How Childhood Advertising Exposure Can Create Biased Product Evaluations That Persist into Adulthood

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# How Childhood Advertising Exposure Can Create Biased Product Evaluations That Persist into Adulthood

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Previous research has found that children incrementally learn how to cope with advertising as they age. The current research investigates whether these developmental constraints in advertising knowledge at time of exposure have enduring consequences. Results from four experimental studies show that childhood exposure to advertisements can lead to resilient biased product evaluations that persist into adulthood. Study 1 demonstrates that positive affect toward ad-related stimuli encountered in childhood mediates the relationship between childhood advertising exposure and biased evaluations for products associated with childhood (but not adulthood) advertising. Study 2 demonstrates stronger biases when participants are exposed to childhood advertising cues relative to childhood consumption cues. Studies 3 and 4 show that even when ability and motivation to correct bias are high, lingering positive affect toward childhood ad-related stimuli is a motivational deterrent to correct biased product evaluations. Study 4 also shows that biased product evaluations can transfer to line extensions.

> The past is never dead. It is not even past.
> (William Faulkner, *Requiem for a Nun*)

A large body of research has investigated how children understand and deal with advertising as they age. However, little is known about how exposure to advertising in childhood affects people in adulthood. This is an issue of significant theoretical and practical importance because adults remain active in many of the product categories for which they were targeted as children, both for their own consumption and for that of their children. Although recent research has examined the long-term effects of advertising to children on brand recall (Ellis, Holmes, and Wright 2010), many questions in this potentially broad stream of research remain unanswered. For example, do the messages of fun and happiness so common in children's advertising create lasting affective associations that cloud people's judgments about the featured products for the rest of their lives? If so, how resilient are these resulting biased product evaluations? Are they limited to the product originally advertised, or can childhood advertising exposure cause biased evaluations for new products introduced years or even decades later if the same advertising stimuli are used? How are biased product evaluations resulting from affect toward advertising different from biased product evaluations resulting from fond memories of consumption? We take a first step toward answering such questions by linking age of initial advertising exposure to product evaluations in adulthood.

This article makes several important contributions. We demonstrate that exposure to advertising in childhood can lead to biased product evaluations that persist into adult-

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hood. Furthermore, we find that positive affect felt toward ad-related stimuli is the mechanism through which these biases are formed. This research also demonstrates that positive affect toward ad-related stimuli leads to stronger biased product evaluations than affect toward the product itself. Finally, we show that biased product evaluations can transfer to line extensions, are resilient even when both ability and motivation to correct bias are high, and have the potential to adversely affect consumer health and well-being.

We present the results of four experiments to test these assertions. Study 1 demonstrates that exposure to advertising in childhood can lead to biased product evaluations in adulthood that result from strongly positive affect toward ad-related stimuli. Study 2 demonstrates that biased product evaluations based on positive affect are more pronounced for childhood ad-related stimuli than for product consumption-related stimuli. Studies 3 and 4 show that these biased product evaluations are resilient and can be difficult to correct. Study 4 also shows that biased product evaluations can carry over to line extensions when the same advertising stimuli are used to promote these extensions.

We focus on advertising characters for less healthful foods (e.g., Tony the Tiger, Ronald McDonald) as a starting point for investigating this phenomenon. Advertising characters are a prominent fixture in children's advertising, and people often identify with them and develop strong affective attachments to them (Acuff and Reiher 1997; Connell 2013; Garretson and Burton 2005; Moore and Lutz 2000). Recent findings show that the presence of an advertising character can even cause children to judge a food as tastier (LaPierre, Vaala, and Linebarger 2011; Roberto et al. 2010). Given that approximately half of all advertising directed to children in the United States promotes food and that the vast majority of food advertising to children is for high-calorie foods with limited nutritional value, such as sodas, candy, presweetened breakfast cereals, and fast food (Brownell and Horgen 2004; Gantz et al. 2007), advertising effects that persist into adulthood may directly affect public health.

## CONCEPTUAL BACKGROUND

A large and growing literature spanning the fields of consumer research, communication, developmental psychology, public policy, and nutrition has consistently demonstrated that children do not understand advertisements in the same way as adults do. In this section, we review prior research on the effects of advertising to children, showing that it is likely to (1) generate positive affective reactions to ad-related stimuli; (2) influence children more than adults, due to underdeveloped advertising knowledge; and (3) generate enduring effects, due to the early stage in life in which this learning occurs. We build on these prior findings to develop predictions that are tested in our four experimental studies.

### Development of Advertising Knowledge and Social Cognitive Skills

To understand how children process advertising information, it is important to examine the nature of advertising to children. Fun and happiness are the most commonly employed appeals in advertising to children (Folta et al. 2006), thus directing children toward aspects of advertising messages related to positive affect (Moore and Lutz 2000). Research has demonstrated that positive affect elicited by the evaluation target requires fewer processing resources (Shiv and Fedorikhin 1999), leads to judgments that are reached more rapidly (Pham et al. 2001), leads to affect-congruent evaluations (Pham et al. 2001), favors short-term rewards over long-term consequences (Loewenstein 1996), and changes brand beliefs (Mackenzie, Lutz, and Belch 1986).

Although positive affect alone can cloud judgment, when it is coupled with underdeveloped advertising knowledge, biased product evaluations are even more likely (Friestad and Wright 1994). In a highly cited integrative review, John (1999) demonstrates that children incrementally develop advertising knowledge as they age. Much of this research documents that children evaluate marketing communications less critically than adults because they have not yet developed the advertising knowledge and cognitive skills necessary to cope effectively with advertising messages (Brucks, Armstrong, and Goldberg 1988; Moore and Lutz 2000; Oates, Blades, and Gunter 2006; Ward, Reale, and Levinson 1972; Ward, Wackman, and Wartella 1977; Wright, Friestad, and Boush 2005). Most children approach adultlike levels of skepticism and knowledge of advertising tactics in adolescence, in approximately eighth grade or at about age 13 (Boush, Friestad, and Rose 1994; John 1999).

In addition to knowledge of advertising goals and tactics, effectively coping with the persuasive intent of advertising requires substantial perspective-taking skill (Moses and Baldwin 2005). Specifically, people must realize that advertisers and sources in an advertisement (e.g., spokesperson, advertising character) do not necessarily share their own perspectives and that these perspectives may conflict. They must also understand that advertising has a complex set of related intentions—to make money by selling a product and to promote that product by informing, persuading, and framing consumer decisions by directing attention away from product disadvantages. Finally, they must have executive functioning skills that enable them to activate advertising and product knowledge and use it to process incoming advertising messages. Immature executive functioning skills render children uniquely vulnerable to audiovisual effects in advertising, nonsalience of important information, and stimulation of hedonic impulses (Moses and Baldwin 2005; Pechmann et al. 2011; Wright et al. 2005).

The way children perceive others (including companies or characters in their advertising) changes as they age. Children do not develop nuanced assessments of other people on the basis of conflicting aspects of their personalities (e.g., generous with gifts but not helpful to others) until later stages of development (Alvarez, Ruble, and Bolger 2001). While children respond readily to messages of fun and happiness, they are unlikely to consider advertiser motivations or to integrate these understandings with multiple product dimensions into their processing of advertising messages

(Bahn 1989). As a result, the knowledge structures developed in childhood for heavily advertised products are likely to be affect laden, nonskeptical, and generalized.

### Enduring Effects of Childhood Learning

Research in cognitive psychology indicates that what is learned early is learned well. Words, objects, faces, and brand names learned early in life are recognized and categorized more quickly and more accurately than those acquired later in life, even when frequency of exposure is held constant (Ellis et al. 2010). One explanation is that early acquired concepts are more firmly embedded in semantic memory than later acquired concepts (Steyvers and Tenenbaum 2005). In addition, evidence suggests that early acquired concepts shape neural networks into an efficient form for representing them, resisting attempts at reconfiguration by later learned concepts (Ellis and Lambon Ralph 2000). Thus, what children learn from advertising may be particularly accessible in adulthood. Ellis et al. (2010) argue that this "age-of-acquisition" effect confers benefits to brands that reach consumers at an early age that make them more memorable. Through these same mechanisms, we note that this age-of-acquisition effect also likely results in biased product evaluations in adulthood for products featured in children's advertising.

## THE CURRENT RESEARCH

People incrementally gain an array of skills and knowledge throughout childhood and adolescence that increasingly enhances their ability to cope with advertising. Before fully developing such knowledge (approximately age 13), children are likely to develop affect-laden knowledge structures for advertised products without skeptical processing. At the same time, the associations they made earlier in life will be more easily accessible in adulthood than those learned later. Thus, we expect that a child's extant abilities at the time of initial encoding of advertising into memory affect how he or she deals with this advertising throughout the lifetime. If we presume that at least some of these memory structures persist over time, we can make specific predictions about beliefs and attitudes for adults and consequences for judgment processes regarding products endorsed by the advertising.

Existing theory leads to unclear predictions about what might happen to beliefs formed in childhood when people develop more sophisticated knowledge about advertising. On the one hand, a large body of literature has demonstrated that people can and do update beliefs when they integrate new information into their existing beliefs (Kardes, Kim, and Lim 1994). This literature suggests that biases caused by childhood exposure to advertisements would be corrected when the appropriate advertising knowledge and additional product knowledge have been learned. On the other hand, evidence from social psychology literature suggests that both ability and motivation are required for people to reconsider beliefs when making judgments (Wegener and Petty 1995). Otherwise, people tend to use the knowledge most accessible to them to form judgments (Feldman and Lynch 1988; Wyer 2008). Similarly, previous research has demonstrated that stimulus-induced positive affect is highly accessible (Pham et al. 2001) and that people tend to rely on this affect more when they lack the ability or motivation to process information (Pham et al. 2001; Shiv and Fedorikhin 1999). Thus, we predict that positive affect felt toward stimuli featured in childhood advertising will result in enduring biased product evaluations that persist into adulthood. Formally:

**H1a**: Initial exposure to advertising in childhood leads to biased product evaluations that persist into adulthood, compared with advertising first encountered after full development of advertising knowledge.

**H1b**: This effect is mediated through positive affect felt toward ad-related stimuli.

We focus our predictions on health evaluations of foods such as presweetened cereals, soft drinks, snacks, and fast foods because they constitute nearly half of all advertisements directed to children and because eating such foods in large quantities can potentially affect consumer health and well-being. In addition, products such as breakfast cereals and fast food are relatively ambiguous in their healthfulness (e.g., high in fat or sugar but providing some nutrients). This ambiguity could cause biases to go unchallenged even as knowledge builds over time.

Because we are interested in the effects of childhood advertising that persist into adulthood, we employ a retrospective approach with widely recognized real-life stimuli that were highly likely to have been viewed repeatedly over many years by study participants (Braun-LaTour and LaTour 2004; Ellis et al. 2010). Such an approach makes it feasible to investigate theoretically and practically important phenomena that are reflective of a psychologically distant past. Furthermore, the retrospective approach allows us to conduct studies in a controlled setting that isolates the hypothesized cause-and-effect relationships without uncontrolled external factors, such peer and parental influences, that could confound a longitudinal study.

## STUDY 1

The objective of study 1 was to provide initial evidence of our basic proposition—that adults make biased product evaluations when associated advertising exposure occurred in childhood (about age 13). We predict that this biased product evaluation results from positive affect felt toward childhood ad-related stimuli.

### Method

*Design and Stimuli.* We selected stimuli and participants specifically to isolate childhood advertising exposure effects (i.e., before age 13). For this purpose, we needed two sets

of stimuli. We selected one set of stimuli that was present in advertising when all participants were children and another set of stimuli that was widely used in childhood advertising for some of our participants but was not extant until adulthood for other participants. In addition, all participants were from the United Kingdom, so we chose stimuli for brands that were well known there. First, we selected Kellogg's Frosties, a brand whose advertising has featured the character Tony the Tiger since 1952 (Bamford 2012), as a stimulus that had a high likelihood of childhood exposure for all participants. As a second stimulus, we selected Kellogg's Cocoa Pops, a brand whose advertising has featured the character Coco the Monkey in its advertising since the cereal was introduced in the United Kingdom in 1986 (Kellogg Company 2013). We used the introduction date of the Coco the Monkey advertising character to recruit one group of participants who would have been adults when advertisements featuring Coco the Monkey began airing and one group of participants who would have been younger than 13 when these advertisements began airing.

*Participants and Procedure.* One hundred seventy-seven adult members of Qualtrics Panels (55% female) participated in this study in exchange for monetary compensation. Selection criteria for participation included being born and raised in the United Kingdom and belonging to specific age ranges that put them in either the younger (born between 1989 and 1994) or the older (born between 1958 and 1962) participant groups. After providing their consent, participants read basic written instructions before starting the online study.

We randomly assigned participants to one of the two advertising character conditions. Participants saw the advertising characters in isolation without any potentially identifying information, such as name, logo, or images of the product (see appendix for stimuli). The first page asked participants to view the target advertising character and then to identify it and "write down the earliest memory you have involving this character in the space below." Participants then proceeded to the next web page on which they appraised their affect toward the advertising character with a feeling thermometer (Payne, Burkley, and Stokes 2008). Specifically, we directed them to imagine their feelings as if they were degrees on a thermometer (0 = very cold feelings, 50 = neutral feelings, 100 = very warm feelings). Next, participants evaluated attributes of the product endorsed by the character (either Kellogg's Cocoa Pops or Kellogg's Frosties) using 7-point Likert scales. Five items pertaining to healthfulness were interspersed among 13 items: "is healthy," "is nutritious," "has a lot of fiber," "is low in calories," and "has a lot of added sugar" (reverse coded). The other items were related to hedonic attributes of the product. We combined the health-related items and used them as the dependent variable in the analysis ($\alpha$ = .85). After completing the items, participants were funnel debriefed and thanked for their time.

## Results

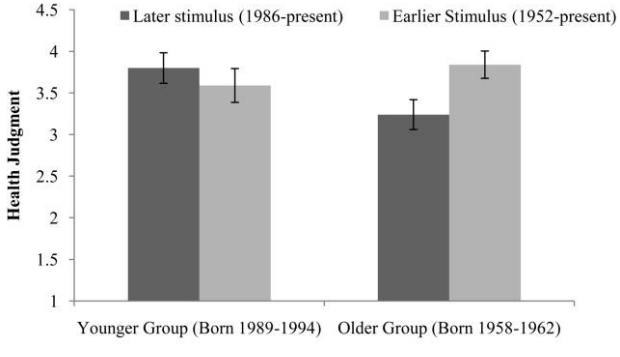
*Health Evaluation.* We expected adults to make biased product evaluations when exposure occurred in childhood before full development of advertising knowledge (about age 13). Thus, we expected that participants who harbored strongly positive affect toward ad-related stimuli they experienced in childhood would display biased health evaluations of the associated product. In contrast, we expected no such biases for participants who did not harbor positive affect for ad-related stimuli from childhood. Finally, we predicted no biased health evaluations for ad-related stimuli in which exposure to advertising could have only been in adulthood, regardless of affect felt toward the stimuli.

The results from a two-way ANOVA with stimulus age and participant age as the independent variables revealed a marginally significant two-way interaction ($F(1, 173) = 3.71$, $p = .056$; see fig. 1). There were no significant main effects. In support of our prediction, participants in the older group evaluated the product associated with the stimulus they would have first been exposed to in adulthood as less healthful than the product associated with the stimulus they would have first been exposed to in childhood ($M_{later} = 3.24$, SD = 1.66; $M_{earlier} = 3.84$, SD = 1.29; $F(1, 97) = 4.06$, $p < .05$). There was no difference in the evaluation of the associated products among the younger group of participants ($M_{later} = 3.80$, SD = 1.24; $M_{earlier} = 3.59$, SD = 1.27; $F < 1$), who would have been exposed to both ad-related stimuli in childhood.

*Positive Affect toward Advertising Character.* Few participants reported negative affect for either character. Thus, we interpret the affect measure as a continuum from mild to strongly positive affect. Because positive affect toward ad-related stimuli is the proposed causal mechanism for the observed biases, we repeated the analysis with affect (instead of health evaluation) as the dependent variable. Main effects of age group ($F(1, 173) = 11.39$, $p < .001$) and

**FIGURE 1**

IMPACT OF TIME OF INITIAL EXPOSURE ON HEALTH JUDGMENTS FOR OLDER AND YOUNGER PARTICIPANTS (STUDY 1)



stimulus ($F(1, 173) = 15.88$, $p < .001$) were qualified by the hypothesized two-way interaction ($F(1, 173) = 30.11$, $p < .001$; see fig. 2). Consistent with our results on product evaluation, older participants reported stronger positive affect toward the earlier stimulus (Tony the Tiger) than toward the later/more recent stimulus (Coco; $M_{later} = 46.96$, SD = 23.17; $M_{earlier} = 76.91$, SD = 17.66; $F(1, 97) = 53.21$, $p < .001$). As with health evaluations, there was no difference in affect reported between the two stimuli among the younger group of participants ($M_{earlier} = 70.23$, SD = 23.45; $M_{later} = 74.98$, SD = 19.46; $F < 1$).

*Mediation Analysis.* To directly test the role of positive affect in producing the observed biases in health judgments, we conducted mediation analysis. The mediating role of affect is conditional on age group because participants in the older group could not have experienced the newer ad-related stimulus in childhood, whereas participants in the younger group would have been likely to have done so. To test this proposed mediation model, we first tested three equations to establish the predicted relationships before directly testing the conditional indirect effect using the procedures and accompanying SPSS macro from Preacher, Rucker, and Hayes (2007, model 2).

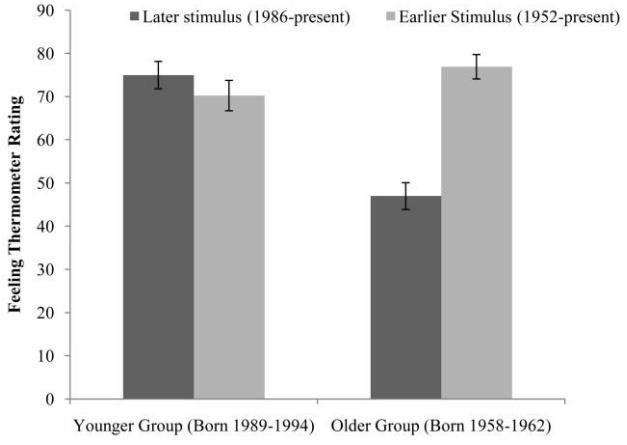
The first equation regressed participant age group, stimulus age, and their interaction on health evaluation. This model confirmed the stimulus age × participant age group interaction reported previously under "health evaluation" ($\beta = .73$, $t = 1.98$, $p < .05$). The second analysis regressed participant age group, stimulus age, and their interaction on the proposed mediator, affect toward the advertising character. Replicating the effect reported under "positive affect," we again find the participant age group × character age interaction ($\beta = 34.7$, $t = 5.48$, $p < .01$). Furthermore, when including the proposed mediator in the first equation, we find that the participant age group × advertising character age interaction is no longer significant ($\beta = .36$, $t = .39$, $p > .36$), while the effect of the mediator is ($\beta = .01$, $t = 2.42$, $p = .05$). A 10,000-sample bootstrap confirmed this conditional indirect effect (95% confidence interval = .05, .63). Finally, further exploration of this conditional indirect effect revealed that among participants in the older age group, there was an effect of advertising character (earlier/later) on health evaluation through affect toward the advertising character (indirect effect = .32, $z = 2.27$, $p = .05$). In contrast, we did not observe this effect for the younger age group, in which all advertisements were experienced in childhood and thus were not expected to differ in their influence on product evaluation (indirect effect = −.05, $z = -.87$, $p > .39$).

## Discussion

Study 1 provides evidence that exposure to advertising in childhood can lead to enduring biased product evaluations. Specifically, participants who were likely exposed to advertising for two presweetened cereals in childhood evaluated both cereals as equally healthful. In contrast, participants who experienced advertising for one product in childhood, but experienced advertising for another product in adulthood, demonstrated biased product evaluations for the childhood product by rating it as more healthful than the adulthood product.

**FIGURE 2**

IMPACT OF TIME OF INITIAL EXPOSURE ON FELT POSITIVE AFFECT FOR OLDER AND YOUNGER PARTICIPANTS (STUDY 1)




Study 1 further confirms that the observed biased product evaluation results from positive affect toward advertising stimuli; that is, reported positive affect was higher among older participants for the childhood advertising stimulus than for the adulthood advertising stimulus. In contrast, there was no difference in reported affect between the stimuli among younger participants (who were likely exposed to both advertising stimuli in childhood). Furthermore, positive affect fully mediated the relationship between the interaction of participant age with stimulus age and health evaluations.

Although the results of study 1 suggest that advertising is the driver of biased product evaluations, the stimulus set used in this experiment does not rule out the possibility that the advertising stimuli simply reminded participants of consuming the product. We designed study 2 to tease apart the effect of consumption-related memories from advertising effects.

# STUDY 2

The primary goal of study 2 was to untangle effects of childhood exposure to advertising from fond memories of product consumption on biased product evaluations. It is important to determine whether advertising exposure (rather than product consumption) is the root cause of the judgment biases observed in study 1 because it could be argued that the advertising character served merely as a retrieval cue for pleasant memories of consumption. If this argument were true, more direct retrieval cues for consumption (e.g., a pic-

ture of the product itself) should lead to equal or greater bias in evaluations. In the context of foods marketed to children, such as presweetened breakfast cereals, research indicates that products are far less likely to be preferred and consequently consumed in the absence of advertising (Boyland and Halford 2013; Goldberg 1990; Hitchings and Moynihan 1998). Research also indicates that adults rely more on advertising than direct experience in forming judgments when consumption does not provide any information about the attribute (e.g., nutrition; Wright and Lynch 1995). Thus, we predict that positive affect toward ad-related stimuli will have effects on health evaluation biases over and above any effects of positive affect toward consumption-related stimuli. Formally:

**H2**: Biased product evaluations resulting from positive affect toward childhood ad-related stimuli are more pronounced than biased product evaluations resulting from positive affect toward childhood consumption-related stimuli.

## Method

Study 1 demonstrated between-group differences in resulting biased product evaluations from childhood advertising exposure. Conversely, studies 2–4 rely on populations of participants who all were likely to have encountered the experimental stimuli in childhood and thus are vulnerable to biased product evaluation.

*Stimuli.* In study 2, we manipulated one factor (advertising/consumption cue) and measured the other (positive affect). We conducted this study in the United States and thus selected a set of stimuli that was culturally relevant, well known, and heavily advertised to this specific target population. We randomly assigned participants to view either an ad-related stimulus or a consumption-related stimulus for one of two food brands (see appendix for stimuli). Specifically, to prime advertising-related associations, study 2 employed ad-related stimuli for Kellogg's Froot Loops (Toucan Sam) or McDonald's (Ronald McDonald). Toucan Sam was introduced as the cartoon advertising character for Froot Loops in 1963 (*Kellogg Co. v. Toucan Golf, Inc.*, 337 F.3d 616 [6th Cir. 2003]) and has been continuously and heavily advertised since. Ronald McDonald has appeared on national television for McDonald's since 1966 (BBC News 2005). To prime more general associations with consumption, we relied on images of the product itself (without any accompanying packaging or other branding elements) with its name written underneath in 10-point Arial font ("Kellogg's Froot Loops" or "McDonald's French Fries" in the consumption condition).

*Participants and Procedure.* One hundred fifty-one US-born Amazon Mechanical Turk workers (45.8% female, born between 1966 and 1994) participated in the study in exchange for monetary compensation. We imposed a selection criterion of birth year later than 1966 (when the newest stimulus began being advertised) to ensure likely exposure to the stimulus in childhood. After giving consent, participants saw one of the two ad-related stimuli or one of the two consumption images on a web page. As in study 1, participants then wrote a memory related to what they saw in the image. This task also served as a manipulation check to ensure that the character stimuli evoked associations with advertising and the product stimuli evoked associations with consumption. Participants then proceeded to the next web page on which they appraised positive affect felt toward the image stimulus with the feeling thermometer measure described in study 1. Participants were then directed to the next web page on which they evaluated the associated product on 7-point Likert scales.

To the extent possible, the evaluation items were identical to the items in study 1. We made three changes to accommodate the new product category, french fries: "has a lot of salt" replaced "has a lot of added sugar," "are crispy" replaced "stays crunchy in milk," and "has appealing packaging" replaced "has fun prizes." All the remaining items for the french fries product were identical to those in study 1, and all items for the Froot Loops product were also identical to those in study 1. Participants were funnel debriefed and thanked for their time.

## Results

*Manipulation Check.* Two paid independent coders who were blind to the study's predictions coded the memory statements participants wrote in response to the stimulus images as being related to either advertising or consumption. Interrater reliability was good ($\alpha_{ad} = .87$, $\alpha_{cons} = .90$). Disagreements were resolved by discussion between the two coders. We report the results when participants specifically mentioned memories related to advertising or consumption. The results show that 74.44% of memories specifically mentioning consumption were from participants in the consumption condition, in which they viewed the product itself ($\chi^2(1) = 59.01$, $p < .001$), and 84.62% of memories specifically mentioning advertising were from participants in the advertising condition, in which they viewed the advertising character ($\chi^2(1) = 32.54$, $p < .001$). These results lend support to our assertion that product images are more likely to cue memories related to consumption than advertising and that advertising character images are more likely to cue memories related to advertising than consumption.

*Affect Measure Standardization.* The results of a one-way ANOVA revealed that affect felt toward the consumption and advertising images did not differ ($M_{cons} = 63.80$, SD = 27.66; $M_{ad} = 66.73$, SD = 18.75; $F(1, 155) < 1$). However, affect felt toward the two advertising characters significantly differed ($M_{Toucan} = 69.93$, SD = 22.12; $M_{Ronald} = 60.03$, SD = 23.87; $F(1, 153) = 7.18$, $p < .01$). Because of these differences in reported affect, we standardized the affect measure by subtracting the mean affect score of the relevant brand from that brand's mean and then dividing it by the standard deviation of affect score of the same brand

(i.e., computing a *z*-score). The resulting measure was a single standardized affect measure across the stimuli with a mean of 0 and standard deviation of 1.

*Dependent Variable Validation and Standardization.* The item "has a lot of salt" that was intended to substitute for "has a lot of sugar" did not load well with the other health-related items in an exploratory factor analysis and reduced the reliability of the health scale for McDonald's french fries. Examination of the written memory exercises suggests that participants sometimes associated saltiness with hedonic pleasure (e.g., "These are yummy, salty fries") but other times noted it as an unhealthful feature of the product ("not healthy and very salty"). Because of this inconsistency, the health scales for both brands comprised the items "is healthy," "is nutritious," "has a lot of fiber," and "is low in calories." Reliability was good for the resulting composite health evaluation measures ($\alpha_{\text{Froot}} = .83$, $\alpha_{\text{fries}} = .73$). However, participants rated Froot Loops as more healthful than McDonald's french fries ($M_{\text{Froot}} = 2.29$, SD = 1.23; $M_{\text{fries}} = 1.23$, SD = 1.03; $F(1, 154) = 33.27$, $p < .001$). Because health evaluation of the stimuli also differed, we standardized health evaluation following the procedure used for the affect measure.

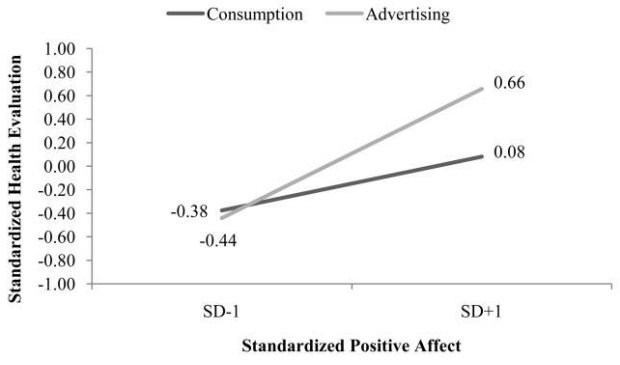
*Biased Health Evaluation.* We did not make a prediction about evaluation bias in the consumption condition, although previous research demonstrating affect-congruent biases would suggest a possible effect. The critical prediction is that the advertising condition would reveal a biasing effect over and above any observed biases in the consumption condition. Support for this prediction would indicate that the biasing effect of the advertising character (as observed in study 1) cannot be attributed solely to consumption memories.

We tested this prediction with a general linear model, with image stimulus as a categorical independent variable and the standardized feeling thermometer measure as a continuous independent variable. The standardized health evaluation measure across all stimuli was the dependent variable. The three-way interaction of brand with the two independent variables (image and affect) was not significant ($F < 1$), so we collapsed the data across brand (McDonald's and Froot Loops) for all analyses. In line with previous research on affect-congruent biased product evaluation, we observed a significant main effect of positive affect on health evaluation ($F(1, 151) = 22.86$, $p < .001$), such that higher positive affect led to higher health evaluations. This main effect was qualified by the hypothesized two-way interaction between image type (advertising vs. consumption) and felt positive affect ($F(1, 151) = 3.86$, $p = .05$). Figure 3 provides a graphical representation of the results.

To interpret the interaction, we followed the procedures outlined by Aiken and West (1991) and recommended by Fitzsimons (2008). We ran these spotlight analyses for both "high" and "low" positive affect. When positive affect was "low" (1 standard deviation below the mean), there was no difference in health evaluation between the image stimulus conditions ($z_{\text{cons}} = -.38$, $z_{\text{ad}} = -.44$; $F < 1$). In contrast, when positive affect was "high" (1 standard deviation above the mean), the difference between the conditions was significant ($z_{\text{cons}} = .08$, $z_{\text{ad}} = .66$; $F(1, 151) = 6.94$, $p < .01$), with positive affect toward advertising stimuli resulting in more favorable product evaluations than positive affect toward consumption stimuli.

**FIGURE 3**

HEALTH JUDGMENT AS A FUNCTION OF POSITIVE AFFECT TOWARD STIMULUS (STUDY 2)




NOTE.—Values plotted are *z*-scores.

## Discussion

Study 2 provides additional evidence that exposure to advertising in childhood leads to biased product evaluations in adulthood by ruling out affect toward consumption as the source of this effect. Furthermore, study 2 improves the generalizability of study 1's findings by showing biased product evaluations in a different country with different brands and another product category.

Combined, studies 1 and 2 demonstrate the persistent effect of childhood advertising on biased product evaluations in adulthood. The questions remain, however, as to how persistent such biased product evaluations are and how they might be corrected. We designed studies 3 and 4 to demonstrate that people are most likely to correct biased product evaluations when both ability and motivation to correct are high (Campbell and Kirmani 2000; Wegener and Petty 1995). Studies 3 and 4 further demonstrate that strongly positive affect can interfere with such correction. We manipulate participants' ability to recognize the source of their biases by making the relevant advertising salient (study 3) and by providing information about how children lack sophisticated knowledge of advertising (study 4). We also demonstrate the importance of motivation to employ this knowledge in correcting biased product evaluation by manipulating motivation with a prime (study 3) and by measuring motivation to attend to bias correction information

(study 4). In both studies, we assess how lingering strongly positive affect toward ad-related stimuli can create a motivational impediment to correct biased product evaluation.

## STUDY 3

We examine the resiliency of the biased product evaluation observed in studies 1 and 2 by employing known correction techniques. People are more likely to reconsider biased evaluation when the source of the bias is made salient or when motivation to correct the bias is enhanced (Wegener and Petty 1995). Nevertheless, conditions exist in which full correction of biased product evaluation is strongly inhibited. Because higher arousal affect is chronically more accessible than less polarized levels of affect (Feldman and Lynch 1988), we expect that strongly positive affect could retain its accessibility and interfere with a person's motivation to correct biased product evaluation. This is because lingering extreme positive affect is likely to lead to high levels of commitment, which can create resistance to attending to negative information (Ahluwalia, Burnkrant, and Unnava 2000; Lisjak, Lee, and Gardner 2012). Thus, extreme positive affect toward advertising stimuli is likely to create a motivational impediment to correct bias, and therefore biased product evaluation is likely to be more resilient (Isen et al. 1978; Mackie and Worth 1989). In contrast, people who experience more moderate levels of positive affect toward advertising stimuli are more likely to correct biased product evaluations when prompted to do so.

Building on prior research on semantic priming, study 3 demonstrates that when people are motivated to critically assess a product, they are less likely to rely on affect-based heuristics in making judgments (Forgas 1995). However, because metacognitive bias correction processes are most likely to be activated when both ability and motivation to do so are high, we also enhance ability to correct bias by making the source of the bias salient and manipulating motivation with a prime.

We propose that when the source of the bias is made salient and motivation to be healthy is activated, people will be more likely to adjust their evaluations to more accurately reflect an objective judgment of the product. However, because strongly felt positive affect is likely to lead to inhibited motivation to integrate negative information (i.e., high sugar content of a sugary cereal) into evaluations, we predict that such high levels of positive affect toward relevant advertising stimuli will interfere with the motivation to correct biased product evaluations. Formally:

**H3a**: People are more likely to correct biases favoring products endorsed by childhood advertising that persist into adulthood when both ability and motivation to do so are enhanced.

**H3b**: A high level of positive affect negates the effectiveness of the bias correction mechanisms.

### Method

*Stimuli.* As in study 2, we conducted studies 3 and 4 in the United States; thus, we again selected a set of stimuli that was culturally relevant to the specific participant population. As a target visual stimulus, we selected Tony the Tiger (Kellogg's Frosted Flakes), which has been heavily and continuously advertised since 1951 in the United States (1 year earlier than in the United Kingdom; Enrico 1999), making it highly likely that the vast majority of US-born participants would have been repeatedly exposed to this advertising character before age 13. As a control, we selected another enduring but irrelevant children's advertising icon. This control advertising character was Play-Doh Pete, a graphic image of a boy's face that has appeared on Play-Doh's packaging since 1960 (National Toy Hall of Fame 2013) and therefore is also likely to have been repeatedly seen by the participants (an undergraduate subject pool) before age 13 (see appendix for stimuli). The purpose of this control group was to demonstrate that participants need to be made aware of the source of the biased product evaluation to correct it. That is, if participants write down a memory of a relevant ad-related stimulus (vs. irrelevant stimulus) and appraise positive affect felt toward it, they are more likely to become aware that the stimulus could be the source of biased product evaluations.

*Participants and Procedure.* We randomly assigned 150 US-born undergraduate student participants at the University of Arizona (47% female) to a between-subjects design. We manipulated motivation (prime: health/control) and ability (relevant/irrelevant stimulus made salient) to correct bias. We measured affect toward the stimulus image as a continuous independent variable. Participants in the motivational prime condition completed a word-search priming task that followed a format used by Bargh et al. (2001). They searched for seven words related to health ("energetic," "exercise," "fitness," "healthy," "nutritious," "strong," and "thin") among six neutral words ("green," "lamp," "plant," "robin," "staple," and "turtle"). Participants in the control prime condition searched for seven neutral words ("alligator," "gasoline," "magazine," "mountain," "picture," "ranch," and "shampoo") in addition to the six previously mentioned neutral words.

On completing the word-search exercise, participants moved on to an ostensibly unrelated task in which they first completed an exercise in which they visualized a memory involving Tony the Tiger or Play-Doh Pete. Specifically, they were asked to recall a memory from their childhood and to write down everything they could remember about the memory. The purpose of the memory exercise was to make the source of bias (advertising stimulus) salient for an associated product (Kellogg's Frosted Flakes) for participants in the relevant (Tony the Tiger) condition but not in the irrelevant (Play-Doh Pete) condition. After the memory exercise, participants appraised their affect felt toward the stimulus image they saw with a feeling thermometer. Participants then proceeded to the dependent measure. The product endorsed by Tony the Tiger, Frosted Flakes, was

rated on the same health-related items as in study 1 (embedded within the same items related to other product attributes), all on 7-point scales.

## Results

The relevant and irrelevant stimulus images did not differ in the level of positive affect felt toward them ($M_{\text{Tony}} = 71.85$, $M_{\text{Pete}} = 72.79$; $F < 1$). Similarly, neither the prime ($F < 1$) nor the stimulus relevance ($F < 1$) manipulation had an effect on the affect measure.

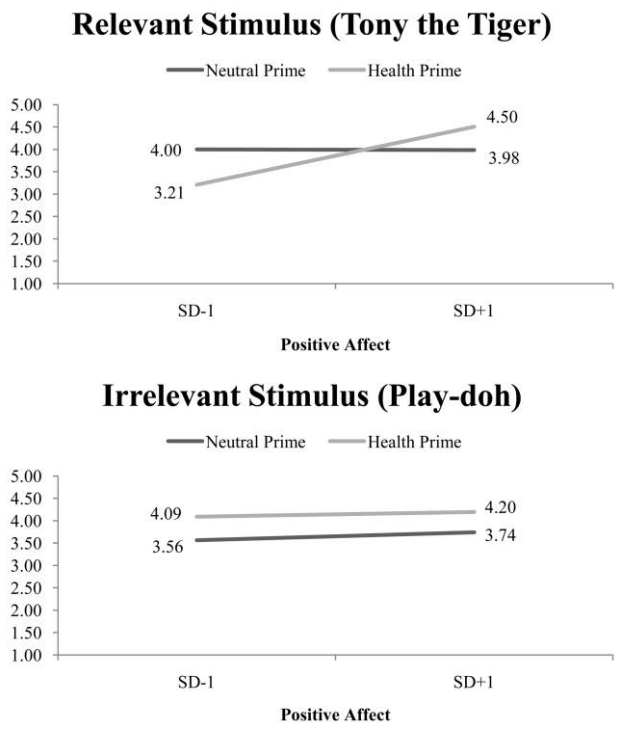
We expected that strongly positive affect toward product-relevant childhood advertising stimuli would interfere with the ability to correct biased product evaluation when both ability and motivation to correct were high. We tested our predictions with a general linear model, with prime and stimulus relevance as categorical independent variables, the mean-centered feeling thermometer measure as a continuous independent variable, and the composite of the health-related questions ($\alpha = .74$) as the dependent variable. We observed a significant main effect of reported affect on the health evaluation measure ($F(1, 142) = 4.12$, $p < .05$) and a marginally significant two-way prime × advertising relevance interaction ($F(1, 142) = 3.42$, $p = .066$). These effects were qualified by the hypothesized three-way interaction of health prime condition, stimulus relevance, and felt positive affect, which was marginally significant ($F(1, 142) = 3.21$, $p = .075$; see fig. 4).

We first interpreted the three-way interaction by examining the significant affect × prime interaction in the relevant stimulus (Tony the Tiger) condition ($F(1, 69) = 5.93$, $p < .05$). Participants who were primed for health and who visualized a memory of the product-relevant ad-related stimulus (Tony the Tiger) were less likely to correct biased product evaluations as positive affect toward the stimulus increased ($t = 3.14$, $\beta = .46$, $p < .01$). In the neutral prime condition, however, participants did not alter their health evaluations, regardless of felt affect ($t < |1|$, $\beta = -.01$). We ran spotlight analyses for the relevant stimulus condition by mean centering the feeling thermometer measure and rerunning the model when positive affect was both "high" (extremely positive, at 1 standard deviation above the mean, 92.2/100 degrees) and "low" (neutral/mildly positive, at 1 standard deviation below the mean, 57.9/100 degrees). When affect was extremely positive, there was no difference between prime conditions on health evaluation (estimated means at +1 standard deviation positive affect: $M_{\text{health}} = 4.50$, $M_{\text{neutral}} = 3.98$; $F(1, 69) = 1.15$), confirming that participants experiencing extremely positive affect were less likely to correct. However, when affect was neutral/mildly positive, participants in the motivational prime condition tended to adjust their health evaluations downward (estimated means at −1 standard deviation positive affect: $M_{\text{health}} = 3.21$, $M_{\text{neutral}} = 4.00$; $F(1, 69) = 5.75$, $p < .01$).

In the irrelevant stimulus condition, the source of bias was not made salient. Instead, participants recalled a memory of an ad-related stimulus that is also based in childhood (Play-Doh Pete) but not relevant to the product under consideration (Kellogg's Frosted Flakes). Neither participants in the control ($t < 1$, $\beta = .09$) nor participants in the motivational prime ($t < 1$, $\beta = .04$) condition altered their health evaluations, regardless of felt affect. The affect × prime interaction for the irrelevant stimulus (Play-Doh) was not significant ($F < 1$).

**FIGURE 4**

ESTIMATED MEANS OF HEALTH JUDGMENT AS A FUNCTION OF POSITIVE AFFECT TOWARD ADVERTISING STIMULUS AND BIAS CORRECTION (STUDY 3)




## Discussion

Study 3 shows that biased product evaluations based on positive affect toward childhood advertising stimuli can be difficult to correct. We experimentally increased the likelihood of participants engaging in such correction by priming health motivations and making the source of their biases salient. We find that primes can be an effective tool to correct such bias, provided that the source of bias is made salient and that affective levels toward the source of bias do not interfere with bias correction. In addition, because we only observed effects of the motivational prime manipulation (i.e., priming health) for the relevant stimulus image (vs. an irrelevant but also fondly remembered childhood advertising icon, Play-Doh Pete), we provide further evidence that affect toward the ad-related stimulus (e.g., the advertising character) drives the observed biased product evaluation.

A limitation of study 3 is that it is possible that the observed effects are due to priming congruency rather than enhanced ability and motivation to correct bias. In study 4, we directly test this limitation. Furthermore, an unanswered question from studies 1–3 is whether observed biased product evaluations are limited to the original advertised products or whether they can transfer to line extensions that use the same advertising stimuli. Therefore, in study 4 we directly test whether positive affect toward childhood advertising stimuli can lead to biased product evaluations for line extensions.

## STUDY 4

In study 4, we replicate and extend study 3 in four ways. First, we provide convergent evidence for the finding that positive affect interferes with bias correction even when ability and motivation to correct bias are high. Second, we introduce a cognitive defense intervention to enhance ability to correct bias favoring products endorsed by childhood advertising (as opposed to making the source of biases merely salient, as in study 3). Third, we introduce a measure to determine whether participants' motivation to attend to their biases enhances correction (as opposed to priming motivation to correct bias, as in study 3). Fourth, we examine whether these biased product evaluations transfer to line extensions represented by the same advertising stimulus.

We predict that affect toward childhood advertising stimuli will not only lead to biased evaluations of the originally advertised products but also carry over to line extensions. This is because people often use affect toward extant brands in memory to form evaluations of line extensions, through a process known as affect referral (Boush and Loken 1991). If true, this finding would have important practical implications because childhood brand icons are often extended beyond the products they originally represented and thus could create further consumer vulnerability when evaluating line extensions. For example, Trix cereal was introduced in 1954. The brand began using its famous advertising character, the Trix Rabbit, in 1959. The brand name and the Trix Rabbit advertising character were extended to a new Trix yogurt product decades later, in 1998. Because the essential advertising stimuli are identical, we predict that biased product evaluations will occur not only for original products but also for logical line extensions. Formally:

**H4**: Exposure to advertising in childhood leads to biases that favor line extensions in adulthood.

Whereas study 3 makes the source of bias salient as a means to enhance ability to correct bias, in study 4 we use a metacognitive bias correction procedure. In addition, whereas study 3 used a motivational prime to correct biases resulting from childhood exposure to advertising, in study 4 we assess motivation to attend to the information provided through a choice task. Such a replication with different bias correction mechanisms would rule out the possibility that study 3's effects are driven merely by priming/behavior congruency and would provide strong converging evidence that exposure to advertising in childhood can lead to resilient biased product evaluations that persist into adulthood. In study 4, we enhance ability to correct bias by manipulating participants' active defense against childhood advertising. Brucks et al. (1988) found that training children on the nature of advertising and encouraging them to be skeptical of claims helps them defend against advertisements. Similarly, making people aware of their own potential biases facilitates correction of those biases (Wegener and Petty 1995), and making persuasion motives more accessible affects adults' evaluations of influence agents (Campbell and Kirmani 2000). That is, when cognitive defenses are made active for advertising experienced in childhood, bias correction should occur, provided that there is also sufficient motivation to do so. As in study 3, we also measure positive affect toward the advertising stimulus because we predict that it interferes with bias correction. In addition, we extend the results of study 3 by having participants rate a fictitious line extension of the original product.

### Method

Seventy-eight US–born and raised undergraduate students at the University of Arizona (40% female) participated in exchange for partial course credit. This experiment employs a between-subjects design with one manipulated (bias correction: cognitive defense activated/not) and two measured (motivation to attend to bias correction information, affect toward the advertising stimulus) independent variables.

As in study 3, we first showed an image of the target childhood advertising character (Tony the Tiger; see appendix) and directed participants to complete the same childhood memory exercise as in study 3, in which they were asked to visualize a memory involving the image. To control for order effects of accessibility of affect and accessibility of bias correction mechanism, we conducted the correction manipulation after the memory exercise, whereas in study 3 the correction manipulation preceded the memory exercise.

We then activated cognitive defense by prompting participants to think about potential biases they might hold from being exposed to advertising when they were children. This manipulation was disguised as a task unrelated to the memory exercise to avoid demand characteristics that might arise from explicitly informing participants about the lack of advertising knowledge in children soon after they had described a memory of a childhood advertising character. Study instructions informed participants that their university was seeking their opinions about a possible topic for an ostensible research symposium on marketing and society. Participants were directed to vote for one of two choices: one on slotting fees for shelf space and the other on vulnerable consumers. Participants read a passage about each topic, and their vote served as a measure of motivation to process information related to sources of bias. To ensure that participants actively read the passages, they were told that they would be asked further questions about the topic.

All participants read the same passage about shelf space, but we manipulated the passage that they read for the vulnerable consumers topic. In the bias correction condition, we made participants aware of sources of potential bias to enhance correction (Brucks et al. 1988; Campbell and Kirmani 2000; Wegener and Petty 1995) by having them read a short passage about children's incapacity to defend against advertisements due to their lack of advertising knowledge. In the control condition, participants read a passage about elderly consumers and their reduced capacity to defend against advertisements due to cognitive decline.

Participants were then directed to a fictitious new product that the Kellogg Company was ostensibly developing and were told that the company was interested in the opinions of college students. The product was described as "Frosted Puffs," a presweetened, puffed corn cereal. We constructed an image that resembled an actual cereal box, featuring the advertising character (Tony the Tiger), a photograph of the fictitious product, a realistic-looking logo, and the information "130 calories per serving" and "contains 10 essential vitamins and minerals" on the box, similar to what is on current cereal products. None of the participants reported disbelief about the veracity of the image of the box during debriefing. Next, participants rated the product on the health-related items from the previous studies again embedded among the same remaining measures (e.g., "fun to eat") on 7-point scales.

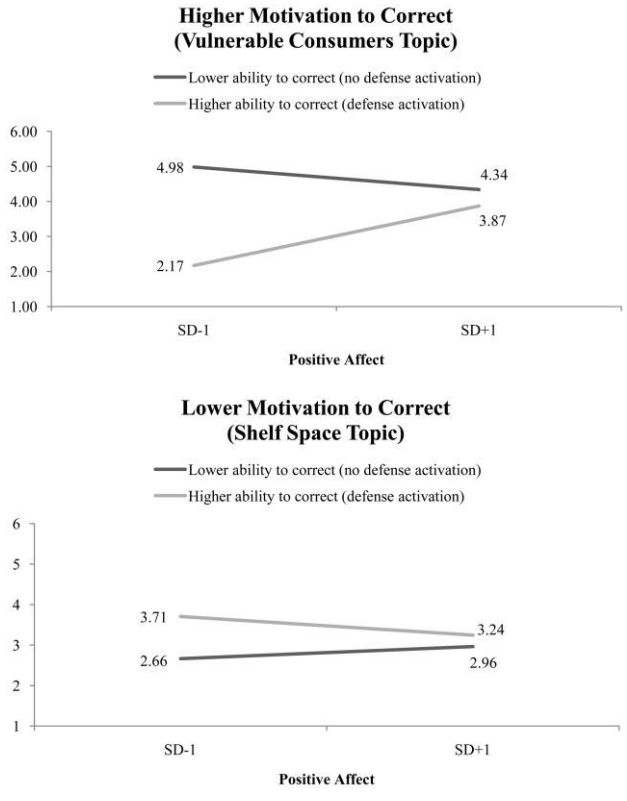
## Results

We expected to conceptually replicate the results of study 3, which used the originally advertised product, with a line extension. We tested this prediction with a general linear model, with bias correction condition and motivation to attend to information as categorical independent variables, the feeling thermometer measure as a continuous independent variable, and the composite of the health-related items on the product evaluation exercise ($\alpha = .86$) as the dependent variable. There was a significant main effect of motivation to correct bias ($F(1, 71) = 6.83$, $p = .01$) and a significant two-way interaction effect of defense activation and motivation to correct bias ($F(1, 71) = 11.77$, $p < .001$) on the health evaluation measure. These effects were qualified by the predicted three-way interaction ($F(1, 71) = 5.42$, $p < .05$; see fig. 5).

As in study 3, higher levels of positive affect felt toward the advertising character interfered with bias correction when ability to correct was enhanced and participants were motivated to attend to the message (i.e., lowered health evaluations of the associated product; $t = 2.94$, $\beta = .55$, $p < .01$). Also replicating the pattern in study 3, evaluations did not change regardless of the level of felt affect in the other three conditions (all $t < |1|$). We began interpreting the three-way interaction by examining the significant defense activation × affect interaction among participants who were highly motivated to correct bias ($F(1, 32) = 5.92$, $p < .05$). We ran spotlight analyses on these participants (i.e., selected vulnerable consumers as the more interesting topic) by mean centering the feeling thermometer measure and rerunning the model when affect was both "high" (or extremely positive, at 1 standard deviation above the mean, 89.88/100 degrees) and "low" (or neutral/mildly positive, at 1 standard deviation below the mean, 52.79/100 degrees). When affect was extremely positive, we found no difference between the defense activation/ability to correct conditions on health evaluation (estimated means at +1 standard deviation positive affect: $M_{\text{defense}} = 3.87$, $M_{\text{no def}} = 4.34$; $F < 1$). When affect was neutral/mildly positive ("low"), participants who were motivated to attend to the bias correction manipulation adjusted their health evaluations downward (estimated means at +1 standard deviation positive affect: $M_{\text{defense}} = 2.17$, $M_{\text{no def}} = 4.98$; $F(1, 32) = 15.69$, $p = .001$). The defense activation × affect interaction was not significant for less motivated participants ($F < 1$).

**FIGURE 5**

ESTIMATED MEANS OF HEALTH JUDGMENT AS A FUNCTION OF POSITIVE AFFECT TOWARD ADVERTISING STIMULUS AND BIAS CORRECTION (STUDY 4)




## Discussion

Study 4 replicates the findings of study 3, along with two important additions. First, we introduce a second bias correction mechanism to show that the results of study 3 are

not unique to the priming technique used but are due to participants' attempt to correct when ability and motivation to do so are enhanced. Second, the results of study 4 confirm that biased product evaluations resulting from affect toward childhood ad-related stimuli are not limited to the originally advertised product but can carry over to line extensions as well. This carryover effect is likely due to affect referral, in which affective information held in memory for an original product (in this case, affect toward its advertising character) carries over to a line extension (Boush and Loken 1991).

## GENERAL DISCUSSION

To our knowledge, this research is the first to hypothesize and test a model that explains how childhood exposure to advertising can have effects on product evaluation that persist into adulthood. We argue that biased product evaluations begin when people are exposed to advertising as children, a time when they do not possess sufficient capacity to defend effectively against advertisements (i.e., under age 13). Because of the affective nature of child-oriented advertising and developmental constraints on processing, brand knowledge structures developed in childhood lead to more biased evaluations in adulthood than knowledge structures developed in adulthood (study 1). Moreover, we show that positive affect that develops for ad-related stimuli at this vulnerable stage mediates the relationship between childhood exposure to advertising and subsequent biased product evaluations. Study 2 demonstrates that positive affect toward ad-related stimuli (rather than consumption) evokes biased product evaluations over and above positive affect toward personal consumption. This result lends support to our argument that advertising exposure is driving the effects observed in study 1. Furthermore, convergent evidence from studies 3 and 4 reveals that these biased product evaluations are difficult to correct. Finally, study 4 suggests that these biased evaluations are not limited to the original endorsed product but can carry over to line extensions, even if those line extensions are introduced when the individual is an adult.

### Practical Implications

Our results have important implications for managers and policy makers alike. On the one hand, the studies suggest that resources invested in child-oriented advertising provide benefits to the brand long after the audience has grown up. On the other hand, the results raise concerns about advertising products with potentially adverse health consequences. Thus, the findings of this research could add fuel to the debate over the consequences of advertising to children, because we demonstrate that such advertising can lead to effects that have the potential to affect judgment for years or perhaps even decades.

Understanding the long-term effects of promotional messages that children see is critically important to creating effective public policy, especially in health contexts such as tobacco use (Freeman et al. 2009) and food consumption (Brownell and Horgen 2004; Institute of Medicine 2005). Not only does affect from childhood advertising persist to bias health evaluations in adulthood, but these biases are also difficult to correct among consumers with the strongest levels of positive affect. Public health interventions to debias consumers are likely to be most effective for people with lower levels of felt positive affect toward childhood ad-related stimuli. However, these interventions would most likely have no effect among the population that is likely to need it the most: those experiencing very high levels of positive affect. Purely from a public health standpoint, it may be more efficient to address health evaluation biases at their source—that is, affectively oriented advertisements directed to children.

Our research also has implications for effective social marketing. Nonprofit organizations have long capitalized on positive affect toward ad-related stimuli in promoting outcomes beneficial to society. For example, Smokey the Bear promotes fire safety, Woodsy the Owl campaigns against littering for the US Forest Service, and McGruff the Crime Dog advocates for the National Crime Prevention Council. Similarly, ad-related stimuli such as advertising characters or jingles have the potential to increase the efficacy of other social marketing efforts, such as smoking and drug abuse prevention and antibullying. Our results imply that such campaigns may have beneficial consequences that could last beyond childhood. However, even if the results are positive, it could be argued that such an approach could be ethically questionable when it is, for all intents and purposes, exploiting a vulnerability.

### Limitations

This research is an initial foray into the long-term effects of advertising to children on product evaluations in adulthood. Indeed, our investigation raises many questions while answering a precious few. We use retrospective methodology to test what is essentially a longitudinal hypothesis. Although this approach has its merits, large-scale, longitudinal studies would not only provide convergent evidence for the effects we observe but also help answer many questions our research raises. More specifically, longitudinal studies can provide more accurate data on television and advertising exposure as it is happening. Such data might reveal how positive affect toward ad-related stimuli forms, which our current inquiry does not address. For example, is this affect caused by repeated exposure, integration of the advertising stimuli into the self-concept, transportation from the advertising's narrative, or some other mechanism(s)?

As another limitation, we did not uncover the exact nature of the affect felt toward advertising-related stimuli. For example, nostalgia could play a key role in these biases. Nostalgia is commonly a positive emotion that reflects a sentimental longing for the past (Sedikides et al. 2008) and can influence consumer behavior for products such as music and film (Holbrook 1993; Holbrook and Schindler 1989). Indeed, previous research on autobiographical memory has

noted a strong link between evoking past memories and positive affect (Sujan, Bettman, and Baumgartner 1993). One of the hedonic items we measured, "brings back fond memories," partially captures this construct. If nostalgia were a primary driver of the effects we observed, this item should influence biased product evaluations in the same way as the positive affect measure. However, when we ran these analyses, the results were inconsistent (i.e., significant in studies 1 and 3 but not in studies 2 and 4). Thus, although nostalgia might play a role in our observed biased product evaluations, it is not a sufficient explanation. Given that some people are more prone to nostalgia than others (Holbrook 1993), we acknowledge that nostalgia could play a moderating role in the biases we observed in all four experimental studies. Further research could determine whether people who are particularly prone to nostalgia are (1) more likely to develop positive affective attachments to childhood advertising stimuli and (2) less likely to correct for their resulting biased product evaluations.

Our investigation relies on advertising characters as a context to study biased product evaluations. However, advertising characters are only one of the many ad-related stimuli to which children are exposed; other stimuli include jingles, slogans, logos, product packaging, and an array of other communications elements. We acknowledge that some of these stimuli are more likely to elicit strong positive affect than others. Advertising characters could be a uniquely powerful form of children's advertising because of their many unique elements. For example, they usually combine both visual and auditory information in consistent narratives over time that are an integral part of brand personification (e.g., the Trix Rabbit's perennially unsuccessful attempts to obtain Trix cereal). Further research should determine which other advertising stimuli are likely to lead to lingering positive affect that can cause long-term biased product evaluations.

It is possible that some product attributes are more prone to persistent biases than others. We predicted and observed these effects for a product characteristic that is not experienced directly through consumption (healthfulness). Biasing effects on characteristics experienced during consumption (e.g., hedonic benefits, such as "good taste" or "fun to eat") are conceptually more complicated to predict because perceptual processes and experience-based learning are also involved. In an exploratory mode, we examined the effects of advertising and consumption stimuli on hedonic judgments in our studies. In study 1, the effects on hedonic evaluations mirrored those for health evaluations. In studies 2–4, the pattern of results did not conform to the predictions for health evaluations. Additional research is necessary to generalize our results to evaluations of product performance characteristics that may be learned through experience.

### Future Research Directions

We recommend that research be conducted using quasi experiments to further investigate the phenomena of long-term consequences of advertising targeted to children. For example, Goldberg (1990) found that English-speaking children reported having more presweetened breakfast cereals in their homes and had better awareness of advertised toys than did French-speaking children after a ban on advertising to children was enacted in Quebec province, Canada. Similarly, additional research could compare consumption of products advertised to children a decade or more ago across different media markets.

An emerging concern in children's advertising is an increase in exposure to commercial messages in newer media such as the Internet and video games (Moore 2004). We limited the scope of our research to television advertising, primarily because of its pervasiveness in the lives of our participants when they were children. While television continues to be an important media influence, other media are becoming increasingly influential, and little is known about how children respond to them in the present or about potential effects that persist into adulthood. Further research could determine whether the effects we observed for television advertising operate in similar ways for these newer media.

Finally, with the finding that advertising in childhood has effects that persist into adulthood and result in biased product evaluations, our research raises the question whether parents might be more vulnerable to their children's attempts to influence purchases when they harbor positive affect toward childhood advertising stimuli. For example, research could determine whether a child might be more successful in influencing a parental purchase for a product that was advertised to the parent in his or her youth than for a newer product. Indeed, because many childhood advertising stimuli have been used for decades and, in some cases, for nearly a century, the effects we observe may have an influence on the intergenerational transfer of consumption behaviors.

## DATA COLLECTION INFORMATION

Paul M. Connell conducted or oversaw data collection on all studies. Melanie Brucks and Ellen Thomas from the Department of Psychology at the University of Arizona conducted content analyses for study 2 in exchange for monetary compensation. Paul M. Connell performed all statistical tests with the assistance of Merrie Brucks in studies 3 and 4 and Jesper H. Nielsen in studies 1 and 2. Participants in study 1 were recruited in the United Kingdom via Qualtrics panels in December 2012. Participants in study 2 were recruited in the United States via Amazon Mechanical Turk in June 2013. Participants in study 3 were undergraduate Introduction to Marketing students drawn from a subject pool at the University of Arizona in the fall semester of 2007. Participants in study 4 were undergraduate Introduction to Marketing students drawn from a subject pool at the University of Arizona in the spring semester of 2008.

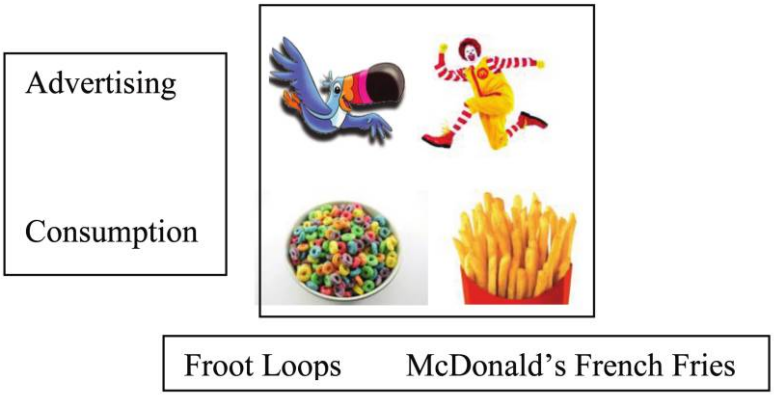
# APPENDIX

## EXPERIMENTAL STIMULI

### Study 1

Earlier stimulus (Tony the Tiger)/later stimulus (Coco the Monkey)

### Study 2




### Study 3


Relevant/irrelevant stimulus

### Study 4

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