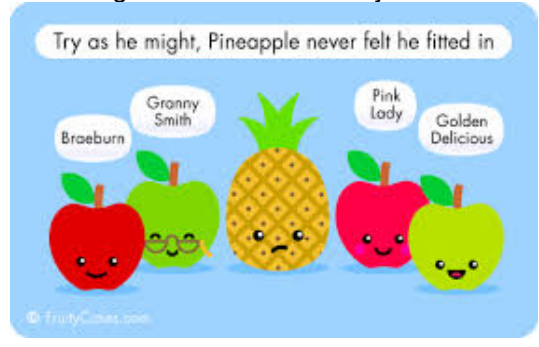
	<p>that shows the child will gain something positive by engaging in the target nutrition behavior.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• Eat protein before and after you exercise to build strong muscles.</li> <li>• Make your heart and lungs stronger with activities that get your heart pumping</li> <li>• Eat carrots for super vision like Superman!</li> <li>• Try something new at lunch today and you'll get "Today is a Try day" sticker</li> <li>• Eat citrus fruit to get more vitamin C in your diet and keep your immune system strong.</li> </ul>
<p>Gain-framed (negative) /negative reinforcement frame_gain_neg</p>	<p>Gain frame: when a message is framed to focus on a positive outcome of engaging in the target behavior.</p> <p>Negative reinforcement: Avoiding a negative consequence by engaging in the target behavior.</p> <p>Marketing emphasizes a negative consequence the student will avoid from engaging in the target health message. The marketing is framed in a way that shows the child will avoid a negative consequence by engaging in the target nutrition behavior.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• Eat citrus fruit which is high in vitamin C to avoid getting sick!</li> <li>• Take a fruit and vegetable at lunch so you don't get charged for your lunch.</li> <li>• Eat a balanced diet of fruits, vegetables, whole grain and lean protein to avoid feeling sluggish at soccer practice.</li> <li>• Drink high calcium foods like milk to prevent broken bones.</li> <li>• Wash your hands before eating so you don't get yourself or your friends sick.</li> </ul>
<p>Loss-framed (positive) / positive punishment frame_loss_pos</p>	<p>Loss Frame: A loss-frame is when a message is focused on the costs or the loss (such as opportunity cost) of not engaging in the target behavior or by engaging in an undesired behavior.</p> <p>Positive punishment: A negative consequence caused by <b>not</b> engaging in the target behavior.</p> <p>Marketing emphasizes a consequence for <b>not</b> following the targeted health message. The marketing is framed in a way that emphasizes the negative consequence that NOT engaging in the target nutrition behavior may cause.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• Eating junk food (undesired behavior) will make you gain weight (aversive consequence)</li> <li>• Eat breakfast every day or your grades could drop.</li> <li>• Eating excessive junk food may cause undesired weight gain.</li> </ul>

	<ul style="list-style-type: none"> <li>• Not eating enough before sports practice will make you feel sluggish and slow.</li> <li>• If you don't get enough calcium, zinc and antioxidants in your diet, you're more likely to get sick during flu season.</li> </ul>
Loss-framed (negative) / negative punishment frame_loss_neg	<p>Loss Frame: A loss-frame is when a message is focused on the costs or the loss (such as opportunity cost) of not engaging in the target behavior or by engaging in an undesired behavior.</p> <p>Negative punishment: Taking a positive consequence away (that the student already had) away to decrease undesirable behavior</p> <p>Marketing emphasizes a positive consequence (that they possess or have already earned) the student will <b>lose</b> by engaging in an undesirable behavior or not engaging in the target behavior. The marketing is framed in a way that shows the child will <b>lose</b> a positive consequence by not engaging in the target nutrition behavior or engaging in a less desirable nutrition behavior.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• If you leave any fruits and vegetables on your plate you won't get to go outside for recess.</li> <li>• Eating too many sugary sweets will cause your energy to crash.</li> <li>• If you don't select a fruit or vegetable, whole grain, protein and milk during lunch, your meal will not be free.</li> <li>• If you have a green barcode tray, don't share your food with other students or you won't get your prize.</li> <li>• Not consuming enough calcium can cause healthy bones to lose their strength over time.</li> </ul>


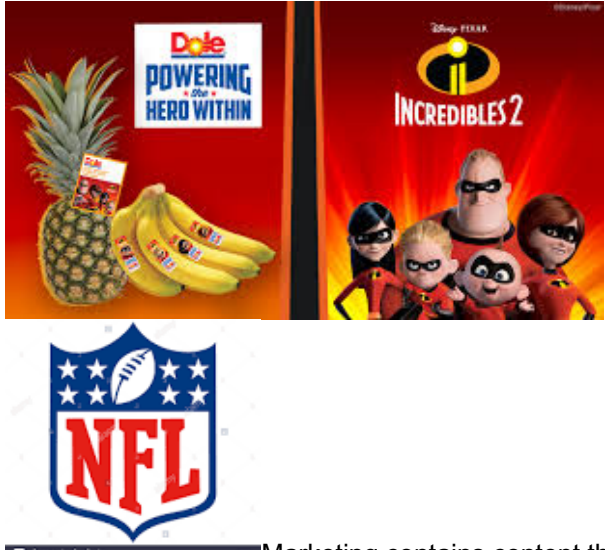
<b>Proximal v. Distal Outcome Message</b>	
Proximal message_prox	<p>Marketing emphasizes health outcomes related to the immediate/short term future of a student.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• <i>Eating more fiber will help you feel fuller after meals.</i></li> <li>• <i>Eating healthy meals will give your body more energy for sports practice</i></li> <li>• <i>Eating more fruits and vegetables can put you in a better mood and make it easier to focus.</i></li> <li>• <i>Eating too much junk food can cause stomach aches</i></li> <li>• <i>Eat lots of protein to gain muscle</i></li> </ul>



<p>Distal message_dist</p>	<p>Marketing emphasizes health outcomes related to the long-term future of a student.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• Milk contains a lot of calcium which is beneficial for bone health.</li> <li>• Tomatoes are great for your heart!</li> <li>• Eating lots of fruits and vegetables reduces risk of heart disease.</li> <li>• Eating carrots can improve your eyesight</li> <li>• Eat a healthy diet so you grow to be a healthy and strong adult.</li> </ul>
----------------------------	---

<p><b>Marketing Strategy</b></p>	<p><b>Definition/Examples</b></p>
<p>Celebrity/Athlete endorsements strategy_endorsed</p>	<p>Marketing contains an image of a famous celebrity or athlete that is endorsing a food product. Ex: Got Milk Posters</p>
<p>Cartoon characters strategy_cartoon</p>	<p>Marketing contains images of cartoons endorsing a food product. Ex: Disney characters, cartoon fruits &amp; vegetables, cartoon students</p>
<p>Social media / websites strategy_media</p>	<p>Marketing utilizes social media or website links to engage with students. Ex: link to website, QR Code, reference to Facebook or Instagram</p>
<p>Interactivity strategy_interactive</p>	<p>Marketing contains content that students can engage with via touch screen, answering questions, playing a game, etc. Ex: technology display that gives you a trivia questions, eye spy w/ vegetables, matching a color with a food group</p>
<p>Humor strategy_humor</p>	<p>Marketing contains humor and jokes</p> 



<p>Emotional Appeal strategy_emotion</p>	 <p>Marketing contains content that appeals to specific emotions using strong wording or images. The words must state a specific emotion and images must have an obvious emotional association.</p> <p>Ex:</p> <ul style="list-style-type: none"> <li>• “Eating fruits and vegetables will make you happy!”</li> <li>• “Eating junk food will make you feel bad!”</li> <li>• Cartoon characters showing strong emotional expressions that can be easily defined (happy, sad, crying, distraught, confused etc.)</li> <li>• Models/actors showing strong emotional expression that can be easily defined (happy, sad, crying, distraught, confused etc.)</li> </ul>
<p>Brand Appeal strategy_brand</p>	 <p>Marketing contains content that displays an affiliation between the food product/message and a specific brand(s)</p>
<p><b>Message Specificity</b></p>	<p><b>Definition/Examples</b></p> <p>message_broad</p> <p>Marketing promotes a general message about a broad topic. Ex: Eat your fruits and vegetables, take what you can eat</p>

Specific message_specific	Marketing promotes a specific message that discusses a specific action, item or topic. Ex: Eat 5 servings of fruits and vegetables a day, eating oranges is great a great way to boost your immunity, let's talk about seasonal vegetables
---------------------------	---

## Relevance

Reading Level Appropriateness	Definition/Examples <a href="#">Flesch Kincaid Calculator Link</a> Enter the text components present in the marketing into the Flesch Kincaid Calculator linked above. See what reading level the text components are and if it matches the grade level of the school (elementary = 1-5th grade, middle school = 6th-8th grade or high school = 9th-12th grade). Note the grade level in the notes section.
Reading level appropriate for target audience  readinglevel_app	Reading level of text according to Flesch Kincaid score indicates that the text in the marketing material matches the grade levels present in the school the marketing photo was taken in (elementary = 1-5th grade, middle school = 6th-8th grade or high school = 9th-12th grade) Ex: The Flesch Kincaid score states that the reading level is at a 5th grade level and the marketing is in an elementary school.
Reading level NOT appropriate for target audience (too high) reading level not appropriate  readinglevel_notapp_high	Reading level of text according to Flesch Kincaid score indicates that the text in the marketing material does NOT match because it is higher than the grade levels present in the school the marketing photo was taken in (elementary = 1-5th grade, middle school = 6th-8th grade or high school = 9th-12th grade).  Ex: The Flesch Kincaid score states that the reading level is at an 8th grade level and the marketing is in an elementary school.
Reading level NOT appropriate for target audience (too low) reading level not appropriate  readinglevel_notapp_low	Reading level of text according to Flesch Kincaid score indicates that the text in the marketing material does NOT match because it is lower than the grade levels present in the school the marketing photo was taken in (elementary = 1-5th grade, middle school = 6th-8th grade or high school = 9th-12th grade).  Ex: The Flesch Kincaid score states that the reading level is at a 2nd grade level and the marketing is in a high school.

Language	Definition/Examples
English lang_eng	Marketing text is written in English
Spanish lang_span	Marketing text is written in Spanish