

Advertising and Fictional Media Effects on Healthy Eating Choices in Early and Later Childhood

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The influence of advertisements on children's healthy eating choices continues to be an issue of great concern to policymakers, activists, and parents. However, these influences have not been examined closely from a developmental perspective. The current analysis examines advertising effects on a sample of 304 mainly Hispanic children aged 3 to 12. Using a randomized experimental design, children were exposed to either advertisements or fictional entertainment clips with healthy or unhealthy food options. Children were also randomized to conditions wherein their parents either encouraged them to select healthy options or whatever food options they most wanted. The outcome variable was selection of a food coupon for either a healthy or an unhealthy food choice. Results illustrated developmental trends. Young children (3–5) were influenced by media clips of food, whether advertisements or fictional. Middle elementary children (6–8) were influenced mainly by their parents, whereas older children (9+) were influenced by neither of these. Results of this experiment help illustrate how advertisements influence children's eating choices and which age categories of children are most vulnerable.

Keywords: advertisements, healthy eating, child development, parental influence

The potential impact of advertising of unhealthy food on children's healthy eating choices has been a topic of concern among scholars and policymakers. In 2004, the American Psychological Association warned that advertising directed at children could have deleterious impact and could be construed as unfair (American Psychological Association, 2004). This is particularly true related to children's healthy eating, given concerns over a high level of overweight and obesity in recent generations of children (Pretlow, 2011). Concern exists that exposure to advertisements for unhealthy food may promote unhealthy food choices, presenting one possible cause of overweight and obesity in childhood. Although research supports this basic view, relatively little is known about

how advertising works in altering behavior, or whether such influences can be counteracted by positive parental influences. Nor has much research examined the degree to which children process advertising similarly to or different from fictional media. This manuscript seeks to address gaps in the previous literature by examining the influence of advertising, fictional media, and parents on children's healthy eating choices across early to late childhood.

Advertisements and Children's Eating Choices: What Is Known

By and large, research evidence supports the existence of links between exposure to advertisements for non-nutritional food and subsequent eating choices. For more than a decade, compelling research has indicated links between children's viewing patterns and their food consumption (Coon & Tucker, 2002). This is a critical issue, given that a considerable amount of advertisement targeted toward children is food related, and this pattern has been stable across decades (Gamble & Cotugna, 1999). Research by Kelly, Smith, King, Flood,

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and Bauman (2007) indicated that advertisements targeted toward children, relative toward adults, were particularly likely to be for unhealthy food choices. Although generalization from the laboratory to the real world can be fraught, randomized experiments suggest that advertisements may have direct causal influences on eating behaviors. For example, using well-matched commercials, carefully embedded in a naturalistic media portrayal, Ferguson, Munoz, and Medrano (2012) found that exposure to commercials for unhealthy products increased desire for those products relative to commercials for healthier products, even from the same company. Parental influences moderated this effect somewhat, but not completely. Boyland et al. (2011) found similar results, with effects particularly pronounced among children who were higher habitual TV viewers. Halford, Gillespie, Brown, Pontin, and Dovey (2004) found that obese children may be particularly attuned to food cues in commercials and susceptible to their effects. Other research has indicated that the use of popular cartoon characters can increase demand for food products, although this can work for both healthy and unhealthy food choices (de Droog, Valkenburg, & Buijzen, 2011).

Correlational studies suggest some complexities in the relationship between advertisements and food choices among children. Buijzen, Schuurman, and Bomhof (2008) found that advertisement effects were one facet of complex interactions between media, family, and healthy eating outcomes among children, and that advertising effects were more pronounced among lower-income children. Buijzen (2009) further found that parents had substantial ability to moderate advertising effects, particularly among older children. Parents were particularly effective when discussing advertising and its purposes rather than restricting media access. However, a review of work in this area indicated that methodological limitations of many of these studies limit their application to public policy (Larson & Story, 2009). Eagle, Bulmer, De Bruin, and Kitchen (2004) note that although correlations exist between advertisement practices and real-world obesity, public policy approaches aimed at addressing this tend to be simplistic and problematic.

Thus, current research results suggest that food advertisements can influence children's

healthy eating choices, but that advertisements are but one part of a larger milieu in which intrapersonal child factors and parenting factors moderate influences. Given such research, calls for policy limiting, regulating, or banning direct advertisements of fast food to children have been made. Although the effectiveness of such approaches has not always been clear (Kent, Dubois, & Wanless, 2011), some studies suggest they may be effective in reducing overall fast food consumption (Dhar & Baylis, 2011).

Advertisements and Children's Eating Choices: What Isn't Known

As is often the case, social science research that intersects with policy issues that influence children's welfare is often presented simplistically, in terms of broad effects without nuance. However, although the current research does support the existence of advertising effects on children's healthy eating choices, much remains unknown about this phenomenon. For instance, current research does not inform us whether general depictions of unhealthy eating are influential or whether advertising is distinct from fictional media. Most previous research has also not taken a fully developmental perspective. That is to say, we do not understand yet how advertising influences children of different age categories, nor the degree to which parental influences may moderate children's eating choices at different ages. Previous researchers certainly have included theories of cognitive development in understanding how children may be particularly susceptible to advertising influences (Buijzen & Valkenburg, 2000). However, relatively few studies have examined for developmental patterns across age categories. Understanding these issues would give us a fuller picture of advertising influences on eating behavior in children.

Related to the issue of differences between advertising and fictional media, it is important to note that, in ways that appear less common for advertising effects, fictional media effects on child behavior tend to be controversial in the scientific literature. Few studies examine fictional media influences on healthy eating choices, per se, although research areas such as violent entertainment and body dissatisfaction have typically been controversial (see Freedman, 1984; Holmstrom, 2004; Olson, 2010 for

discussion.) Although many scholars or professional organizations express concern about fictional media effects, others have concluded such effects are minimal. Similarly, meta-analytic reviews of fictional media effects vary from concluding that effects are indistinguishable from zero through relatively small effects. We often hear both scholars and policymakers express wonder at why, if advertising is a multibillion dollar activity, fictional media has such minimal effect on behavior.

We believe this to be a reasonable, yet largely unexplored, question. We expect this may be something of an “apples and oranges” question with the structure and purpose of advertising being far different from fictional media. Advertising is designed to change behavior, and only small changes in behavior are needed to produce profitable outcomes. Advertisers may also deliberately use manipulative strategies to influence the behavior of children such as using cartoon characters (Bezbaruah & Brunt, 2012) and that the range and variety of such practices complicate regulatory efforts (Hebden, King, & Kelly, 2011). Fictional media, by and large, are less likely to set specific behavior change as a goal. The two forms may overlap at times, such as through the use of product placements (Schmitt, Wagner, & Kirch, 2007), although this may be best conceived as the intrusion of advertising into fictional media. Although, put simplistically, fictional media rarely makes any claim to truthfulness, whereas advertising does (whether misleadingly or not).

Coupled with this is evidence that children gradually develop the capacity to use source monitoring of information as a means of judging its quality and whether it is worth learning. For instance, evidence suggests that children as young as 3 to 5 may begin using source monitoring to distinguish reality from fiction, treating information from these sources differently (Woolley & Van Reet, 2006). Naturally, such abilities do not flick on like a light switch, but rather develop gradually across childhood. Woolley, Ma, and Lopez-Mobilia (2011) found that even young children at age 3 could use concrete conversational cues to access the reality of a proposed entity, but only by age 9 could children doubt the existence of a fictional entity even if its existence was explicitly confirmed during overheard conversations. Thus, fiction detecting clearly matures and develops across

childhood. From this, we might expect to see differences in impact between fictional and advertising effects, with even the influence of advertising diminishing in later childhood.

The Current Study

The current study is designed to fill gaps in previous literature by examining the relative impact of advertising and fictional media influences on children's healthy eating choices from a developmental perspective using a randomized experimental design. The current design will improve on previous research by considering both advertising and fictional media depictions of eating behavior concurrently, while also considering potential moderating parental influence. The current study will also examine effects across differing age categories to examine for developmental trends in the processing of advertising, fictional media, and parental information on healthy eating choices. Our design is intended to examine several hypotheses:

H1: Exposure to advertisements for unhealthy eating choices relative to healthy eating choices will promote unhealthy eating choices in children.

H2: By contrast, exposure to fictional depictions of unhealthy eating choices relative to healthy eating choices will have minimal impact on children's healthy eating choices.

H3: The influence of advertising effects will decline in older children, consistent with Woolley's observations regarding greater sophistication in distinguishing the factuality of information in older children.

H4: Parental messages regarding healthy eating behaviors will moderate the impact of advertising influences.

Methods

Participants

Participants in the current study included 304 children and their primary caregivers from a small Hispanic-majority city in the South. Children ranged in age from 3 to 12 ($M = 7.33$, $SD = 2.76$), with relatively even dispersal across ages (no significant skew or kurtosis to

the age distribution). Regarding gender, 129 (42.4%) of the children were male, and 175 (57.6%) were female. Consistent with the city from which the sample was drawn, the vast majority of participants, 285 (93.8%), were Hispanic, with small numbers of other ethnicities. Use of a Hispanic sample was a matter of convenience, given that the university is located in this city, although we do point out that Hispanics are often underrepresented in social science research. Also consistent with the local city, median reported family income was fairly low, in the range of \$15 to 20 k per year, with the mean income at approximately \$22.5 k. As such, the average family in our study is approximately at the national poverty line, a population of children particularly at risk for overweight and obesity (Juby & Meyer, 2011). Children and their families were provided with a \$25 gift certificate to a local store (Walmart or Target) as compensation for participation in the study.

Materials

Demographic form. Each parent was given a brief demographic form to fill out, which included the basic demographic information noted earlier under Participants, as well as data on the child's height and weight, TV viewing habits, frequency of fast food eating, and the child's primary attraction to fast food, whether it be the food itself, toy products, or play-grounds provided.

Food clips. Children were randomized to watch either one of two commercials, both of McDonald's food products, or two clips of cartoon characters eating food. All clips lasted 1 min in length. These clips were embedded into cartoon programs, as described later. Approximately one-quarter of the children were exposed to a commercial featuring a relatively healthy food item (Apple Dippers), whereas another quarter were exposed to a food item that was comparatively less healthy (French Fries). Using these two items for comparison allowed us to compare food items that differed relatively in health value while keeping the restaurant, food function (side item), advertisement length, and even the sliced/stripped nature of the food item constant.

The remaining children were randomized either to watch a brief cartoon clip in which cartoon characters ate healthy food items (car-

rots, specifically) or in which cartoon characters ate junk food (mainly cakes and other pastries). These clips were included to distinguish whether fictional clips had as much influence on children's food choices as did commercials. Matching fictional clips to commercials is much more difficult than matching commercial conditions, given prohibitions in cartoons against endorsing specific commercial products and difficulty locating cartoon clips involving specific food items (i.e., Apple Dippers, French Fries). We are aware of the importance of matching media conditions regarding external validity (Adachi & Willoughby, 2011). However, in this case, the differences between the commercials and cartoons are likely representative of actual differences in these forms of representations in real life. As such, these comparisons have ecological validity without necessarily compromising internal validity. Given our aim is to examine how naturalistic media, both advertising and fictional, influence children, using realistic representations appears appropriate.

Parental influence. Just as their children were randomized to watch one of four possible clips, parents were randomly assigned a brief script to repeat once their children were asked to make a food coupon selection (see later). Half of the parents were assigned a script in which they advised the children to select the healthier food choice (Apple Dippers). The other half of parents were given a script in which they advised the child to choose the selection they most wanted. All parents agreed to use the script. The full pattern of randomization and group assignment is presented, for clarity, in Figure 1.

Food coupons. The dependent measure of this study was the child's selection of food coupons. Each child was allowed to select one of two food coupons, either for Apple Dippers or French Fries. Similarly sized color photographs of each food item were presented to the child and the child could pick one of the two.

Procedure

Each family signed up for a specific research time to attend a research session at the local university. Research sessions were conducted in a research laboratory at times (evenings and Saturday mornings) thought to be convenient for families. During the research session, parents filled out the demographic form as they

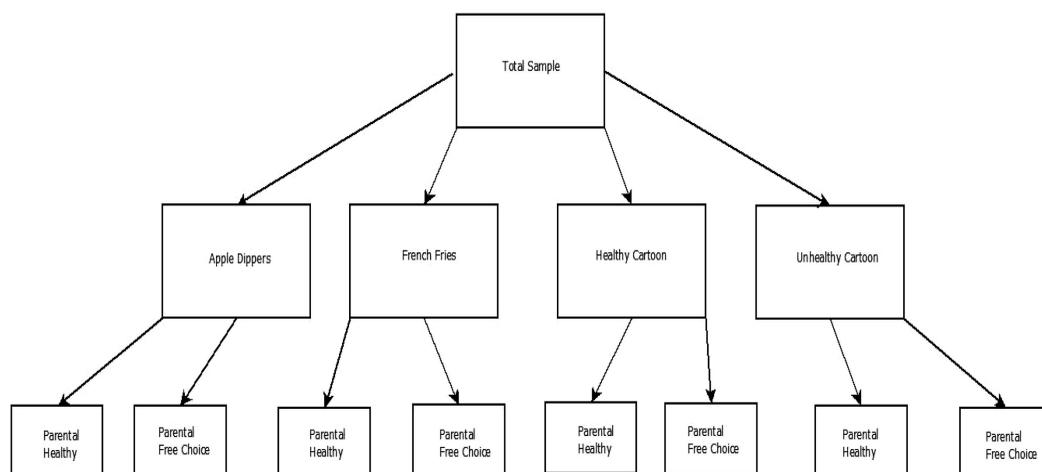


Figure 1. Group randomization assignment.

accompanied their children in watching the short film. The film consisted of two cartoons (Tom and Jerry) with three commercials or clips sandwiched between the two cartoons. The three commercials or clips were for Legos, the randomized clip (food commercial or cartoon) noted earlier, and a trailer for the upcoming (at the time of the experiment) The Hobbit movie. This arrangement of one commercial or clip embedded between two others, between two cartoons, was designed to reflect the nature of commercial exposure in real life and also to reduce demand characteristics.

After the film, a female research assistant approached the children and their parents with the pictures of the two food items (Apple Dippers and French Fries) and asked each child to select a coupon for one they could theoretically get at McDonald's (all parents were informed in advance that children would be compensated with a food coupon). The parents were allowed to repeat the script phrase (either encouraging selection of the Apple Dippers specifically, or whichever item the child most wanted, depending on randomization) but otherwise not allowed to influence the child's choice. Once children made their selection, they were given their coupon as well as a gift certificate in the amount of \$25 to a local store, thanked for their participation, and released. Parents were provided with a copy of the informed consent form (signed at the beginning of the study) and invited to ask any questions they had.

The procedures described earlier were designed to allow parents an experimentally controlled opportunity to exert influence that may undo the potential influence of exposure to commercials. All procedures were designed to adhere to federal standards for research with human participants and passed local institutional review board guidelines. Note that due to the vagaries of random assignment and soliciting attendance from the general public, individual cell sample sizes are not always equal.

Results

To examine the influence of advertising and fictional media on healthy food choices from a developmental perspective, children were analyzed separately by age categories based on the cognitive processing work done by others (Woolley & van Reet, 2006; Woolley et al., 2011). Thus, children in the age ranges of 3 to 5, 6 to 8, and 9 to 12 will be analyzed separately to examine for developmental trends. All analyses are conducted using generalized linear modeling for binary outcomes. This method allows for testing of main effects for healthy content (healthy foods vs. unhealthy foods), fictional media (cartoons vs. advertisements), and parental influences (healthy guidance vs. no guidance), as well as their interactions. In each equation, gender was also controlled as a covariate.

Children Aged 3–5

For the youngest category of children, results of the generalized linear modeling indicated a main effect for healthy content of the media viewed ($\chi^2(1) = 4.01, p < .05, r = .20, 95\%$ confidence interval [CI] = .01, .38). No other main effects nor interactions were significant, nor was gender a significant covariate. **Table 1** presents the distribution of coupon choices across conditions for children aged 3–5. As can be seen, effects were more dramatic for the commercials than the fictional clips, although effects were in the same direction for both types of media.

T1

Children Aged 6–8

In the case of children in the middle age range, results indicated that, of the study variables, only the main effect for parental influence was statistically significant ($\chi^2(1) = 6.87, p < .01, r = .27, 95\%$ CI = .07, .45). No significant effects were found for media exposure, although the gender covariate was significant ($\chi^2(1) = 6.98, p < .01, r = .27, 95\%$ CI = .07, .45), with girls more likely to choose healthier food options (38 healthy vs. 22 unhealthy) than boys (11 healthy vs. 22 unhealthy). **Table 2** presents the distribution of coupon choices across conditions for children aged 6 to 8. As can be seen, the pattern of media influence identifiable in **Table 1** is no longer present.

T2

Table 1
Distribution of Children’s Coupon Choices Across Study Conditions, Ages 3 to 5

Clip viewed	Selected AD	Selected FF
Apple Dippers	20	10
Parental healthy	11	4
Parental free choice	9	6
French Fries	6	11
Parental healthy	4	6
Parental free choice	2	5
Healthy cartoon	12	8
Parental healthy	8	7
Parental free choice	4	1
Unhealthy cartoon	13	17
Parental healthy	8	4
Parental free choice	5	13

Note. AD = Apple Dippers; FF = French Fries.

Table 2
Distribution of Children’s Coupon Choices Across Study Conditions, Ages 6 to 8

Clip viewed	Selected AD	Selected FF
Apple Dippers	20	18
Parental healthy	11	7
Parental free choice	9	11
French Fries	6	7
Parental healthy	3	4
Parental free choice	3	3
Healthy cartoon	6	8
Parental healthy	5	4
Parental free choice	1	4
Unhealthy cartoon	17	11
Parental healthy	9	1
Parental free choice	8	10

Note. AD = Apple Dippers; FF = French Fries.

Children Aged 9–12

With children in the oldest age range, results indicated that, as with children in the middle age-group, parental influence retained significance, although marginally so ($\chi^2(1) = 3.69, p = .055, r = .18, 95\%$ CI = .00, .35). No significant effects were found for media exposure, although the gender covariate was significant ($\chi^2(1) = 4.70, p < .05, r = .20, 95\%$ CI = .01, .37), with girls more likely to choose healthier food options (32 healthy vs. 25 unhealthy) than boys (21 healthy vs. 36 unhealthy). **Table 3** presents the distribution of coupon choices across conditions for children

T3

Table 3
Distribution of Children’s Coupon Choices Across Study Conditions, Ages 9 to 12

Clip viewed	Selected AD	Selected FF
Apple Dippers	23	24
Parental healthy	14	14
Parental free choice	9	10
French Fries	8	8
Parental healthy	6	1
Parental free choice	2	7
Healthy cartoon	9	13
Parental healthy	8	7
Parental free choice	1	6
Unhealthy cartoon	13	16
Parental healthy	4	5
Parental free choice	9	11

Note. AD = Apple Dippers; FF = French Fries.

aged 9 to 12. As can be seen, the pattern of media influence identifiable in [Table 1](#) is no longer present.

Fast Food Attraction

As noted, we asked parents what their children tended to value most about the fast food experience. Parents were split, with approximately equal amounts selecting the food (39%), toys offered in the meal packages (26.7%), and the playgrounds (34.3%). A series of logistic regressions were then conducted with the outcome categories (food, toys, playgrounds) treated as dummy-coded binary outcomes (e.g., food vs. not food). Predictors included child age and gender, parental education and marital status, family income, and number of children in the family. For preference of food, only age was a significant predictor, with parents of older children more inclined to indicate their child was particularly motivated by food (odds ratio [OR] = 1.53, $p < .001$). Preference for toys was predicted by male gender (OR = 1.89, $p = .05$). By contrast, preference for the playground was inversely predicted by male gender (OR = .46, $p = .011$).

Prediction of Body Mass Index

The guardians of 199 of the children provided height and weight information sufficient for the calculation of body mass index (BMI), an approximate index of weight status. To examine the factors related to children's BMI, an ordinary least squares regression was used with child age and gender as control variables and family income, parental education, number of TV hours children watch, and frequency of fast food eating as predictors. Of these only family income was predictive of child BMI ($\beta = -.24$, $p < .001$). Neither TV viewing nor frequency of fast food viewing was predictive of BMI above and beyond family income. Collinearity diagnostics indicated that multicollinearity was not an issue with the highest VIF at 1.13.

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Discussion

The impact of advertising and fictional media on children's healthy eating choices continues to be an issue of great concern to policymakers, scholars, and parents. Although considerable

evidence indicates advertising can influence children's eating, little previous research has examined this from a developmental perspective or examined similarities and differences between advertising and fictional media. The current study found that both advertising and fictional media can influence young children's (age 3–5) eating choices, although the effects of advertising were more pronounced than for fictional media. However, these effects diminish in older children.

Our first hypothesis was that exposure to advertising for unhealthy foods would promote the selection of unhealthy food options in children viewing these advertisements. This hypothesis was supported for the youngest category of children (ages 3–5) but not for older children. As such a developmental switch may occur between early to middle childhood, in which children become more resilient to the influences of advertising on eating choices. Or, put differently, children in the youngest age category are those most vulnerable to advertising effects.

Our second hypothesis was that exposure to fictional media would have minimal impact as compared with advertising. For middle and older age category children, neither fictional nor advertising influenced children's eating choices. However, for the youngest age category, unhealthy eating depictions, whether fictional or advertising, did influence children's eating choices. From an observation of the cells in [Table 1](#), it is evident that advertising had more impact than fictional media, but we cannot discount entirely the impact of fictional media. As such, the second hypothesis was not supported.

The third hypothesis was that the impact of advertising would decline in older age categories of children as they became more sophisticated in processing media messages ([Woolley & Van Reet, 2006](#)). Our results supported this hypothesis. Only the youngest age category of children was influenced by advertising.

Our fourth hypothesis was that parental messages would moderate the impact of advertising on children's health eating choices. Interestingly, rather than a moderating effect, children developmentally appear to switch entirely from attending to media messages in early childhood to parental messages in middle childhood, to attending to neither by late childhood. Thus, the

relative degree of impact that media and parents have differs across developmental stages.

Overall results from the experiment provide some preliminary but novel understanding of how children developmentally process media messages about eating. As might be expected developmentally, the youngest children are the most susceptible to media messages. To our surprise, although advertising effects were arguably more pronounced, even fictional media eating depictions could influence children's choices in the youngest age category. By middle childhood, the influence of both advertising and fictional media had diminished entirely. This suggests that children's processing of media messages undergoes something of a paradigm shift between early to middle childhood rather than going through a more gradual developmental shift. During middle childhood, children are attending to parents, not media, for messages about eating. By later childhood, both parents and media are ignored, perhaps because by that age, children's eating preferences have been largely internalized. It is also possible that by these years, peers have become more important as influences on behavior than either parents or media, although this was not assessed in the current study.

These results may be of value to policymakers and parents concerned about the potential impact of advertising or even fictional media on children's eating choices. It appears most advantageous to focus on younger age categories of children, who may be most vulnerable to such influences. Although certainly more research is necessary, parents may conversely be able to worry less about the exposure of their children to advertising in later years as they appear less inclined to attend to it for general eating choices (brand selection, of course, might still be influenced by advertising, even if general eating choices are not). It is important, as well, to note that overfocusing on advertising to the exclusion of other factors influencing children's eating habits may oversimplify approaches to addressing this problem (Kay, 1974). There are cultural differences in food preferences as well, which do not appear to be clearly explained by TV viewing (Lapierre, 2013).

Our other results are also worth discussing. Our results suggest that children's preference for fast food outlets varies by age and gender.

Older children are more likely to be enticed by the food specifically, as opposed to the toys and playgrounds, whereas boys were attracted by toys packaged with meals and girls by playgrounds. Actual child BMI was best predicted by family income, with higher weights more common in lower-income families. This is consistent with considerable past research. We did not find that TV viewing hours predicted BMI above income level, suggesting that it is family income, not TV viewing per se, that predicts BMI. To our surprise, we did not find that frequency of fast food consumption correlated with BMI. This conflicts with past research from our own laboratory (citation removed for anonymous review). It is difficult to explain this discrepancy from the current database. In the past few years, fast food outlets have made some efforts to include healthier options in their menus and reduce the number of "supersize" options for meal packages. Perhaps some of these efforts are paying off in relation to decreased associations between weight and fast food eating.

As with any study, ours has limitations that must be considered. First, we note that our study considers only short-term effects of exposure to a single media food representation. It is possible that long-term exposure to repeated advertising messages could produce differing results from our short-term analysis. Also, as noted, it was difficult to match fictional and advertising media exemplars, although this would have been a greater concern had fictional effects been null. In the current analysis, we used animated clips in the fictional conditions and it is possible that live-action fictional clips may have had different outcomes, although these are typically longer as well. It is possible that the parental scripts may, in some case, have been at variance with parents' typical at-home messages and it unclear what influence this may have had on children's responding. Finally, our sample was Hispanic majority, which has the advantage of extending this research to an underserved population, but limits the generalizability of our results to other ethnic groups. It is unclear whether respondents from other backgrounds would respond similarly.

In conclusion, our results demonstrate how advertising and fictional media influences on healthy eating choices function from a developmental perspective. Our analyses suggest that

children of differing ages process media messages differently and it is not possible to take a "one size fits all" approach to understanding media influences on healthy eating across all children of all ages. We hope that our results are a positive addition to the discussions of this important topic.

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