Appetite 53 (2009) 76–83

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Research report

Food branding influences *ad libitum* intake differently in children depending on weight status. Results of a pilot study

Jamie Forman [a], Jason C.G. Halford [b], Heather Summe [a], Megan MacDougall [a], Kathleen L. Keller [a,*]

[a] New York Obesity Research Center, St. Luke's-Roosevelt Hospital Center, Columbia University College of Physicians & Surgeons, 1090 Amsterdam Avenue 14A, New York, NY 10025, USA
[b] School of Psychology, Eleanor Rathbone Building, Bedford Street South, University of Liverpool, Liverpool L69 7ZA, UK

ARTICLE INFO

Article history:
Received 9 March 2009
Received in revised form 11 May 2009
Accepted 15 May 2009

Keywords:
Food marketing
Food branding
Childhood eating behavior
Obesity
Laboratory intake

ABSTRACT

Environmental changes have facilitated the rapid increase in childhood obesity. One such change is increased presence of food marketing which promotes intake of high-fat, energy-dense foods. This study tested the hypotheses that overweight (OW) children are more sensitive to the intake-enhancing effects of food branding than non-OW children, and that the relationship between weight status and intake of branded foods is mediated by level of food brand awareness. Forty-three non-OW ($n = 23$) and OW ($n = 20$) children from diverse ethnic backgrounds participated in four dinnertime visits to test their intake of meals where food brands were present ("branded") or absent ("unbranded"). Food brand awareness was assessed by testing children's abilities to match food brand logos with correct foods and name specific brands from recall. Weight and height were measured on the first visit to determine BMI *z*-score and weight status. OW children consumed significantly more energy per meal than non-OW. Child age and brand awareness were positively associated. OW children consumed an additional 40 kcal in branded vs. unbranded meals whereas non-OW children consumed 45 kcal *less* in branded meals. Overweight children showed greater responsiveness to food branding, and they may be at risk in environments that are highly inundated with messages about food.

Published by Elsevier Ltd.

Introduction

Currently, 17% of United States (US) children are considered obese and one in every three children is overweight (OW) (Ogden et al., 2006). While multiple biological factors may mediate individual susceptibility to obesity (Hill, 2006), most experts agree that environmental changes have facilitated the rapid increase of the disease in recent years. A primary environmental factor associated with childhood obesity is increased television (TV) viewing (Campbell, Crawford, & Ball, 2006; Cooper, Klesges, Debon, Klesges, & Shelton, 2006). Excess TV viewing increases the amount of sedentary time and might displace time available for physical activity. Additionally, TV viewing is often accompanied by food consumption (Matheson, Killen, Wang, Varady, & Robinson, 2004), particularly of energy dense snack foods (Coon, Goldberg, Rogers, & Tucker, 2001; Halford, Gillespie, Brown, Pontin, & Dovey, 2004) and this may be due in part to a disruption in food cue habituation that occurs when one is viewing a TV program (Temple, Chappel, Shalik, Volcy, & Epstein, 2007). Finally, food advertisements might directly affect intake by either stimulating hunger and/or encouraging children to consume the specific foods that are marketed (Borzekowski & Robinson, 2001). Most often foods advertised during children's and family programs are cereals, snacks, and fast foods (Powell, Szczypka, Chaloupka, & Braunschweig, 2007), many of which are high in sugar, fat, and calories.

Food marketing is considered one of multiple components of the external environment that show potential associations with obesity (Lobstein & Dibb, 2005), but the mechanism of this effect has not been investigated. Studies (Borzekowski & Robinson, 2001; Brody, Stoneman, Lane, & Sanders, 1981; Robinson, Borzekowski, Matheson, & Kraemer, 2007) suggest that food advertisements alter children's preference for specific food brands, but few have investigated how advertisements subsequently impact food intake. One possibility is that advertisements act as cues for food consumption and exposure to them may promote eating in individuals who are responsive to these messages and/or images. Several studies suggest that OW adults (Herman & Polivy, 2008; Stoeckel et al., 2008) and OW children (Carnell & Wardle, 2008) may be more responsive to food cues and they often score higher on scales that measure external eating (Braet et al., 2008; Elfhag and Morey, 2008). If OW children are more motivated by external food cues, they might also be more vulnerable to influences from food advertisements. Further, there is evidence that OW children find food more reinforcing than non-OW children (Temple,

* Corresponding author.
E-mail address: kk2092@columbia.edu (K.L. Keller).

0195-6663/$ – see front matter. Published by Elsevier Ltd.
doi:10.1016/j.appet.2009.05.015

Bulkley, et al., 2008), so the combined forces of a memorable advertisement with a palatable food source could increase the temptation for children who are susceptible. Recent evidence to support this came from studies conducted by Halford et al. (2004, 2008). There were two main findings in these studies. First, OW children were able to recognize more food-related advertisements than non-OW children (Halford et al., 2004). Second, OW children increased their food intake to a greater extent when they were exposed to food advertisements (Halford et al., 2004; Halford et al., 2008). Thus, under certain conditions, OW children appear more vulnerable to the effects of food advertising than non-OW children. However, the studies were conducted in older children (9–11 years) at an age where children's experience and knowledge of food promotion was arguably already well developed. When these researchers examined children who were 5–7 years old, increases in intake after advert-exposure were similar regardless of weight status (Halford, Boyland, Hughes, Oliveira, & Dovey, 2007). Further studies to clarify these relationships in younger children are necessary.

While researchers have predominately focused on the effect of a single advert or blocks of adverts on children's intake, one question that remains unresolved is whether or not OW children are more vulnerable to other forms of food advertising, particularly branding. Branding is a form of marketing aimed at promoting recognition with a company brand or product, in the hopes that children will form emotional attachments to these products and eventually be lifelong consumers (Connor, 2006). Because children often reject foods that are novel or unfamiliar (Fallon, Rozin, & Pliner, 1984), product branding may help reduce this neophobia by offering children a familiar package for food delivery. The powerful effects of food branding were seen recently in a study by Robinson et al., where children had higher preferences for foods in McDonald's® wrappers, regardless of whether the foods contained in the packaging came from McDonald's® or not (Robinson et al., 2007). Because this study did not test for differences in branding's effects as a function of child weight status and did not assess the effects of branding on subsequent intake, additional studies are warranted.

There were two main objectives for the present study. First, we tested the hypothesis that OW children ages 4–6 years will increase their intake under laboratory conditions where foods are branded compared to when foods are not branded, and this increase will be greater than the increase experienced by non-OW children. In order to determine the effect of child weight status on response to food brands independently, we adjusted for covariates such as age, sex, ethnicity, and socioeconomic status. Second, a novel instrument was developed using a logo-based procedure to assess both brand recognition and recall to test the hypothesis that increased food brand awareness would be associated with higher BMI *z*-scores and would mediate the relationship between weight status and intake at the branded conditions.

Methods

Participants

Forty-three, 4–6 years old children (26 girls; 17 boys), mean age (±SD) 5.9 years (±0.9) participated in this study. Children were from diverse ethnic backgrounds, with 42% African American, 19% Hispanic, 19% Caucasian, and 19% defined as other, which typically signified a child of mixed ethnic origin. Forty-five percent of families were low-income, as identified by a reported annual earning of ≤$20,000 per year, although 98% reported having cable television. Twenty-three children were classified as non-OW (BMI-for-age ≤ 85th %) and 20 were classified as "at risk for overweight" (BMI-for-age ≥ 85th %), referred to as OW throughout.

Four- to six years old children were selected because this age group has been shown to be highly affected by food advertisements and can recognize food brands (Fisher, Schwartz, Richards, Goldstein, & Rojas, 1991). The intention was to select children that were influenced by food advertising but that were old enough to perform the testing procedures used to assess brand awareness.

Families were recruited by posting flyers on the Internet and in and around the study site (the Child Taste and Eating Laboratory at St. Luke's Hospital). Interested parents phoned the research staff to be screened, and if eligible, were scheduled for study visits. Children were excluded from the study if they had any pre-existing medical conditions, were taking any medications known to affect taste and body weight or did not have a television in the house. Also, eligible children had to be familiar with all the food brands used in the study, and had to report liking at least five out of seven (assessed during the initial phone screening). Familiarity and liking for each of the seven foods were assessed during the initial phone screen by having the mother report the appropriate response for each food on a dichotomous scale (yes vs. no). Children who were not familiar with all seven of the food brands used in the test-meal were excluded. Also, children whose parents reported that they liked less than five out of seven of the foods were also excluded. The purpose of this procedure was to ensure that unfamiliarity with the food brands would not affect children's intake of these foods in the laboratory.

The study was approved by the Institutional Review Board of St. Luke's Roosevelt Hospital. A parent (most often the mother) gave informed consent for the child, and the child verbally agreed to participate. After the study, each family was compensated $125 for time and travel expenses.

Experimental design

A 2 × 2 factorial design was used where non-OW and OW children (condition) were exposed to test meals where all foods were either branded or unbranded (treatment). Meals were presented to the children in randomized order across four separate, nonconsecutive visits to the Child Taste and Eating Laboratory. On two of the visits, children received meals in which the brands on all foods were clearly visible ("branded"), while on the other two visits, all foods were packaged in plain, unrecognizable plastic bags or containers ("unbranded").

Food brand recognition

An age-appropriate instrument that used pictures of food logos to test children's recognition and recall was developed that consisted of 30 pictures that were representative of food brand logos. Pictures and/or product logos were chosen that varied in familiarity and perceived healthfulness (see Appendix A). These foods were selected based on discussions between the lead investigators and research colleagues working on this project, and were designed to represent both well-recognizable and lesser known food brand images in addition to brands from healthy and unhealthy foods. Because children this age may have a decreased ability to recall brand images by name (Macklin, 1983), a forced-choice procedure was established where each food brand logo was paired with 3 pictures of foods, one of which correctly matched with the logo. All pictures [a total of 30 brand logos, and 90 foods (3 per brand logo)] were laminated in 8 × 11.5 sheets and placed in a 3-ring binder for ease of presentation. One of the example presentations is found in Appendix B, for further explanation.