



Child-targeted TV advertising and preschoolers' consumption of high-sugar breakfast cereals



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ABSTRACT

Breakfast cereals represent the most highly advertised packaged food on child-targeted television, and most ads are for cereals high in sugar. This study examined whether children's TV exposure to child-targeted, high-sugar breakfast cereal (SBC) ads was associated with their consumption of those SBC brands. Parents of 3- to 5-year-old children were recruited from pediatric and Women, Infants, and Children (WIC) clinics in Southern New Hampshire, USA, and completed a cross-sectional survey between April–December 2013. Parents reported their child's consumption of SBC brands; whether their child had watched any of 11 kids' channels in the past week; their child's TV viewing time; and socio-demographics. Children's exposure to child-targeted SBC TV ads was calculated by combining TV channel and viewing time with advertising data for SBC ads aired on kids' TV channels during the same timeframe. Five hundred forty-eight parents completed surveys; 52.7% had an annual household income of \$50,000 or less. Children's mean age was 4.4 years, 51.6% were female, and 72.5% were non-Hispanic white. In the past week, 56.9% (N = 312) of children ate SBCs advertised on kids' channels. Overall, 40.6% of children were exposed to child-targeted SBC TV ads in the past week. In fully adjusted analyses, the number of SBC brands children consumed was positively associated with their exposure to child-targeted SBC ads. Children consumed 14% (RR = 1.14, 95% CI: 1.02, 1.27) more SBC brands for every 10 SBC ads seen in the past 7 days. Exposure to child-targeted SBC TV advertising is positively associated with SBC brand consumption among preschool-aged children. These findings support recommendations to limit the marketing of high-sugar foods to young children.

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1. Introduction

Public health advocates are concerned about the marketing of high-sugar, ready-to-eat breakfast cereals (SBCs) to young children (Federal Trade Commission, 2008; 2012; Institute of Medicine, 2006; World Health Organization, 2010). In the U.S., the breakfast cereal industry is the second leading food advertiser to children under age 12, spending \$173 million annually directly marketing

ready-to-eat cereals to children (Federal Trade Commission, 2012). Many ready-to-eat cereal brands have a lengthy history of marketing their products to child consumers, particularly by using animated brand mascots (e.g., General Mills' *Trix* rabbit; Kellogg's *Tony the Tiger*), and more recently through the use of cross-promotional tie-ins with popular licensed media characters (e.g., Nickelodeon's *SpongeBob SquarePants*) appearing on cereal boxes (Kraak & Story, 2015b). Ample evidence suggests that the cereals most heavily advertised to children are the least nutritious, primarily because they contain the greatest amounts of added sugars (Batada, Seitz, Wootan, & Story, 2008; Kraak & Story, 2015a; LoDolce, Harris, & Schwartz, 2013; Schwartz, Vartanian, Wharton, & Brownell, 2008; Schwartz et al., 2010). The Rudd Center for

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Food Policy and Obesity demonstrated that child-targeted cereals contained 57% more sugar than adult-targeted cereals (LoDolce et al., 2013; Rudd Center for Food Policy and Obesity, 2012). In an analysis of cereal brands, the Environmental Working Group found that 78% of child-targeted cereals contained over two teaspoons of sugar per serving (Environmental Working Group, 2014).

Television is the primary type of media used by preschool-age children (Common Sense Media, 2013), and much of child-targeted cereal marketing occurs on television (Federal Trade Commission, 2012). Ready-to-eat cereals represent the most highly advertised packaged-food category to children on TV, with estimates indicating children view hundreds of televised cereal ads annually (LoDolce et al., 2013; Powell, Szczypka, & Chaloupka, 2007). Hingle and colleagues analyzed a sample of food advertisements aired during children's TV programming in 2013 and compared product nutrient data to the voluntary nutrition guidelines proposed by a coalition of four federal agencies (Hingle, Castonguay, Ambuel, Smith, & Kunkel, 2015; Interagency Working Group on Foods Marketed to Children, 2011). Ready-to-eat cereals accounted for over one-third of TV ads in this sample, yet none of the advertised cereals met the federal nutrition guidelines for added sugar (i.e., not more than 8 g of sugar per serving) (Hingle et al., 2015). Exposure to child-targeted ready-to-eat cereal TV advertising is associated with family purchases of the advertised products. Using Nielsen household panel food purchasing data, Castetbon and colleagues showed that households were 13 times more likely to purchase child-targeted cereals advertised on TV than cereal brands without advertising (Castetbon, Harris, & Schwartz, 2012). That study, however, did not examine actual consumption of purchased cereals.

Globally, marketing of high-sugar, high-fat foods to children has been identified as a risk factor for childhood obesity (Healthy Eating Research, 2015; Institute of Medicine, 2006; White House Task Force on Childhood Obesity, 2010; World Health Organization, 2012). Numerous international studies – primarily using experimental designs in controlled laboratory settings – indicate that children's food preferences, requests, and short-term consumption are influenced by exposure to child-targeted food marketing (Boyland & Halford, 2013; Boyland et al., 2016; Cairns, Angus, Hastings, & Caraher, 2013; Harris, Pomeranz, Lobstein, & Brownell, 2009). Additional research in non-controlled settings is needed to understand the potential impact of food marketing on children's usual eating behaviors in real-world environments with greater external validity (Institute of Medicine, 2006; White House Task Force on Childhood Obesity, 2010). Research meeting this criteria is mounting (Andreyeva, Kelly, & Harris, 2011); however, to date this evidence is primarily for foods (e.g., fast food, sugar-sweetened beverages) other than ready-to-eat breakfast cereals. We are unaware of any studies that have quantified the association between children's exposure to SBC TV ads and their actual cereal consumption. The purpose of this study was to assess whether children's TV exposure to child-targeted SBC ads was associated with their consumption of those SBC brands outside of a laboratory setting.

2. Materials and methods

2.1. Study design

Between April 2013 and March 2014, trained research assistants invited parents at pediatric outpatient and Women, Infants, and Children (WIC) clinics, located in Manchester and Nashua, NH, to complete a 15-min written survey about children's media use and food choices. Our recruitment sites were chosen because they provide access to a broad cross-section of families with young

children located in our catchment areas. WIC is a supplemental nutrition program in the U.S. To qualify, families cannot earn more than 185% of the poverty income level. Surveys were pre-tested with a demographically comparable sample for comprehension, face validity, and completion time. Eligibility for study participation included children's age (3–5 years) and parents' ability to complete a written consent form and survey in English or Spanish. If parents had multiple age-eligible children, we selected the child present for an appointment. If more than one child had an appointment, we randomly selected one. Parents received a \$10 gift card and children received a toy for participating. The study was approved by [BLINDED] Institutional Review Board.

Seventy-one percent of eligible parents completed a survey. The primary reason for not participating was insufficient time (44% of refusals). For this analysis, we assessed data from 548 parents surveyed between April and December 2013, which corresponded to our advertising data time period.

2.2. Measures

2.2.1. SBC consumption

We examined ten SBCs that were top-ranked in terms of child-targeted advertising (Rudd Center for Food Policy and Obesity, 2012) and were advertised on kids' TV channels during the last three quarters of 2013 (Kantar Media, 2013). The sugar content for these SBCs in 2013 ranged from 9 to 12 g of added sugar per ounce of cereal (i.e., approximately one serving size). We ascertained the number of advertised SBC brands children consumed by asking parents, "In the past 7 days, did your child eat any of the following cereals? (Apple Jacks, Honey Nut Cheerios, Cocoa Puffs, Cinnamon Toast Crunch, Froot Loops, Frosted Flakes, Lucky Charms, Pebbles—all flavors, Reese's Puffs, Trix)?" Responses were combined into a single count variable indicating the number of SBC brands each child had eaten in the past 7 days. For simplicity, we hereafter refer to this as SBC consumption.

2.2.2. SBC TV Ad exposure

Children's exposure to child-targeted SBC TV ads was based on parental report of children's viewing time and channels watched. For viewing time, we asked, "On average, how many days a week does your child do the following activities: watch TV (regular, cable, or satellite)? (0, 1–2, 3–4, 5–6, 7 days)." We then asked, "On days when your child does the following activities, about how much time does your child spend: watching TV (regular, cable or satellite)?" [response choices ranged from 0 to 6+ hours with 30-min segments]. For channels, we asked, "In the past 7 days, has your child watched any of the following TV channels? [Boomerang; Cartoon Network; The Disney Channel; Disney Junior; Disney XD; The Hub (now called Discovery Family); Nickelodeon; Nick Jr.; Nicktoons; PBS Kids; Sprout]" For each child, we calculated weekly TV viewing time by multiplying the number of days/week by the number of hours/day the child watched TV. We then estimated each child's weekly exposure to specific TV channels by dividing weekly viewing time by the number of kids' channels the child watched in the past 7 days.

All child-targeted SBC ads aired on kids' channels between April–December 2013 were obtained from Kantar Media™, a company that tracks TV commercials on an hourly basis. We assumed that all cereal ads aired on kids' channels were child-targeted. The SBCs asked about in the survey accounted for 97.5% of all SBC ads aired on kids' channels during this time period. For each day, we calculated channel-specific averages of the number of SBC ads aired per hour between 6am and 11pm or during child programming. For example, we did not include ads aired during Nick-at-Nite, which begins as early as 8pm and shares channel

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