



Racial/ethnic and income disparities in child and adolescent exposure to food and beverage television ads across the U.S. media markets[☆]

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ABSTRACT

Obesity prevalence and related health burdens are greater among U.S. racial/ethnic minority and low-income populations. Targeted advertising may contribute to disparities. Designated market area (DMA) spot television ratings were used to assess geographic differences in child/adolescent exposure to food-related advertisements based on DMA-level racial/ethnic and income characteristics. Controlling for unobserved DMA-level factors and time trends, child/adolescent exposure to food-related ads, particularly for sugar-sweetened beverages and fast-food restaurants, was significantly higher in areas with higher proportions of black children/adolescents and lower-income households. Geographically targeted TV ads are important to consider when assessing obesity-promoting influences in black and low-income neighborhoods.

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1. Background

In 2009–2010, nearly 17% of U.S. children ages 2–19 were classified as obese (Ogden et al., 2012). The data indicated that obesity prevalence was 24.3% among non-Hispanic black children and 21.2% among Hispanic children, compared to 14% among non-Hispanic white children (Ogden et al., 2012). Evidence also shows obesity prevalence is greater among children and adolescents living in lower-income households (Ogden et al., 2010). Marketing of foods and beverages that are unhealthy (i.e. high in saturated fat, sugar and/or sodium) to children and adolescents has received particular attention from researchers, public health advocates, and regulatory agencies as a probable contributor to the increased prevalence of childhood obesity (Federal Trade Commission, Centers for Disease Control and Prevention 2011; Kraak et al., 2011; Cheyne et al.,

2013; Powell et al., 2011; Federal Trade Commission, 2012; Institute of Medicine, 2006; Center for Science in the Public Interest, 2010). Exposure to food-related television advertising is associated with children's purchase requests, consumption patterns and adiposity (Chou et al., 2008; Institute of Medicine, 2006; Andreyeva et al., 2011).

Nutritional content studies show that despite industry pledges to promote only healthy products, relatively little progress has been made; the vast majority of television advertisements seen by or directed at children consist of unhealthy foods and beverages that are high in saturated fat, sugar or sodium (Harris et al., 2010; Harris et al., 2011; Harris et al., 2012; Powell et al., 2011; Kunkel et al., 2009; Powell et al., 2013). Exposure to television ads for foods increased between 2009 and 2011 among children ages 2–5 and 6–11 years, offsetting previous declines for children, while teens' exposure further increased and steepened its upward trend (Powell et al., 2013).

“Targeted marketing” refers to the common marketing strategy of directing products and product promotions to groups of consumers or ‘segments’ with common demographic or other relevant characteristics based on their presumed likelihood of buying the product (Kotler, 1975). Targeted product advertising may involve placing relatively more advertisements in channels that reach the population segment of interest, resulting in higher exposure, as well as tailoring the content of advertisements to be particularly salient for the targeted group; these strategies are often used in combination and concern about such marketing practices arises when relatively unhealthy products are being promoted to the

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targeted group (Grier and Kumanyika, 2010; Grier and Lassiter, 2013). The Federal Trade Commission reported that 48 food and beverage companies spent \$1.8 billion on youth-targeted marketing in 2009, of which \$632.7 (35.4%) was on television, the largest single medium through which products are marketed to youths (Federal Trade Commission, 2012).

Targeted marketing of food and beverages that are high in fat or sugar based on race/ethnicity has been documented in studies of exposure to national TV advertisements as well as the content of those ads (Grier and Kumanyika, 2008; Harris et al., 2010; Harris et al., 2011; Powell et al., 2010) and may contribute to or perpetuate the higher than average risks of obesity among black and Hispanic children. The disproportionate exposure of black and Hispanic youths to targeted television advertising is compounded by the fact that on average they are more likely to have TVs in their bedrooms and watch television an hour or more longer per day compared to their white peers (Rideout et al., 2010; Rideout et al., 2011). Of similar concern, low- to mid-socioeconomic status (SES) based on parents' education level is correlated with youths' viewing more TV (greater than 30 additional minutes) than their high-SES counterparts (Rideout et al., 2010). Further, a number of studies with multivariate analyses suggest independent associations of race/ethnicity and SES with children's and adolescents' TV viewing time (Gorely et al., 2004; Hoyos Cillero and Jago, 2010).

Television advertising can be targeted at local as well as national levels, increasing exposure among certain segments of the population; these two levels may be complementary or mutually reinforcing. Although national television ads can be targeted based on a given population's relative viewership of certain programming, advertising directed to local geographic areas can vary according to specific demographic characteristics such as racial/ethnic composition through placement of ads (referred to as "spot ads") in local media markets known as "designated market areas" (DMAs) (Gold, 2005). DMA media market data, including data with information about racial/ethnic characteristics of the area population, are made available to marketers for use in targeting ad placement and for other business purposes (The Nielsen Company, 2013).

To understand the patterns of geographically-based food and beverage product television advertisements seen by children and adolescents, we linked Nielsen DMA-level spot television ratings data for children aged 2–11 and adolescents aged 12–17 from 2003–2007 to DMA-level Census data on racial, ethnic and SES characteristics across DMAs. Controlling for unobserved media market-level factors and time trends, we assessed exposure according to the racial/ethnic composition of residents in DMAs and according to DMA-level median household income.

2. Methods

2.1. Advertising measures

Local spot food and beverage television ratings data reflecting the numbers of ads seen were licensed from Nielsen Media Research (NMR) for English language stations. Ratings were obtained for each year from 2003–2007 for the largest 129 DMAs in the United States. Nielsen's DMA[®] regions are geographic areas used when measuring local television viewing. DMAs vary in size, generally covering several counties, with some describing commonly recognized metropolitan areas. Nielsen tracks commercials either as full-disclosure markets (FDMs), which track all television advertising in the area, or automated discovery markets (ADM), which do not track commercials until they have appeared in a FDM (Szczyepka et al., 2003). Therefore, we examined the 88 DMAs that had been tracked as FDMs.

The NMR advertising data are based on individual ratings of television programs, obtained by monitoring household audiences across DMAs. Ratings are measured in units of Targeted Ratings Points (TRPs) for specific subgroups of the population within households, which we obtained for children aged 2–11 years and adolescents aged 12–17 years. An ad with 100 TRPs in the year, for example, is estimated to have been seen an average of one time by 100 percent of the given subgroup population in households with televisions in that DMA during that year. We used the ratings data to derive exposure measured as the weekly number of television ads seen, on average, by children and adolescents in a given DMA.

2.2. Food product categories

TRPs were aggregated at the brand level and then categorized across food product categories using NMR product classification codes that define its product categories based on definitions used by the Publishers Information Bureau (PIB) (Publishers Information Bureau, 2006). Food-related products were categorized into seven mutually exclusive categories, as reported elsewhere (Powell et al., 2007): cereal, sweets, snacks, beverages, other food products, fast-food restaurants and full-service restaurants. Several subcategories of beverages were examined including sugar-sweetened versus non-sugar-sweetened beverages and regular versus diet soda. The sugar-sweetened beverage (SSB) category was defined as including soda, fruit drinks, bottled water with added sugar, isotonic drinks (sports drinks), and other sugar-sweetened drinks. This beverage sub-category was created using a combination of PIB product classification codes and brand-specific nutrition information in order to correctly identify relevant products (Powell et al., 2011).

2.3. Demographic and socioeconomic information

We examined the association of racial/ethnic composition using four race/ethnicity categories: non-Hispanic white (white-reference category), non-Hispanic black (black), Hispanic, and non-Hispanic non-white/black (other race) (consisting mostly of non-Hispanic American Indians and Asians). The information on the percentage of children ages 2–11 and adolescents ages 12–17 in each of the four race/ethnicity categories was calculated using estimated population counts by age, year and county obtained from the 1990–2011 Bridged-Race Population Estimates produced by the U.S. Census Bureau in collaboration with the National Center for Health Statistics (United States Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, 2013). The total population for each DMA was added up for each age category (for ages 2–11 and 12–17) within each racial/ethnic group. The racial/ethnicity distribution of children or adolescents in each DMA was then calculated by dividing the respective racial/ethnic estimated population total for all available counties in each DMA by the total population for the two age categories in that DMA. Information on median household income and population was obtained by county and year from the Small Area Income and Poverty Estimates by the U.S. Census (U.S.Census Bureau, 2013).

Because the Nielsen ratings data were measured at the DMA level, the demographic and socioeconomic information was summed for all counties within each DMA for which public information was available. Of the original 88 FDM DMAs in our sample, we were unable to obtain demographic information for one of the DMAs (Bakersfield) whose only county was split with another DMA. Additionally, small rural counties without public information on population or median household income were excluded. We also excluded 21 counties that were split across DMA borders. The resulting reduction in the representative

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