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Food Advertising on Television Before and After a National Unhealthy Food Marketing Regulation in Chile, 2016–2017

Teresa Correa, PhD, Marcela Reyes, MD, PhD, Lindsey Smith Taillie, PhD, Camila Corvalán, MD, PhD, and Francesca R. Dillman Carpentier, PhD

Objectives. To study changes in food advertising on television after Chile's food marketing restriction was implemented in June 2016.

Methods. Food advertisements shown between 6 AM and 12 AM on the 4 primary broadcast and 4 cable channels with the largest Chilean youth audiences during 2 random weeks in April and May 2016 and 2017 were analyzed for product nutrition and child-directed marketing.

Results. The percentage of ads for foods high in energy, saturated fats, sugars, or sodium (HEFSS) decreased from 41.9% before the regulation to 14.8% after the regulation ($P < .001$). This decrease occurred in programs intended for children (from 49.7% to 12.7%; $P < .001$) as well as general audiences (from 38.5% to 15.7%; $P < .001$). The largest declines were seen for sodas, desserts, breakfast cereals and industrialized fruit- and vegetable-flavored drinks. Fewer HEFSS ads featured child-directed content (a decrease from 44.0% to 12.0%; $P < .001$), and the remaining child-directed HEFSS ads primarily aired on internationally owned cable channels.

Conclusions. The significant postregulation decrease in the prevalence of HEFSS television ads suggests that children in Chile are now less exposed to unhealthy food advertising. However, television originating from national and international outlets should still be monitored for compliance. (*Am J Public Health*. Published online ahead of print May 21, 2020: e1–e6. doi:10.2105/AJPH.2020.305658)

Extensive evidence links exposure to unhealthy food advertising to preferences for and increased consumption of nutrient-poor foods, particularly among children.^{1–5} Unhealthy food advertising is likewise associated with obesity and related non-communicable diseases.^{6,7} The World Health Organization has called for regulations that reduce children's exposure to marketing of food high in saturated fats, sugars, or salt.⁸ Among the countries that have implemented statutory policies regulating food advertising to children,^{9–11} Chile has engaged in a comprehensive regulation of its food marketing environment.¹¹

Chile is facing epidemic proportions of obesity: 25% of schoolchildren 6 to 7 years old and 31% of adults (older than 15 years) are obese.^{12,13} High body mass indexes and diet-related risk factors are leading to

premature death and disability.¹⁴ Chileans snack frequently¹⁵ and have a low dietary intake of dairy products, fruits, and vegetables and a high intake of energy-dense foods and beverages.¹⁶ Ultra-processed food represents 29% of Chileans' total energy intake and 59% of intake of added sugars.¹⁷

In June 2016, Chile implemented the Food Labeling and Advertising Law, a multifaceted effort to decrease consumption of

unhealthy foods, particularly among children.^{18,19} Enforced by Chile's Ministry of Health, this law requires manufacturers to include front-of-package warning labels on prepackaged foods or beverages exceeding regulation-defined thresholds in energy, saturated fats, sugars, or sodium (hereafter HEFSS). (Unpackaged foods sold in bulk or portioned at the request of consumers, such as raw chicken, are exempt.)

HEFSS products are prohibited from being sold or offered for free in schools and nurseries. Furthermore, the law bans the marketing of HEFSS foods to children younger than 14 years in media that self-identify as being intended for children or that have a high (20% or more) percentage of audience members who are children. A 2018 addition bans all HEFSS food advertising on television from 6 AM to 10 PM. Any remaining HEFSS food advertising is prohibited from featuring child-directed strategies (e.g., child actors, animated characters, or toys). Implementation of the law occurred in 3 phases (June 2016, June 2018, June 2019) in which thresholds categorizing products as HEFSS become more restrictive. In addition to Ministry of Health enforcement, the public can file violations with the ministry or the National Consumers Service. Noncompliant companies can receive a reprimand, fine, or prohibition to sell the product.²⁰

Few evaluations have assessed changes in marketing after the implementation of

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statutory regulations, and the results of these investigations (i.e., studies of regulations in the United Kingdom, Ireland, Quebec, and South Korea) have revealed few or no reductions of unhealthy food advertising due to shifts in marketing to general audience television or other media platforms.^{11,21–24} In this study, we assessed differences in food advertising on Chilean television before and after implementation of the Food Labeling and Advertising Law, a law that regulates more products and marketing techniques than other statutory regulations to date. We focused on television because this medium dominates children's media exposure in Chile²⁵ and remains the primary venue for food marketing worldwide.³

METHODS

The first phase of the regulation was implemented in June 2016. Food and beverage television ads were sampled in April and May 2016 (preregulation) and again in April and May 2017 (postregulation). We used audience data from Kantar Ibope Media to collect ads from Chile's 4 major national broadcast channels (Canal 13, TVN, Chilevisión, and Mega) and the 4 cable channels with the largest child (aged 4–12 years) and adolescent (aged 13–17 years) audiences (Cartoon Network, Disney, Discovery Kids, and Fox). Television recordings were obtained from Chile's National Television Council.

Following best practices in media content analyses,²⁶ we drew a stratified random sample of television days to build 1 constructed week for April (1 random Monday, 1 random Tuesday, etc.) and 1 constructed week for May. We gathered all ads on each of the 8 channels that aired during the selected television days between 6 AM and 12 AM. This method provided a cross section of advertising across the entire week and controlled for weekly variation of media content.²⁶

Eight trained coders in 2016 and 7 trained coders in 2017 (6 of 7 coders in 2017 also coded in 2016) performed a quantitative content analysis of marketing strategies in all ads promoting foods and beverages, including ads for supermarkets, restaurants, and food brands. We excluded ads promoting alcohol, infant formulas, and nutritional supplements. Intercoder reliability was calculated in a

subsample, and agreement between coders reached acceptable levels (Cohen's κ and Scott's $\pi = 0.70$ – 0.98 across strategies).

We then analyzed the prevalence of HEFSS ads before and after the June 2016 implementation according to program placement (children's vs general audience programs), food groups represented, and use of child-directed strategies. We also assessed the prevalence of HEFSS ads based on time of day aired to anticipate the impact of the 6 AM to 10 PM ban on all HEFSS advertising set for 2018.

Variables

Placement. Coders recorded the channel, air date, time, and host program in which each ad appeared.

Children's programs. As the law restricted HEFSS ads on children's programs, television programs were identified as children's programs if (1) host program producers listed the program as being intended for children or (2) at least 20% of the program's audience consisted of children 4 to 12 years of age. Intended audience was determined from information provided on the channel's or program's Web site. Child audience composition was calculated from Kantar Ibope Media audience ratings data. Combining intended audience and audience composition data, we created a children's program variable to designate host programs as either programs likely to be seen by children (ranked as 1) or programs with a more general audience (ranked as 0).

Child-directed strategies. Presence (ranked as 1) or absence (ranked as 0) of child-directed marketing strategies was determined by applying the list of prohibited strategies in the law's implementation guidelines to each ad. These prohibitions were as follows:

1. Child actors or voices,
2. Animated characters (licensed or unlicensed animals, children, items),
3. Celebrities and athletes,
4. Promotional gifts or incentives (giveaways, prizes, contests, interactive games), and
5. Childhood life references (e.g., school, playgrounds, popular children's words, fantasy).

The same coding categories were used for the 2016 and 2017 samples. Ads featuring at

least 1 child-directed strategy listed in the implementation guidelines were considered child-directed ads.

Regulation status. Trained nutritionists evaluated up to 4 identifiable foods and beverages per ad to determine which products exceeded June 2016 thresholds in energy, saturated fats, sugars, or sodium. These thresholds were 350 kilocalories of total energy, 6 grams of saturated fats, 22.5 grams of sugars, and 800 milligrams of sodium for solid foods (per 100 g) and 100 kilocalories of total energy, 3 grams of saturated fats, 6 grams of sugars, and 100 milligrams of sodium for liquids (per 100 mL). To make these determinations, we linked products to nutritional fact panel data collected in 2016 and 2017 using a protocol developed (according to INFORMAS project guidelines) at the University of Chile's Institute of Nutrition and Food Technology.²⁷

Ads were classified as “high in energy,” “high in saturated fats,” “high in sugars,” and “high in sodium” if they exceeded the respective June 2016 threshold (i.e., 1 vs 0). Ads were then categorized as HEFSS (ranked as 1) overall if they contained at least 1 product exceeding any regulated threshold and non-HEFSS (ranked as 0) if no HEFSS products were present. Ads containing foods that could not be linked to nutritional fact panels or categorized as HEFSS versus non-HEFSS (e.g., ads with unpackaged foods) were excluded from our analyses.

Food groups. Nutritional fact panel data were also used to categorize foods and beverages in each ad according to food group. Beverages were classified as follows:

1. Sodas,
2. Dairy-based beverages (e.g., milk, drinkable yogurt),
3. Coffee or tea,
4. Water (e.g., sparkling water, flavored water),
5. Sports or energy drinks, and
6. Industrialized fruit- or vegetable-flavored drinks.

Similarly, foods were categorized as:

1. Grain- and non-grain-based sweet desserts (e.g., cookies, chocolate, candies),
2. Meat, poultry, or meat substitutes; fish or seafood; and eggs,

3. Dairy products (e.g., cheese, cream, yogurt),
4. Salty snacks (e.g., chips),
5. Oil and fats (e.g., butter, margarine),
6. Toddler milks (i.e., formula for children 12 months or older),
7. Breakfast cereal,
8. Cereal-based products (e.g., pasta, rice, flour, bread),
9. Soups, sauces, and condiments (e.g., soy sauce, mayonnaise, ketchup),
10. Baby food, and
11. Fruits and vegetables, legumes (packaged).

Statistical Analysis

Descriptive analyses were conducted for food ads in total, by critical nutrient (HEFSS vs non-HEFSS), and by food group represented. The Pearson χ^2 test and post hoc Fisher z test with Bonferroni correction was used to compare differences between 2016 and 2017 in the proportion of HEFSS ads relative to total ads, HEFSS ads aired at different times of day, HEFSS ads using child-directed advertising strategies, and HEFSS ads featuring particular food categories. In the case of food group comparisons (Table B, available as a supplement to the online version of this article at <http://www.ajph.org> in online supplement), sample sizes were based on the total number of identified food products that appeared across ads (up to 4 products per ad were coded).

RESULTS

The percentage of HEFSS ads relative to all ads on television decreased significantly from 41.9% before the regulation ($n = 2147$) to 14.8% ($n = 629$) after the regulation (Table 1). Significant decreases were found across critical nutrients within children's and general audience programming and within ads featuring at least 1 child-directed marketing strategy. The average duration (in seconds) of HEFSS ads decreased from before to after the regulation (preregulation mean = 23.75, $SD = 9.09$; postregulation mean = 21.43, $SD = 9.03$; $P < .001$), whereas the duration of non-HEFSS ads increased (preregulation mean = 21.51, $SD = 9.14$; postregulation mean = 22.98, $SD = 9.99$; $P < .001$; data not shown). Also, the number of HEFSS ads in

TABLE 1—Preregulation Versus Postregulation Changes in the Prevalence of Television Food and Beverage Advertisements Including at Least 1 HEFSS Product: Chile, 2016–2017

Category	Preregulation (2016), No. (%)	Postregulation (2017), No. (%)	Percentage Point Difference (2017 Relative to 2016)
All programs			
Total	5129	4256	
Any HEFSS product	2147 (41.9)	629 (14.8)	-27.1*
High in energy	973 (19.0)	181 (4.3)	-14.7*
High in saturated fats	561 (10.9)	72 (1.7)	-9.2*
High in sugars	1414 (27.6)	363 (8.5)	-19.1*
High in sodium	242 (4.7)	125 (2.9)	-1.8*
Children's programs			
Total	1527	1271	
Any HEFSS product	759 (49.7)	161 (12.7)	-37.0*
General audience programs			
Total	3602	2985	
Any HEFSS product	1388 (38.5)	468 (15.7)	-22.8*
Ads with child-directed strategies			
Total	3790	3509	
Any HEFSS product	1667 (44.0)	421 (12.0)	-32.0*

Note. HEFSS = high in energy, saturated fats, sugar, and sodium. Percentages were calculated within columns, with the sample size at the beginning of each section as the denominator. Statistical differences were based on χ^2 test of independence. Absolute numbers represent a stratified random sample of 2 constructed weeks of food TV advertising (1 in April and 1 in May) before and after the regulation.

* $P < .001$.

children's programs on broadcast (national origin) television dropped from 99 of 257 total food ads (38.5%) to 4 of 93 total food ads (4.3%; $P < .001$; data not shown). On cable (international origin) television, the number of HEFSS ads decreased from 660 of 1270 (52.0%) to 157 of 1178 (13.3%; $P < .001$).

Table 2 shows the distribution of food and beverage ads aired during different times of day in anticipation of the 6 AM to 10 PM ban. As can be seen, the percentage of afternoon and evening (12 PM to 10 PM) HEFSS ads decreased after the regulation. Yet, a significantly greater percentage of the HEFSS ads seen after the regulation aired at night. This increase was primarily noted in general audience programs, as few children's programs aired after 10 PM (data not shown). Percentages for non-HEFSS ads remained relatively stable within time periods from preregulation to postregulation.

The prevalence of specific child-directed strategies in HEFSS ads is shown in Table A (available as a supplement to the online version of this article at <http://www.ajph.org>; data on HEFSS ads featuring any child-

directed strategy are shown in Table 1). As can be seen in Table A, there were significant decreases in the percentages of HEFSS ads using child actors or voices, animated characters, and childhood references (e.g., playgrounds, fantasy) after the regulation. Small but significant increases in the proportions of ads featuring athletes, gifts and giveaways, interactive games, and popular words were found. In contrast to HEFSS ads, use of child-directed strategies increased significantly in non-HEFSS ads after the regulation, particularly use of children, childhood references, animated characters, and promotional gifts (Table A). The presence of celebrities did not significantly change in HEFSS or non-HEFSS ads from before to after the regulation.

A comparison of HEFSS foods and beverages that appeared across the ads sampled before and after the regulation is shown in Table B. Because we coded a maximum of 4 products per ad, these analyses were based on the sum of food and beverage products matched with nutritional fact panel data. As Table B shows, the percentage of HEFSS

TABLE 2—Preregulation Versus Postregulation Prevalence of Television Food and Beverage Ads Based on Presence of At Least 1 HEFSS Product and Time of Day Aired: Chile, 2016–2017

Category	Time of Day Aired			No., Total
	6 AM to 12 PM, No. (%)	12 PM to 10 PM, No. (%)	10 PM to 12 AM, No. (%)	
HEFSS ads^a				
Preregulation	328 (15.2)	1521 (70.8) ^b	299 (13.9) ^b	2147
Postregulation	97 (15.4)	299 (47.5) ^b	233 (37.0) ^b	629
Non-HEFSS ads^c				
Preregulation	606 (20.3)	2056 (68.9)	320 (10.7)	2982
Postregulation	839 (23.1)	2421 (66.7)	367 (10.1)	3627

Note. HEFSS = high in energy, saturated fats, sugar, and sodium. Percentages were calculated within rows, with the sample size in the last column as the denominator.

^a $\chi^2 = 176.00$; $P < .001$.

^bSignificant preregulation–postregulation difference ($P < .05$) within type of ad based on χ^2 test of independence and post hoc Fisher z test with Bonferroni correction.

^c $\chi^2 = 7.67$; $P < .05$.

products appearing across ads dropped from 53.7% to 13.1% ($P < .001$). Among beverages, sodas had the highest frequency of appearances across ads before the regulation. Sodas also had the highest percentage of HEFSS product appearances within their overall frequency of appearances (76.7%). After the regulation, sodas were still highest in frequency appearance, but the percentage of soda appearances for HEFSS products decreased significantly to 25.7% ($P < .001$).

Among solid foods, sweet desserts (i.e., cookies, candies, sweet bakery goods) were the most prevalent category before the regulation; 66.9% of these product appearances involved HEFSS products. After the regulation, sweet desserts were no longer the most prevalent food appearing in advertisements, and only 31.2% of these postregulation appearances were for HEFSS products, a significant decrease from preregulation ($P < .001$). Across product categories, industrialized fruit-flavored drinks and breakfast cereals had the largest percentage drops among HEFSS products from before to after the regulation.

DISCUSSION

In the first year after implementation of the Chilean Food Labeling and Advertising Law, the amount of television advertising featuring HEFSS foods and beverages was substantially lower than the amount observed in the months prior to implementation. Before the

law, about 40 in 100 food ads contained an HEFSS product. Conversely, after the law, only 15 in 100 food ads contained an HEFSS product. Significant decreases were seen across both children's programs and general audience programs. The decrease was also notable in food and beverage ads that included at least 1 child-directed marketing strategy.

Previous evaluations of industry self-regulation of food advertising to children have revealed low levels of compliance and little improvement in the nutritional quality of advertised foods.¹¹ Also, prior assessments of statutory regulations that include restrictions of food advertising in children's television programs have shown little to no significant change in exposure to HEFSS advertising due to shifts in the placement of unhealthy food advertising from children's programs to general audience programs that are watched by children.^{9,11,21–24}

By contrast, our study suggests an advertising shift away from HEFSS foods and toward non-HEFSS foods across daytime television. This observed change in HEFSS advertising prevalence explains the findings of a complementary investigation that linked the Chilean food advertising described in our study with a survey assessing preschoolers' and adolescents' television viewing; the results indicated that HEFSS ad exposure was significantly reduced in both age groups.²⁸ This reduction is relevant because meta-analyses of randomized trials have shown that children exposed to unhealthy food marketing

increase their dietary intake by an average of 30.3 kilocalories and 4.8 grams shortly after exposure.⁵

Despite the decreases in HEFSS ad prevalence observed in our study, 13% of the food and beverage ads we found in children's programs included HEFSS products. These programs primarily aired on the internationally owned cable channels we included in our sample, in accord with their large child and adolescent audiences. HEFSS food ads nearly disappeared from children's programs on the national broadcast channels. These child-directed HEFSS ads are out of compliance with Chilean law, which bans the use of marketing material targeting anyone younger than 14 years, regardless of where the material is placed.²⁹ Marketing covered by this law includes any form of publicity or communication encouraging the purchase or consumption of the promoted product, whether that encouragement comes through direct promotion or more subtle, suggestive messages.³⁰ The implementation guidelines thus include cable television in advertising regulations.³¹ We interpret our findings as supporting an ongoing need to monitor both over-the-air and paid (i.e., cable) television for compliance with the law.

It is also relevant to note that we found a shift in HEFSS food advertising toward the night. In anticipation of Chile's more comprehensive ban on all television HEFSS advertising between 6 AM and 10 PM, we observed a significant reduction in HEFSS ads during the day and a significant increase at night after the anticipated ban would end. Although children are more likely to be watching TV in the afternoons, and although the earlier-mentioned complementary study showed that children's and adolescents' overall exposure to HEFSS ads decreased,²⁸ it is nonetheless important to monitor this shift for 2 reasons. First, children can be exposed to general audience programs³² viewed in the household, even at night. Second, parents are gatekeepers for food availability and purchase decisions in their households³³ and might be influenced by HEFSS advertising during their nighttime television viewing.

We can also surmise an industry shift away from advertising HEFSS versions of sugary sodas, sports and energy drinks, sweet desserts (i.e., candies, chocolate, cookies), and breakfast cereals, food categories that are

relevant in the diets of Chilean children and adolescents.³⁴ Such shifts have occurred in the context of general decreases in advertising of HEFSS products across nearly all categories of foods and beverages. Because the Chilean law focuses only on energy, saturated fats, sugars, and sodium and does not include beneficial nutrients,¹¹ we did not evaluate the nutritional quality of food products beyond this focus. Future research should include a more comprehensive assessment of nutritional quality to better understand the foods and beverages advertised beyond the scope of the regulation.

A further shift we detected was in the use of child-directed strategies in HEFSS ads. Use of child actors, characters, and childhood references dropped significantly in HEFSS ads and increased significantly in non-HEFSS ads after the regulation. This change in the use of child-directed strategies is important, as studies have suggested that children act as key promoters of diet changes in the household. In one study of Chilean mothers, focus group data revealed that children were influenced by their schools' healthier food environments to ask their mothers for healthier snacks, compelling families to adjust to these requests.³⁵

Despite the significant drops in the prevalence of HEFSS and child-directed HEFSS ads, there remained a relevant proportion (about one third) of HEFSS ads that included child-directed strategies after the regulation. Whereas the use of children, animated characters, and childhood life references decreased, the use of popular words, gifts, and athletes increased. Yet the law explicitly prohibits food promotions that use marketing appeals not directly related to characteristics of the product itself. In no case is the marketing material allowed to use toys, accessories, stickers (adhesives), or other such incentives to attract consumers to the product.^{29,30}

Our definition and analysis of child-directed strategies were designed to reflect the law by operationalizing child-directed advertising according to the strategies outlined in the Chilean Ministry of Health's implementation guidelines.³¹ However, we were purposely conservative in our operationalization of these strategies. Thus, our findings might actually underestimate the prevalence of child-directed advertising of HEFSS foods.

Limitations

Our operational definition of child-directed strategies based on the regulation is one limitation of this study. Our reported prevalence rates may be complicated by the inherent difficulties in explicitly defining child-directed strategies. However, the consistent application of these definitions supports the interpretation of our findings as relative changes. The simpler 6 AM to 10 PM ban of all HEFSS advertising on television should have overcome any obstacles related to identifying instances of child-directed advertising. In light of this time-based ban, the fact that we were able to detect a post-regulation increase in HEFSS ads at night, as well as detect shifts in child-directed strategies toward non-HEFSS ads, suggests a need for continued research to monitor challenges to and unintended consequences of Chile's statutory food regulation.

Our findings are also limited to broadcast and cable advertising; we were not able to address social media, Web sites, or product placement within programming. We were also unable to determine the extent to which decreases in HEFSS ads were a result of industry shifts in marketing strategies, entry of new products, product retirements, or reformulations affecting 1 or more critical nutrients (e.g., substitution of sugars with artificial sweeteners). Research is therefore needed to examine motivations for why these marketing shifts may have occurred.

Finally, research is needed to extend this study to other media platforms and strategies, as well as to examine whether food manufacturers are more or less likely to comply when introducing new as opposed to reformulated products. Specific to Chile, research is needed to evaluate the impact of the next phases of the law, including the extended ban on HEFSS food advertising and the increasingly strict nutrient thresholds that categorize foods as HEFSS.

Conclusions

HEFSS food ads on children's and general audience programs decreased significantly after the first phase of Chile's marketing law. These drops occurred most prominently in the afternoon, when children are at home, and in food groups that are relevant in Chilean children's diets. These findings suggest that

the law was effective in reducing children's exposure to unhealthy food advertising on television. However, HEFSS ads continued to exist after the regulation, suggesting challenges with gaining complete compliance from television, particularly cable channels originating from abroad. The postregulation increase in HEFSS ads during late-night hours suggests that the 2018 ban of HEFSS food advertising from 6 AM to 10 PM is necessary to further reduce such advertising. **AJPH**

CONTRIBUTORS

T. Correa recruited and trained coders, managed data sampling and coding, conducted statistical analyses, and led the writing of the article. M. Reyes secured the television sample and contributed to codebook development and nutritional profiling. L. S. Taillie assisted with linkage between ads and nutritional profiling. C. Corvalán assisted with nutritional profiling, data entry, and general leadership. F. R. Dillman Carpentier contributed to codebook development, analysis, and writing and was responsible for the final article. All of the authors contributed to the study design, revisions of the article, and the writing of the article.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this study because no human participants were involved.

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