CHILDREN'S USE OF HEALTH INFORMATION

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This paper examines children's usage of two types of health information – front-of-package claim information and in-school health curricula. Our results indicate that children can use on-package claim information to select healthier food options and we identify conditions (e.g., type of claim, choice goal) that maximize the effectiveness of on-package claims and nutrition education for influencing the healthfulness of children's choices. Children utilized general claims, which are similar in content to recent food industry labeling approaches, to a greater extent than more traditional claim types (i.e., nutrient-content and health claims). Knowledge gained through health and nutrition education was used only when health goals were active. Implications of our findings for researchers, policy makers, and food marketers are discussed.

KEYWORDS: on-package claims, children, decision-making, knowledge, motivation

Recent reports regarding children's health and nutrition are alarming. Children do not eat enough fruits, vegetables, or fiber, and over-consume fat (CDC 2008). Given the negative effects of poor nutrition on proper growth and development and its contribution to health problems, such as obesity and cardiovascular disease, it is becoming increasingly important to find ways to encourage children to make healthier choices.

Two key inputs to decision-making are knowledge and motivation. Motivation provides goal-directed arousal, while knowledge increases an individual's ability to select an appropriate action. Compared to adults, children typically have lower levels of both health motivation and health knowledge. While the children's information-processing literature has examined children's understanding of different types of information (e.g., advertising (e.g., Moore and Lutz 2000), brand names (Achenreiner and John 2003)), we do not have a well-developed understanding of how children perceive or use health information. Health information differs from other types of information in that it is more complex, more factual, and involves future, personal outcomes. Since children tend to adopt shorter time frames (Kelley, Mayall and Hood 1997; Reyna and Farley 2006) and their cognitive processing capabilities are still developing (John 1999), their ability to use and understand health information may be compromised. Further, children may not perceive the relevance of this information making them less likely to use it. Consequently, by gaining a better understanding of factors affecting children's usage of health information, we can anticipate how children will respond to specific communications and structure information in ways that can increase children's usage of this information, hopefully, leading to healthier choices.

In this paper, we focus on two types of health information – on-package claim information and in-school health (nutrition) curricula – and how children's usage of this

information is affected by health goals (motivation). We selected these two types of information as our focus because they represent two distinct contexts in which children are exposed to nutritional information: one a consumption context (where children act as consumers) and the other an educational context (where children act as students). Further, children are frequently exposed to these types of information and they are less commercial than other sources of information (e.g., advertising). While information in the nutrition facts panel (NFP) is also less commercial and available on packages, NFP information is more complex than information found in on-package claims and we expect it is even less likely to be used by children. The two sources of information we study are tailored or can be tailored especially to children, making them particularly relevant to understand.

Our findings indicate that children can use on-package claim information in their decision-making and that both claims and nutrition education are effective under certain conditions. This research contributes to the literature in two general areas. First, it advances knowledge as to how children use health and nutrition information and provides some guidance as to what steps might be taken to improve their use of such information. Second, it furthers the study of on-package claims by examining the effects of this important and highly regulated information on children. Further, our findings have relevance for food companies as they seek to self-regulate and promote healthier behavior by consumers in order to avoid increased government regulation.

In the sections that follow, we present the theoretical support for our hypotheses and describe the experimental method used to empirically test them. We present our results and discuss the research and managerial implications. Finally we address the limitations of our research and discuss directions for future research.

DEVELOPMENT OF HYPOTHESES

On-Package Claim Information

On-package claims are statements which describe the level of a nutrient in a food and/or how the nutrient affects human structure or functions. Used in a variety of product categories, on-package claim information is employed mainly for marketing purposes, within constraints set by the Food and Drug Administration (FDA). In studies with adult consumers, it has been shown to impact attitudes, purchase intentions, disease risk perceptions, and perceptions of healthiness (e.g., Kozup, Creyer, and Burton 2003; Roe, Levy, and Derby 1999). However, we know little about how children are influenced by on-package information, in part because studies of their information processing have traditionally focused on traditional advertising (Wright, Friestad, and Boush 2005). Since on-package health information is more factual in nature and less entertaining or involving than advertisements, the effects of these two types of information on children's perceptions and choices may differ.

We examine the effects of three categories or types of on-package claims: nutrient content claims, which describe the level of a nutrient or dietary substance in the product or compare the level of nutrient to another food (e.g., "low in calories," "99% fat free," "high in fiber"); health claims, which characterize a relationship between a specific food or food component and its ability to reduce the risk of a disease or health-related condition (e.g., "fiber can help reduce the risk of heart disease," a claim validated by the FDA in 2003); and general claims, which present information without a specific nutritional focus (e.g., "good for you") and

are similar in content to recent food industry labeling approaches, such as PepsiCo's "Smart Spot" icon.

To effectively use claim information, children must be aware of the information, care about processing it, be able to process it, and be able to apply it accurately to make optimal choices. Since all three claim types similarly appear on the front of product packages, children should be equally aware of each type of claim. However, their ease of processing could vary across claim types because the focal information is presented differently. Nutrient content and health claims both contain specific nutrient information. Therefore, to use these claims effectively, children must recognize the nutrient, know what it does (in the case of nutrient content claims; health claims provide this information), and determine the desirable dietary level. Further, they must then translate this information into a value assessment of the product and determine if the product helps them meet their goal, for example, to purchase a healthful product or to purchase a good-tasting product.

In contrast, general claims do not contain specific nutrient information and they provide the value judgment (i.e., a summary judgment based on specific (in this case, nutrition) information), thus reducing the information processing requirements. Reducing the effort required to obtain information has been shown to increase information usage (e.g., Brucks, Mitchell, and Staelin 1984; Moorman 1990). Since children should find it easier to use the general claim, compared to nutrient-content and health claims, general claims should have a greater impact on children's choices. Thus, we predict children will be more likely to choose products containing a general claim compared to those having nutrient-content or health claims.

H1: Children will be more likely to choose products containing general on-package claim information than either (a) nutrient-content or (b) health claim information.

The information processing requirements highlighted above indicate that for information to impact choices, not only must children be able to process the information, they must also care about processing the information. Some models of health decision-making highlight motivation as an important input to health behavior (e.g., Jayanti and Burns 1998; Moorman and Matulich 1993), and research with adults has examined motivation as a moderator of the usage of claim information (e.g., Andrews, Netemeyer, and Burton 2009; Balasubramanian and Cole 2002; Keller et al. 1997).

Motivation can be effected through internal or external sources, but existing research suggests children's internal health motivation is relatively low. Children's perceptions of risk and sense of urgency about their own personal health are limited (O'Dea 2003; Walsh and Bibace 1991), and they optimistically view themselves as relatively immune to a number of health and lifestyle risks (Albery and Messer 2005; Sigelman et al. 2000; Whalen et al. 1994). This suggests children may require external motivation – such as an explicit health goal – to cause them to care about their health. As such, we predict that the impact of claims on children's choices will be enhanced for children given a health goal compared to those who do not receive a health goal.

H2: Children's use of on-package claim information will be moderated by motivation such that children receiving a health goal will be more likely to use claim information than children who do not receive a health goal.

In-School Curricula

While on-package claim information is typically present at both purchase and consumption, information learned in the classroom is stored internally in memory. For this

information to impact children's choices, it must be encoded correctly, retrieved, and then correctly applied to the choice task. Because the encoding stage occurs at the point of learning (i.e., in the schools) and not at the time of the decision, we do not consider factors affecting this stage of the process; rather, we focus on the latter two steps – retrieval and application.

Roedder (1981) categorized children into three different groups based on their information processing abilities. Children under 8 are "limited processors" because they are unable to use storage and retrieval strategies to enhance learning even when prompted to do so. Children between the ages of 8 and 12 are "cued processors" because they exhibit production deficiencies: they are capable of using complex information storage and retrieval strategies, but do not do so spontaneously. Children over 12 are "strategic processors" because they typically possess and use the skills necessary to store and retrieve information. In this research, we focus our attention on 8-12 year old children (i.e., "cued processors") because they are often the target of education interventions and, due to their significant purchase autonomy (McNeal 1999; Valkenburg and Cantor 2001), comprise an established consumer segment that is valued and targeted by marketers.

Much of the information processing research conducted with children in the 8-12 age group supports Roedder's (1981) conceptualization. These children are unlikely to use rehearsal and other memory improvement strategies unless given explicit instructions to do so (e.g., John and Cole 1986; Paris, Lindauer, and Cox 1977). They are unlikely to use advertising knowledge unless it is expressly activated by a cue (Brucks, Armstrong, and Goldberg 1988). Thus, children may require a reminder or cue in order to activate their own specific knowledge (cf., Moore and Rideout 2007) and without such cues, knowledge may not impact behavior. Based on these findings, we expect that nutrition knowledge gained from an in-school curriculum will

have a positive impact on the healthfulness of children's choices only in the presence of an external cue. However, while prior literature has used cues which cue specific informational content, we examine the ability of an explicit health goal to serve as a cue.

H3: The effectiveness of an in-school health curriculum will be moderated by the presence/ absence of a health goal, such that the curriculum will be most effective (i.e., result in the healthiest choices) in the presence of a health goal.

To test these hypotheses, we conducted an experiment in conjunction with a health curriculum delivered to fourth and fifth graders in a cluster of public elementary schools. By including on-package claim information and the in-school curriculum within the same experimental design, we were able to test not only the impact of the curriculum on children's choices, but also the impact of education (knowledge) on the effectiveness of on-package claim information. In addition, considering that children are typically exposed to multiple sources of information throughout their day, the ability to study multiple sources of information at one time provides a more realistic assessment of the impact of differing types of health information.

METHOD

We conducted a 2 (curriculum: before, after) x 2 (health goal: present, absent) x 4 (on-package claim type: none, nutrient-content claim, health claim, general claim) between-subjects experiment in conjunction with a health curriculum delivered to fourth and fifth graders at nine urban elementary schools. All of the schools were racially and ethnically diverse (11% Asian, 37% Black, 38% Latino, and 14% Caucasian), with 74% of their students qualifying for free or reduced price lunches. Of these students, 236 (approximately 54%) obtained parental consent to

participate in the experiment; however, due to scheduling issues and absenteeism during data collection, the final sample size was 152 (55% female). Students were randomly assigned to the experimental conditions and participated in the study as part of their daily class work.

Fourth and fifth grade children (~ 8-11 year olds) were selected for the study because prior research indicates that at this age, children are capable of attending to information about both functional and perceptual product attributes (John 1999). They are able to search for information that is most relevant to the choice task, evaluate multiple product attributes, and understand persuasive intent inherent in marketing messages (John 1999; Robertson and Rossiter 1974). Consequently, they should be capable of understanding and potentially acting on health information (either claims or NFP information) provided on product packages. While these cognitive abilities clearly are present in older children, the 8-11 age group is of primary interest because health interventions targeted to children who are young, and have less well-established attitudes and habits, are believed to be most effective (Nation et al. 2003).

Stimuli

We selected four cereals – Cheerios, Cinnamon Toast Crunch, Froot Loops, and Honey Nut Cheerios – to use for the choice task. These cereals were selected based on a pretest (N = 8) confirming that they were both familiar and liked (with the exception of Cheerios, which was less preferred but was included due to its relative healthfulness). Mean preference ratings on a 1-5 scale, where 1 = "hate it" and 5 = "love it," were Cheerios = 3.0, Cinnamon Toast Crunch = 3.8, Honey Nut Cheerios = 4.4, and Froot Loops = 4.5. In addition, these cereals varied in both objective healthfulness (as described below) and perceived healthfulness, with children perceiving Honey Nut Cheerios and Cheerios as relatively healthful choices (*M*s = 4.3, on a 1-5

scale where 1 = “very bad for you” and 5 = “very good for you”) and Froot Loops (M = 3.8) and Cinnamon Toast Crunch (M = 3.3) as less healthful choices. Cereals were selected for inclusion in the pre-test based on national market share data.

We selected “high in fiber” as the nutrient-content claim and “fiber can help reduce the risk of heart disease” (combined with the “high in fiber” text) as the health claim. “Cereal that’s good for you” was selected as the general claim. Claims about fiber were used because (1) a survey of cereals available in local supermarkets suggested that claims concerning fiber and/or heart disease were particularly prevalent; (2) pre-tests indicated that children were less familiar with fiber (as compared to sugar, fat, and calories), so using this nutrient increased our ability to assess the effects of the curriculum by allowing a cleaner knowledge manipulation and reducing the likelihood of encountering a ceiling effect; and (3) we wanted to avoid confounding effects of aesthetic concern about body weight because prior research has suggested that information about fat and calorie content may be more salient than information about other nutrients, such as vitamins and minerals (Garretson and Burton 2000). Further, the American Dietetic Association has highlighted inadequate fiber intake as a critical nutrition concern and called for more studies regarding children’s fiber intake (American Dietetic Association 2004).

Actual brand names were used rather than private label or fictional brands because children were highly unfamiliar with the two private label brands we pre-tested (more than 50% of participants indicated that they had never heard of Toasted O’s and Fruit Rings) and may be less able to understand hypotheticals (Piaget 1970). In addition, brand names provide important information (Balasubramanian and Cole 2002) and are more realistic.

Pretest2

A second pre-test (N = 14) confirmed children were familiar with cereals (80% reported eating cereal at least once a week); had some say in the decision process (4 children shopped with parents once a week for cereal; 3 indicated they sometimes got to choose the cereal; 2 always got to choose the cereal they wanted (even if someone else purchased it for them); 1 child got to approve the cereal his parents wanted to buy ("I get to say if I like it"); and 2 children reported having no say in the choice); and had seen claim information in stores (86% of participants). Children also believed information in claims was relevant to them (meant for kids and adults), but did not believe it would influence their choices.

In addition, this pretest provided preliminary evidence that different claim types vary in their information-processing requirements. Children understood the literal meaning of the nutrient-content and health claims (i.e., the cereal had a lot of fiber and would help you not have heart disease, respectively), but showed deficits in applying this information. For example, when exposed to a nutrient-content claim, children did not know what fiber was or if it was good for them, and when exposed to the health claim, some children may have over-extended the meaning (e.g., believing the cereal could "stop disease" or was healthy). The general claim was more ambiguous (opinions varied as to what "healthy" meant) and many were skeptical of it (e.g., one child commented "That's just advertising; it attracts people to buy the cereal; it's not really true; it's over-exaggerated"). Finally, our belief that children's health motivation is relatively low also received support, as the majority of children (71%) believed it was their parents' responsibility to ensure that the foods they ate were healthful.

Health Curriculum

A health curriculum – which contained units on nutrition and healthful eating, fitness and exercise, safety, and social skills – was delivered in weekly classroom sessions by a trained health coordinator. The nutrition and physical activity component of the curriculum was adapted from the *Eat Well and Keep Moving* curriculum (developed jointly by the Harvard School of Public Health and the Baltimore City Public Schools), while the social competence component was adapted from *Lions-Quest Skills for Growing*. Both curricula have demonstrated the ability to positively affect elementary school children (see, for example, Gortmaker et al. 1999 and Kim and Laird 1995) and have received accolades or awards honoring their effectiveness (CASEL 2003; http://www.hsph.harvard.edu/prc/proj_eat.html).

A week-by-week overview of the curriculum along with information about lessons with content relevant to this study appears in Appendix A. The activity and nutrition components of the curriculum were taught from January through March in two half-hour classes per week. An eight-week module focused on topics related to healthful eating, with an emphasis on the Food Pyramid (U.S. Department of Agriculture) approach to a balanced diet and the Eat 5-a-Day guidelines (see www.mypyramid.gov and www.5aday.gov). Content relevant to this study included lessons on reading nutrition label information, the importance of a nutritious breakfast, and the benefits of fiber (see Appendix A). Students were taught that fiber is beneficial because it promotes digestion, lowers risk for certain types of cancer, and helps reduce cholesterol and heart disease. They were provided information about which foods contain a substantive amount of fiber and used their newly acquired knowledge about percent daily values to help assess a product's fiber content based on nutrition label information. Students also participated in an

activity in which they were asked to draw foods that were high in fiber. On-package claim information was not covered in the curriculum.

Approximately half of the students (85) participated in the study prior to the unit on nutrition (*pre-curriculum condition*), while the remaining students (67) participated in the study after the unit on nutrition (*post-curriculum condition*).

Health Goal

Approximately half the participants (74) were asked to select the cereal "that [they'd] like" (*no health goal/ free choice*) while the other half (78) were asked to select the cereal that was "best for [them]" (*health goal*). The latter instruction was selected in order to imply a health goal without specifically stating that students should make a healthful choice. The use of this instruction to cue a health goal allows us to assess how children use health information (either from packages or learned in school) when given a goal to choose a healthful option. Having such a goal should create the most favorable conditions for the use of health information. If information is used successfully under these conditions, then finding ways to motivate children to set goals themselves will be a critical task for encouraging them to make healthier choices. If information is not used successfully under these conditions, then finding new ways of communicating health information to children will be a critical task.

On-Package Claim Information

Participants were assigned to one of the four claim conditions (none, nutrient-content, health, or general). Only one of the cereals in the choice set contained a claim (in the claim present conditions). Approximately ¼ of the participants were exposed to each condition: 62

participants saw no claim, 56 saw a nutrient-content claim, 68 saw a health claim, and 64 saw a general claim. Claims appeared with roughly equal frequency on each cereal.

Procedure

We created two-dimensional cereal "boxes" using 8" x 11" laminated cards. The front of the box contained the cereal name (Cheerios, Cinnamon Toast Crunch, Froot Loops, or Honey Nut Cheerios) and a picture of a bowl filled with the particular cereal. The background color of the box was consistent with the color of the actual product package (i.e., the Cheerios box was yellow; Froot Loops was red; etc.). There was no other information on the front of the box, except for the on-package claim. For the nutrient content claim, the text "High in Fiber" appeared on the front, in the upper-right corner of the stimulus. For the health claim, the text "High in Fiber" appeared on the front, in the upper-right corner of the stimulus and a white box containing the words "Fiber can help reduce the risk of heart disease" appeared about halfway down the right hand side of the stimulus, partially overlapping the picture of the cereal bowl. For the general claim, the text "Cereal that's good for you" appeared just underneath the cereal name, above the picture of the cereal bowl (see Appendix B, figure 1). The back of the box contained nutritional information similar to the actual product package with the exception of fiber content, which was reported as 5g for all cereals (see Appendix B, figure 2). This created consistency with FDA guidelines for a "high in fiber" health claim (Garretson and Burton 2000).

Children who had provided signed consent forms were randomly assigned to experimental conditions using class lists which we obtained prior to data collection. When the experimenter(s) entered the classroom, students who had been assigned to the same experimental condition were directed to an experimenter in a specific area of the room. In most classrooms,

desks were already clustered in small groups, and students sat at these desks while they participated in the study. Data was collected simultaneously for all groups, which ranged from one to four students (M = 2.6) depending on class size. Small groups were used in order to maintain student attention to the task and enable the experimenter to carefully observe students throughout the process. Such groups are commonly used in psychological research with school-age children (see, for example, Levine et al. 2005). Students were assigned to conditions individually and each experimenter oversaw one to four students.

Researchers gave students a seven-page questionnaire and asked them to record their name, age, and classroom teacher. Students were told that (1) there were no right or wrong answers, (2) their answers were personal choices, and (3) their responses would not influence their class grades. The latter point was emphasized by informing them that their names would be removed from their questionnaires so no one would know which responses were theirs. Students were instructed that it was very important not to talk to others or look at others' work; folders were placed vertically between students to ensure that they would not observe others' answers. Finally, the students were asked to follow the experimenter as he or she read the questions aloud and not to work ahead of the group.

Prior to the study, all experimenters were trained regarding optimal procedures for collecting data from children. This training included specific instructions to be communicated to the children; information about how to maintain the desired environment (e.g., keep things serious, exhibit confidence, treat children with respect); and suggestions for keeping children involved with the task (e.g., be conversational and don't sound like you are reading the instructions).

To begin the study, experimenters explained that we were interested in learning about how kids choose breakfast cereals, and conveyed the ground rules discussed above (e.g., that there were no right or wrong answers). Next, they asked participants to "imagine that [they] were going to a supermarket." Large color photographs were used to depict, in sequence, the exterior, interior, and cereal aisle of the supermarket. After "arriving" at the cereal aisle, each student received a set of four cereal cards (one each of Cheerios, Cinnamon Toast Crunch, Froot Loops, and Honey Nut Cheerios), and was asked to look at the cards as they would look at cereal boxes on the shelf of a supermarket – as if they were shopping in the store. The students were asked to either choose the cereal that they thought was best for them (*health goal condition*) or the cereal they would like (*free choice condition*) and to place it on top of their set of cereal cards. (Students were assigned to experimenters such that each experimenter received a group of students that had all been assigned to the same choice instruction condition.) Participants then answered questions about their choices; each question and answer choice was read aloud by the experimenter and then each student privately recorded his or her response by circling the appropriate response on his or her questionnaire (see Goldberg 1990).

Measures

The key dependent variables were product choice and healthfulness of choice. "Healthfulness of choice" was coded as a "1" if the participant chose either Cheerios or Honey Nut Cheerios and as a "0" otherwise (i.e., if s/he chose Froot Loops or Cinnamon Toast Crunch). Cheerios and Honey Nut Cheerios have lower sugar content (1 g and 10 g per serving, respectively), fewer calories per serving (110 and 120, respectively), and more fiber (3 g and 2 g per serving, respectively) than Froot Loops (15 g sugar, 120 calories, 1 g fiber) and Cinnamon

Toast Crunch (10 g sugar, 130 calories, 1 g fiber); Cheerios and Honey Nut Cheerios are also marketed based on their "health" qualities and were perceived as healthier in our initial pre-test (*M* = 4.3 on a 1 ("very bad for you") to 5 ("very good for you") scale, for Cheerios and Honey Nut Cheerios; *M* = 3.8 for Froot Loops; and *M* = 3.3 for Cinnamon Toast Crunch).

To assess the effectiveness of the health goal instruction, we asked participants why they chose the cereal they chose ("reason for choice"). Response options were: (a) it's my favorite one, (b) it tastes good, (c) it's healthy, (d) my mom (or someone else) buys it for me, or (e) other. These responses were selected based on responses to an open-ended question in our initial pre-test (N = 8).

To assess the effectiveness of the curriculum at delivering health knowledge, we assessed participants' awareness of fiber ("perceived fiber content"). We asked participants: "How much fiber do you think this cereal has? (a) none, (b) very little, (c) a little, (d) a lot, or (e) don't know." Finally, participants were asked how much they liked each of the four cereals (possible responses: (a) hate it, (b) dislike a little, (c) like a little, (d) love it, or (e) don't know), their age, and their gender.

RESULTS

Manipulation Checks

The curriculum was designed to deliver health and nutrition information with the ultimate goal of improving the healthfulness of children's choices; additional modules relating to fiber were included in the curriculum to provide consistent information to all participants. Thus, to assess the effectiveness of the curriculum as a knowledge manipulation, we examined the

proportion of "don't know" responses given in response to the "how much fiber does this cereal have" question for those in the control condition (i.e., those who did not receive any claim information). Significantly fewer children responded "don't know" to the fiber question when they participated in the study after exposure to the curriculum compared to those who participated prior to exposure to the curriculum ($M_{pre\text{-}curriculum}$ = 27%, $M_{post\text{-}curriculum}$ = 7%, z = 2.06, p = .04).

The health goal instruction was designed to increase health motivation by cueing a goal of healthfulness. Therefore, to assess the effectiveness of this manipulation, we examined the reasons children gave for their choices. If the goal instruction was successful, children should have been more likely to choose based on "healthfulness" in the health goal condition compared to the no health goal (free choice) condition. This was indeed the case – children in the health goal condition were more likely than those in the free choice condition to indicate that they had chosen their cereal because it was healthy (M_{hg} = 59%, M_{fc} = 15%) and less likely to indicate that they had chosen their cereal because it was their favorite or because it tasted good (M_{hg} = 37%, M_{fc} = 78%, χ^2 = 32.38, $p < .0001$).

Impact of On-Package Claims on Children's Choices

We predicted that the impact of claims on choice would depend on the type of claim used, with general claims being more effective (i.e., having a greater impact) than nutrient-content or health claims. This hypothesis (H1) was supported. A logistic regression (including all interactions) with choice of cereal with a claim as the dependent variable, and claim type, health goal condition, and curriculum as the independent variables, revealed a significant effect of claim type (χ^2 = 5.67, p = .05). Specifically, 21% of participants exposed to the nutrient-

content claim chose the cereal with the claim; 19% of participants exposed to the health claim chose the cereal with the claim; and 38% of participants exposed to the general claim chose the cereal with the claim (see Figure 3). The proportion of participants choosing the general claim was significantly greater than that choosing the nutrient-content ($p = .05$) or health ($p = .02$) claims. In addition, the proportion choosing the general claim was significantly greater than that which one would expect based on chance ($p = .02$). These results support the effectiveness of the general claim, but cast doubt on the effectiveness of the nutrient-content and health claims.

INSERT FIGURE 3 HERE

We hypothesized that children's propensity to use claims would be moderated by motivation, such that those receiving the external health goal would be even more likely to use claim information. As can be seen in Table 1, this hypothesis (H2) received partial support. Motivation marginally affected the proportion choosing the nutrient-content ($M_{fc} = 13\%$, $M_{hg} = 32\%$, $p = .08$) and general ($M_{fc} = 26\%$, $M_{hg} = 48\%$, $p = .07$) claims, with those receiving the health goal more likely to choose the cereal containing the claim than those who were not given a health goal, as expected. The effects of motivation were more pronounced for those who had not been exposed to the curriculum (see Table 1).

INSERT TABLE 1 HERE

There were no differences in the proportion of children choosing a cereal containing a claim pre- and post- curriculum for any of the three claim types (p's $> .3$; see Table 1).

Impact of Curriculum on Children's Choices

To assess the effectiveness of the curriculum at improving the healthfulness of children's choices, we conducted a logistic regression (including all interactions) with health goal,

curriculum, and presence/absence of claim information as the independent variables and choice of healthy cereal as the dependent variable. There was a main effect of the health goal (χ^2 = 6.77, p = .01); participants were more likely to choose one of the healthy options when they received the health goal (M_{hg} = 59%) compared to when they did not receive this goal (M_{fc} = 39%). There was also a main effect of the curriculum (χ^2 = 4.19, p = .04); participants were more likely to choose one of the healthy options after being exposed to the curriculum (M_{post} = 58%) compared to before being exposed to the curriculum (M_{pre} = 42%). As predicted in H3, these effects were qualified by a significant health goal by curriculum interaction (χ^2 = 7.25, p = .007). The healthiest choices were observed for those who had been exposed to the curriculum and received the health goal ($M_{hg\text{-}post}$ = 77%; $M_{hg\text{-}pre}$ = 45%; $M_{fc\text{-}post}$ = 39%; $M_{fc\text{-}pre}$ = 39%; see Figure 4). Indeed, there was no difference between the proportion of participants choosing the healthier options pre- and post- curriculum in the free-choice condition (M's = 39%). This finding highlights the importance of inducing a health goal (or otherwise cueing health motivation) in order for children to apply the knowledge they had gained from the curriculum. No other results were significant (p's > .3).

INSERT FIGURE 4 HERE

DISCUSSION

Our goal in this paper was to examine children's use of health information and how these effects are moderated by motivation. We investigated two different types of health information – on-package claim information and in-school health and nutrition curricula. Our results provide

insight into children's usage of different types of health information and provide guidance for how to positively influence the healthfulness of children's food choices.

We examined three types of claims – nutrient-content, health, and general. As predicted in H1, children were more likely to use the general claim than either the nutrient-content or health claims. We expected this difference because the general claim uses simpler language and includes a value judgment (which limits children's need to apply the information correctly to make the optimal choice). These features appear to have made this claim type more accessible and/or more relevant for children. Future research may wish to examine which specific aspects of the general claim accounted for children's favorable response.

Exposure to the curriculum did not affect usage of claims, suggesting children's ability to understand these claims is not the critical factor affecting usage. Rather, children's decisions to use this information seem to be more affected by their goals (i.e., the desire to choose (or not choose) a healthful cereal). Consistent with H2, motivation (presence of external health goal) had a marginal effect on claim usage (for nutrient-content and general claims). One reason motivation may not have had a stronger effect on claim usage could be due to the way motivation was manipulated. Children typically pay minimal attention to their health (O'Dea 2003) and the findings from our second pre-test indicate that children (of this age) believe it is their parents', as opposed to their own, responsibility to choose healthful foods. Although we successfully focused children's attention towards health by manipulating external motivation, we may have found stronger effects had we been able to influence children's internal motivation. Future research may want to explore the role of motivation more fully.

We also examined the impact of an in-school health curriculum on the healthfulness of children's choices. As predicted in H3, children were most likely to choose a healthful option

when they received both the curriculum and the external health goal. Indeed, the curriculum only had a positive impact when a health goal was provided. In the free-choice condition, the curriculum had no effect on the healthfulness of children's choices. These results are consistent with the view that children are "cued processors" and highlight the importance of finding ways to increase children's motivation levels or include motivational cues within the choice environment.

Theoretical and Practical Contributions

Our research makes important theoretical and practical contributions to the literature. Our research contributes to the on-package claim literature by examining the impact and usage of on-package claims by a new audience (children), and it contributes to the children's information-processing literature by examining children's usage of an additional type of marketing communication (on-package claim information). Even though on-package claim information is more factual in nature and less entertaining or involving than other types of marketing communications, such as advertising (a traditional focus of children's information processing research; Wright, Friestad, and Boush 2005), our results suggest that children still use this information. However, we find that more general information is more successful than more specific information at influencing children's choices. Future research may wish to examine why children preferred general information to specific information and whether this preference might exist in other information formats as well.

Children's usage of on-package claims differed from how adults respond to this type of information. While nutrient-content and health claims have been found to positively affect adult choices (e.g., Burke, Milburg, and Moe 1997; Kozup, Creyer, and Burton 2003; Roe, Levy, and

Derby 1999), we do not find a similar effect for children. Further, while knowledge has been found to moderate adults' usage of claims (e.g., Andrews, Netemeyer, and Burton 1998; Roe, Levy, and Derby 1999), we find little effect of knowledge (exposure to the nutrition curriculum) in our population. Such differences were expected since children differ from adults in terms of their information-processing and comparative abilities, their levels of health motivation, and their skepticism of marketing information. Children's reduced skepticism of marketing information may account for the reduced impact of the curriculum on children's usage of claim information; future research should explore the effect of skepticism on children's usage of on-package information.

Practically, our research provides guidance for how marketers and public policy makers could best use on-package information to communicate with children. Given children's increased autonomy and influence in consumption decisions (McNeal 1999; Valkenburg 2000), the growing childhood obesity epidemic (Strauss and Pollack 2001), and the food industry's interest in self-regulation and finding initiatives to promote healthier choices (FTC 2008), successfully communicating health information to children is increasingly important. To do so, marketers should do as much as possible to reduce information processing requirements, while still communicating truthful information. General claims were more successful at influencing children's choices than either nutrient-content or health claims, suggesting icon approaches, such as those being used by Kraft and PepsiCo, as well as some third-party groups, hold the most promise for successfully influencing children's choices. However, such information must be seen as relevant to achieve the highest levels of success. In addition, marketers and public policy makers may want to spend more time investigating approaches that will raise children's levels of

health motivation, as motivation had a stronger impact on choices and use of health information, than did education.

Finally, our findings provide guidance for increasing the efficacy of educational interventions. In particular, our findings highlight the critical need to induce children to care about their health and suggest this can be accomplished through the provision of an external health goal. Some tactics which could be used to create a health goal include targeted advertisements and/or point-of-purchase promotions in schools and traditional retail environments. Another tactic could be positive reinforcement received from teachers or parents. For example, discussing health related topics immediately prior to lunch could provide a sufficient reminder to children to choose healthier food options. Future research should explore how such external motivation methods impact children's behavior and investigate the relative efficacy of different types of approaches.

Limitations, Future Research, and Conclusions

Although our research provides important insight for encouraging healthier food choices by children, we should note some limitations. First, children chose cereals by viewing pictorial representations of the boxes while in their school classrooms, rather than choosing real cereals in an actual store. While we tried to make this task as realistic as possible, providing pictures of the supermarket exterior and interior, as well as flat boxes to represent the cereal, future research should examine whether such effects carry-over to in-store purchases and other purchase environments (such as school cafeterias and canteens). Further, we chose a product category that was particularly relevant to children and one in which they are likely to be the primary decision-maker. However, it is still a category in which they may not be the primary purchaser. Future

research could utilize a field study approach to examine children as they make product choices in a real-world environment. Finally, we used a very direct motivational instruction. Future research should examine other ways to manipulate motivation, including assessments of children's internal motivation levels.

Despite these limitations, our research makes important contributions regarding how children use different types of health information in their decision-making and how to best utilize these information sources to encourage healthier choices. We designed a simulated shopping experience using a familiar choice context for children and were able to talk directly to children to understand their choices, without having to rely on parents' perceptions of their children's thoughts and preferences. We were able to implement a health curriculum within the school system and examine the influence of this curriculum along with an external health goal and on-package claim information on children's choices. Our findings highlight the importance of increasing health motivation in order to bolster the effects of educational programs. Further, our findings illustrate that children can use on-package claim information and highlight conditions under which such information is most likely to increase product choice. Specifically, we find that general claims were more successful at influencing children's choices than health or nutrient-content claims.

These findings suggest three ways marketers can try to influence the healthfulness of children's choices. First, marketers and/or public policy makers can work to develop a consistent symbol or verbal claim for identifying healthful choices; this symbol should be easy enough for a child to understand and use and should provide a value judgment (i.e., indicate that the product is healthful, rather than focusing on specific nutrient benefits). Second, marketers can work to provide motivational cues within the choice environment in order to enhance

children's health motivation and commitment to health goals. Third, marketers may wish to sponsor or work with local school districts to create and implement in-school health curricula as part of their philanthropic efforts.

APPENDIX A

Health Curriculum Schedule

Unit 1: Building a School Community *1 week (end of September)*
Unit 2: Growing up as a Group *4 weeks (October)*
Unit 3: Making Positive Decisions *3 weeks (November)*
Unit 4: Eat Well and Keep Moving *11 weeks (January – March)*

Includes lessons on (1) healthy living and the food pyramid, (2) energy foods in the pyramid, (3) the safe workout, (4) balancing act (re: balanced diet), (5) fast food frenzy, (6) snack attack, (7) the safe workout, (8) prime-time smartness, (9) chain-five, (10) alphabet fruits and vegetables, (11) brilliant breakfast, and (12) fitness walking.

- Lesson 6 (snack attack) included information on reading nutrition labels, as well as activities in which students used food product labels to locate information on serving size, calories, fat, cholesterol, vitamins, minerals, and fiber.

- Lesson 11 (brilliant breakfast) included information about eating a healthy breakfast and emphasized optimal breakfast foods and the importance of eating carbohydrates derived from whole grain cereal or toast.

Unit 5: Growing up Drug Free *5 weeks (April – May)*

APPENDIX B

INSERT FIGURE 1 HERE

INSERT FIGURE 2 HERE

REFERENCES

Achenreiner, G. B. & John, D. R. (2003). The meaning of brand names to children: A developmental investigation. *Journal of Consumer Psychology*, 13 (3), 205-219.

Albery, I. P. & Messer, D. (2005). Comparative optimism about health and nonhealth events in 8- and 9-year-old children. *Health Psychology*, 24 (3), 316-320.

American Dietetic Association. (2004). Position of the American Dietetic Association: Dietary guidance for healthy children ages 2 to 11 years. *Journal of the American Dietetic Association,* 104 (4), 660-677.

Andrews, J. C., Netemeyer, R. G. & Burton, S. (2009). The nutrition elite: Do only the highest levels of caloric knowledge, obesity knowledge, and motivation matter in processing nutrition ad claims and disclosures? *Journal of Public Policy and Marketing*, 28 (Spring), 41-55.

Andrews, J. C., Netemeyer, R. G. & Burton, S. (1998). Consumer generalization of nutrient content claims in advertising. *Journal of Marketing*, 62 (October), 62-75.

Balasubramanian, S. K. & Cole, C. (2002). Consumers' search and use of nutrition information: The challenge and promise of the Nutrition Labeling and Education Act. *Journal of Marketing,* 66 (July), 112-127.

Brucks, M., Armstrong, G. M. & Goldberg, M. E. (1988). Children's use of cognitive defenses against television advertising: A cognitive response approach. *Journal of Consumer Research*, 14 (March), 471-482.

Brucks, M., Mitchell, A. A. & Staelin, R. (1984). The effect of nutritional information disclosure in advertising: An information processing approach. *Journal of Public Policy and Marketing*, 3, 1-25.

Burke, S. J., Milburg, S. J. & Moe, W. (1997). Displaying common but previously neglected health claims on product labels: Understanding competitive advantages, deception, and education. *Journal of Public Policy and Marketing*, 16 (2), 242-255.

CASEL: Collaborative for Academic, Social, and Emotional Learning. (2003). *Safe and Sound: An Educational Leader's Guide to Evidence-based Social and Emotional Learning (SEL) Programs*, Chicago, IL: Author.

CDC: Centers for Disease Control and Prevention. (2008). Healthy youth! Health topics: Nutrition. Retrieved July 16, 2008 from http://www.cdc.gov/HealthYouth/nutrition/index.htm

Federal Trade Commission. (2008). Marketing food to children and adolescents: A review of industry expenditures, activities, and self-regulation. Report to Congress, July 2008. Retrieved March 5, 2009 from http://ftc.gov/os/2008/07/P064504foodmktingreport.pdf

Garretson, J. A. & Burton, S. (2000). Effects of Nutrition Facts Panel values, nutrition claims, and health claims on consumer attitudes, perceptions of disease-related risks, and trust. *Journal of Public Policy and Marketing*, 19(2), 213-227.

Goldberg, M. E. (1990). A quasi-experiment assessing the effectivenesss of TV advertising directed to children. *Journal of Marketing Research*, 27 (November), 445-54.

Gortmaker, S. L., Cheung, L. W., Peterson, K. E., Chomitz, G., Cradle, J. H., Dart, H., Fox, M. K., Bullock, R. B., Sobol, A. M., Colditz, G., Field, A. E., & Laird, N. (1999). Impact of a school-based interdisciplinary intervention on diet and physical activity among urban

primary school children: Eat well and keep moving. *Pediatrics and Adolescent Medicine, 153*(9), 975-83.

Jayanti, R. K & Burns, A. C. (1998). The antecedents of preventive health care behavior: An empirical study. *Journal of the Academy of Marketing Science,* 26 (1), 6-15.

John, D. R. (1999). Consumer socialization of children: A retrospective look at twenty-five years of research. *Journal of Consumer Research,* 26 (December), 183-213.

John, D. R. & Cole, C. A. (1986). Age differences in information processing: Understanding deficits in young and elderly consumers. *Journal of Consumer Research,* 13 (3), 297-315.

Keller, S. B., Landry, M., Olson, J., Velliquette, A. M., Burton, S & Andrews, J. C. (1997). The effects of nutrition package claims, Nutrition Facts Panels, and motivation to process nutrition information on consumer product evaluations. *Journal of Public Policy & Marketing,* 16 (2), 256-269.

Kelley, P, Mayall, B, and Hood, S. (1997). Children's accounts of risk. *Childhood: A Global Journal of Child Research,* 4 (3), 305-324.

Kim, S. & Laird, M. (1995). *An outcome evaluation of Lions-Quest Skills for Growing First Edition, grades K-5.* Charlotte, NC: Database Evaluation Research.

Kozup, J., Creyer, E. H., & Burton, S. (2003). Making healthy food choices: The influence of a health claim and nutrition information on consumers' evaluations of packaged food products and restaurant menu entrees. *Journal of Marketing,* 87 (April), 19-34.

Levine, S. C., Vasilyeva, M., Lourenco, S. F., Newcombe, N. S., & Huttenlocher, J. (2005). Socioeconomic status modifies the sex differences in spatial skill. *Psychological Science,* 16, 841-845.

McNeal, J. U. (1999). *The Kids Market: Myths and Realities.* Ithaca, NY: Paramount Marketing Publishing.

Moore, E. S. & Rideout, V. J. (2007). The online marketing of food to children: Is it just fun and games?" *Journal of Public Policy and Marketing,* 26 (2), 202-20.

Moore, E. S. & Lutz, R. J. (2000). Children, advertising, and product experiences: A multimethod inquiry. *Journal of Consumer Research,* 27 (June), 31-48.

Moorman, C. (1990). The effects of stimulus and consumer characteristics on the utilization of nutrition information. *Journal of Consumer Research,* 17(December), 362-374.

Moorman, C. & Matulich, E. (1993). A model of consumers' preventive health behaviors: The role of health motivation and health ability. *Journal of Consumer Research,* 20 (September), 208-228.

Nation, M., Crusto, C., Wandersman, A., Kumpfer, K. L., Seybolt, D., Morrissey-Kane, E. & Davino, K. (2003). What works in prevention: Principles of effective intervention programs. *American Psychologist,* 58, 449-456.

O'Dea, J. (2003). Why do kids eat healthful food? Perceived benefits of and barriers to healthful eating and physical activity among children and adolescents. *Journal of the American Dietetic Association,* 103 (4), 35-39.

Paris, S. G., Lindauer, B. K. & Cox, G. L. (1977). The development of inferential comprehension. *Child Development,* 48 (December), 1728-33.

Piaget, J. (1970). Piaget's theory. In P. Mussen (Ed.), *Handbook of Child Psychology,* Vol. 1 (pp. 703-732). New York: Wiley.

Reyna, V. F. and Farley, F. (2006). Risk and rationality in adolescent decision-making: Implications for theory, practice, and public policy. *Psychological Science in the Public Interest*, 7 (1), 1-44.

Robertson, T. S., & Rossiter, J. R. (1974). Children and commercial persuasion: An attribution theory analysis. *Journal of Consumer Research*, 1 (June), 13-20.

Roe, B., Levy, A. S., & Derby, B. M. (1999). The impact of health claims on consumer search and product evaluation outcomes: Results from FDA experimental data. *Journal of Public Policy & Marketing*, 18 (1) (Spring), 89-105.

Roedder, D. L. (1981). Age differences in children's responses to television advertising: An information-processing approach. *Journal of Consumer Research*, 8 (September), 144-153.

Sigelman, C. K., Leach, D. B., Mack, K. L., Bridges, L. J., Rinehart, C. S., Dwyer, K. M., Daview, A. P., & Sorongon, A. G. (2000). Children's beliefs about long-term health effects of alcohol and cocaine use. *Journal of Pediatric Psychology*, 25, 8, 557-566.

Strauss, R. & Pollack, H. A. (2001). Epidemic increase in childhood overweight, 1986-1998. *Journal of the American Medical Association*, 286(22), 2845-2848.

Valkenburg, P. M. (2000). Media and youth consumerism. *Journal of Adolescent Health*, 27 (2), 52-56.

Valkenburg, P. M. & Cantor, J. (2001). The development of a child into a consumer. *Applied Developmental Psychology*, 22, 61-72.

Walsh, M. E. & Biface, R. (1991). Children's conceptions of AIDS. *Journal of Pediatric Psychology*, 16 (3), 273-285.

Whalen, C. K., Henker, B., O'Neil, R., Hollingshead, J., Holman, A., & Moore, B. (1994). Optimism in children's judgments of health and environmental risks. *Health Psychology*, 13, 319-325.

Wright, P., Friestad, M. & Boush, D. M. (2005). The development of marketplace persuasion knowledge in children, adolescents, and young adults. *Journal of Public Policy and Marketing*, 24 (2), 222-233.

Table 1. **Proportion of Children Choosing a Cereal containing a Claim by Condition**

A. Nutrition-Effects Claim

	Pre-Curriculum	Post-Curriculum	All Participants
Free-Choice	.06[a]	.20	.13[b]
Health Goal	.31[a]	.33	.32[b]
All Participants	.17	.26	

B. Health Claim

	Pre-Curriculum	Post-Curriculum	All Participants
Free-Choice	.29	.14	.23
Health Goal	.17	.14	.16
All Participants	.23	.14	

C. General Claim

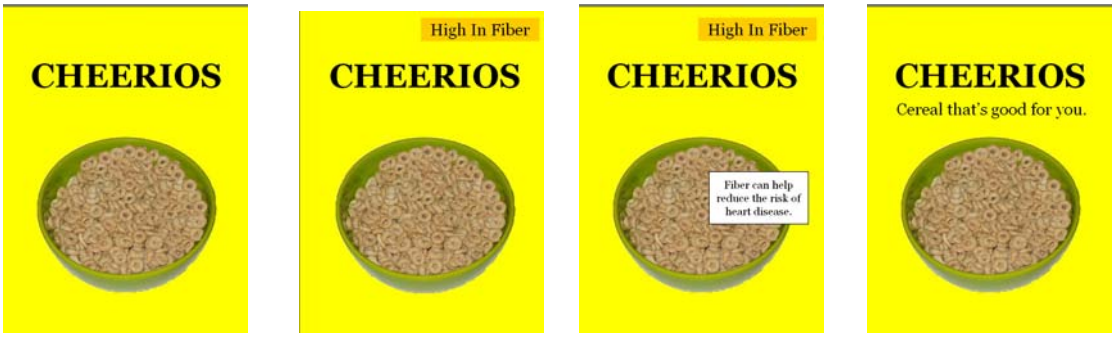
	Pre-Curriculum	Post-Curriculum	All Participants
Free-Choice	.16[c]	.42	.26[d]
Health Goal	.55[c]	.38	.48[d]
All Participants	.36	.40	

Numbers with the same superscript are significantly different.

[a,b,d] $p<.1$

[c] $p<.05$

Figure 1. Example of cereal box fronts



Control Nutrient Content Health Claim General Claim

Figure 2. Example of nutritional information (cereal box back)

Cheerios

Nutrition Facts

Serving Size 1 cup (30 g)

Serving Per Container 10

Amount Per Serving			
Calories 110		**Calories from Fat** 15	
			% Daily Value*
Total Fat 2 g			**3%**
Saturated Fat 0 g			0%
Cholesterol 0 mg			0%
Sodium 210 mg			9%
Total Carbohydrates 22 g			7%
Dietary Fiber 5 g			19%
Sugars 1 g			
Protein 3 g			
Vitamin A 10%	•	Vitamin C 10%	
Calcium 10%	•	Iron 45%	

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.
** Contains less than 2% of the Daily Value of these nutrients

Figure 3. Proportion of Children Choosing a Cereal Containing a Claim by Claim Type

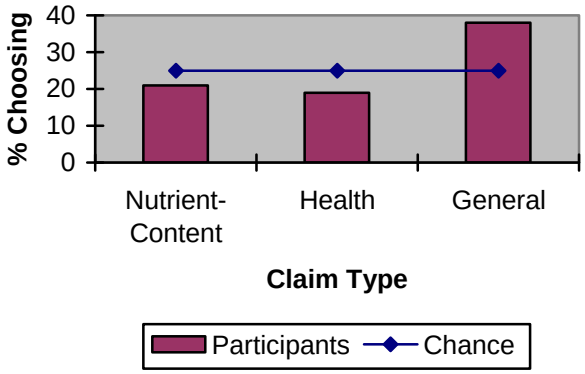


Figure 4. Proportion of Children Choosing a Healthful Cereal