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Title: Kids, Caregivers and Cartoons: The Impact of Licensed Characters on Food Choices and Consumption

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Kids, Caregivers and Cartoons: The Impact of Licensed Characters on Food Choices and Consumption

This research examines effects of on-package licensed characters on children's and caregivers' choices of healthy and indulgent food and children's consumption amount. The authors propose that food liking exerts the greatest influence on children's choices and consumption, such that the impact of on-package characters will be limited to choices between equally-liked options. Caregivers' choices are primarily influenced by their food goals for their children, thus the impact of characters will likewise be limited to caregivers' within-category choices. Two experiments find that a character influences children's choices between two same-category options but not between indulgent and healthier options. A third experiment reveals that food liking influences amount consumed, while the presence of a character influences neither amount consumed nor food liking. Two additional experiments show that characters influence caregivers' choice between the same foods, but not between different food types or intention to purchase a food. The expanded framework for the effects of licensed characters—taking into account choice versus consumption, children versus caregivers, and healthy versus unhealthy foods—enhances understanding for consumers, practitioners and policymakers.

175 words

Keywords: children; licensed cartoon characters; marketing to children; food choice; food consumption

Childhood obesity has increased rapidly over the last forty years; 17% of American 2- to 19-year-olds are classified as obese and 32% are overweight or obese (Ogden et al. 2014). Overweight and obesity can have significant negative effects on children's physical and psychosocial well-being. In particular, overweight and obesity increase chances of joint problems, sleep apnea, asthma, high blood pressure, high blood cholesterol, prediabetes, and Type 2 diabetes in children (e.g., Han, Lawlor, and Kimm 2010). Children who are overweight are sometimes stigmatized. For example, children perceive that children who are overweight have fewer social skills, lower academic success, and low fitness (Hill and Silver 1995). In addition, children indicate that they are less interested in socializing with children who are overweight as compared to those who are not (Cramer and Steinwert 1998). Children who are overweight or obese are more likely to be overweight or obese as adults (Freedman et al. 2005), leading to decreased physical and psychosocial well-being across the lifespan.

While many factors affect whether children are overweight or obese, more energy consumed than expended plays a central role (Butte, Christiansen, and Sorensen 2007). Thus, it is important to understand factors that influence what and how much children eat (as well as factors that influence energy expended). Research suggests that marketing unhealthy food and beverages (e.g., high in sugar and/or fat and/or low in nutrition) to children may undermine healthy choices and play a role in childhood obesity (Grier and Moore 2012; Harris et al. 2009; World Health Organization 2010). In 2009, \$1.79 billion was spent marketing foods to children and adolescents, with \$113 million of that total spent on in-store marketing and packaging (Federal Trade Commission 2012). In the U.S., cross-promotions such as the use of licensed characters (i.e., when a product firm pays to use a character created by another, usually entertainment, firm in the marketing of a product) increased 78% between 2006 and 2008

(Harris, Schwartz, and Brownell 2010), accounting for almost 50% (\$530 million) of all child-directed marketing in 2009 (Federal Trade Commission 2012). Licensed characters (LC) are used extensively with foods targeted toward children, and are more frequently used with high-energy, low-nutrient foods, such as cookies and gummy snacks, than on healthy foods, such as fruit and vegetables (Grigsby-Toussaint and Rooney 2013; Harris, Schwartz, and Brownell 2010). Despite efforts to curb the use of LC in advertising to children, analyses indicate that LC remain prevalent in advertising and highly prevalent on packaging (Castonguay et al. 2013).

There is concern that food marketing may negatively impact children's well-being by leading to unhealthy food choices (e.g., Grier and Moore 2012) and interfering with important food socialization provided by families (Moore, Wilkie, and Lutz 2002). From a policy perspective, the World Health Organization (WHO) recommends policies that (1) reduce children's exposure to marketing of foods that are high in saturated fats, trans fats, sugars, or salt, and (2) restrict use of "powerful" marketing techniques (World Health Organization 2010). Recent policy discussions have centered on the appropriateness of using LC in marketing to children. The Robert Wood Johnson Foundation and the Children's Food and Beverage Advertising Initiative (CFBAI) pledge recommend that LC should only be used to market "healthier" foods that meet a minimum nutritional standard (CFBAI 2014; Robert Wood Johnson Foundation 2016). While organizations and companies that follow the CFBAI pledge have policies against using characters in *advertising* to children, these policies rarely extend to characters on *packaging* (Wootan, Batada, and Balkus 2010).

Some consumer and health advocates suggest that policymakers invest resources into restricting the use of LC on food packaging marketed to children, or limiting such use to healthier foods. However, there is little scientific evidence to support such efforts. Limited

research examines LC effects, and the majority of the limited research focuses on attitudes rather than choice or consumption. Accordingly, the objective of the current research is to gain insight into the impact of on-package LC on children's choice and consumption and caregivers' choice of indulgent and healthy foods for their children.

Package Effects

When examining the impact of on-package LC on children's food consumption, there are at least three decisions to consider. Typical for much consumer decision making, children make decisions regarding product choice and use (e.g., consumption). Somewhat less typical, however, is that the decisions of a third party, namely the child's parent or other caregiver, play a critical role in children's food choices and consumption. Parents and other caregivers (collectively referred to as "caregivers") exert strong influence on children's food choice and consumption by (1) controlling choice and consumption options and (2) deciding what to provide (e.g., Block et al. 2011; Moore, Wilkie, and Desrochers 2017). On-package LC could thus impact children's food consumption by influencing: (1) what children choose and what they ask their caregivers to purchase ("pester power"); (2) the amount of food that children consume; and (3) what parents purchase and provide (purchase power). We thus consider each of these decisions.

Packaging Effects on Children's Attitudes and Intentions

Considerable research focuses on the impact of food package elements, such as colors, patterns, images, fun names, and familiar brand names, on children's attitudes, taste perceptions, and intentions (e.g., Elliott 2009; Elliott, Den Hoed, and Conlon 2013; Enax et al. 2015; Letona et al. 2014a; Pires and Agante 2011; Robinson et al. 2007). Overall, several studies suggest that attractive package elements, such as vivid colors and interesting graphic elements (Letona et al.

2014a; Pires and Agante 2011) and cute pictures and names (Enax et al. 2015) can increase attention to, perceptions of, and intentions toward foods as compared to plain packaging without these elements.

Studies of the impact of branded packaging have found effects of the presence of familiar brands on children's evaluations and taste perceptions. One study found mixed results such that children evaluated healthy, but not indulgent, foods more positively when packaged with a familiar as opposed to an unfamiliar brand name (Levin and Levin 2010). Other research finds that children perceive the same food to taste better when packaged with a familiar brand name, as compared to a plain package (Robinson et al. 2007) but to taste the same when compared to packaging with other attractive elements (Elliott, Den Hoed, and Conlon 2013).

Impact of On-Package LC on Children's Food Product Attitudes and Choices

Among the many promotional techniques that may be employed to influence children's choices and food consumption, LC have been implicated as potentially powerful (Harris, Schwartz, and Brownell 2010; Roberto et al. 2010). Accordingly, researchers have begun examining possible effects of LC. As with other package elements, however, most of this research has focused on children's perceptions, attitudes and intentions and to a lesser extent, choice or amount consumed. In some of the research, children only *see* products, whereas in other research, children also *taste* the food. Some research has concurrent presentation (within-subject) whereas a more limited amount of research examines children's responses to individual products (between-subject). See Table 1 for an overview of these papers.¹

Insert Table 1 about here

Results are mixed with respect to whether on-package LC influence children's attitudes and intentions. Research has found that when selecting between identical foods (e.g., two

apples), 6 to 7 year old children express greater preference for, and intent to ask parents to purchase, foods with a LC over foods without a LC (Smits and Vandebosch 2012). Research examining the impact of LC on preferences between healthy (e.g., chopped banana) relative to indulgent (e.g., banana candy) food has found that, while preference for indulgent food is higher than that for healthy food: (1) LC had a positive impact on liking and purchase request intent for healthy (but not unhealthy) food among 4 to 6 year old children (de Droog, Valkenburg, and Buijzen 2011); but (2) LC only had a positive impact on attitudes toward unhealthy (not healthy) foods with unfamiliar (not familiar) brand names among 7 year old children (Levin and Levin 2010). Additional research examining the impact of LC on preferences between more- and less-healthy food pairs found that while on-package LC increased attention, children consistently preferred less- to more-healthy foods and in almost all situations in this research, LC led to *lower*, not higher, preference (Ogle et al. 2017). Overall, these research results on the attitudinal impact of LC are best described as mixed.

Impact of On-Package LC on Children's Taste Perceptions and Preferences

We identified three studies that examined effects of LC when children tasted the food. Two studies simultaneously presented children with the exact same food, either packaged without or with a LC, and had them taste each (Letona et al. 2014b; Roberto et al. 2010). When children (4 to 11 year old Guatemalans or 3 to 6 year old Americans) were asked to taste and directly compare pairs of what were actually identical foods presented in packaging that differed in terms of whether it included a LC sticker, children indicated that the food with the LC on the package tasted better and that they would prefer it relative to the food from the plain package (Letona et al. 2014b; Roberto et al. 2010). However, a between-subjects study found that 4 to 6 year old children who tasted a moderately sugary cereal branded "Sugar Bits" rated the taste of

the cereal higher when the package included a LC compared to those consuming the same cereal without a character, but the presence or absence of the character unexpectedly did not affect ratings of taste when the cereal was branded as “Healthy Bits” (Lapierre, Vaala, and Linebarger 2011). Thus, results on the impact of LC on children’s perceptions of taste are mixed.

Children’s and Caregivers’ Food Choice Behavior

Consideration of children’s information processing can help us make predictions about when the presence of LC on packaging will influence children’s choices between foods and amounts consumed. Characters include a broad range of human and anthropomorphized fictional, animal-based, or object-based beings (Garretson and Burton 2005). Children learn about and form attitudes towards characters that they see in the media and social environments (Richert, Robb, and Smith 2011). Children develop parasocial relationships (i.e., friendships felt by an audience member for a media character) with cartoon and other characters in the media (Calvert and Richards 2014). Given children’s familiarity and parasocial relationships with LC, on-package LC are similar to celebrity endorsers and can be expected to influence attitudes and choices similarly. Just as a liked celebrity endorser can positively impact adults’ perceptions, attitudes and purchase intent through a transfer process (e.g., Campbell and Warren 2012; McCracken 1989; Weisbush, Mackie, and Garcia-Marques 2003), we propose that a LC on a product package can transfer a child’s positive affect for the LC to the associated product. In an effort to create such a positive impact via a LC, firms strategically select characters for their packages that are familiar and liked by children in their target age and gender group. When a child sees a familiar, liked character on a food package, the character is likely to attract the

child's attention (Ogle et al. 2017) and positive affect that the child feels for the character is likely to transfer, increasing attitude toward the product (Chaplin and John 2005; de Droog, Buijzen, and Valkenburg 2011; Kim, Lim, and Bhargava 1998; Weisbuch, Mackie, and Garcia-Marques 2003).

This leads to the question of how children make food choices. Children tend to heavily weight the most important attributes in their decision making rather than using compensatory strategies (Wartella et al. 1979). While there are multiple influences on children's food consumption, expected taste is one of the most important (Patrick and Nicklas 2005). Thus, expected taste preference is anticipated to be heavily weighted in children's food choices. If children are choosing between two foods with similar expected taste, other factors, such as brand name or positive associations with the product, are likely to affect the choice (Wartella et al. 1979). If, however, children are choosing between two foods with different expected taste, since taste tends to be the most important attribute, choice is expected to be most strongly impacted by taste, with limited influence by other factors, such as LC.

Children have a biological preference for sweet and salty foods (Mennella 2014), and therefore, often prefer "indulgent" to "healthy" foods because the indulgent foods are "tastier" (McCullough, Guilkey, and Stark 2017; Moore, Wilkie, and Desrochers 2017; Phillips and Kolasa 1980). In choice contexts, the effect of the presence versus absence of a LC is likely to depend upon the food types. When one type of food has a LC and a different type does not, the child's choice will depend upon the relative weighting of the expected taste of the food versus liking provided by the LC. Because taste is normally the most important attribute, liking for an indulgent food will often outweigh liking for a healthy food plus liking for a LC (Kotler, Schiffman, and Hanson 2012). Thus, children's expectations of the taste difference (between the

options in the choice set) may moderate the effect of the LC. If taste expectations between the options are equal, due to affect transfer, a child is likely to choose a package with a familiar and liked LC versus a package without a character. However, when taste expectations for one product are higher than for the other, taste will be an important driver of the choice and a LC is less likely to have an impact. This conceptualization leads to the following hypotheses.

- H1: An on-package LC is likely to increase children's choice of a food as compared to the same type of food without the on-package LC.
- H2: The presence of an on-package LC is more likely to influence children's choices between two foods expected to taste the same (two indulgent or two healthy options) than between two foods with divergent expected tastes (healthy vs. indulgent).

A potential question is whether the impact of on-package LC will depend upon children's age. While it is possible that younger children—with lower media literacy and fewer cognitive defenses—could be more likely to be influenced by peripheral factors such as fun themes and package graphics (Livingstone and Helsper 2006), a body of research shows that teens and adults are often influenced by peripheral factors including tactics such as celebrity endorsers (e.g., Agrawal and Kamakura 1995; Campbell and Warren 2012; Petty, Cacioppo, and Schumann 1983). Even young children are impacted by perceptual features, such as liked characters, so transfer from the characters to the product are likely to occur across age (see John 1999). While we do not expect the impact of familiar, liked LC to differ over our target range of 4- to 12-year-olds, we will explore age effects in the data.

Impact of LC on Children's Food Product Consumption

In addition to choosing a food, children also choose how much of a food to eat. The choice of consumption quantity is directly related to weight status. Thus, it is important to understand whether on-package LC impact the amount of food that children consume. Despite the key importance of consumption amount for children's health, well-being, and public welfare, a limited amount of research has examined the impact of LC on children's consumption. Keller and colleagues (2012; study 3, $n = 16$) found evidence to support an increase in fruit and vegetable intake among 4 to 5 year old children when the fruit and vegetables were presented in a package with a combination of LC, cute names and phrases and a sticker premium, with stickers that could be collected on a game board for a bigger prize, compared to presented in a plain package with no name, premium or possible prize. It is unclear whether the character, name, sticker gift, collection of stickers for a prize, or the combination of all of these (plus nutrition education provided to the families) drove the effect. In contrast, a higher-powered study ($n = 207$) found no impact of the inclusion of a LC on a healthier food on preschool-aged children's consumption of the healthier versus a less healthy food (e.g., broccoli vs. chocolate); children consumed more of the less healthy food item, regardless of the presence of a LC (Kotler, Schiffman, and Hanson 2012).

Many environmental factors increase the quantity of food consumed by adults, including meal duration, social environment, distractions, food salience, size of plates, portion sizes, size of package and on-package food display (see Wansink 2004 for a review). For example, the amount of food displayed on a package appears to influence the amount adults consume by providing an anchor and impacting perceptions of consumption norms (Madzharov and Block 2010). Less is known about environmental influences on children's food intake. Research demonstrates that both television advertisements and cartoon character body weight prime

eating, leading to increased consumption in children (Campbell et al. 2016; Halford et al. 2007; Harris, Bargh, and Brownell 2009). Additionally, the portion size of food served increases consumption in children as young as four years old, perhaps by impacting consumption norms (Mrdjenovic and Levitsky 2005; Patrick and Nicklas 2005; Rolls, Engell, and Birch 2000).

Unlike the amount of food displayed, a LC does not provide a numerical anchor. Likewise, LC in general are unlikely to prime specific consumption behaviors (unless, as noted in Campbell et al. 2016, the LC is overweight) or impact children's perceptions of consumption norms.

Given the important influence of food taste on children's consumption (Havermans et al. 2009; Patrick and Nicklas 2005), the lack of consumption-relevant information provided by a LC, and the tendency of children to heavily weight the most important attribute (Wartella et al. 1979), we propose that while the mere presence of a LC on a package can affect a child's choice between foods that taste the same, it is unlikely to influence the *amount* of a specific food that a child consumes. Rather, the amount of a food that children choose to consume is expected to be more strongly influenced by liking based on the taste of the food (and hunger) (Kotler, Schiffman, and Hanson 2012; Patrick and Nicklas 2005) than whether or not the package includes a LC. This reasoning leads to the following prediction.

H3: The amount of food a child chooses to consume will be influenced more by food taste than by the presence of an on-package LC.

Impact of LC on Caregivers' Food Product Choices

Caregivers (e.g., parents, relatives, daycare providers) have a critical influence on children's food consumption through control over choices, the food that they provide to children in their care, and choices that they model (Grier et al. 2007; Moore, Wilkie, and Desrochers 2017; Nicklas et al. 2001). Young children typically only have access to foods that a caregiver

provides, although as children get older, they begin to have more independent control (Story, Neumark-Sztainer, and French 2002). Thus, it is important to examine the impact of on-package LC on caregivers', as well as children's, choices.

Caregivers often have a variety of health-oriented and non-health-oriented goals in terms of feeding their children (Kiefner-Burmeister et al. 2014). Three common caregiver goals include choosing: healthy foods, foods that the child will enjoy, and foods that the child will consume (Kiefner-Burmeister et al. 2014). Research on parental motivations and feeding practices reveals that parents strive for balance between providing children with healthy food and making children happy through treats and "fun" foods (Carnell et al. 2011; Harman and Cappellini 2014). Parents want their children to eat healthy foods, but they also want their children to be happy, and they want to avoid food waste, particularly at low levels of household income (Daniel 2016).

On-package LC could impact caregivers' attitudes toward a food for their children in multiple ways. First, the presence of a LC could signal to a caregiver that a food is "for kids," strengthening the belief that the food is normative for children. Increasing social norms is one way in which food marketing influences caregivers' food choices for children (Grier et al. 2007). Second, when an on-package LC is one that a caregiver believes his or her child likes, the presence of the character is likely to seem "fun", thus strengthening the beliefs that the child will enjoy and like the food, and perhaps, that the child will be more likely to consume the food.

Considering caregivers' multiple goals suggests that, just as with children, the type of choice is likely to moderate the impact of an on-package LC. When a caregiver is choosing between two of the same foods, whether healthy or indulgent, the extent to which each product meets the caregiver's health goal is the same, while the LC could increase perception that the food is fun, and the likelihood of meeting the goals of child liking and thus, consumption. It

follows that when choosing between two of the same food, a caregiver is more likely to choose the product with a LC than the one without a LC.

When, however, a caregiver is choosing between a healthy and an indulgent food for a child, each food achieves different types of caregiver goals. As noted above, children tend to like indulgent foods more than healthy foods such that a caregiver may feel pulled between choosing a food that is healthy for the child and one that the child is likely to like and eat. This conflict may increase the caregiver's processing involvement, such that the cue to social norms and fun that a LC can provide is given less weight in the decision than the ability of the foods to meet the caregiver's active goals. The presence versus absence of a LC is thus less likely to have a strong impact on choice between two diverse types of foods (i.e., healthy vs. indulgent).

H4: An on-package LC is likely to increase caregivers' choice of a food as compared to the same type of food without the on-package LC.

H5: An on-package LC is more likely to influence a caregiver's choice between two of the same type of food (two indulgent or two healthy options) than between two different types of food (healthy vs. indulgent).

H6: An on-package LC is likely to increase caregivers' perceptions that a food is "fun" and "for kids" as compared to the same food without a character.

The Current Research

The current research focuses on providing insight into the effect of including familiar, liked LC on healthy and indulgent food. Experiments 1 and 2 examine whether the impact of a LC on children's choice of product depends on the type of choice, i.e., whether children are

choosing between the same healthy or the same indulgent food, or they are choosing between a healthy and an indulgent food. Experiment 3 examines whether taste is a stronger predictor of children's consumption of both healthy and indulgent foods than a LC. Experiment 4 examines whether the impact of a LC on caregivers' choices for healthy and indulgent foods depends on the type of choice, and examines the impact of an on-package LC on caregivers' perceptions of that food as well as their purchase intentions.

Selecting LC and Foods

The Q Scores Company conducts a Cartoon Q study biannually measuring familiarity and likeability of more than 600 LC among nationally representative samples of children. Because of our interest in companies' use of familiar, liked characters to market to children, we used LC (SpongeBob, Scooby Doo, and Minions) that were familiar and well-liked across age groups (4 to 12), and by both girls and boys, according to Q Score data.

A stimuli pretest for the indulgent and healthy foods used in Experiments 1, 2, and 3 was conducted with 26 children between the ages of 4 and 12. In public spaces (e.g., airports), caregivers of children that looked to be in the correct age range were asked their children's ages and asked for verbal consent for their children to participate in a short survey. After verbal consent, children were asked for verbal assent and completed a brief questionnaire rating how healthy they thought each of five foods were on a 7-point scale from 1 = "Bad for me" to 7 = "Good for me". See Web Appendix for the mean ratings for each food. Fruit gummy snacks and cookies were rated as unhealthy (less healthy than the mid-point of the scale; gummy snacks: $t = -4.67, p < .0001$; cookies $t = -7.32, p < .0001$). Carrots, raisins, and dried apricots were rated as healthy (average ratings above the mid-point of the scale; carrots: $t = 17.35, p < .0001$; raisins: $t = 7.79, p < .0001$; dried apricots: $t = 6.34, p < .0001$). Paired t-tests revealed that children

considered each of the healthy options to be significantly healthier than each of the indulgent options (raisins and gummy snacks: $t = 7.53, p < .0001$; raisins and cookies: $t = 10.08, p < .0001$; carrots and gummy snacks: $t = 12.85, p < .0001$; carrots and cookies: $t = 16.18, p < .0001$; dried apricots and gummy snacks: $t = 6.88, p < .0001$; dried apricots and cookies: $t = 9.29, p < .0001$).

Experiment 1: Children's Choice between Same Food Type with a LC and Without

The purpose of this experiment was to examine the effect of a LC on choice between two of the same foods. Children, 4 to 10 years old, were offered a choice between the same food in a package with a LC or a package without a LC (see Web Appendix for the distribution of age in Experiments 1 and 2).

Stimuli

We used three different sets of stimuli to test the hypothesis that a LC increases within-category choice. Experiment 1a ($N = 26$, 61% female, average age 6.6 years) used an indulgent snack (fruit flavored gummy snacks) from the same brand, with half of the packages stickered with a SpongeBob character. Experiment 1b ($N = 26$, 38% female, average age 6.2 years) included fruit gummy snacks from two different brands, one in a package designed with a LC (Scooby Doo), and one designed with pictures of fruit and no LC. Experiment 1c ($N = 29$, 28% female, average age 7.27) used a healthy snack (baby carrots) from the same brand, with or without a SpongeBob sticker. See Web Appendix for packages. These variations allowed examination of the effects of LC on children's within-category choices when (1) the LC was shown on a sticker affixed to the package, (2) the LC was integrated into the package design, and (3) the within-category choice was between healthy or indulgent foods.

Method

Pairs of researchers went to public spaces popular with families, such as libraries, museums, and children's soccer games. They approached parents with children who looked to be between 4 and 10 years old and asked their child's age and if their child could choose a snack. After receiving verbal consent from the parent, one researcher asked the child if he/she would like to choose a snack. After receiving the child's verbal assent, the tray was offered at the level of the child's chest, where the child could easily see the options and make a choice. The snacks were offered on a clear, divided tray, with ten packages including LC in a column on one side and ten packages without LC in a column on the other side; which side the packages with characters were on was counterbalanced for order roughly every five minutes. The tray was refilled after each selection to maintain equivalent numbers of each package type for every choice. The second researcher recorded the child's age, gender, and choice.

Results and Discussion

One sample chi-square tests were used to test whether the packages in each choice set were equally attractive to children (in terms of the observed frequency of choice). If the packages with and without LC were equally attractive, we would expect the package with a LC to be selected approximately 50% of the time. Thus, we test whether the percent of children who chose the package with a LC is significantly different than 50%. Analyses revealed that children were more likely to choose the option with the LC than expected by chance across all three experiments (Experiment 1a: 77%, $\chi^2 = 7.54$, $p = .006$; Experiment 1b: 69%, $\chi^2 = 3.85$, $p = .05$; and Experiment 1c: 69%, $\chi^2 = 4.17$, $p = .04$; see Web Appendix for choice shares). Logistic regression analyses examining whether age or gender predicted package choice found a directional effect of age in Experiment 1a, but no age effect in 1b or 1c and no effect of gender

(Experiment 1a: age Wald $\chi^2 = 2.93, p = .087$, gender Wald $\chi^2 = .074, p = .78$; Experiment 1b: age Wald $\chi^2 = .50, p = .48$, gender Wald $\chi^2 = .055, p = .46$; Experiment 1c: age Wald $\chi^2 = .03, p = .85$, gender Wald $\chi^2 = 1.61, p = .20$). Supporting H1, a LC on a package, whether a sticker or part of the package design, for either an indulgent or a healthy product, significantly increased choice compared to the same product type without a LC.

Experiment 2: Impact of a LC on Choice between Healthy and Indulgent Snacks

The Robert Wood Johnson Foundation (2016) and the CFBAI (2014) both recommend using LC to market healthy and not indulgent foods as an important strategy to encourage children to make healthier choices. However, based on children's non-compensatory processing (Wartella et al. 1979) and the importance of taste (Patrick and Nicklas 2005), we hypothesize that the presence of a LC is unlikely to increase choice of a healthy over an indulgent (typically more preferred) food, or vice versa. Thus, to further explore the effect of LC on children's food choices, and to examine H2, we ran an experiment including healthy versus indulgent options. Based on the pretest of perceptions of healthiness, we used raisins as our healthy option, and fruit gummy snacks as our indulgent option. For generalization, we used a different LC (Minions).

Method

Experiment 2 was a 2 (type of choice: within-category, across-category) X 2 (product with LC: healthy, indulgent) design plus a control of healthy food versus indulgent food, with no LC on either. Thus, some children picked between two healthier or two indulgent options (within-category choice), whereas others picked between a healthier and a more indulgent option

(across-category choice). Children, 3 to 12 years old ($N = 139$, 49% female, average age 7.4 years) participated in the study. The procedures were identical to Experiment 1.

Results and Discussion

We first examined whether children were more likely to choose the package with a LC in the within-category choice (i.e., when choosing between two of the same type of food).

Replicating Experiment 1, and confirming H1, children were more likely to choose both raisins with (74%) than raisins without (26%) the LC ($\chi^2 = 6.26, p = .012$; see Figure 1) and gummies with (73%) versus without (27%) the LC ($\chi^2 = 4.54, p = .033$). Logistic regression analyses examining whether gender or age predicted whether children chose the option with the LC found no effect of gender and directional, but not significant effects of age in the indulgent choice only (gummies: gender Wald $\chi^2 = .48, p = .49$, age Wald $\chi^2 = 3.19, p = .07$; raisins: gender Wald $\chi^2 = .20, p = .65$, age Wald $\chi^2 = 1.00, p = .32$).

Insert Figure 1 about here

Next, we examined the control condition (i.e., choice between the healthy and indulgent options with no LC on either). As expected, in the absence of LC, children showed a preference for the indulgent (80%) over the healthy (20%) ($\chi^2 = 10.8, p = .001$). Our next analyses showed that the choice proportions were not significantly different from the control condition when the LC was present on the healthy option (76% indulgent, 24% healthy; $\chi^2 = .12, p = .73$), or when the LC was present on the indulgent option (85% indulgent, 15% healthy; $\chi^2 = .202, p = .65$).

We used logistic regression to test H2, examining whether the choice of the option with the LC depended on whether the decision was within food type or across food type (choice type). The independent variables were choice type, whether the LC was on the package of healthy or indulgent food, the interaction of choice type and LC, age, and gender; the dependent variable

was whether children chose the option with the LC. We found effects of choice type (Wald $\chi^2 = 13.34, p = .0003$), LC presence (Wald $\chi^2 = 17.91, p < .0001$), and a significant interaction of choice type and LC presence (Wald $\chi^2 = 9.19, p = .002$). There was also a directional, but not significant effect of age (Wald $\chi^2 = 2.94, p = .09$). Gender had no significant effect ($p = .92$). Accordingly, the overall pattern of results is consistent with H2, with LC effects on choice when children chose between foods within a food type, but not when selection was across food types.

While influential in intra-category choice sets where food liking is constant, LC did not alter choices between healthy and indulgent foods. The findings suggest that LC have limited influence on children's choices, having an impact only when differences in liking across the foods under consideration are minimal.

Analysis of Age Effects in Experiments 1 and 2

Neither Experiment 1 nor 2 revealed a significant effect of age. This could be because none exists or because the relatively small sample sizes did not provide ample power to see an effect. We combined data from Experiments 1a, 1b, 1c and the within-category conditions from Experiment 2. This resulted in a relatively large set of data ($n=130$) consisting of within-category choices (i.e., selection between two packages from the same product category with one of the packages including a LC). We tested for the influence of age on choice of package with a LC and also assessed any potential gender effects, interactive effects of gender and age, as well as in/consistency of any of these effects across the products or characters. Logistic regression was employed with package choice as the dependent variable and age, gender, a categorical indicator of the five combinations of products/characters, and their interactions as the independent

variables. The effect of age was not significant ($p > .2$), and the other independent variables also did not have an effect on choice ($ps > .15$). Thus, we do not find evidence that age or gender influence the impact of LC on children's within-category food choice.

Experiment 3: The Relative Roles of Food Liking and LC on Amount Consumed

The primary goal of Experiment 3 was to examine the effects of a LC on food liking (taste) and consumption of healthy and indulgent foods. We expect that, across both food types, food liking will have a stronger effect than the presence of a LC on the amount consumed (H3). Earlier research in which children were given two of the exact same foods concurrently, one with a LC and one without, found that children indicated higher taste liking for the food with the LC in the direct comparison (Letona et al. 2014b; Roberto et al. 2010). Thus, LC could have a direct impact on consumption, or an indirect effect by impacting liking. We propose, however, that such an impact of a LC on food liking is unlikely to arise in the absence of a direct comparison because in isolation a LC is unlikely to change perceived taste. We use a between-subject design that allows us to examine both direct and indirect effects of LC on liking and on consumption.

Method

Experiment 3 had a 2 (food: healthy, indulgent) x 2 (character: present, absent) between-subjects design. In public locations, after parental consent, children aged 4 to 7 ($N = 130$, 48% female, average age 5.6 years) were asked to participate in a taste test. Since any effects of a LC on liking and consumption would occur through affect transfer, all participants were asked at the end of the study to indicate whether they knew the character (Scooby Doo). Twenty children who did not know Scooby Doo were removed from the analysis. Removing these subjects did

not have a material effect on the results (see Web Appendix). The remaining 110 participants were 45% female, with an average age of 5.8.

Children were seated behind a privacy screen without parents, and viewed a package of either cookies or dried apricots with an image of Scooby Doo or the same package without Scooby Doo (see Web Appendix). While viewing the package, participants received a bowl of the cookies or dried apricots, tasted at least one, and rated liking of the food. They then ate as much as they wanted while completing a brief survey, a filler task, consisting of circling their preferred option out of paired pictures unrelated to food or LC. The researcher stepped away and children were given about three minutes to complete the questionnaire, while eating as much of the food as they wanted. The food was removed and children indicated whether they knew various characters, including Scooby Doo. After the child left, the amount of food the child consumed was recorded.

Results and Discussion

Food reward involves two interconnected components—the pleasure received from taste (liking) and the motivation to eat (wanting)—that cannot be easily dissociated (Havermans 2011). For this reason, food liking was measured using two 5-point scales that included face emoticons, one measuring taste and the other measuring wanting. The taste rating asked children “how much do you like the way that this food tastes,” with the labels Hate It, Don’t Like It, It’s OK, Like It, and Love It. The wanting rating asked “how much would you like to have this food for a snack” with labels Don’t Want!, Not Really, It Would Be OK, Kind Of, and Want It!. The two scales were correlated ($r = .51, p < .001$) and were averaged together to create a food liking score.

A LC could have an indirect effect on amount consumed by influencing food liking as well as a direct effect on consumption. We thus examined whether the presence of a LC on the

package elicited higher food liking. Analysis of variance with the food liking measure as the dependent variable showed an effect of food type on food liking ($F(1, 106) = 13.69, p < .001$); not surprisingly, children indicated higher liking for cookies ($M = 4.47$) than for apricots ($M = 3.87$). The analysis showed no effect of character ($F(1, 106) = 1.11, p = .29$), or interaction of food type and character on liking ($F(1, 106) = 0.09, p = .76$).

To test the hypothesized influence of food liking and the presence of the LC on the amount consumed (H3), we conducted an analysis of covariance with amount eaten as the dependent variable and food liking as a covariate. Because the two foods vary in weight and calories (on average, each apricot weighed 0.3oz and one ounce of dried apricots contain 71 calories, and each cookie weighed 0.2oz and one ounce of cookies contain 147 calories), the analysis of covariance was conducted twice, once with ounces consumed and once with calories consumed as the dependent variable (see Figure 2 for Means and Web Appendix for cell sizes and standard deviations). There was a significant effect of type of food (ounces: $F(1, 105) = 3.81, p = .053$; calories: $F(1, 105) = 11.12, p = .001$) and a significant effect of food liking (ounces: $F(1, 105) = 4.78, p = .03$; calories: $F(1, 105) = 3.91, p = .050$), but no significant effect of character (ounces: $F(1, 105) = .01, p = .92$; calories: $F(1, 105) = .00, p = .97$) or interaction of food type and character (ounces: $F(1, 105) = .02, p = .88$; calories: $F(1, 105) = .04, p = .84$). Supporting H3, food liking was a significant predictor of amount consumed, whereas we found no evidence of an impact of the presence of a LC on either food liking or consumption.

Insert Figure 2 about here

Our first three experiments examined effects of LC on children's: (1) choices between two of the same type of product; (2) choices between two different types of products (healthy and unhealthy); and (3) consumption amount of healthy and unhealthy foods. The results indicate

that LC can have a significant impact on children's choices between two of the same type of food. When children ages 4 to 12 make a real choice of a snack that they get to consume between two of the same type, they overwhelmingly choose the one with the LC. However, the results also show that when choosing between two different types of products, a healthier snack and a tasty, unhealthy snack, children tend to choose the one they like best, regardless of the presence of a LC on either one. In short, children tend to choose the tasty, unhealthy product and the presence of a LC (on either product) does not affect this. Similarly, when looking at the amount that children choose to consume, the liking of the food impacts children's consumption, while LC does not impact either consumption or liking.

As discussed above, in addition to their own choices of foods and consumption amounts, children's food consumption is strongly influenced by parents and other caregivers. Much of the food available to children is provided by caregivers. Thus, another route by which LC could influence what children eat is by influencing caregivers' choices. The next two experiments examine impacts of LC on caregivers' perceptions, intentions, and choices for their children.

Experiment 4a: Impact of a LC on Caregiver Choices

The purpose of Experiment 4a was to test hypotheses 4, 5, and 6 by asking caregivers of 4 to 12 year old children to select one of two products as a snack for their child. It also examines how the presence of an on-package LC affects perceptions that the product might meet common parental feeding goals—specifically, perceptions that a food is healthy (thus meeting health goals) and perceptions that the product is “fun” and intended for kids (thus potentially providing a treat and allowing parents to balance health goals and making children happy).

Method

Caregivers ($n = 163$, 42% female, average age of 35.8) were recruited from Amazon's Mechanical Turk. The posting noted that a screener would be used to identify appropriate participants, and only those who qualified would be able to complete the survey. The screener included several questions to vet for child care responsibilities for children in the intended age group. Consistent with Experiment 2, we employed a 2 (choice: within-category; across-category) X 2 (product with LC: healthy; indulgent) between-subjects design with the addition of an across-category, no LC control condition. Thus, participants chose between two products that varied in terms of whether the products were in the same category (i.e., two indulgent or two healthy) or different categories (i.e., one healthy and one indulgent) and the presence or absence of a LC. There was also a "control" in which the choice was between the healthy and the indulgent food with no character on either. Pretesting (using a 7-point scale anchored by "healthy" and "unhealthy" revealed that a veggie pack (broccoli, celery, carrots, and dip) was perceived as a healthy option ($M = 6.39$), while a cookie pack (chocolate chip cookies) was perceived as unhealthy ($M = 2.70$); accordingly, product packages from these two categories were utilized in the study. A graphic designer created the LC conditions by incorporating a picture of SpongeBob on the two packages.

Participants were asked to think about one child they cared for between 4 and 12 years of age and to indicate the child's age ($M=7.4$) and gender (57% male). Next, with this child in mind, the caregiver was asked to view photos and select between two food items. Following the choice measure, participants were asked to judge each item on 7-point scales anchored by "designed for adults"(1) - "designed for children"(7), "unhealthy"(1) - "healthy"(7), and "not fun"(1) - "fun"(7). The survey concluded with demographic questions.

Results and Discussion

First, we examined within-category choices (i.e., choosing between two of the same items, one with an on-package LC). When caregivers choose between two veggie packs, the package with the LC (82%) was disproportionately selected relative to the package without the character (18%; $\chi^2 = 13.36, p < .001$; see Figure 3). Similarly, the condition where the choice was between two cookie packages revealed a disproportionate percentage (74%) selected the option including the LC on the package ($\chi^2 = 7.53, p = .006$). Consistent with H4, these findings indicate that when a caregiver is choosing between two of the same foods, the presence of a LC can increase choice of a child's food.

Insert Figure 3 about here

The control condition (i.e., choice between the veggie pack and cookies without an LC on either package) was employed in examining the across-category choice conditions. In the control condition, 48% (52%) of caregivers selected the veggie pack (cookies). A logistic regression model included a categorical independent variable reflecting whether the LC was not present on either package (i.e., control condition and reference category), appeared on the veggie pack, or appeared on the cookies. Within the model, we also included other potentially applicable independent variables (i.e., child's age, caregivers' household size and income, child's gender) to examine whether they interacted with the absence/presence of the LC in influencing choice. Results indicated that the choice proportions did not differ between the control condition and the condition in which the LC was shown on the veggie pack ($p > .8$; 35.5% veggies, 64.5% cookies) or the condition in which the LC appeared on the cookie package ($p > .8$; 54.8% veggies, 45.2% cookies). There were no other significant effects ($ps > .1$). The pattern of results described above

(i.e., significant effects of LC on choice between the same foods and no effects of LC on choice between different foods) is consistent with H5.

To gain insight into the process underlying the positive effects of LC on caregivers' within-category product choices, we examined responses to the three semantic differential scales reflecting beliefs that the products are designed for children, healthy, and fun. In particular, paired t-tests were used to examine whether the items with LC were judged differently from the items without the LC. For both the healthy and indulgent within-category choice contexts, these measures reveal that the addition of an LC leads to stronger beliefs ($ps < .001$) that the item is designed for children ($M_{\text{veggie, no LC}} = 3.64$, $M_{\text{veggie with LC}} = 6.36$; $M_{\text{cookies, no LC}} = 3.65$, $M_{\text{cookies with LC}} = 5.79$) and fun ($M_{\text{veggie, no LC}} = 3.67$, $M_{\text{veggie with LC}} = 6.00$; $M_{\text{cookies, no LC}} = 3.50$, $M_{\text{cookies with LC}} = 5.56$), but does not impact beliefs regarding the healthiness of the food items ($ps > .5$).

This experiment reveals the same pattern of influence of LC on caregivers' choices as found with children. When caregivers pick between two of the same food for their children, they tend to pick the option with a familiar, liked LC. However, when caregivers pick between two different foods, one healthy and one unhealthy, they are not influenced by the presence of a LC. In this case, choice shares across the options are the same in the absence and the presence of LC on food packages. This is despite the evidence that the presence of LC influences caregivers' perceptions of food as "for children" and "fun." These findings provide some support for the idea that when caregivers choose across categories, their goals are the primary driver of choice.

Experiment 4a provides important insight into the effects of LC and particularly, indicates a lack of potential for LC to be used to increase caregivers' choice of healthy versus unhealthy foods for their children. However, when considering caregivers' in-store shopping behavior, while they holistically choose between types of foods for their children, in practice

they tend to consider one type at a time. That is, when shopping in-store, a caregiver considers produce in the produce section and cookies or gummy snacks, etc. when in those aisles. It is thus important to also consider the potential impact of LC on caregivers' purchase consideration of a product on its own, rather than in a choice set. It is possible that when a caregiver sees a product with a LC and thinks of it as more fun and for children he or she will be more likely to purchase it than in the absence of a LC. While this is one possibility, given the importance of caregivers' goals in selecting food for their children, we propose that LC are unlikely to influence caregivers' purchase intent for each product, even in this case.

Experiment 4b: Impact of a LC on Caregiver Choices

The purpose of Experiment 4b was to further examine the impact of an on-package LC on caregivers' perceptions of products and purchase intentions compared to choice.

Method

Caregivers ($n = 174$; 54% female; average age of 35) were recruited from Amazon's Mechanical Turk using the same procedure and screening questions as Experiment 4a. Ten failed an attention check and were excluded from subsequent analysis; this omission did not have a substantive impact on the results. The study was a mixed design with a 2 (within-subjects food type: healthy, indulgent) X 2 (between-subjects character: on healthy food, on indulgent food). The same cookie and veggie packs with and without SpongeBob from Experiment 4a were used.

As in Experiment 4a, participants were asked to think about one child they cared for between 4 and 12 years of age and to indicate the child's age ($M = 7$ years) and gender (male = 62%). Keeping that child in mind, participants were asked to indicate their purchase intentions

individually for four foods: two filler items to disguise our hypotheses (cereal and crackers), and 2 target foods (cookie and veggie packs). Across conditions, the four foods were presented in the same order: cereal, cookies, crackers, veggies. Half of the participants were first presented with a cookie package that included the LC and later a veggie pack without; the other half were presented with a cookie package that did not include the LC and later saw a veggie pack with the LC. Participants indicated their intentions to purchase each food for their child on a seven-point scale from extremely likely to extremely unlikely (reverse-coded for clarity in presentation of means). After indicating purchase intentions for the foods, participants were asked their beliefs regarding whether the products were designed for children versus adults, healthy, and fun using the same items as in Experiment 4a. Prior to completing final demographic questions, participants were asked to choose between either two veggie packs or two packages of cookies with one of the packages in each choice set including the LC.

Results and Discussion

A repeated measures analysis of variance model was used to assess the effects of the LC on beliefs (i.e., healthy, fun, for kids) and purchase intentions regarding the healthy product (i.e., veggie snack pack). A main effect of the measures ($F(3, 162) = 85.80, p < .001$) and a main effect of LC ($F(1, 162) = 104.06, p < .001$) were qualified by an interaction between the two. The measures interacted ($F(1, 162) = 16.72, p < .001$) with the absence versus presence of the LC indicating differential effects across the four measures (see Figure 4). Further analysis revealed that the LC had no effect on purchase intentions ($M_{\text{no LC}} = 4.33, M_{\text{LC}} = 4.72; p > .1$) despite strengthening beliefs that the product is fun ($M_{\text{no LC}} = 2.99, M_{\text{LC}} = 5.37; p < .001$), for kids ($M_{\text{no LC}} = 3.20, M_{\text{LC}} = 5.43; p < .001$), and healthy ($M_{\text{no LC}} = 4.32, M_{\text{LC}} = 4.72; p < .05$).

When included as covariates, household income as well as the age and gender of the considered child were not significant ($ps > .3$).

Insert Figure 4 about here

Turning our attention to the indulgent item (i.e., cookies), we again find main effects of the repeated measure factor ($F(3, 162) = 78.19, p < .001$) and the LC ($F(1, 162) = 31.70, p < .001$). These main effects were qualified by an interaction between the belief/intention measures and presence of the LC on the package ($F(1, 162) = 6.47, p = .01$) (see Figure 4). As expected, the presence of the LC had no effect on intentions to purchase the cookies ($M_{no\ LC} = 3.89, M_{LC} = 3.69; p > .4$) or on the strength of the belief that the food is healthy ($M_{no\ LC} = 2.59, M_{LC} = 2.34; p > .2$). Beliefs that the cookies were for kids ($M_{no\ LC} = 3.56, M_{LC} = 5.67$) and fun ($M_{no\ LC} = 3.74, M_{LC} = 5.24$) were both strengthened by inclusion of the LC on the package ($ps < .001$). As covariates in this model, household income, gender and age of the child under consideration were not significant ($ps > .3$).

The choice results replicated those from Experiment 4a. In particular, 82.1% of the 78 participants selecting between the two veggie snack packs (with one of the two including the LC), selected the option with the LC ($\chi^2 = 32.05; p < .001$). For the cookie choice set, 81.4% of the 86 participants selected the option including the LC on the package ($\chi^2 = 33.91, p < .001$).

This experiment shows that when considering a single food at a time, a LC increases perceptions that both healthy and indulgent foods are fun and designed for kids, but does not increase purchase intent. The results support the idea that LC have limited effects on caregiver choices. Only in a situation where a caregiver is choosing between the same food, in packaging with a LC or without, does a LC influence the caregiver's decision. In the context of shopping, this may indicate that LC may impact brand choice, but not food choice, such that they only have

an impact after a caregiver has decided to purchase a specific type of food. Because LC increase perceptions that a food is fun and designed for kids, once the category choice has been made, caregivers may consider foods with a LC as helping them balance between providing their child with healthy food and providing a food their child will like and consider a treat.

Discussion and Conclusions

This research proposes that a fuller understanding of the effects of the use of LC in food marketing on children's food well-being can be gained by considering four possible influences for both healthy and indulgent foods. Thus, we examined the influence of familiar and liked LC on: (1) children's choice between two of the same types of food and between different types of food; (2) children's choice of amount of healthy and indulgent foods to consume; (3) caregivers' choice between two of the same types of food and between different types of food; and (4) caregivers' purchase consideration of a single type of food.

Four experiments, using multiple different characters (SpongeBob SquarePants; Minions; Scooby Doo), healthy foods (baby carrots, raisins, mixed veggie packs, dried apricots), and indulgent foods (gummy snacks, cookies), provide support for the conceptualization. Experiments 1 and 2 reveal that children are more likely to choose food in a package with a LC than the same type of food in a package without (H1). However, when faced with a choice between healthy and indulgent foods, one with a LC on the package, and the other without, children choose the indulgent over the healthy food, regardless of the presence or absence of LC (H2). Experiment 3 examined whether an on-package LC would lead to increased food liking and consumption. Importantly, we find that the amount children consume is significantly

impacted by food liking, but not the presence of a LC on the package (H3). Experiments 4a and 4b examined the impact of LC on caregivers' choices, intentions, and perceptions. Like children, when faced with a choice between two of the same food, caregivers are more likely to choose the package with the LC (H4). However, when choosing between two different foods, a LC does not impact caregivers' choices (H5); instead, caregivers appear to choose based on the caregivers' goals for their children. Although the LC does not impact caregivers' across-category choices or purchase intentions (when considering products one at a time), it does affect their perceptions that the food is fun and designed for kids (H6).

Our research contributes to the existing literature on the impact of characters on children in several ways. First, we provide a framework that provides structure for the existing literature, as well as how our research contributes to it (Table 1). Our framework makes clear that the majority of research asks children to distinguish between products presented concurrently and only a few studies ask children to respond to a product on its own. This also shows that only two previous studies examine consumption, which, of course, is the ultimate concern. By clarifying the different questions asked by different studies, we gain clearer insight into the fact that the literature reveals mixed effects.

Second, we ground our research within theory-based conceptualization of children's consumption, as suggested by recent research (Kraak and Story 2015). We conceptualize the major decisions that impact children's food consumption: children's choice of foods; caregivers' choice of foods to provide; and children's choice of consumption amount. Drawing from research on children's decision-making, we propose that children will tend to use non-compensatory, rather than compensatory strategies, such that the most important attribute will have a very significant impact on choice (Wartella et al. 1979). Combining this with research on

children's food preferences, we expect taste to be the most important attribute and thus hypothesize that LC will have a different impact on children's decisions between two of the same taste foods and two different taste foods. The hypothesis, and findings, that food type within a choice set significantly influences the impact of LC is an important contribution to the literature and, as discussed below, has important public policy implications. The conceptualization of children's taste-driven decision-making, also leads to the hypothesis, supported by the data, that LC will have limited impact on the amount children consume.

Overall, our results indicate that the presence of a LC on a food package leads to increased choice when the food options are the same, but is less likely to affect choice of healthy over indulgent options, increase food liking, or increase the quantity of food consumed. It should be noted, however, that whereas our results reveal an effect of LC on choice and no effect on consumption, these were not simultaneously tested in the same experiment. Future research that simultaneously examines choice and amount consumed would be useful.

Implications for Researchers and Policy Makers

An important implication of this research is that efforts to include LC on healthy foods in order to increase children's consumption of healthy, relative to unhealthy, foods may not be successful. While it is important for our research findings to be replicated, the current studies show no impact of LC on either children's or caregivers' choices between healthy and unhealthy foods nor on amount children consume. These results are consistent with the findings of Kotler et al. (2012) that children did not consume more of a food with a LC, even when paired with a food without a LC. Only one study, with a small sample of 16 and a complex combination of simultaneous interventions, provides evidence of a positive impact of LC on consumption of healthy foods (Keller et al. 2012). The US Institute of Medicine (Institute of Medicine 2006), the

White House Task Force on Childhood Obesity (2010), the Robert Wood Johnson Foundation (2016) and others have spent resources to encourage the use of LC on healthy and discourage the use of LC on unhealthy foods. Our research, combined with earlier evidence, suggests that resources for the public good may be better spent on other, more effective, methods for increasing children's relative consumption of healthy versus unhealthy foods. For example, efforts to persuade food marketers to change to healthier formulations may be more effective than efforts regarding LC. At this point, the evidence is that the effect of LC seems limited to a competitive effect between two of the same types of food; children's choice between two brands of nutritionally-equivalent foods is important to the marketers of the foods, but less important to society.

A second implication of our findings is that we need additional research that provides a better understanding of how to influence children to increase consumption of healthy and decrease consumption of unhealthy foods. As discussed above, Keller et al. (2012) found that healthy food consumption can be increased with a combination of fun names, colorful, fun packages with LC, sticker premiums and prizes, within a context of providing nutrition education as well as the healthy food to the children and their families. Given their promising results, future research with more substantial samples should tease apart the effects of the multiple components of fun name, package character, sticker gift and prize. While our results suggest a lack of an impact of the LC, it is possible that one of the other pieces could drive an increase in consumption of fruits and vegetables. Alternatively, it could be that the combination, including the family education and healthy food accessibility, is necessary to get results. The gamification involved in Keller et al. (2012) seems worth exploration in terms of increasing healthy food consumption, paying particular attention to long-term effects, given the research showing that

external motivation (such as a reward) can decrease longer-term intrinsic interest (e.g., Lepper, Green, and Nisbett 1973; Maimaran and Fishbach 2014).

Limitations and Future Research

Our research shows that neither children nor adult caregivers are influenced by LC to make a different choice when choosing between two different food types. However, our research is limited to short-term choices—choices between two foods or purchase intention for a single food at a given time. It is possible that the inclusion of LC on healthy foods could have a longer-term impact on children’s and/or caregivers’ consideration of healthy foods more generally. We find that caregivers’ perceptions of foods as fun and for kids are impacted by the presence of LC and, while we did not explore children’s perceptions, it is conceptually plausible that LC would impact children’s perceptions similarly. In this case, it could be that repeated inclusion of LC on, for example, fruits and vegetables could increase consideration of these foods. Since adding LC to foods increases caregivers’ perceptions that the food is fun and for children, including them on healthy foods might encourage caregivers to replace indulgent foods with healthy well-liked foods when choosing fun treats for their children. Limiting LC to healthy foods could likewise be beneficial by lessening “pester power” for low-nutrition foods and increasing pester power for higher-nutrition foods. That is, perhaps the inclusion of familiar, liked LC on foods that are more nutritious, such as veggie packs and fruits, could lead to greater attention and interest for these foods on the part of children when they are shopping with caregivers. Either of these longer-term impacts on caregivers or children could result in increased availability of healthier and less availability of indulgent food within the home, which is important since food availability has a major influence on children’s food consumption (Patrick and Nicklas 2005). Further, the LC used in this research were chosen because of their attractiveness to boys and girls across a broad

age range, but whether the LC used on healthy foods were associated with health or healthy lifestyles were not considered. In future, it may be beneficial to examine whether the LC associations with healthy/indulgent foods and healthy/indulgent lifestyles can encourage children to make healthier choices. Much the same way an overweight character primes children to increase consumption (Campbell et al. 2016), it may be possible that a health-oriented or an athletic character can prime children to choose healthy foods. These tactics may also help with parents' food socialization efforts (Block et al. 2011). See Table 2 for more potential future research questions that could help shape our understanding of the use and role of LC on food packaging.

Insert Table 2 about here

We note that this research focuses on LC, without considering brand characters. Many foods are marketed using brand characters, such as the Jolly Green Giant or the Trix rabbit. Although little research has examined the influence of brand characters, one study found that brand characters increased preference for products presented with, versus without, their associated brand character (McGale et al. 2016). While both LC and brand characters are used on products aimed at children, they may have different effects. Brand characters are strongly associated with brands, rather than other media, and create positive feelings toward brands that can persist from childhood into adulthood (Connell, Brucks, and Nielsen 2014). LC, on the other hand, like celebrity endorsers, are used to increase attention and affect for a product at a time when the LC is relevant and popular; LC are thus less likely to be strongly associated with specific brands. An interesting and policy-relevant direction for additional research is to further examine the effects of both licensed and brand characters on children's and caregivers' choices with the goal of increasing children's consumption of healthy as opposed to indulgent foods.

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Footnote:

¹ We identified one additional study that examined the impact of a LC on children's choice between a healthy and an unhealthy product (Wansink et al. 2012), but this was retracted in 2017.

Table 1
OVERVIEW OF PAST AND CURRENT LC RESEARCH

Study	Type of Decision	Measure of Impact	Participants N; Age in Years	Findings
Levin and Levin 2010	Healthy and unhealthy food pairs, presented with either a familiar or unfamiliar brand name and a character or no character	Attitude scale (good – bad)	43; 7	Presence of character increased attitude only for unhealthy products with unfamiliar brand names.
de Droog, Valkenburg, and Buijzen 2011	Healthy and unhealthy food pair presented either with a familiar, with an unfamiliar, or with no character.	Liking scale (not at all – very much) Intent to request purchase	216; 4 - 6	Presence of a character (either familiar or unfamiliar) on the package increased liking and intent to request purchase for healthy food.
Smits and Vandebosch 2012	Same foods (healthy and unhealthy) presented concurrently with and without a character	Appetite rating (scale with pictorial portion sizes) Intent to request purchase	57; 6 - 7	Foods were preferred when shown with a character (either licensed or unknown) versus no character.
Ogle et al. 2017	More and less healthful product pairs, presented both with and without characters, and with character on either product	Hypothetical choice of which product they would want to eat	149; 6 - 9	Children preferred less healthful products and tended to prefer products without characters. Only young boys (6 – 7) showed some preference for products with two of the three characters. Less-healthful products without characters were preferred to more-healthful products with characters.
<i>Current research, Experiments 1 and 2,</i>	<i>S1&2: Same type foods (two healthy or two unhealthy) presented concurrently with and without a character S2: Healthy and indulgent food pair presented with character on either the healthy or indulgent food, or no characters</i>	<i>Actual choice (participant chose and took a food product)</i>	<i>81; 4 - 10, 139; 3 - 12</i>	<i>When choosing between two of the same type of food, children prefer the option with the LC. When choosing between healthy or indulgent food, children prefer the indulgent option, regardless of character.</i>

Effect of characters on preferences for foods when the food is tasted

Study	Type of Decision	Measure of Impact	Participants N; Age in Years	Findings
Roberto et al. 2010	Same foods presented concurrently with and without a character	Taste scale (love it to hate it) Hypothetical choice of which one they would pick	40; 3 - 5	Food from a package with a LC tasted better and children would prefer it for a snack than food from a plain package.
Lapierre, Vaala and Linebarger 2011	Food presented either with or without a character and with a healthy name or an indulgent name.	Taste scale (really do not like – really like)	80; 4 - 6	Character only increased liking of the food when the food was branded with an indulgent name, but not when the food was branded with a healthy name.
Letona et al. 2014b	Same foods presented concurrently with and without a character	Taste scale (love it to hate it) Hypothetical choice of which one they would pick	121; 4 - 11	Food from a package with a LC tasted better and children would prefer it for a snack than food from a plain package.
<i>Current research, Experiment 3</i>	<i>A healthy or an indulgent food presented with or without a character</i>	<i>Food liking scales (hate it to love it; don't want to want it)</i>	<i>130; 4 - 7</i>	<i>Character did not increase liking of the food for either healthy or indulgent foods.</i>

Effect of characters on consumption of food

Study	Type of Decision	Measure of Consumption	Participants N; Age in Years	Findings
Keller et al. 2012	Fruits and vegetables presented in either plain packages or packages with characters and including a sticker	Consumption in grams	16; 4 - 5	Children increased consumption of healthy foods when presented in a package with a combination of LC, cute names and phrases, and a sticker premium than when they were presented in a plain package.
Kotler, Schiffman and Hanson 2012	Food pairs presented with either no character or with a character in front of one of the foods.	% of pieces eaten	207; 3 - 6	Children did not consume more when the food was presented with a LC than when presented with no character.
<i>Current research, Experiment 3</i>	<i>A healthy or an indulgent food presented with or without a character</i>	<i>Consumption in ounces and calories</i>	<i>130; 4 - 7</i>	<i>Children did not consume more of either the healthy or indulgent food when there was a LC on the package.</i>

Table 2

RESEARCH QUESTIONS REGARDING THE USE AND ROLE OF CHARACTERS ON
FOOD PACKAGING

Licensed and Brand Characters	<ul style="list-style-type: none"> • Do novel, or familiar, characters impact children's willingness to try unfamiliar foods? • Does food that is shaped like a character influence the amount that children consume? • Do LC and brand characters have the same or different effects? Are children and/or caregivers more likely to use their persuasion knowledge when faced with one or the other? • How does the use of brand characters impact children and caregivers' preferences of healthy and/or indulgent foods? • Does self-brand connection influence the impact of brand characters on children's choices and/or consumption amount?
Longer-Term Impacts	<ul style="list-style-type: none"> • Over the longer-term, can LC increase interest in a product category? • Over the longer-term, do on-package characters influence children's food motives (for example, emphasizing food as fun rather than nutrition)?
Motives	<ul style="list-style-type: none"> • How do social factors, such as impression management and self-concept, influence children's choices and preferences with respect to food products featuring LC and brand characters? • What role does impression management play in the choices of caregivers for their children? • What is the impact of on-package LC for healthy foods on dimensions of food well-being such as pleasure in the eating experience?
LC Associations	<ul style="list-style-type: none"> • How do characters that are strongly associated with one gender versus the other impact children's and caregivers' decisions (i.e., Disney princesses vs. Spiderman)? • What is the impact of LC that are strongly associated with health goals or activities (i.e., athletic characters) on both healthy and indulgent foods? • What role does self-congruency theory play in the choices of food products featuring LC?

Figure 1

CHOICE SHARES BY CONDITION, EXPERIMENT 2

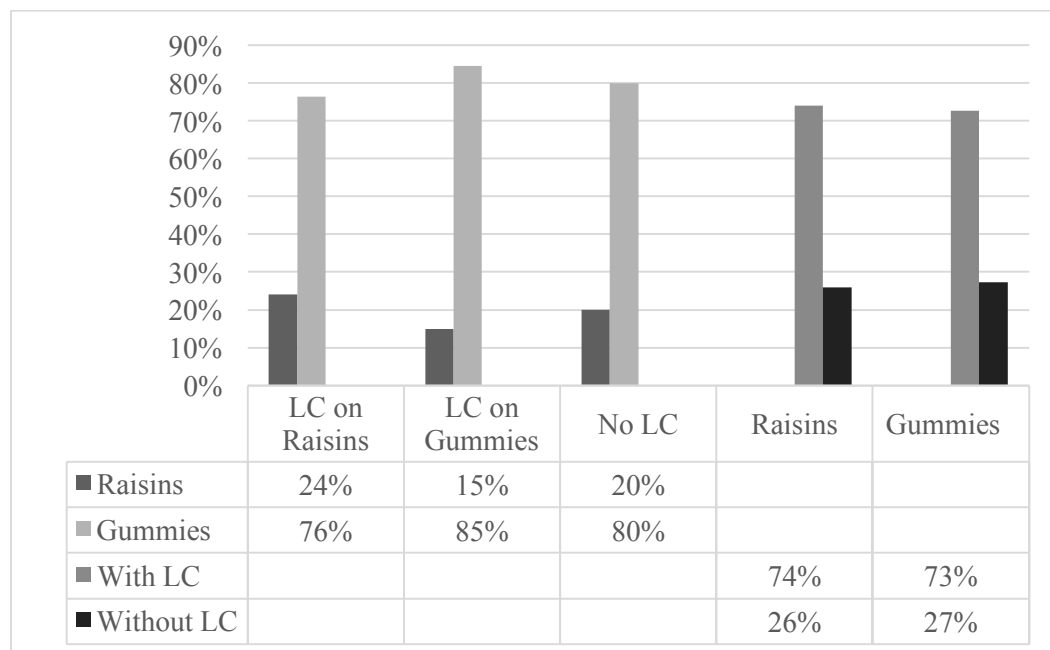


Figure 2

LIKING AND CALORIES CONSUMED BY CONDITION, EXPERIMENT 3

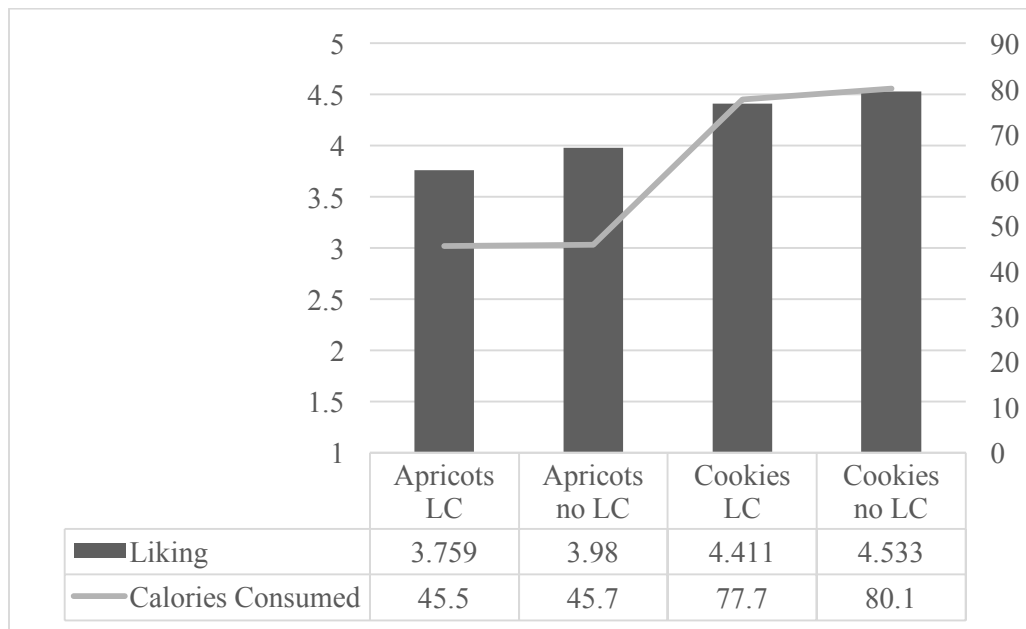


Figure 3

CHOICE SHARES BY CONDITION, EXPERIMENT 4A

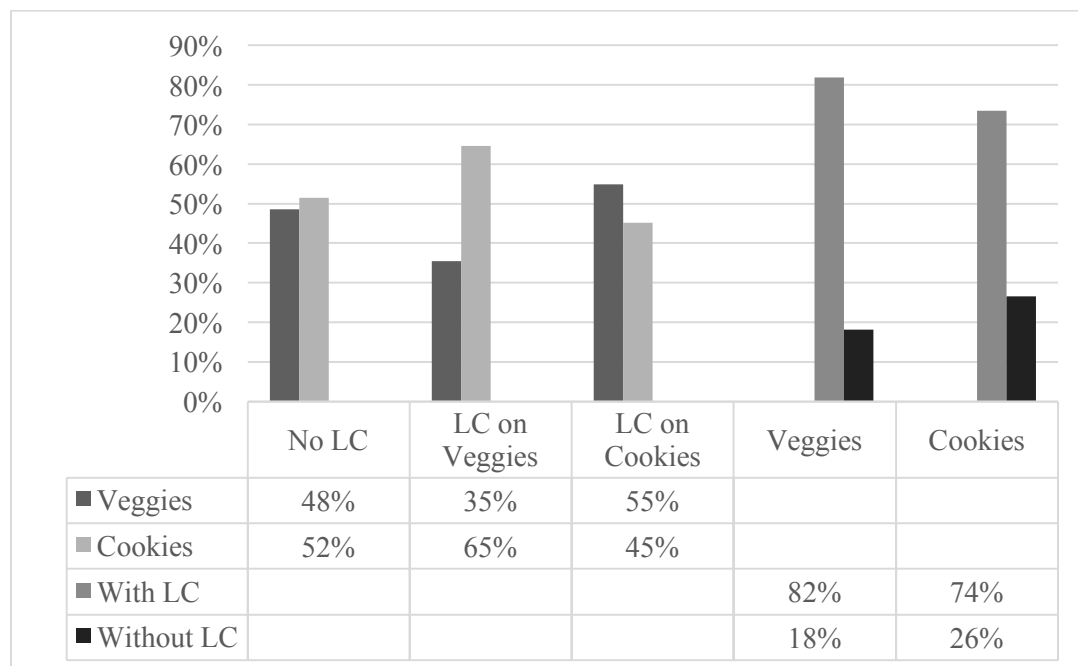
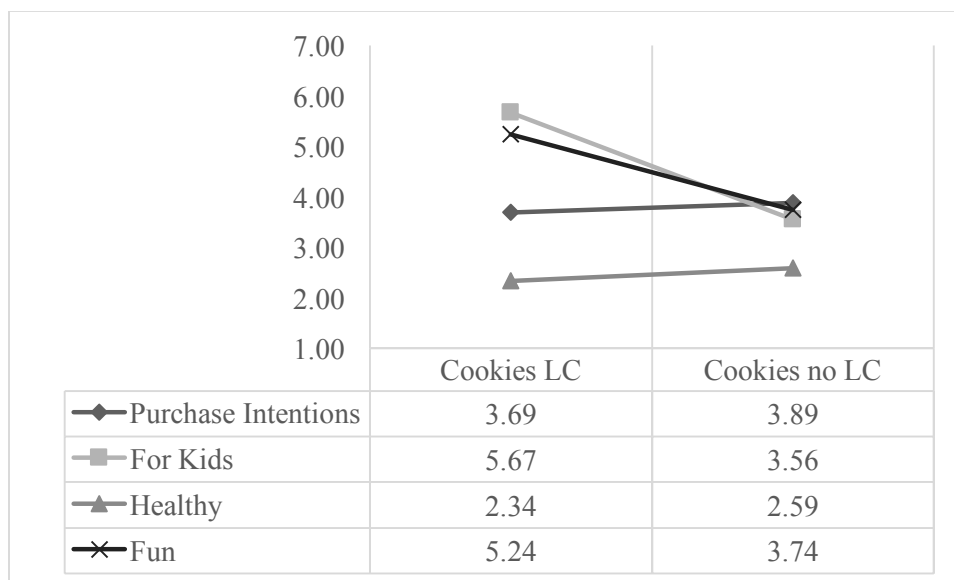
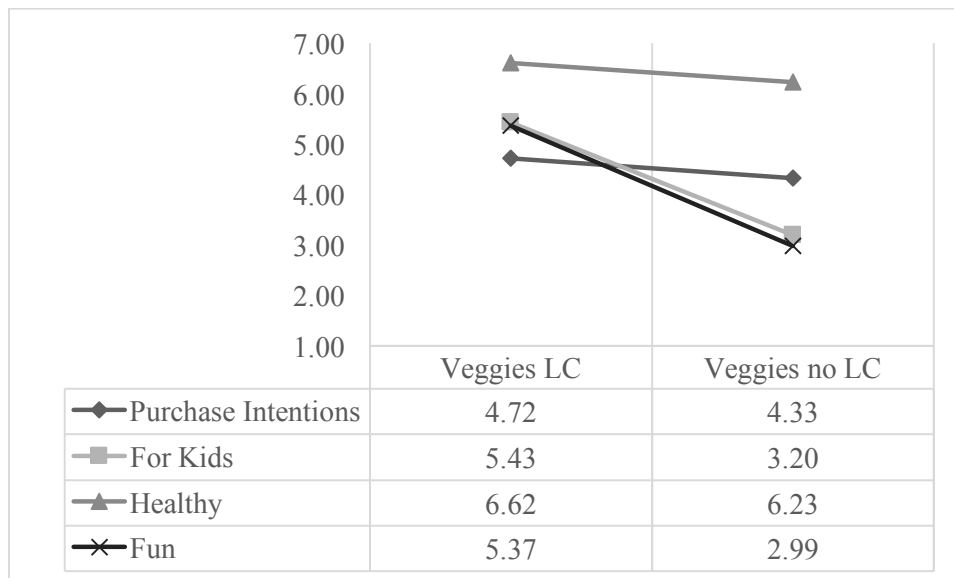


Figure 4

MEANS BY CONDITION, EXPERIMENT 4B



Web Appendix

Experiment 1 Package Stimuli



Experiment 3 Package Stimuli



Experiment 4 Package Stimuli



Tables

Mean ratings of healthiness – Pretest

Food	Mean
Gummy Snacks	2.22
Raisins	5.15
Carrots	6.48
Cookies	1.96
Dried Apricots	5.17

Age distribution – Experiments 1 and 2.

Experiment	N	Number of Participants									
		Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12
Experiment 1a	26	0	4	4	5	4	5	2	2	0	0
Experiment 1b	26	0	7	5	2	5	4	1	2	0	0
Experiment 1c	26	0	1	3	6	7	7	1	3	0	1
Experiment 2	139	7	13	16	18	23	11	14	20	12	5

Choice of package with or without LC – Experiment 1.

Experiment	N	Choice	
		With LC	Without LC
Experiment 1a	26	20	6
Experiment 1b	26	18	8
Experiment 1c	26	20	9

Food liking and amount eaten – Experiment 3.

Condition	N	Food Liking		Ounces Consumed		Calories Consumed	
		M	SD	M	SD	M	SD
Apricots with Character	27	3.759	1.077	0.641	0.600	45.5	42.6
Apricots without Character	25	3.980	0.995	0.644	0.496	45.7	35.2
Cookies with Character	28	4.411	0.667	0.529	0.304	77.7	44.7
Cookies without Character	30	4.533	0.615	0.545	0.288	80.1	42.3

Experiment 3 Data Analysis Notes: Subjects Removed

At the end of the data collection, participants were asked if they recognized several LC, including the one on the experimental stimuli (Scooby Doo). Twenty subjects who indicated that they did not recognize Scooby Doo were removed from the analysis: five from Condition 1 (Apricots with Character), eight from Condition 2 (Apricots without Character), four from Condition 3 (Cookies with Character), and three from Condition 4 (Cookies without Character). Removing these subjects did not materially affect the results of the analyses. In an analysis of variance to the test of effect of the LC on ratings of food liking that included the 20 excluded participants, there remained a significant effect of food liking on type of food ($F(1, 126) = 10.71, p = .001$), and no effect of character ($F(1, 126) = .70, p = .40$), or interaction of food and character ($F(1, 126) = 0.27, p = .60$).

Including the 20 excluded participants in the analysis of covariance to test the influence of food liking and the presence of the LC on the amount consumed, also made no material difference. There were significant effects of type of food ($F(1, 125) = 5.13, p = .025$) and food liking ($F(1, 125) = 6.35, p = .01$), but no significant effect of character ($F(1, 125) = .48, p = .49$) or interaction of food and character ($F(1, 125) = .79, p = .38$).