

The ANNALS of the American Academy of Political and Social Science

<http://ann.sagepub.com>

The Effects of Food Marketing on Children's Preferences: Testing the Moderating Roles of Age and Gender

Ariel Chernin

The ANNALS of the American Academy of Political and Social Science 2008; 615; 101
DOI: 10.1177/0002716207308952

The online version of this article can be found at:
<http://ann.sagepub.com/cgi/content/abstract/615/1/101>

Published by:



<http://www.sagepublications.com>

On behalf of:



[American Academy of Political and Social Science](#)

Additional services and information for *The ANNALS of the American Academy of Political and Social Science* can be found at:

Email Alerts: <http://ann.sagepub.com/cgi/alerts>

Subscriptions: <http://ann.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations <http://ann.sagepub.com/cgi/content/refs/615/1/101>

The Effects of Food Marketing on Children's Preferences: Testing the Moderating Roles of Age and Gender

By
ARIEL CHERNIN

A large body of research suggests that food marketing affects children's food preferences, short- and long-term dietary consumption, and purchase requests directed to parents. It is frequently argued that younger children are more susceptible to marketers' messages than older children because they do not understand the persuasive nature of advertising; however, little direct evidence supports this claim. Employing an experimental design, this study examined the influence of food marketing on children's preferences and tested whether age (and gender) moderated the effects of ad exposure. The sample consisted of 133 children between the ages of five and eleven. Results indicated that exposure to food commercials increased children's preferences for the advertised products. Age did not moderate this effect; younger and older children were equally persuaded by the commercials. Boys were more influenced by the commercials than girls. Implications for the study of food marketing to children are discussed.

Keywords: food marketing; advertising; children; persuasion

The authors of several large-scale literature reviews have concluded that exposure to food marketing affects children's food preferences and eating behavior (Hastings et al. 2003; Institute of Medicine 2006; Livingstone and Helsper 2004; Office of Communication [Ofcom] 2004; World Health Organization 2003; see Paliwoda and Crawford [2003] and Young [2003] for a more critical interpretation of the research literature). For example, the Institute of Medicine (2006) argued that there is "strong evidence" that commercials shape children's food preferences and short-term eating habits and increase the number of purchase requests children direct to parents. Similarly, Hastings et al. (2003) stated that food marketing "*can*

NOTE: This publication was made possible by grant number 5P50CA095856-04 from the National Cancer Institute. Its contents are solely the responsibility of the author and do not necessarily represent the official views of the National Cancer Institute.

DOI: 10.1177/0002716207308952

have and *is* having an effect on children, particularly in the areas of food preferences, purchase behavior, and consumption. It is also clear that these effects are significant, independent of other influences and operate at both brand and category level" (p. 182). It is also frequently suggested that children younger than eight years old are more susceptible to advertising than older children because they lack knowledge of persuasive intent; that is, they do not understand that commercials try to convince people to buy things (American Academy of Pediatrics 1995; Federal Trade Commission 1978; Institute of Medicine 2005; Kunkel et al. 2004). While knowledge of persuasive intent tends to increase with age (e.g., Blosser and Roberts 1985; Robertson and Rossiter 1974; Ward, Wackman, and Wartella 1977), little direct evidence supports the claim that younger children are inherently more persuasible than older children (Christenson 1985; Livingstone and Helsper 2004, 2006). This study examines the influence of food marketing on product preference and tests whether age and gender moderate any observed effects.

Background

A large body of research suggests that food marketing affects children's preferences, short- and long-term dietary consumption, and purchase requests. Both preference and short-term dietary consumption studies frequently employ experimental designs and examine the effect of exposure to advertising on product choice. These two types of studies differ, however, with respect to their operationalization of the dependent variable. In preference studies, children are typically asked to choose their favorite food(s) from a series of pictures, while in short-term dietary consumption studies, children's actual eating behavior is used as an indicator of choice (e.g., children select and eat a snack). In long-term dietary consumption research, children's exposure to food marketing is often linked to parent reports of children's regular eating habits. Purchase request studies examine the relationship between food marketing and children's requests for advertised products directed to parents. Research in each of these areas is reviewed below, beginning with the effects of food marketing on children's product preferences.

In Borzekowski and Robinson's (2001) widely cited study, children between the ages of two and six years old watched a television show with a series of food commercials or the same show without commercials. Children were then

Ariel Chernin is a postdoctoral fellow at the Center on Media and Child Health, Children's Hospital Boston, Division of Adolescent Medicine. She received her Ph.D. in communication from the Annenberg School for Communication at the University of Pennsylvania. This article presents research conducted as part of her dissertation, which was supervised by Dr. Robert Hornik. Her research interests include the effects of food marketing on children's eating habits, the link between media exposure and adolescents' sexual behavior, and the development and evaluation of media literacy curricula.

presented with pairs of similar products in picture form and asked to identify which of the two products they preferred in each pair (one product in each pair had been featured in the commercials). Borzekowski and Robinson found that the children who were exposed to the commercials selected the advertised products significantly more often than the children who did not see the commercials.

Goldberg, Gorn, and Gibson (1978) randomly assigned first-graders to watch a cartoon with either a series of commercials for highly sweetened snack and breakfast foods or several public service announcements (PSAs) promoting nutritious eating (a control group that did not watch television was also included in the study). All children were subsequently asked to choose several snacks and breakfast food items from a series of images of sugared and healthier options. Goldberg, Gorn, and Gibson reported that children who saw the commercials selected significantly more sugared foods than children who saw the PSAs or did not watch television.

Several studies have assessed food choice by directly observing children's eating behavior (e.g., Auty and Lewis 2004; Galst 1980; Gorn and Goldberg 1982; Jeffrey, McLellarn, and Fox 1982). In Gorn and Goldberg's (1982) two-week field experiment, children between the ages of five and eight years old watched a series of cartoons embedded with one of three types of ads: candy commercials, fruit commercials, or pronutrition PSAs. A fourth group of children watched the TV shows without ads. After each viewing session, children chose two snacks from a selection of two fruits and two candies that had appeared in the commercials. Gorn and Goldberg found that the children who saw the candy commercials consumed significantly more candy than children in the other three conditions.

In Resnik and Stern's (1977) experiment, children watched a television show either with or without a commercial for an unfamiliar brand of potato chips and were then invited to choose one of two brands of potato chips to take home with them. Children who had seen the potato chip commercial were significantly more likely to select the advertised brand of potato chips than children in the control group.

Evidence also suggests that food marketing influences children's regular dietary intake (Bolton 1983; Boynton-Jarrett et al. 2003; French et al. 2001; Gracey et al. 1996; Phillips et al. 2004; Utter et al. 2003; Wiecha et al. 2006; Woodward et al. 1997). With the exception of Bolton (1983), however, these studies correlated overall television viewing with indicators of diet. Thus, behaviors associated with television viewing, such as eating while watching TV (e.g., Matheson et al. 2004), or the influence of television content other than advertising may explain the observed relationship between television exposure and diet. Similarly, a large body of literature links television exposure to childhood overweight (e.g., Andersen et al. 1998; Dietz and Gortmaker 1985; Gortmaker et al. 1996; Hancox, Milne, and Poulton 2004), and exposure to food marketing is only one of several possible mechanisms that may explain the association (Henderson 2006; Kaiser Family Foundation 2004).

Rather than use overall television viewing as proxy for exposure to food marketing, Bolton (1983) combined TV diaries completed by parents and TV station broadcasting logs to create a measure of children's exposure to food commercials. Bolton found that exposure to food ads was positively associated with snacking and the consumption of low-nutrient, high-calorie foods (as captured by a seven-day food diary). Interestingly, Bolton's results indicated that parents' eating behavior had a much stronger influence on children's diets than advertising.¹

Finally, numerous studies point to a link between children's exposure to food marketing and purchase requests directed at parents (Brody et al. 1981; Donkin, Neale, and Tilston 1993; Galst and White 1976; Isler, Popper, and Ward 1987; Stoneman and Brody 1982; Taras et al. 1989, 2000). Similar to the long-term dietary consumption studies, overall television exposure is often correlated with the number of children's requests for advertised foods (Donkin, Neale, and Tilston 1993; Isler, Popper, and Ward 1987). It is therefore possible (although unlikely) that depictions of characters eating and drinking, rather than advertising, led to children's purchase requests. It is also possible that a third variable, such as parenting style, accounted for both children's television viewing and the frequency of their purchase requests. The methods employed also make it difficult to establish a direct link between exposure to a commercial and requests for the specific product and brand featured in the ad.

Supporting the theory that food advertising—and not other forms of television content—drives children's purchase requests is Galst and White's (1976) study in which preschoolers and their parents were observed shopping in a supermarket. Galst and White identified a positive correlation between the number of purchase requests children directed to parents and the number of hours per week children spent watching commercial television at home (as reported by parents), while the correlation between the number of requests and overall television viewing (which included exposure to noncommercial programming such as PBS) was not statistically significant.

Perhaps the strongest evidence for an effect of food marketing on children's purchase requests comes from Stoneman and Brody's (1982) experiment conducted with preschoolers. Children watched a television show with or without food commercials and then participated in a simulated shopping trip with their mothers. Children exposed to the commercials requested significantly more products than children who did not see the commercials and requested a greater number of products that had been featured in the ads.

Moderating Effect of Age

While the literature generally shows a positive effect of food marketing on children's preferences and behavior, demographic factors may moderate the effects of advertising. Age is frequently cited as a moderator, and it is often assumed that younger children are more susceptible to advertising than older children because they lack knowledge of persuasive intent (American Academy

of Pediatrics 1995; Federal Trade Commission 1978; Institute of Medicine 2005; Kunkel et al. 2004). While knowledge of persuasive intent generally increases with age (Blosser and Roberts 1985; Robertson and Rossiter 1974; Ward, Wackman, and Wartella 1977), there is little conclusive evidence to support the assertion that younger children are more vulnerable to advertisers' messages than older children (Christenson 1985; Livingstone and Helsper 2004, 2006).

While the literature generally shows a positive effect of food marketing on children's preferences and behavior, demographic factors may moderate the effects of advertising.

In the food marketing literature, most studies have been conducted with samples that cover very narrow age ranges (e.g., preschoolers, first-graders, etc.; Livingstone and Helsper 2004, 2006), making it impossible to test an interaction between ad exposure and age. As a result, the moderating effect of age has been largely inferred from comparisons between different studies conducted with separate populations of children. This is problematic because differences in study design, stimuli, and measures limit one's ability to make valid inferences. After reviewing the literature, Livingstone and Helsper (2004) tentatively concluded that *older* children and teenagers are more influenced by food advertising than younger children. Livingstone and Helsper justified this claim by noting that studies conducted with older children and teens consistently report significant effects of advertising exposure on product preference, while the results among samples of younger children are more mixed. The authors also acknowledged, however, that measures of food choice may be less valid and reliable when administered to younger children. The Institute of Medicine (2006, 294) adopted a more conservative stance, stating that "age has not been found to be a consistent moderator of advertising effects on precursors of diet." Given this lack of evidence, it is somewhat surprising that scholars continue to argue that younger children are more vulnerable to advertising than older children.

Moderating Effects of Gender

Gender has also been proposed as a potential moderator of advertising effects, although there is little theoretical justification for such a claim (Institute of

Medicine 2006).² Nonetheless, several researchers have sought to determine if boys and girls are differentially affected by food marketing. In Pine and Nash's (2003) observational study of preschoolers, girls expressed greater preferences for heavily advertised, branded products than boys; however, this does not conclusively demonstrate that girls were more persuaded by the advertising for the products than boys.

Jeffrey, McLellarn, and Fox (1982) randomly assigned four- and five-year-olds to watch a children's television show embedded with commercials for one of three types of products: foods low in nutritional value, foods high in nutritional value, or toys (control condition). Children were then invited to eat as much as they wanted of twelve foods that had been featured in the low- and high-nutrition commercials. While the main effect of the control condition on the amount and type of food consumed was not significant, Jeffrey, McLellarn, and Fox identified a significant interaction between gender and the control condition such that boys exposed to the low-nutrition ads consumed more low-nutrition food and more food overall than girls who had seen low nutrition ads, and boys and girls in the two other conditions.

Summary

A large body of literature indicates that exposure to food marketing affects children's food preferences, their short-term eating behavior, and purchase requests directed to parents. Food marketing also likely affects long-term dietary consumption and may contribute to childhood obesity. While it is frequently argued that younger children are inherently more susceptible to advertising than older children, surprisingly little research supports this claim. There is also minimal evidence that gender moderates the effects of marketing.

While it is frequently argued that younger children are inherently more susceptible to advertising than older children, surprisingly little research supports this claim. There is also minimal evidence that gender moderates the effects of marketing.

The present study examined the influence of two commercials—one for Sprinkle Spangles cereal, the other for Tang—on children's product preferences.

Sprinkle Spangles cereal was introduced by General Mills in 1994 and discontinued shortly thereafter. This product was selected because it was originally marketed to children but was unfamiliar to the participants. Tang is an orange-flavored, powdered drink mix first marketed in the 1950s by Kraft Foods. While Tang is currently available in stores, the commercial itself was likely unfamiliar to most of the participants because it aired during the mid-1990s.

Based on previous research, it was expected that exposure to the commercials would result in increased preferences for the advertised products.

Hypothesis 1: Children exposed to a commercial will display greater preference for the advertised product than children who did not see the commercial.

While both commercials were expected to influence preferences, the study examined the relative persuasiveness of the Sprinkle Spangles and Tang commercials.

Research Question 1: Is the effect of ad exposure on product preference similar for the Sprinkle Spangles and Tang commercials?

The present study also tested whether age and gender moderated the effects of ad exposure on product preference.

Research Question 2: Does age moderate the effects of exposure to advertising on product preference?

Research Question 3: Does gender moderate the effects of exposure to advertising on product preference?

Method

*Sample*³

Kindergarteners through fourth-graders were recruited from two elementary schools in suburban Philadelphia. Consent forms were distributed to all students in kindergarten through fourth grade at both schools. At the first school, 79 out of a possible 263 consent forms were returned, yielding a response rate of 30 percent. At the second school, 54 out of a possible 239 consent forms were returned, a 22.6 percent response rate. Each school received \$10 for every child who returned a consent form.⁴

The total sample consisted of 133 children ranging in age from five to eleven years old ($M = 8.18$ years, $SD = 1.45$). Among the 132 children for whom age data was available, 6.8 percent were five years old, 20.5 percent six years old, 18.2 percent seven years old, 24.2 percent eight years old, 15.9 percent nine years old, and 14.4 percent ten or eleven years old.⁵ The sample was 60.2 percent female. With regard to race, for the 98.5 percent ($n = 131$) of children for whom race data was available, 67.9 percent were white non-Hispanic, 13.7 percent black non-Hispanic, 8.4 percent Hispanic, and 9.9 percent "other."

The study protocol was approved by the University of Pennsylvania's institutional review board, and both parental consent (written) and child assent (verbal or written, depending on the age of the child) were obtained before testing began.

Design and Procedure

The study design was a single-factor between-subjects experiment.⁶ Participants were randomly assigned, stratified by grade level and gender, to view either the Sprinkle Spangles commercial or the Tang commercial. After securing children's assent to participate in the study, an expressive vocabulary test was administered. Approximately two weeks later, participants watched a thirteen-minute segment of *Foster's Home for Imaginary Friends*, an animated television series airing on the Cartoon Network. The segment was embedded with one of the two experimental commercials, in addition to the ads that originally aired during the episode. The experimental commercial the child was assigned to was seen twice, once during the first commercial break and once during the second commercial break. Participants viewed the stimuli on individual laptops, wearing headphones. Participants then completed several measures related to the television show and the products featured in the ads. The final measure consisted of asking children if they had heard of Tang prior to participating in the study.

Parents completed a brief survey that requested information about family demographics, their child's television viewing and knowledge of advertising, and parent-child conversations about advertising. The present study makes use of only the demographic data. Parents returned 107 of 133 surveys, yielding a response rate of 80.5 percent. The likelihood of returning the survey did not vary as a function of the child's age or gender.

Measures

Expressive vocabulary

Children's expressive vocabulary was assessed with the Expressive One-Word Picture Vocabulary Test-2000 (EOWPVT-2000; Brownell 2000). Brownell (2000) reported a three-week test-retest correlation of .91, and EOWPVT scores are positively associated with other measures of expressive and receptive vocabulary (Beery and Taheri 1992). The EOWPVT can be used with children between the ages of two and eighteen, and raw scores have a possible range of 0 to 170 points. The mean expressive vocabulary score was 78.5 points ($SD = 21.2$), and the two experimental groups were not significantly different from one another with regard to vocabulary, $t(131) = -.47$, $p = .64$.

Distracter questions

Children were asked the following questions about *Foster's Home for Imaginary Friends*: Did you like the show? (Why or why not?) What do you think

is going to happen next? Who was your favorite character or person on the show? These questions were used to distract children from the true purpose of the study and are not used in the present analyses.

Product preference

Two product preference measures were created, one for each of the advertised products. All participants completed both measures, one associated with the product they had seen in the experimental commercial, the other associated with the product they had not seen advertised. The responses associated with the nonviewed ad provided an estimate of baseline product preference, that is, preference absent the influence of advertising. The baseline, or control group, responses for a given product were compared to those provided by children who had seen the commercial for the product to estimate the effects of exposure to the ad on preference.

For each measure, the advertised product was compared to three alternatives in the same product category. Sprinkle Spangles was compared to three other sweetened cereals (Hidden Treasures,⁷ Frosted Chex, and Golden Grahams), and Tang was compared to three other orange-flavored drink mixes (Richfood Orange Overload, Orange Gatorade, and Orange Kool-Aid). The products were evaluated using paired comparisons, a method where each item is matched with every other item and participants then choose one item in each pair (Thurstone 1927; Woodworth and Schlosberg 1955). In the present study, each measure consisted of four products being compared to one another (one of which was the advertised product), resulting in a total of six comparisons per measure.⁸

For each preference measure, children were presented with the six comparisons in random order. Each comparison featured color pictures of the two products being evaluated. The question wording for the Sprinkle Spangles measure was, "If you could eat one of these two cereals for breakfast tomorrow, which one would you choose?" The wording for the Tang measure was, "If you could have a glass of one of these two drinks, which one would you choose?"

The dependent variable in the analyses below captured the number of times the advertised product was chosen over a competitor. For each measure, the advertised product appeared in three of the six comparisons (i.e., the advertised product compared to each of the three alternatives). Thus, the scores for each advertised product had a possible range of 0 (product was not chosen over a competitor in any of the three comparisons in which it appeared) to 3 (product was chosen over a competitor in all three of the comparisons in which it appeared).

Prior familiarity with Tang

Children were shown a picture of Tang and asked, "Before today, had you ever heard of Tang?" There was no significant difference in Tang familiarity between the two conditions. Among children randomly assigned to view the Tang commercial, 31 percent of children had heard of Tang, while 29 percent of children assigned to the view the Sprinkle Spangles commercial had heard of Tang, $t(130) = -.26, p = .79$.⁹

Analytic Approach

To evaluate the hypotheses and research questions, the original data set was reshaped such that each child contributed two cases: one for the commercial to which he or she was exposed and one for the commercial to which he or she was not exposed. Or, put another way, each child contributed two observations: one associated with the Sprinkle Spangles commercial and one associated with the Tang commercial. Each case provided responses for three main variables (in addition to covariates): (1) the commercial to which the case referred, (2) whether the child had been exposed to that commercial, and (3) the child's preference for the product featured in that commercial. Ordinary least squares (OLS) regression was used to determine if exposure to advertising resulted in increased preferences for the advertised products (Hypothesis 1). Research Question 1, which compared the persuasiveness of the two commercials, was tested by adding a product term to the model ($\text{Ad Exposure} \times \text{Ad}$). Research Questions 2 and 3, which addressed interactions between ad exposure and age and gender, respectively, were also examined by adding product terms to the regression model. For all analyses, standard errors were adjusted for nonindependence resulting from the fact that each child contributed two observations to the data set.

Results

Hypothesis 1, which predicted an overall positive effect of exposure to commercials on product preference, was supported. Exposure to the commercials was positively (and significantly) associated with preference for the advertised product (see Table 1). The main effect of age was not statistically significant. Thus, younger and older children exhibited similar preferences for the products. Gender was also largely uncorrelated with preference. The significant coefficient associated with the "ad" variable indicates that preference for Sprinkle Spangles (coded as 1) was greater than preference for Tang (coded as 0) irrespective of exposure to the commercials.

The relative persuasiveness of the two commercials (Research Question 1) was examined by testing an interaction between ad exposure and the ad variable. The product term was not statistically significant ($B = -.15$, robust $SE = .22$, $p = .51$), suggesting that the two commercials were equally persuasive.

Research Question 2 addressed an interaction between ad exposure and age. The product term was not statistically significant ($B = .07$, robust $SE = .07$, $p = .36$), indicating that younger and older children were equally persuaded by the commercials.¹⁰ Research Question 3 examined the interaction between ad exposure and gender. The product term was statistically significant ($B = -.48$, robust $SE = .22$, $p = .03$), and the negative coefficient indicates that boys (coded as 0) were more influenced by the commercials than girls (coded as 1).¹¹ The interaction is displayed in Figure 1.

Discussion

Exposure to commercials significantly increased children's preferences for the advertised products, and these effects were comparable for the Sprinkle Spangles

TABLE 1
EFFECT OF EXPOSURE TO ADVERTISING ON PRODUCT PREFERENCE

Variable ^a	<i>B</i>	Robust <i>SE</i>
Exposure to advertising	.33**	.11
Ad (Tang = 0; Sprinkle Spangles = 1)	.45***	.11
Age	-.02	.05
Gender (boys = 0; girls = 1)	.06	.11
Race ^b		
Black	.02	.16
Hispanic	.02	.15
Other	-.001	.21
Vocabulary	-.002	.003
Ad Exposure × Ad	-.15	.22
Ad Exposure × Age	.07	.07
Ad Expo]sure × Gender	-.48*	.22
Adjusted <i>R</i> -squared = .10 ^c		

a. Main effects calculated without interaction terms in model.

b. Reference category = white.

c. *R*-squared is for model without interactions.

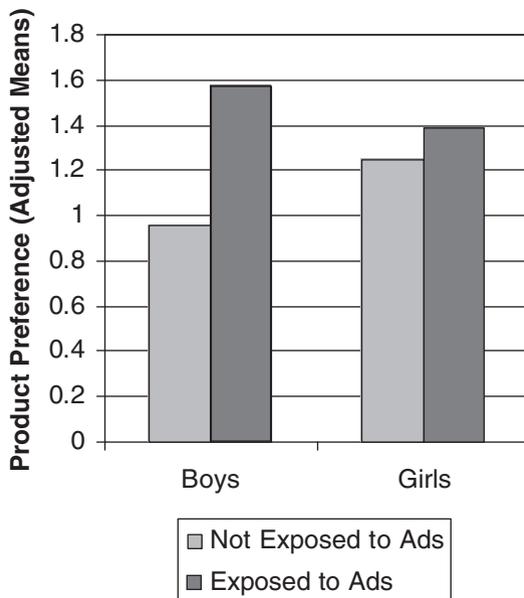
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

and Tang commercials. The products appealed equally to younger and older children, and there was no evidence of an interaction between ad exposure and age on product preference. As a result, the present findings do not support the claim that younger children are inherently more persuasible than older children. It is frequently argued that younger children lack of knowledge of persuasive intent, a deficit that predisposes them to accept advertisers' messages. If, however, younger and older children are equally persuaded by food marketing, the importance of knowledge of persuasive intent in the persuasion process is called into question.

*The present findings do not support the claim
that younger children are inherently more
persuasible than older children.*

It has been suggested that children's affective responses to marketing may play a more important role in the persuasion process than cognitive factors such as knowledge of persuasive intent and skepticism toward advertising (Christenson

FIGURE 1
 INTERACTION BETWEEN AD EXPOSURE AND GENDER
 ON PRODUCT PREFERENCE



NOTE: The product preference measure captures the average number of times children selected the advertised product over one of the three competitors. Scores have a possible range of 0 to 3. Values are adjusted for demographic characteristics other than gender.

1985; Wartella 1984; Young 1990). Wartella (1984, 181) commented that “there is substantial reason to argue that for too long research on television advertising’s influence on children has focused on rational cognitive-oriented approach to studying children’s information processing of advertising messages.” Future research should examine the relationship between children’s emotional responses to advertising and their preferences for advertised products, as well as the relative contributions of affective and cognitive variables in explaining persuasion outcomes.

While age did not moderate the effects of ad exposure, a significant interaction between exposure to the commercials and gender was detected. Boys were more influenced by the ads than girls. This was somewhat surprising given that the products were not strongly gendered (as evidenced by the absence of a main effect of gender of product preference) and both boys and girls were featured in both commercials. One possible explanation for this result is that boys paid more attention to the commercials than girls and this increased attention resulted in greater receptivity to the persuasive appeals. While the present study did not

assess children's attention to the ads, research suggests that boys allocate more visual attention to television than girls (Alvarez et al. 1988; Rolandelli et al. 1991; Wright et al. 1984). In the present study, gender differences in attention may have been exacerbated by the fact that the main character in *Foster's Home for Imaginary Friends*, Mac, is a boy.

Boys were more influenced by the ads than girls.

Limitations

Several limitations of the present research should be noted. First, the study was conducted with a convenience sample of children, which potentially limits the generalizability of the findings. The results are, however, consistent with prior studies (also employing convenience samples) that identified a significant effect of food marketing on product choice.

Second, children identified their preferred cereals and drinks from images and did not actually consume the products. While food choice is frequently operationalized as preference (e.g., Borzekowski and Robinson 2001; Goldberg, Gorn, and Gibson 1978; Gorn and Goldberg 1980), it is unclear if the opinions children expressed will persist and translate into behavior. The preference measures can potentially be viewed as indicators of intention to consume a product relative to other choices, and research testing the Theory of Reasoned Action (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975) with children suggests that intention predicts subsequent behavior (Morrison et al. 2002, 1996; Norman and Tedeschi 1989; Otis et al. 1992). In contrast, however, Jeffrey, McLellam, and Fox (1982) found that children's verbalized food preferences were only moderately correlated with behavioral measures of food consumption.

Third, it is potentially problematic that Tang was available in stores at the time the study was conducted. Prior familiarity with and preexisting attitudes toward Tang may have influenced children's choices; however, random assignment should have ensured that the groups exposed and not exposed to the ad were equivalent in these regards. In addition, analyses indicated that familiarity with Tang was not significantly different across the two commercial conditions.

Finally, it should be noted that the regression model explained only a small amount of variance in product preference. The model likely omitted variables that could have contributed additional explanatory power. This again points to the need to examine children's affective responses to advertising.

Conclusion

Consistent with prior research, the present study found that exposure to food marketing significantly increased children's preferences for advertised products. While it is often argued that younger children are more persuasible than older children, the results indicated that age did not moderate the effects of ad exposure on product preference. This suggests that knowledge of persuasive intent did not influence children's responses to the commercials. Future research should explicitly test the moderating role of knowledge of persuasive intent in the persuasion process and examine how children's affective responses to commercials influence their preferences for advertised products.

Public policy in the area of food marketing to children should be based on strong empirical evidence. While efforts to restrict advertising to young children are well intentioned (e.g., Kunkel et al. 2004), it has yet to be conclusively demonstrated that younger children are inherently more persuasible than older children. In fact, given that older children have more control over their diets than younger children, perhaps older children's responses to food marketing should be of greater concern. Media literacy education is a possible avenue for intervention that can be tailored to children of different ages.

Notes

1. As both Hastings et al. (2003) and Livingstone and Helsper (2004) noted, the magnitude of the effect of food marketing relative to other potential influences on children's preferences and behavior has yet to be conclusively determined.

2. Commercials for products that appeal strongly to one gender will likely be more persuasive among children of that gender; however, this is a function of the product itself and not the result of differential advertising effects.

3. Demographic information was obtained from the parent survey. For cases where the parent survey was not returned, the child's date of birth was obtained from the consent form and gender and race were observed by the interviewer. One child's (0.8 percent) age was coded as missing (the date of birth entered on the consent form was incorrect). For two participants (1.5 percent), race was coded as missing because it could not easily be inferred by observation.

4. Schools were asked to use the stipends to advance the education of students.

5. Only one child was eleven years old at pretest.

6. The study had a second experimental factor that was excluded from the analyses. Children were also randomly assigned to view either a brief media literacy video or a control video of equal length. Inclusion of the second factor as a control variable did not change the present results; it was therefore omitted to simplify the presentation of the study design. Results pertaining to the effects of exposure to the media literacy video are detailed elsewhere (Chernin 2007).

7. This cereal, like Sprinkle Spangles, was introduced in the mid-1990s and discontinued shortly thereafter.

8. Product A vs. product B; product A vs. product C; product A vs. product D; product B vs. product C; product B vs. product D; product C vs. product D.

9. It is possible that children falsely claimed to have heard of Tang, but there was no way to confirm this. In hindsight, it would have been useful to have asked the same familiarity question in reference to Sprinkle Spangles (an unfamiliar product) to assess children's tendency to respond affirmatively regardless of the question.

10. A three-way interaction between ad exposure, age, and ad was tested, but the coefficient was not statistically significant ($p = .28$).

11. A three-way interaction between ad exposure, gender, and ad was tested, but the coefficient was not statistically significant ($p = .14$). The Ad Exposure \times Gender interaction was somewhat more pronounced for the Tang ad, but it was not a statistically significant difference.

References

- Ajzen, Icek, and Martin Fishbein. 1980. *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Alvarez, Mildred M., Aletha C. Huston, John C. Wright, and Dennis D. Kerkman. 1988. Gender differences in visual attention to television form and content. *Journal of Applied Developmental Psychology* 9:459-75.
- American Academy of Pediatrics, Committee on Communications. 1995. Children, adolescents, and advertising. *Pediatrics* 95:295-97.
- Andersen, Ross E., Carlos J. Crespo, Susan J. Bartlett, Lawrence J. Cheskin, and Michael Pratt. 1998. Relationship of physical activity and television watching with bodyweight and level of fatness among children. *Journal of the American Medical Association* 279:938-42.
- Auty, Susan, and Charlie Lewis. 2004. Exploring children's choice: The reminder effect of product placement. *Psychology and Marketing* 21:697-714.
- Beery, Keith E., and Colleen M. Taheri. 1992. *Beery Picture Vocabulary Test*. Odessa, FL: Psychological Assessment Resources.
- Blosser, Betsy J., and Donald F. Roberts. 1985. Age differences in children's perceptions of message intent. *Communication Research* 12:455-84.
- Bolton, Ruth N. 1983. Modeling the impact of television food advertising on children's diets. *Current Issues and Research in Advertising* 6:173-99.
- Borzekowski, Dina L. G., and Thomas N. Robinson. 2001. The 30-second effect: An experiment revealing the impact of television commercials on food preferences of preschoolers. *Journal of the American Dietetic Association* 101:42-46.
- Boynton-Jarrett, Renee, Tracy N. Thomas, Karen E. Peterson, Jean Wiecha, Arthur M. Sobol, and Steven L. Gortmaker. 2003. Impact of television viewing patterns on fruit and vegetable consumption among adolescents. *Pediatrics* 112:1321-26.
- Brody, Gene H., Zolinda Stoneman, T. Scott Lane, and Alice K. Sanders. 1981. Television food commercials aimed at children, family grocery shopping, and mother-child interactions. *Family Relations* 30:435-39.
- Brownell, Rick. 2000. *Expressive One-Word Picture Vocabulary Test*. Novato, CA: Academic Therapy.
- Chernin, Ariel. 2007. The relationship between children's knowledge of persuasive intent and persuasion: The case of televised food marketing. Ph.D. diss., University of Pennsylvania, Philadelphia.
- Christenson, Peter G. 1985. Children and commercials: The relationship between general trust and specific influence. *Communication Research Reports* 2:41-45.
- Dietz, William H., and Steven L. Gortmaker. 1985. Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. *Pediatrics* 75:807-12.
- Donkin, Angela J. M., R. J. Neale, and C. Tilston. 1993. Children's food purchase requests. *Appetite* 21:291-94.
- Federal Trade Commission. 1978. *FTC staff report on television advertising to children*. Washington, DC: Federal Trade Commission.
- Fishbein, Martin, and Icek Ajzen. 1975. *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- French, S. A., M. Story, D. Neumark-Sztainer, J. A. Fulkerson, and P. Hannan. 2001. Fast food restaurant use among adolescents: Associations with nutrient intake, food choices and behavioral and psychosocial variables. *International Journal of Obesity* 25:1823-33.
- Galst, Joann Paley. 1980. Television commercials and pronutritional public service announcements as determinants of young children's snack choices. *Child Development* 51:935-38.
- Galst, Joann Paley, and Mary Alice White. 1976. The unhealthy persuader: The reinforcing value of television and children's purchase-influencing attempts at the supermarket. *Child Development* 47:1089-96.

- Goldberg, Marvin E., Gerald J. Gorn, and Wendy Gibson. 1978. TV messages for snack and breakfast foods: Do they influence children's preferences? *Journal of Consumer Research* 5:73-81.
- Gorn, Gerald J., and Marvin E. Goldberg. 1980. Children's responses to repetitive TV commercials. *Journal of Consumer Research* 6:421-24.
- . 1982. Behavioral evidence of the effects of televised food messages on children. *Journal of Consumer Research* 9:200-205.
- Gortmaker, Steven L., A. Must, A. M. Sobol, K. Peterson, G. A. Colditz, and W. H. Dietz. 1996. Television viewing as a cause of increasing obesity among children in the United States, 1986-1990. *Archives of Pediatrics and Adolescent Medicine* 150:356-62.
- Gracey, D., N. Stanley, V. Burke, B. Corti, and L. J. Beilin. 1996. Nutritional knowledge, beliefs and behaviours in teenage school students. *Health Education Research* 11:187-204.
- Hancox, Robert J., Barry J. Milne, and Richie Poulton. 2004. Association between child and adolescent television viewing and adult health: A longitudinal birth cohort study. *The Lancet* 364:257-62.
- Hastings, Gerard, Martine Stead, Laura McDermott, Alasdair Forsyth, Anne Marie MacKintosh, Mike Rayner, Christine Godfrey, Martin Caraher, and Kathryn Angus. 2003. *Review of research on the effects of food promotion to children: Final report*. Glasgow, UK: Centre for Social Marketing.
- Henderson, Vani R. 2006. Investigating TV viewing and overweight in pre-adolescent and adolescent girls. Ph.D. diss., University of Pennsylvania, Philadelphia.
- Institute of Medicine. 2005. *Preventing childhood obesity: Health in the balance*. Washington, DC: National Academies Press.
- . 2006. *Food marketing to children and youth: Threat or opportunity?* Washington, DC: National Academies Press.
- Isler, Leslie, Edward T. Popper, and Scott Ward. 1987. Children's purchase requests and parental responses: Results from a diary study. *Journal of Advertising Research* 27:28-39.
- Jeffrey, D. Balfour, Robert W. McLellam, and Daniel T. Fox. 1982. The development of children's eating habits: The role of television commercials. *Health Education Quarterly* 9:78-93.
- Kaiser Family Foundation. 2004. *The role of media in childhood obesity*. Menlo Park, CA: Kaiser Family Foundation.
- Kunkel, Dale, Brian L. Wilcox, Joanne Cantor, Edward Palmer, Susan Linn, and Peter Dowrick. 2004. *Report of the APA task force on advertising and children: Psychological issues in the increasing commercialization of childhood*. Available at <http://www.apa.org/releases/childrenads/pdf#search=%22FTC%20report%201978&20advertising%22>.
- Livingstone, Sonia, and Ellen Helsper. 2004. *Advertising "unhealthy" foods to children: Understanding promotion in the context of children's daily lives*. London: Ofcom.
- . 2006. Does advertising literacy mediate the effects of advertising on children? A critical examination of two linked research literatures in relation to obesity and food choice. *Journal of Communication* 56:560-84.
- Matheson, Donna M., Joel D. Killen, Yun Wang, Ann Varady, and Thomas N. Robinson. 2004. Children's food consumption during television viewing. *American Journal of Clinical Nutrition* 79:1088-94.
- Morrison, Diane M., Corinne M. Mar, Elizabeth A. Wells, Mary Rogers Gillmore, Marilyn J. Hoppe, Anthony Wildson, Elise Murowchick, and Matthew E. Archibald. 2002. The Theory of Reasoned Action as a model of children's health behavior. *Journal of Applied Social Psychology* 32:2266-95.
- Morrison, Diane M., Edith E. Simpson, Mary Rogers Gillmore, Elizabeth A. Wells, and Marilyn J. Hoppe. 1996. Children's decisions about substance use: An application and extension of the Theory of Reasoned Action. *Journal of Applied Social Psychology* 26:1658-79.
- Norman, Nancy M., and James T. Tedeschi. 1989. Self-presentation, reasoned action and adolescents' decisions to smoke cigarettes. *Journal of Applied Social Psychology* 19:543-58.
- Office of Communications (Ofcom). 2004. *Childhood obesity: Food advertising in context*. London: Ofcom.
- Otis, Joanne, Dominique Lesage, Gaston Godin, Bruce Brown, Celine Farley, and Jean Lambert. 1992. Predicting and reinforcing children's intentions to wear protective helmets while cycling. *Public Health Reports* 107:283-89.
- Paliwoda, Stan, and Ian Crawford. 2003. An analysis of the Hastings review: "The effects of food promotion on children." London: Food Advertising Unit.

- Phillips, Sarah M., Linda G. Bandini, Elena N. Naumova, Helene Cyr, Skye Colclough, William H. Dietz, and Aviva Must. 2004. Energy-dense snack food intake in adolescence: Longitudinal relationship to weight and fatness. *Obesity Research* 12:461-72.
- Pine, Karen J., and Avril Nash. 2003. Barbie or Betty? Preschool children's preference for branded products and evidence for gender-linked differences. *Developmental and Behavioral Pediatrics* 24:219-24.
- Resnik, Alan, and Bruce L. Stern. 1977. Children's television advertising and brand choice: A laboratory experiment. *Journal of Advertising* 6:11-17.
- Robertson, Thomas S., and John R. Rossiter. 1974. Children and commercial persuasion: An attribution theory analysis. *Journal of Consumer Research* 1:13-20.
- Rolandelli, David R., John C. Wright, Aletha C. Huston, and Darwin Eakins. 1991. Children's auditory and visual processing of narrated and nonnarrated television programming. *Journal of Experimental Child Psychology* 51:90-122.
- Stoneman, Zolinda, and Gene H. Brody. 1982. The indirect impact of child-oriented advertisements on mother-child interactions. *Journal of Applied Developmental Psychology* 2:369-76.
- Taras, Howard L., James F. Sallis, Thomas L. Patterson, Philip R. Nader, and Julie A. Nelson. 1989. Television's influence on children's diet and physical activity. *Developmental and Behavioral Pediatrics* 10:176-80.
- Taras, Howard, Michelle Zive, Philip Nader, Charles C. Berry, Tricia Hoy, and Christy Boyd. 2000. Television advertising and classes of food products consumed in a paediatric population. *International Journal of Advertising* 19:487-93.
- Thurstone, L. L. 1927. A law of comparative judgment. *Psychological Review* 34:273-86.
- Utter, Jennifer, Dianne Neumark-Sztainer, Robert Jeffery, and Mary Story. 2003. Couch potatoes or french fries: Are sedentary behaviors associated with body mass index, physical activity, and dietary behaviors among adolescents? *Journal of the American Dietetic Association* 103:1298-1305.
- Ward, Scott, Daniel B. Wackman, and Ellen Wartella. 1977. *How children learn to buy: The development of consumer information-processing skills*. Beverly Hills, CA: Sage.
- Wartella, Ellen. 1984. Cognitive and affective factors of TV advertising's influence on children. *Western Journal of Speech Communication* 48:171-83.
- Wiecha, Jean L., Karen E. Peterson, David S. Ludwig, Juhee Kim, Arthur Sobol, and Steven L. Gortmaker. 2006. When children eat what they watch: Impact of television viewing on dietary intake in youth. *Archives of Pediatrics and Adolescent Medicine* 160:436-42.
- Woodward, D. R., F. J. Cumming, P. J. Ball, H. M. Williams, H. Hornsby, and J. A. Boon. 1997. Does television affect teenagers' food choices? *Journal of Human Nutrition and Dietetics* 10:229-35.
- Woodworth, Robert S., and Harold Schlosberg. 1955. *Experimental psychology*. New York: Henry Holt.
- World Health Organization (WHO). 2003. *Diet, nutrition, and the prevention of chronic disease* (WHO Technical Report Series no. 916). Geneva, Switzerland: WHO.
- Wright, John C., Aletha C. Huston, Rhonda P. Ross, Sandra L. Calvert, David Rolandelli, Lee Ann Weeks, Pouran Raeissi, and Richard Potts. 1984. Pace and continuity of television programs: Effects on children's attention and comprehension. *Developmental Psychology* 20:653-66.
- Young, Brian. 1990. *Television advertising and children*. Oxford, UK: Clarendon.
- . 2003. Does food advertising influence children's food choices? A critical review of some of the recent literature. *International Journal of Advertising* 22:441-59.