

## ONLINE FIRST

# Amount of Hispanic Youth Exposure to Food and Beverage Advertising on Spanish- and English-Language Television

Frances Fleming-Milici, PhD; Jennifer L. Harris, PhD, MBA; Vishnudas Sarda, MBBS, MPH; Marlene B. Schwartz, PhD

**Importance:** Exposure to large numbers of television advertisements for foods and beverages with little or no nutritional value likely contributes to poor diet among youth. Given higher rates of obesity and overweight for Hispanic youth, it is important to understand the amount and types of food advertising they view.

**Objective:** To quantify the amount of food and beverage advertising viewed by Hispanic youth on Spanish- and English-language television and compare it with the amount of food and beverage advertising viewed by non-Hispanic youth.

**Design, Setting, and Participants:** Data on gross rating points that measured advertising viewed on national broadcast and cable television in 2010 using a Nielsen panel of television-viewing households of Hispanic and non-Hispanic preschoolers (2-5 years), children (6-11 years), and adolescents (12-17 years).

**Main Outcomes and Measures:** Food and beverage television advertisements viewed on English- and Spanish-language television by product category and television-viewing times by age and language preference.

**Exposure:** Food and beverage advertising on Spanish- and English-language television.

**Results:** In 2010, Hispanic preschoolers, children, and adolescents viewed, on average, 11.6 to 12.4 television

food ads per day; the majority of these ads (73%-81%) appeared on English-language television. Fast food represented a higher proportion of food ads on Spanish-language television. Consistent with television-viewing patterns, Hispanic preschoolers saw more Spanish-language food advertisements than did Hispanic children and adolescents. Owing to somewhat less food advertising on Spanish-language television, Hispanic children and adolescents viewed 14% and 24% fewer food ads overall, respectively, compared with non-Hispanic youth. Spanish-language television viewing was highly concentrated among youth who primarily speak Spanish.

**Conclusions and Relevance:** Both Hispanic and non-Hispanic youth view large numbers of television advertisements for nutrient-poor categories of food and beverage. Although Hispanic children and adolescents see somewhat fewer of these ads, the higher obesity rates among Hispanic youth, the greater exposure by Hispanic preschoolers, and the potential enhanced effects of targeted advertising on Hispanic youth suggest that this exposure may pose additional risks for Hispanic youth. Continued monitoring is warranted owing to food companies' stated intentions to increase marketing to Hispanics.

*JAMA Pediatr.*

Published online June 17, 2013.

doi:10.1001/jamapediatrics.2013.137

**Author Affiliations:** Rudd Center for Food Policy and Obesity, Yale University, New Haven, Connecticut.

**H**IGH OBESITY RATES AMONG young people in the United States present an urgent public health concern. In 2009-2010, 12.1% of young children (2-5 years of age), 18% of older children (6-11 years of age), and 18.4% of adolescents (12-17 years of age) were obese, double to triple the rates 30 years earlier.<sup>1</sup> Exposure to large numbers of advertisements for food products with little or no nutritional value are likely contributors to this epidemic of obesity.<sup>2-5</sup> Although children and adolescents encoun-

ter food advertising in many different forms, almost half of food companies' youth-targeted marketing budgets are spent on television advertising (\$745 million in 2006).<sup>6</sup> Therefore, television remains the primary avenue to promote food and beverages to youth. Every day, 2- to 5-year-old children view, on average, 11 food-related television ads,<sup>7</sup> 6- to 11-year-old children view 13 food-related television ads,<sup>7</sup> and 12- to 17-year-old adolescents view 14 food-related television ads.<sup>8</sup> More than 85% of these ads promote products high in saturated fat, sugar, and/or sodium.<sup>7</sup>

The exposure of Hispanic youth to advertising of unhealthy food raises additional concerns. Hispanic youth (2-19 years of age) are more likely to be overweight than non-Hispanic white youth (39.1% vs 27.9%).<sup>9</sup> In addition, Hispanics have a higher estimated lifetime risk for developing type 2 diabetes mellitus than do non-Hispanic whites and blacks,<sup>10</sup> a disease for which overweight and having a poor diet are risk factors.<sup>11</sup> Sugary drink consumption has been linked with being overweight,<sup>12</sup> and Hispanic adolescents consume more soft drinks than do non-Hispanic white and Asian adolescents.<sup>13</sup> In addition, foreign-born Hispanic adolescents and adults<sup>14-18</sup> and Hispanic youth who speak Spanish<sup>19</sup> have healthier eating patterns overall than do US-born and English-speaking Hispanics. Therefore, although some Hispanics have healthy dietary habits that potentially reduce the risk of overweight and related disease, this advantage decreases with the level of acculturation.<sup>20,21</sup>

Hispanic children and adolescents also may watch more television than do white children.<sup>22-25</sup> One recent study<sup>23</sup> reported that, across all television platforms (including the Internet and mobile devices), Hispanic youth 8 to 18 years of age watched, on average, 5 hours and 21 minutes of television daily, whereas white children watched, on average, 3 hours and 36 minutes of television daily. Another study<sup>24</sup> showed that Hispanics 2 to 7 years of age viewed 2 hours and 23 minutes of television per day, 36% more than was found for their white counterparts. Furthermore, acculturation may impact television-viewing time. Among Mexican and Cuban adolescents, television-viewing time increases with generation of US residence,<sup>14</sup> and very young children of English-speaking Hispanic mothers watch significantly more television than do children of Spanish-speaking mothers.<sup>26</sup>

Studies examining advertising on children's television programs have found significantly fewer food advertisements on Spanish- vs English-language television: approximately 2 food ads per hour on Spanish-language programs<sup>27,28</sup> compared with 7.6 ads per hour on English-language programs.<sup>27</sup> However, more than 84% of the Spanish-language food ads promoted products of the lowest nutritional quality compared with 73% of English-language ads,<sup>27</sup> and fast food represented 44% to 47% of food advertising on Spanish-language children's television<sup>27-29</sup> compared with 36% of food ads on English-language television.<sup>27</sup> Similarly, one study<sup>30</sup> of advertising on Spanish-language television with high viewership by adult women (18-35 years of age) found that English-language programs contained more food advertising overall but that fast food restaurants advertised more often on Spanish-language television. Nonetheless, Spanish-language advertising for calorie-dense nutrient-poor foods remains a concern because exposure to advertising with messages designed to appeal specifically to a Hispanic audience may affect them more than advertising in general-audience media.<sup>31-33</sup>

Because Hispanic youth may face a greater risk from exposure to television advertising that promotes calorie-dense nutrient-poor foods, especially when that advertising is directly targeted to them, the Institute of Medicine and others call for additional analyses of food and beverage advertising directed at Hispanic youth.<sup>2,27,28</sup> To

date, published studies have not quantified the amount of food and beverage advertising seen by young Hispanics. In addition, some Hispanic children and adolescents likely watch both English- and Spanish-language television, but it is not clear how they divide their viewing time between these channels. Viewing of Spanish- vs English-language television likely differs widely by level of acculturation and whether the dominant language in the household is Spanish or English. As a result, rates of exposure to food advertising by language are unknown.

To address these gaps in the literature, the present study (1) documents the amount and categories of food and beverage ads Hispanic youth view on Spanish- vs English-language television, (2) compares their total exposure with the total exposure of non-Hispanic youth, and (3) examines differences in viewing of Spanish- and English-language television based on language preference.

## METHODS

To quantify the amount of television food and beverage advertising exposure in 2010 for Hispanic and non-Hispanic youth, data on gross rating points (GRPs) were licensed from Nielsen and obtained using its Ad<sup>2</sup>Views database.<sup>34</sup> Nielsen captures data using surveys and panels consisting of a selected group of individuals represented by a sample of the population. The sample is a multistage, stratified area probability sample of US housing units.<sup>35</sup> The GRPs represent the total number of advertisements viewed by all individuals in a specific demographic group over a specific time period (eg, 2010), divided by the total number of individuals in the demographic group, times 100. Therefore, the GRPs are adjusted for the size of the population and provide a per capita measure of exposure to allow direct comparisons between different populations. The average number of ads viewed by individuals in a demographic group equals total GRPs divided by 100. The GRPs are the standard measure used by the advertising industry to evaluate reach and frequency of television advertising campaigns, and they also have been used in previous research on child and adolescent exposure to television food and beverage advertisements.<sup>7,8,36,37</sup>

The GRPs were obtained for national broadcast and cable English- and Spanish-language television for products included in all Nielsen food, beverage, and restaurant product classification codes for the following demographic groups: Hispanic and non-Hispanic preschoolers (2-5 years), children (6-11 years), and adolescents (12-17 years). Nielsen defines Hispanic persons as individuals living with a head of household who self-identifies as "Hispanic." Each member of the household reports his or her own language preference. Syndicated and spot (ie, local) GRPs were not included because Nielsen does not provide these data for Hispanic persons. In 2010, national broadcast and cable television accounted for approximately 90% of food and beverage GRPs for persons younger than 18 years of age.<sup>34</sup>

All products were assigned to food categories most heavily marketed to youth as defined in guidelines proposed by the Interagency Working Group on Food Marketed to Children, a group composed of representatives from 4 US government agencies.<sup>38</sup> In addition to the Interagency Working Group categories, separate categories were included for diet and regular carbonated beverages, energy and sports drinks, and fruits and vegetables. The GRPs that could not be classified as a specific food category (eg, ads for a company's total product line) or that were not included in the Interagency Working Group cat-

**Table 1. Amount of Hispanic Youth Exposure to Food and Beverage Advertising on Spanish-Language vs English-Language TV in 2010<sup>a</sup>**

Food Category	Average No. of Ads Viewed (% of Total)					
	Preschoolers (2-5 y)		Children (6-11 y)		Adolescents (12-17 y)	
	Spanish-Language TV	English-Language TV	Spanish-Language TV	English-Language TV	Spanish-Language TV	English-Language TV
Fast food restaurants	306 (29.5) <sup>b</sup>	685 (21.5)	206 (31) <sup>b</sup>	830 (22.4)	238 (30.9)	1034 (27.4)
Breakfast cereals	102 (9.8)	633 (19.9) <sup>b</sup>	61 (9.2)	727 (19.6) <sup>b</sup>	64 (8.3)	367 (9.7)
Other restaurants	54 (5.2)	407 (12.8) <sup>b</sup>	31 (4.7)	401 (10.8) <sup>b</sup>	32 (4.2)	354 (9.4) <sup>b</sup>
Candy	94 (9.0)	230 (7.2)	63 (9.5)	299 (8.1)	80 (10.4)	392 (10.4)
Prepared foods and meals	49 (4.7)	232 (7.3) <sup>b</sup>	31 (4.7)	292 (7.9) <sup>b</sup>	32 (4.2)	275 (7.3) <sup>b</sup>
Snack foods	39 (3.8)	244 (7.7) <sup>b</sup>	24 (3.6)	291 (7.9) <sup>b</sup>	28 (3.7)	256 (6.8) <sup>b</sup>
Dairy products	97 (9.3)	240 (7.6)	58 (8.7)	260 (7.0)	63 (8.2) <sup>b</sup>	181 (4.8)
Fruit juice and noncarbonated beverages	26 (2.5)	147 (4.6) <sup>b</sup>	16 (2.4)	198 (5.3) <sup>b</sup>	19 (2.4)	188 (5) <sup>b</sup>
Carbonated regular beverages	25 (2.4) <sup>b</sup>	26 (0.8)	17 (2.5) <sup>b</sup>	37 (1.0)	18 (2.3)	86 (2.3)
Baked goods	18 (1.8)	33 (1.0)	11 (1.7)	41 (1.1)	12 (1.5)	69 (1.8)
Energy and sports drinks	12 (1.2)	32 (1.0)	10 (1.5)	41 (1.1)	18 (2.3)	104 (2.8)
Fruits and vegetables	10 (1.0)	28 (0.9)	6 (1.0)	29 (0.8)	6 (0.8)	37 (1.0)
Frozen and chilled desserts	0 (0.0)	12 (0.4)	0 (0.0)	16 (0.4)	0 (0.0)	18 (0.5) <sup>c</sup>
Carbonated diet beverages	1 (0.1)	11 (0.3)	1 (0.1)	14 (0.4)	1 (0.2)	31 (0.8) <sup>c</sup>
All others <sup>d</sup>	204 (19.7)	219 (6.8)	129 (19.4)	231 (6.2)	158 (20.5)	382 (10.1)
Total	1037 (100)	3179 (100)	664 (100)	3707 (100)	769 (100)	3774 (100)
Total ads viewed, %	25	75	15	85	17	83
Daily TV viewing, h:min	0:59	2:42	0:40	2:46	0:43	2:40
Total daily viewing, %	27	73	19	81	21	79
No. of ads viewed per hour	2.9	3.2	2.7	3.7	2.9	3.9

Abbreviation: TV, television.

<sup>a</sup>Analysis of Nielsen data from January 1 to December 31, 2010.

<sup>b</sup>Exposure to category of ad significantly greater at  $P < .01$ .

<sup>c</sup>Exposure to category of ad significantly greater at  $P < .05$ .

<sup>d</sup>Analysis not applicable.

egories (eg, condiments, sauces, meats, jellies, butter, and baking products) were classified as “all other.”

Another database, Nielsen MarketBreaks,<sup>39</sup> provided data on the average daily time spent viewing Spanish- and English-language television in 2010 by Hispanic and non-Hispanic preschoolers, children, and adolescents. MarketBreaks also provided viewing times for Hispanic persons by individuals’ language preference: Spanish only, Spanish mostly, Spanish and English equally, English mostly, and English only. However, GRP data were not available for these different Hispanic language segments. With the use of 2-proportion  $z$  tests, we identified significant differences in the proportion of advertising exposure for different food and beverage categories on Spanish- versus English-language television and examined differences in exposure for Hispanic vs non-Hispanic youth.

## RESULTS

In 2010, Hispanic preschoolers, children, and adolescents viewed 4218, 4373, and 4542 total food and beverage ads on television, respectively, or 11.6 to 12.4 ads per day (**Table 1**). The majority appeared on English-language television. Preschoolers viewed 1038 food advertisements on Spanish-language television, the most of any age group. However, food advertisements on Spanish-language television comprised just 25% of their total food advertising exposure. Hispanic children viewed 664 Spanish-language food ads, and adolescents viewed 769 Spanish-language food ads, which represent 15% and 17% of all food ads viewed, respectively. These numbers largely

reflect the television-viewing patterns of Hispanic youth. Hispanic preschoolers viewed the most Spanish-language television in 2010: 59 minutes per day, on average, or 27% of their viewing. Children and adolescents viewed, on average, 40 and 43 minutes of Spanish-language television daily, respectively, or 19% and 21% of their viewing, respectively.

Three product categories comprised approximately one-half of food ads viewed on Spanish-language television by Hispanic youth: fast food, breakfast cereals, and candy. Fast food represented a significantly higher proportion of food ads viewed on Spanish- vs English-language television. Approximately 30% of Spanish-language food ads viewed by Hispanic youth promoted fast food, compared with 22% to 27% of English-language food ads viewed. Of note, Hispanic preschoolers saw 306 Spanish-language fast food ads, almost 1 ad per day and 29% to 48% more than Hispanic adolescents and children. Dairy products (for adolescents) and carbonated beverages (for preschoolers and children) were the only other food categories with a higher proportion of ads viewed on Spanish-language television than on English-language television. The numbers are small, but Hispanic preschoolers viewed equal numbers of carbonated beverage ads in English and Spanish, even though they watched 3 times as much English-language television. Spanish-language television also included significantly more advertisements for products in categories not specified in the Interagency Working Group,<sup>38</sup> primarily condiments, sauces, meats, jellies, but-

**Table 2. Amount of Food and Beverage Advertising Exposure for Hispanic and Non-Hispanic Youth in 2010<sup>a</sup>**

Food Category	Average No. of Ads Viewed, Total, No. (%)					
	Preschoolers (2-5 y)		Children (6-11 y)		Adolescents (12-17 y)	
	Hispanic	Non-Hispanic	Hispanic	Non-Hispanic	Hispanic	Non-Hispanic
Fast food restaurants	991 (23.5)	966 (22.5)	1036 (23.7)	1142 (23.0)	1272 (28.0)	1522 (27.0)
Breakfast cereals	735 (17.4)	685 (16.0)	788 (18) <sup>b</sup>	797 (16.0)	431 (9.5)	496 (8.8)
Other restaurants	461 (10.9)	511 (11.9)	432 (9.9)	520 (10.5)	386 (8.5)	529 (9.4)
Candy	324 (7.7)	348 (8.1)	363 (8.3)	433 (8.7)	471 (10.4)	598 (10.6)
Prepared foods and meals	281 (6.7)	337 (7.9) <sup>b</sup>	323 (7.4)	408 (8.2)	307 (6.8)	433 (7.7)
Snack foods	283 (6.7)	306 (7.1)	315 (7.2)	367 (7.4)	285 (6.3)	370 (6.6)
Dairy products	337 (8.0)	298 (6.9)	318 (7.3)	327 (6.6)	243 (5.4)	269 (4.8)
Fruit juice and noncarbonated beverages	174 (4.1)	206 (4.8)	214 (4.9)	262 (5.3)	206 (4.5)	285 (5.1)
Carbonated regular beverages	51 (1.2)	50 (1.2)	54 (1.2)	63 (1.3)	104 (2.3)	122 (2.2)
Baked goods	51 (1.2)	63 (1.5)	52 (1.2)	82 (1.7)	81 (1.8)	114 (2.0)
Energy and sports drinks	44 (1.0)	62 (1.4)	51 (1.2)	75 (1.5)	122 (2.7)	168 (3.0)
Fruits and vegetables	39 (0.9)	49 (1.1)	35 (0.8)	53 (1.1)	44 (1.0)	65 (1.2)
Frozen and chilled desserts	13 (0.3)	17 (0.4)	17 (0.4)	22 (0.4)	18 (0.4)	26 (0.5)
Carbonated diet beverages	12 (0.3)	21 (0.5)	15 (0.3)	25 (0.5)	32 (0.7)	45 (0.8)
All others	423 (10.0)	368 (8.6)	360 (8.2)	396 (8.0)	540 (11.9)	590 (10.5)
Total	4219 (100)	4287 (100)	4373 (100)	4972 (100)	4542 (100)	5632 (100)
Daily TV viewing, h:min	3:41	3:17	3:26	3:22	3:23	3:27
No. of ads viewed per hour	3.1	3.6	3.5	4.0	3.7	4.5

Abbreviation: TV, television.

<sup>a</sup>Analysis of Nielsen data from January 1 to December 31, 2010.

<sup>b</sup>Exposure to category of ad significantly greater at  $P < .05$ .

ter, and baking products. A few categories were advertised significantly less often on Spanish- vs English-language television, including breakfast cereals, other restaurants, prepared foods and meals, snack foods, and fruit juice/noncarbonated beverages.

Spanish-language television viewed by Hispanic youth contained fewer food and beverage ads per hour than did English-language television. Hispanic children and adolescents, respectively, saw 3.7 and 3.9 food ads per hour on English-language television vs 2.7 and 2.9 food ads per hour on Spanish-language television (Table 1). Of note, the English-language television viewed by Hispanic preschoolers contained just 3.2 ads per hour, a lower incidence of food ads than occurred on the English-language television viewed by older youth.

Overall, Hispanic and non-Hispanic children and adolescents watched similar amounts of television: total viewing times differed by just 4 minutes (Table 2). Owing to less frequent food advertising on Spanish-language television viewed by youth, Hispanic children and adolescents saw 14% and 24% fewer food ads in total, respectively, compared with their non-Hispanic peers. Hispanic preschoolers, however, watched 12% more television than did non-Hispanic preschoolers (3 hours and 41 minutes vs 3 hours and 17 minutes). As a result, they saw just 2% fewer food ads in total. There were only 2 significant differences found when comparing the number of ads viewed by Hispanic youth with the number of ads viewed by their non-Hispanic peers: breakfast cereals represented a higher proportion of ads viewed by Hispanic children, whereas non-Hispanic preschoolers viewed a greater proportion of ads for prepared foods and meals.

Examination of Spanish- and English-language television viewing by Hispanic youth with different lan-

guage preferences provides insights into levels of acculturation and exposure to television food advertising. Individuals who spoke only or mostly Spanish (ie, Spanish-dominant) comprised 42% of Hispanic preschoolers, 32% of Hispanic children, and 28% of Hispanic adolescents, whereas individuals who spoke English and Spanish equally made up 30% of preschoolers, 36% of children, and 42% of adolescents (Table 3). Almost one-third of Hispanic youth in all age groups were English-dominant. Spanish-language television viewing was highly concentrated among Spanish-dominant youth, with Spanish-only preschoolers viewing the most (64% of total television viewing). Youth who speak Spanish and English equally spent 18% to 19% of their television viewing with Spanish-language television, whereas Hispanic youth who spoke mostly English averaged less than 1 minute of Spanish-language television per day. Of note, Hispanic youth who only spoke Spanish spent the most time watching television within all age groups; these preschoolers and adolescents watched more than 4 hours per day, approximately 1 hour more than their non-Hispanic counterparts. This analysis suggests that Spanish-dominant individuals account for nearly all the viewing of advertisements on Spanish-language television by youth.

## DISCUSSION

To our knowledge, this study presents the first comprehensive examination of food and beverage advertising viewed by Hispanic youth. According to these Nielsen data, Hispanic and non-Hispanic youth watched similar amounts of television in 2010, but food ads appeared less

**Table 3. Daily Viewing Times of Hispanic Youth for English- and Spanish-Language TV by Language Use in 2010<sup>a</sup>**

Language Use	Audience Estimate, No.	Audience, %	Total TV-Viewing time, h:min	Spanish-Language TV		English-Language TV	
				Viewing time, h:min	Total, %	Viewing time, h:min	Total, %
Hispanic preschoolers (2-5 y)	3 819 000		3:41	0:59	27	2:42	73
Spanish only	366 000	10	4:13	2:41	64	1:32	36
Spanish mostly	1 204 000	32	3:32	1:36	45	1:56	55
Spanish and English equally	1 139 000	30	3:42	0:42	19	3:00	81
English mostly	793 000	21	3:44	0:04	2	3:40	98
English only	317 000	8	3:35	<1 min	NA	3:35	100
Hispanic children (6-11 y)	5 009 000		3:26	0:40	19	2:46	81
Spanish only	266 000	5	3:54	1:42	44	2:12	56
Spanish mostly	1 351 000	27	3:19	1:14	37	2:05	63
Spanish and English equally	1 813 000	36	3:26	0:37	18	2:49	82
English mostly	1 102 000	22	3:00	0:04	2	2:56	98
English only	477 000	10	3:31	<1 min	NA	3:31	100
Hispanic adolescents (12-17 y)	4 604 000		3:23	0:43	21	2:40	79
Spanish only	222 000	5	4:26	2:35	58	1:51	42
Spanish mostly	1 075 000	23	3:18	1:23	42	1:55	58
Spanish and English equally	1 920 000	42	3:16	0:37	19	2:40	81
English mostly	977 000	21	3:24	0:03	2	3:21	99
English only	410 000	9	3:29	<1 min	NA	3:29	100

Abbreviations: NA, not applicable; TV, television.

<sup>a</sup>Analysis of Nielsen data from January 1 to December 31, 2010.

frequently on the Spanish-language television they viewed. As a result, Hispanic youth saw fewer food and beverage ads on television than did non-Hispanic youth of the same age. Nonetheless, Hispanic youth saw 9 to 12 television food advertisements every day, with 75% to 85% appearing on English-language television. Previous research has documented the poor nutritional quality of the food being advertised on English-language<sup>40</sup> and Spanish-language<sup>27-29</sup> television viewed by children and adolescents. Our study found that approximately one-half of food ads viewed on Spanish-language television promoted fast food, cereal, and candy. Similarly, our study confirmed previous findings<sup>27-29</sup> that fast food represents a higher proportion of food ads on Spanish- vs English-language television and that Spanish-language television contains fewer food and beverage ads per hour.

Because Hispanic youth face higher rates of obesity and related diseases than do non-Hispanic white youth,<sup>10</sup> these levels of exposure to food advertising raise considerable public health concerns. In addition, research suggests that Spanish-language and other targeted advertising could have more of an effect on Hispanic youth (including bilingual viewers) than nontargeted ads.<sup>32,41,42</sup> The high levels of television viewing and of exposure to food advertising by the youngest Hispanic children are especially troubling. Hispanic preschoolers watched 24 more minutes of television per day than did non-Hispanic preschoolers, and those who only spoke Spanish watched more than 4 hours per day. This age group also watched the most amount of Spanish-language television with its significant number of advertisements for fast food and candy, both food categories which are not approved for advertising to children according to Children's Food and Beverage Advertising Initiative participants.<sup>43</sup> Because children younger than 7 or 8 years of

age do not have the cognitive ability to recognize the persuasive intent of advertising,<sup>44,45</sup> exposure in these early years may be especially damaging. As suggested by others,<sup>26</sup> these findings demonstrate the need for additional commercial-free Spanish-language programming for young children.

One limitation of this analysis is that the Nielsen data did not provide data on advertising exposure based on individuals' language preference. However, the high amount of television viewing by youth who only speak Spanish (approximately 1 hour more per day than their non-Hispanic counterparts) warrants future research. This finding suggests that exposure to food advertising could help explain why healthier eating patterns exhibited by recent Hispanic immigrants disappear with increasing levels of acculturation. Advertising that persuades new arrivals to make unhealthy American foods a greater share of their diet likely has negative consequences. Future research on media and food marketing exposure by Hispanic youth and adults should include measures of language dominance and level of acculturation to further examine this important question.

Although the lower rate of food advertising on Spanish-language television than on English-language television is an encouraging finding, food advertisers have increased their focus on Hispanic consumers in recent years, and Spanish-language advertising has intensified. From 2010 to 2011, ad spending on Spanish-language network and cable television increased by 13% and 21%, respectively, and this growth is expected to continue.<sup>46</sup> Advertisers also have found new ways to reach young Hispanics who do not regularly watch Spanish-language television. For example, media companies have introduced new programming with English subtitles and bilingual and youth-oriented content to appeal to younger,

more acculturated Hispanic viewers.<sup>47-49</sup> Food and beverage companies also engage in targeted marketing in Latino communities, including outdoor advertising,<sup>50,51</sup> event sponsorships,<sup>52,53</sup> and local Spanish-language television.<sup>54</sup> Youth exposure to Spanish-language food and beverage television advertising has not been tracked in the same way as youth exposure to English-language food and beverage advertising.<sup>7,8,36,37,40</sup> Therefore, the extent of changes in Hispanic youth exposure to television advertising and changes in local Hispanic-targeted marketing is unknown and requires continued monitoring.

The present findings appear to differ from previous research<sup>22-25</sup> that has shown higher amounts of television viewing for Hispanic youth than for other youth. In addition, our study found that the small segment of Hispanic youth who speak only Spanish (presumably also children with Spanish-speaking mothers) watched more television than other Hispanic youth, whereas previous studies<sup>14,26</sup> showed that foreign-born Hispanic youth and very young children with Spanish-speaking mothers watch less television. These discrepancies are likely due to methodological differences, including comparison groups, data collection, and definitions of television exposure. For example, previous studies<sup>22-25</sup> compared Hispanic youth with non-Hispanic white youth, whereas the present study compared Hispanic youth with all non-Hispanic (including black) youth because Nielsen does not provide data for non-Hispanic white youth.<sup>34</sup> Past research also utilized self-report data,<sup>22-26</sup> whereas with the Nielsen data<sup>34</sup> in the present study, we measure actual television usage via set-top boxes in panel members' homes, thus addressing the limitations of self-report data.<sup>55-57</sup> Although the Nielsen data are also limited,<sup>58</sup> the data do provide the standard measures used by the advertising industry to assess ads viewed by Hispanic youth. Because the present study's goal was to measure advertising exposure, the Nielsen data<sup>34</sup> likely captured the majority of youth exposure to commercial television, including both live and prerecorded television. Finally, despite differences in data collection methods, daily television viewing for Hispanic youth reported by Nielsen (3 hours and 23-41 minutes) in the present study is comparable to the 3 hours and 15 minutes of live and prerecorded television viewing by Hispanics 8 to 18 years of age reported in a recent Kaiser Family Foundation study.<sup>23</sup> These differences underscore the potential methodological differences in assessing exposure, as well as the need to include specific measures of acculturation in all research with Hispanic youth and to avoid generalizations about "Hispanics" as a homogeneous group.

As found in previous research on television food advertising to youth, Hispanic youth view significant numbers of advertisements for foods and beverages that should be consumed in limited amounts. However, our study also shows that the majority of this exposure occurs on English-language television and that food advertising appears less frequently on Spanish-language television. Although Hispanic youth viewed somewhat fewer food and beverage advertisements in total compared with non-Hispanic youth, this exposure may have greater risks because of the higher rates of obesity and related disease. Greater exposure to Spanish-language food advertising

among preschoolers and less-acculturated youth and the predominance of fast food, breakfast cereal, and candy advertising on Spanish-language television raise additional concerns. Given the potential for greater effects from exposure to Hispanic-targeted advertising, the recent introductions of new media and marketing campaigns targeted to bilingual Hispanic youth, and food companies' stated intentions to increase marketing to Hispanics, continued monitoring of food and beverage marketing to Hispanic youth is required.

**Accepted for Publication:** December 14, 2012.

**Published Online:** June 17, 2013. doi:10.1001/jamapediatrics.2013.137

**Correspondence:** Frances Fleming-Milici, PhD, Rudd Center for Food Policy and Obesity, Yale University, 309 Edwards St, New Haven, CT 06520 (frances.flemingmilici@yale.edu).

**Author Contributions:** Dr Fleming-Milici had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Harris and Schwartz. *Acquisition of data:* Sarda. *Analysis and interpretation of data:* Fleming-Milici, Harris, and Sarda. *Drafting of the manuscript:* Fleming-Milici and Harris. *Critical revision of the manuscript for important intellectual content:* Sarda and Schwartz. *Statistical analysis:* Fleming-Milici and Sarda. *Obtained funding:* Harris and Schwartz. *Administrative, technical, and material support:* Fleming-Milici. *Study supervision:* Harris.

**Conflict of Interest Disclosures:** None reported.

**Funding/Support:** This research was supported by grants from the Robert Wood Johnson Foundation and the Rudd Foundation.

## REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*. 2012; 307(5):483-490.
2. Institute of Medicine of the National Academies; Committee on Food Marketing and the Diets of Children and Youth. *Food Marketing to Children and Youth: Threat or Opportunity?* Washington, DC: National Academies Press; 2006.
3. Harris JL, Pomeranz JL, Lobstein T, Brownell KD. A crisis in the marketplace: how food marketing contributes to childhood obesity and what can be done. *Annu Rev Public Health*. 2009;30:211-225.
4. Zimmerman FJ. Using marketing muscle to sell fat: the rise of obesity in the modern economy. *Annu Rev Public Health*. 2011;32(1):285-306.
5. Halford JC, Boyland EJ, Hughes GM, Stacey L, McKean S, Dovey TM. Beyond-brand effect of television food advertisements on food choice in children: the effects of weight status. *Public Health Nutr*. 2008;11(9):897-904.
6. Federal Trade Commission. Marketing food to children and adolescents: a review of industry expenditures, activities, and self-regulation: a report to Congress. <http://ftc.gov/os/2008/07/P064504foodmktngreport.pdf>. Published July 2008. Accessed September 12, 2012.
7. Powell LM, Schermbeck RM, Szczycka G, Chaloupka FJ, Braunschweig CL. Trends in the nutritional content of television food advertisements seen by children in the United States: analyses by age, food categories, and companies. *Arch Pediatr Adolesc Med*. 2011;165(12):1078-1086.
8. Powell LM, Szczycka G, Chaloupka FJ. Trends in exposure to television food advertisements among children and adolescents in the United States. *Arch Pediatr Adolesc Med*. 2010;164(9):794-802.
9. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity in the United States, 2009-2010. *NCHS Data Brief*. 2012;(82):1-8.
10. Narayan KM, Boyle JP, Thompson TJ, Sorensen SW, Williamson DF. Lifetime risk for diabetes mellitus in the United States. *JAMA*. 2003;290(14):1884-1890.
11. Centers for Disease Control and Prevention (CDC). Diabetes public health resource.

- CDC website. <http://www.cdc.gov/diabetes/consumer/prevent.htm>. Accessed August 7, 2012.
12. Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *Am J Public Health*. 2007;97(4):667-675.
  13. Giammattei J, Blix G, Marshak HH, Wollitzer AO, Pettitt DJ. Television watching and soft drink consumption: associations with obesity in 11- to 13-year-old schoolchildren. *Arch Pediatr Adolesc Med*. 2003;157(9):882-886.
  14. Gordon-Larsen P, Harris KM, Ward DS, Popkin BM; National Longitudinal Study of Adolescent Health. Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health. *Soc Sci Med*. 2003;57(11):2023-2034.
  15. Schaffer DM, Velie EM, Shaw GM, Todoroff KP. Energy and nutrient intakes and health practices of Latinas and white non-Latinas in the 3 months before pregnancy. *J Am Diet Assoc*. 1998;98(8):876-884.
  16. Guendelman S, Abrams B. Dietary intake among Mexican-American women: generational differences and a comparison with white non-Hispanic women. *Am J Public Health*. 1995;85(1):20-25.
  17. Winkleby MA, Albright CL, Howard-Pitney B, Lin J, Fortmann SP. Hispanic/white differences in dietary fat intake among low educated adults and children. *Prev Med*. 1994;23(4):465-473.
  18. Dixon LB, Sundquist J, Winkleby M. Differences in energy, nutrient, and food intakes in a US sample of Mexican-American women and men: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. *Am J Epidemiol*. 2000;152(6):548-557.
  19. Aldrich L, Varyyam JN. Acculturation erodes the diet quality of US Hispanics. *Food Rev*. 2000;23(1):51-55.
  20. Ghaddar S, Brown CJ, Pagan JA, Diaz V. Acculturation and healthy lifestyle habits among Hispanics in United States-Mexico border communities. *Rev Panam Salud Publica*. 2010;28(3):190-197.
  21. Neuhauser ML, Thompson B, Coronado GD, Solomon CC. Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *J Am Diet Assoc*. 2004;104(1):51-57.
  22. Bickham DS, Vandewater EA, Huston AC, Lee JH, Caplovitz AG, Wright JC. Predictors of children's electronic media use: an examination of three ethnic groups. *Media Psychol*. 2003;5(2):107-137. doi:10.1207/S1532785XMEP0502\_1.
  23. Rideout VJ, Foehr UG, Roberts DF. Generation M<sup>2</sup>: media in the lives of 8- to 18-year-olds: a Kaiser Family Foundation Study. <http://www.kff.org/entmedia/upload/8010.pdf>. Published January 2010. Accessed August 24, 2012.
  24. Roberts DF, Foehr UG. *Kids and Media in America*. New York, NY: Cambridge University Press; 2004.
  25. Greenberg BS, Burgoon M, Burgoon JK, Korzeny F. *Mexican Americans and the Mass Media*. Norwood, NJ: Ablex; 1983.
  26. Thompson DA, Sibinga EMS, Jennings JM, Bair-Merritt MH, Christakis DA. Television viewing by young Hispanic children: evidence of heterogeneity. *Arch Pediatr Adolesc Med*. 2010;164(2):174-179.
  27. Kunkel D, Mastro D, Ortiz M, McKinley C. Food marketing to children on U.S. Spanish-language television [published online May 2, 2013]. *J Health Commun*. doi:10.1080/10810730.2013.768732.
  28. Thompson DA, Flores G, Ebel BE, Christakis DA. Comida en venta: after-school advertising on Spanish-language television in the United States. *J Pediatr*. 2008;152(4):576-581.
  29. Bell RA, Cassidy D, Culp J, Alcalay R. Frequency and types of foods advertised on Saturday morning and weekday afternoon English- and Spanish-language American television programs. *J Nutr Educ Behav*. 2009;41(6):406-413.
  30. Abbatangelo-Gray J, Byrd-Bredbenner C, Austin SB. Health and nutrient content claims in food advertisements on Hispanic and mainstream prime-time television. *J Nutr Educ Behav*. 2008;40(6):348-354.
  31. Grier SA, Kumanyika SK. The context for choice: health implications of targeted food and beverage marketing to African Americans. *Am J Public Health*. 2008;98(9):1616-1629.
  32. Grier SA, Kumanyika S. Targeted marketing and public health. *Annu Rev Public Health*. 2010;31(1):349-369.
  33. Samuels SE, Craypo L, Dorfman L, Purciel M, Standish MB. Food and beverage industry marketing practices aimed at children: developing strategies for preventing obesity and diabetes: a report on the proceedings from a meeting sponsored by the California Endowment. Berkeley Media Studies Group website. [http://www.bmsg.org/tools-framing\\_resources.php](http://www.bmsg.org/tools-framing_resources.php). Published November 2003. Accessed August 27, 2012.
  34. Nielsen Ad\*Views. 2010. <http://www.nielsen.com>. Accessed May 17, 2013.
  35. Nielsen families. Nielsen website. <http://www.nielsen.com/us/en/about-us/nielsen-families.html>. Accessed December 10, 2012.
  36. Powell LM, Szczypka G, Chaloupka FJ. Adolescent exposure to food advertising on television. *Am J Prev Med*. 2007;33(4 suppl):S251-S256.
  37. Powell LM, Szczypka G, Chaloupka FJ. Exposure to food advertising on television among US children. *Arch Pediatr Adolesc Med*. 2007;161(6):553-560.
  38. Interagency Working Group on Food Marketed to Children. Preliminary proposed nutrition principles to guide industry self-regulatory efforts: request for comments. <http://www.ftc.gov/os/2011/04/110428foodmarketproposedguide.pdf>. Accessed January 25, 2012.
  39. MarketBreaks. Nielsen website. <http://en-us.nielsen.com/sitelets/cls/marketbreaks.html>. Accessed May 14, 2013.
  40. Powell LM, Szczypka G, Chaloupka FJ, Braunschweig CL. Nutritional content of television food advertisements seen by children and adolescents in the United States. *Pediatrics*. 2007;120(3):576-583.
  41. Pardo C, Dreas C. Three things you thought you knew about U.S. Hispanic's engagement with media. . .and why you may have been wrong. Nielsen website. <http://www.nielsen.com/content/dam/corporate/us/en/newswire/uploads/2011/04/Nielsen-Hispanic-Media-US.pdf>. Accessed August 27, 2012.
  42. Roslow P, Nicholls J. Targeting the Hispanic market: comparative persuasion of TV commercials in Spanish and English. *J Advert Res*. 1996;36(3):67-77.
  43. Kolish ED, Hernandez M, Blanchard K. The Children's Food & Beverage Advertising Initiative in action. <http://www.bbb.org/us/storage/16/documents/cfbai/cfbai-2010-progress-report.pdf>. Published December 2011. Accessed December 10, 2012.
  44. Wilcox BL, Kunkel D, Cantor J, Dowrick P, Linn S, Palmer E. Report of the APA task force on advertising and children. <http://www.apa.org/pi/families/resources/advertising-children.pdf>. Published February 20, 2004. Accessed July 20, 2012.
  45. John DR. Consumer socialization of children: retrospective look at twenty-five years of research. *J Consum Res*. 1999;26:183-213. doi:10.1086/209559.
  46. State of the Hispanic consumer: the Hispanic market imperative. Nielsen website. <http://www.nielsen.com/us/en/insights/reports-downloads/2012/state-of-the-hispanic-consumer-the-hispanic-market-imperative.html>. Accessed June 23, 2012.
  47. Thielman S. TV Bebé Boom: Univision and Telemundo still dominate Hispanic TV, but a rash of start-up channels is about to make things a lot noisier. *Adweek*. March 13, 2012. <http://www.adweek.com/news/advertising-branding/tv-bebe-boom-138849>. Accessed March 15, 2012.
  48. Elliott S, Vega T. TV steps up pitch to Hispanic market. *New York Times*. May 17, 2011. <http://www.nytimes.com/2011/05/18/business/media/18adco.html?pagewanted=all>. Accessed May 20, 2012.
  49. Littleton C. Mun2 harnesses Hispanic demo growth. *Variety*. April 17, 2012. <http://www.variety.com/article/VR1118052781>. Accessed August 23, 2012.
  50. Yancey AK, Cole BL, Brown R, et al. A cross-sectional prevalence study of ethnically targeted and general audience outdoor obesity-related advertising. *Milbank Q*. 2009;87(1):155-184.
  51. Powell LM, Rinkus LM, Isgor Z, Barker D, Chaloupka FJ. Exterior marketing practices of fast-food restaurants. *Bridging the Gap*. Robert Wood Johnson Foundation website. <http://www.rwjf.org/newsroom/product.jsp?id=74160>. Published March 1, 2012. Accessed September 12, 2012.
  52. Harris JL, Schwartz MB, Brownell KD, et al. Sugary drink FACTS: evaluating sugary drink nutrition and marketing to youth. [http://www.sugarydrinkfacts.org/resources/SugaryDrinkFACTS\\_Report.pdf](http://www.sugarydrinkfacts.org/resources/SugaryDrinkFACTS_Report.pdf). Published October 2011. Accessed February 17, 2012.
  53. We deliver in NYC. <http://www.deliveringchoices.org/nyc/#nyc>. Accessed September 12, 2012.
  54. Parliarkov Y. Dr Pepper ads, tour target young Latinos. *Adweek*. May 14, 2009. <http://www.adweek.com/news/advertising-branding/dr-pepper-ads-tour-target-young-latinos-105801>. Accessed May 6, 2011.
  55. Cook TD, Campbell DT. *Quasi-Experimentation: Design and Analysis Issues*. Boston, MA: Houghton Mifflin; 1979.
  56. Schacter DL. The seven sins of memory. Insights from psychology and cognitive neuroscience. *Am Psychol*. 1999;54(3):182-203.
  57. Prior M. The immensely inflated news audience: assessing bias in self-reported news exposure. *Public Opin Q*. 2009;73(1):130-143. doi:10.1093/poq/nfp002.
  58. Milavsky R. How good is the A.C. Nielsen people-meter system? a review of the report by the committee on nationwide television audience measurement. *Public Opin Q*. 1992;56:102-115. doi:10.1086/269299.