



# Influence of Cartoon Media Characters on Children's Attention to and Preference for Food and Beverage Products

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Figure 1 is available at [www.andjrn.org](http://www.andjrn.org)

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## ABSTRACT

**Background** Over-consuming unhealthful foods and beverages contributes to pediatric obesity and associated diseases. Food marketing influences children's food preferences, choices, and intake.

**Objective** To examine whether adding licensed media characters to healthful food/beverage packages increases children's attention to and preference for these products. We hypothesized that children prefer less- (vs more-) healthful foods, and pay greater attention to and preferentially select products with (vs without) media characters regardless of nutritional quality. We also hypothesized that children prefer more-healthful products when characters are present over less-healthful products without characters.

**Design** On a computer, participants viewed food/beverage pairs of more-healthful and less-healthful versions of similar products. The same products were shown with and without licensed characters on the packaging. An eye-tracking camera monitored participant gaze, and participants chose which product they preferred from each of 60 pairs.

**Participants/setting** Six- to 9-year-old children (n=149; mean age=7.36, standard deviation=1.12) recruited from the Twin Cities, MN, area in 2012-2013.

**Main outcome measures** Visual attention and product choice.

**Statistical analyses performed** Attention to products was compared using paired-samples *t* tests, and product choice was analyzed with single-sample *t* tests. Analyses of variance were conducted to test for interaction effects of specific characters and child sex and age.

**Results** Children paid more attention to products with characters and preferred less-healthful products. Contrary to our prediction, children chose products without characters approximately 62% of the time. Children's choices significantly differed based on age, sex, and the specific cartoon character displayed, with characters in this study being preferred by younger boys.

**Conclusions** Results suggest that putting licensed media characters on more-healthful food/beverage products might not encourage all children to make healthier food choices, but could increase selection of healthy foods among some, particularly younger children, boys, and those who like the featured character(s). Effective use likely requires careful demographic targeting.

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**A**MERICANS OVER-CONSUME FOODS HIGH IN CALORIES, saturated fat, sodium, and added sugar<sup>1</sup>; such poor-quality diets (ie, those that disproportionately contain nutrient-poor foods) increase risk of overweight/obesity<sup>2</sup> and health problems, including type 2 diabetes<sup>3</sup> and heart disease.<sup>4</sup> The high prevalence of obesity among children (16.9%) and increase in type 2 diabetes are especially concerning.<sup>5,6</sup> Many factors encourage poor-quality diets among children, including stronger preferences for sweet and salty flavors compared with adults, likely because of both biological drives and frequent exposure.<sup>7,8</sup> Dietary preferences and choices are also influenced by food

marketing,<sup>9-12</sup> which is pervasive in the United States. For instance, Nielsen Media Research estimates that 6- to 11-year-olds see more than 4,750 food advertisements annually, with 44% of these for energy-dense, nutrient-poor foods such as sweets, snacks, and fast food.<sup>13</sup> Major reports from the Federal Trade Commission and Institute of Medicine have concluded that food marketing influences children's preferences for and consumption of unhealthy foods.<sup>14,15</sup>

One important way in which companies market their products is with food and beverage packaging. Common techniques used by food, beverage, and restaurant companies are to either license entertainment companies' media

characters (eg, Dora the Explorer [owned by Viacom/Nickelodeon]) or use their own brand mascots (eg, Tony the Tiger [owned by Kellogg Co]) to induce children to notice and like their products.<sup>16,17</sup> The rationale from socio-cognitive theories and a parasocial interactions model is that positive associations children have with these familiar and likable characters will transfer to the brand or product, producing increased trust, loyalty, recognition, and preference.<sup>18,19</sup> A systematic review of character marketing's effects on children's cognitive, behavioral, and health outcomes<sup>19</sup> concluded that 3- to 6-year-old children preferred products with (vs without) characters, and that children prefer energy-dense foods with a character over fruits and vegetables bearing the same characters. At the same time, these data also suggest that licensed media characters can enhance the attractiveness of more-healthy food. For this reason, Sesame Street Workshop offered to freely license its characters for 2 years to fruit and vegetable producers.<sup>20,21</sup> However, the few studies that have examined such characters' influence on older children (7 to 9 years old) suggest less influence among this age group.<sup>22,23</sup> In addition, data are lacking regarding the mechanisms through which these characters influence children, although Kraak and Story's<sup>19</sup> synthesis of existing models provides a conceptual framework for inquiry on the topic.<sup>19</sup> One proposed mechanism is that cartoon characters capture children's attention,<sup>24</sup> but only one study has examined the amount of attention cartoon characters in food marketing receive among older children.<sup>25</sup>

This study extends existing research by examining the influence of licensed media characters' (henceforth referred to in this study simply as "characters" for brevity) influence on younger and older children's attention as well as behavioral intentions (ie, what the child would prefer to eat). *Attention* was chosen as an outcome measure based on evidence strongly connecting it with behaviors,<sup>26</sup> and *food/beverage preferences* based on the widely used theory of planned behavior, which identifies behavioral intentions as key proximal predictors of behavior.<sup>27</sup>

We hypothesized that, in a simulated task in which participants had to select a preferred food, children: H1) pay more attention to products with (vs without) characters; H2) have a preference for less-healthy (vs more-healthy) products when a character appears on both products or does not appear on either product; H3) demonstrate a preference for products with (vs without) characters; and H4) prefer more-healthy products with a character vs less-healthy products without a character. We also explored whether the specific cartoon character shown or child age and sex moderated associations between character preference and food choice.

## METHODS

### Participants

A convenience sample of Minneapolis/St Paul, MN—area children (n=149) participated in a "computer game" assessing food and beverage preferences. Children were eligible if they were between 6 and 9 years old and if an English-speaking parent or guardian could accompany them. Participants were recruited using a variety of print, online, and in-person techniques in 2012 and 2013. Children

saw two products side-by-side on a computer screen in an on-campus laboratory and were told to press the button on the left-hand side of a videogame controller if they would prefer to eat the product on the left-hand side of the screen, and to press the button on the right if they would prefer to eat the product on the right. The University of Minnesota Institutional Review Board approved the study protocol; participants' parents provided written informed consent, and participants provided written assent.

### Procedure

The computer game was created and presented using SR Research's Experiment Builder<sup>28</sup>; attention was tracked with an EyeLink 1000, high-speed, desk-mounted eye-tracking camera (SR Research, Ottawa, Ontario, Canada). A chin rest ensured the highest levels of accuracy (0.25 degrees) and resolution (0.01 degrees).

A bank of 30 matched food/beverage pairs available in the US marketplace was created consisting of a more-healthy and a less-healthy version of a product from a shared category (eg, dried fruit vs fruit snacks, respectively) that either did or did not have a cartoon character on its package.\* Examples of food categories included yogurt, corn chips, bread, and cereal. NuVal scores were used to determine which of two paired products would be considered more- and less-healthy.<sup>29</sup> These proprietary scores, licensed by many large national supermarket chains, range from 1 (least healthy) to 100 (most healthy) based on the Overall Nutritional Quality Index, an algorithm designed by nutrition scientists. NuVal scores were obtained from supermarket shelf tags. In the present study, the more-healthy food in each pair received a NuVal score, on average, 26.7 points (55.7%) higher than its less-healthy counterpart.

Each child completed 60 trials that required them to view product pairs (eg, dried fruit vs fruit snack) within a given food/beverage category and chose which product in the pair they wanted to eat. For each food pair, we varied whether each food was more or less healthy and whether each food displayed a character. Children saw six possible combinations (Table) of less- or more-healthy foods with or without characters across 10 randomly selected food/beverage pairs. For example, for the category of fruit, six trials compared raisins and fruit snacks. A child might first see both foods without a character, then both foods with characters, then raisins with a character and fruit snacks without a character, then the reverse, then raisins with and without a character, and finally fruit snacks with and without a character. Children saw all six comparison types for each pair of matched products. Products with each attribute combination (more/less healthy, character/no character) were counterbalanced to appear equally often on the left-hand and right-hand side of the screen.

We used the following three characters in this study: Lightning McQueen (owned by the Walt Disney Company), SpongeBob SquarePants (owned by Viacom/Nickelodeon), and Dora the Explorer, which all appeared frequently on

\*The corresponding author is able to provide these stimulus images upon request.

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