Public Health 198 (2021) 263–269

Contents lists available at ScienceDirect

Public Health

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

Original Research

Digital marketing of products with poor nutritional quality: a major threat for children and adolescents

F.L. Théodore [a], M. López-Santiago [a], C. Cruz-Casarrubias [a], P.A. Mendoza-Pablo [b], S. Barquera [a], L. Tolentino-Mayo [a, *]

[a] National Institute of Public Health of Mexico, Nutrition and Health Research Center, Universidad No. 655, Colonia Santa María Ahuacatitlán, Cerrada Los Pinos y Caminera, C. P. 62100, Cuernavaca, Morelos, México
[b] School of Dietetics and Nutrition ISSSTE, Callejón Vía San Fernando No. 12, San Pedro Apóstol, 14070, CDMX, México

ARTICLE INFO

Article history:
Received 25 February 2021
Received in revised form
8 July 2021
Accepted 24 July 2021

Keywords:
Digital media
Persuasive techniques
Unhealthy foods and beverages
Obesity
Children/adolescents

ABSTRACT

Objectives: To identify general characteristics, the use of persuasive techniques, and the nutritional quality of Mexican digital marketing of food and beverages/brand with the greatest number of followers and views (Facebook, Twitter, and YouTube) with specific appeal to children/adolescents.
Study design: Cross sectional, quantitative, exploratory, and descriptive study.
Methods: Multistep process to select a sample of 46 products with a Mexican website and major audiences on social networks. The energy and nutrient content of the foods and beverages were analyzed with the Pan American Health Organization Nutrient Profile Model.
Results: Cola and soft drinks, sweetened juices were the products with the greatest number of followers on Facebook and Twitter (13,321,274 and 1,020,504). Companies used diverse persuasive techniques combining promotional characters (79.1%), incentives (65.1%), and digital techniques (78.3%). Products with excess critical nutrients were most frequently advertised regardless of the type of social network and the marketing techniques used.
Conclusion: Digital Marketing represents a major threat for children and adolescents in Mexico, and probably all over the world, because of its persuasive techniques, and it shall be regulated.

Introduction

There is a growing understanding of how marketing shapes food practices and obesity.[1] Marketing is evidenced among children and adolescents as a powerful driver of food/beverage choice,[2,3] which leads them to prefer, buy, consume unhealthy food and drink[3,4] (with low nutritional value, with a high level of sodium, added sugars or fats), with consequential negative health outcomes.[5]

The effectiveness of marketing depends on 'exposure' (frequency and reach), 'power' (techniques used that increase the appeal and desire to purchase these products),[6,7] media in which it appears, and creative content.[6]

International health organizations[6,8] encourage governments to regulate and limit children/adolescents' exposure to the marketing of unhealthy foods/beverages and to reduce its persuasive power. However, few countries have adopted regulatory measures for digital media (DM).[9] In Mexico, the marketing regulation concerns only television and movie theatres.[10] DM is defined as 'a promotional activity, delivered through a digital medium, which seeks to maximize impact through creative and/or analytical methods'. It includes creative methods to activate implicit emotional persuasion, such as building engagement in social networks and analysis among others of emotions, responses, preferences, behavior, and location to target specific groups, individuals, and particular moments of vulnerability or to maximize the impact of creative methods.[7]

In recent years, access to digital media (websites, social networks) has grown exponentially worldwide. In Mexico, according to the 2018 National Survey of Audiovisual Content Consumption, 79% of boys and girls between 7 and 11 years old watched YouTube content, and 8% Facebook.[11] Ninety-six percent of internet users between 13 and 18 years old are registered on at least one social network, such as Facebook, YouTube, or Twitter.[12]

Evidence of the power and impact of DM is incipient[2] and might be greater than TV marketing[13–15] due to: peer endorsement and direct communication with brands; difficulty to identify the promotional intention of advertisements; lack of explicit advertisements; fewer parental warnings about DM;[16,17] and a boost in positive attitudes towards brands online.[18]

* Corresponding author. Tel.: +52 55 5487 1000.
E-mail address: mltolentino@insp.mx (L. Tolentino-Mayo).

https://doi.org/10.1016/j.puhe.2021.07.040
0033-3506/

In Mexico, there is little evidence about DM. These data are indispensable to support a public health policy aimed at the protection of children and adolescents in Mexico and all over the world.

The purpose of this article is to study the nature of the Mexican DM of products/brands with the greatest number of followers and views (Facebook, YouTube, and Twitter) and websites with specific appeal to children/adolescents, analyzing the persuasive techniques used and the nutritional quality of the promoted products.

Methods

Sample selection of food and beverage products

This is a cross-sectional, quantitative, exploratory, and descriptive study. We used a multistep approach for our sample of food/beverage of products and brands (groups of products manufactured by a particular company under a specific name) available in Mexico with the greatest number of followers and views in the commonly used social networks (Facebook, Twitter, and YouTube) (Fig. 1).

We followed a 5-step process to select a sample of food and beverage products and brands and analyze their corresponding social media accounts (Facebook, YouTube, and Twitter).

#1. In the platform Socialbakers (https://www.socialbakers.com/statistics/), a free large worldwide database of statistics on company social media profiles, we selected the data from Mexico and built the sample. # 2. For each platform, we selected, when available, the top 10 products/brands of 'Soft drinks'; 'Fast Moving Consumer Good-FMCG Food' [Low-cost foods, sold quickly (i.e., chips, yogurt)], and 'retail food' [mainly fast-food companies]. We excluded water, coffee, tea, alcoholic beverages. We created a unique list with the products/brands identified on Facebook, YouTube, and Twitter. #3. We excluded 43 products/brands (duplicated n = 31; without a Mexican website n = 11; alcohol product

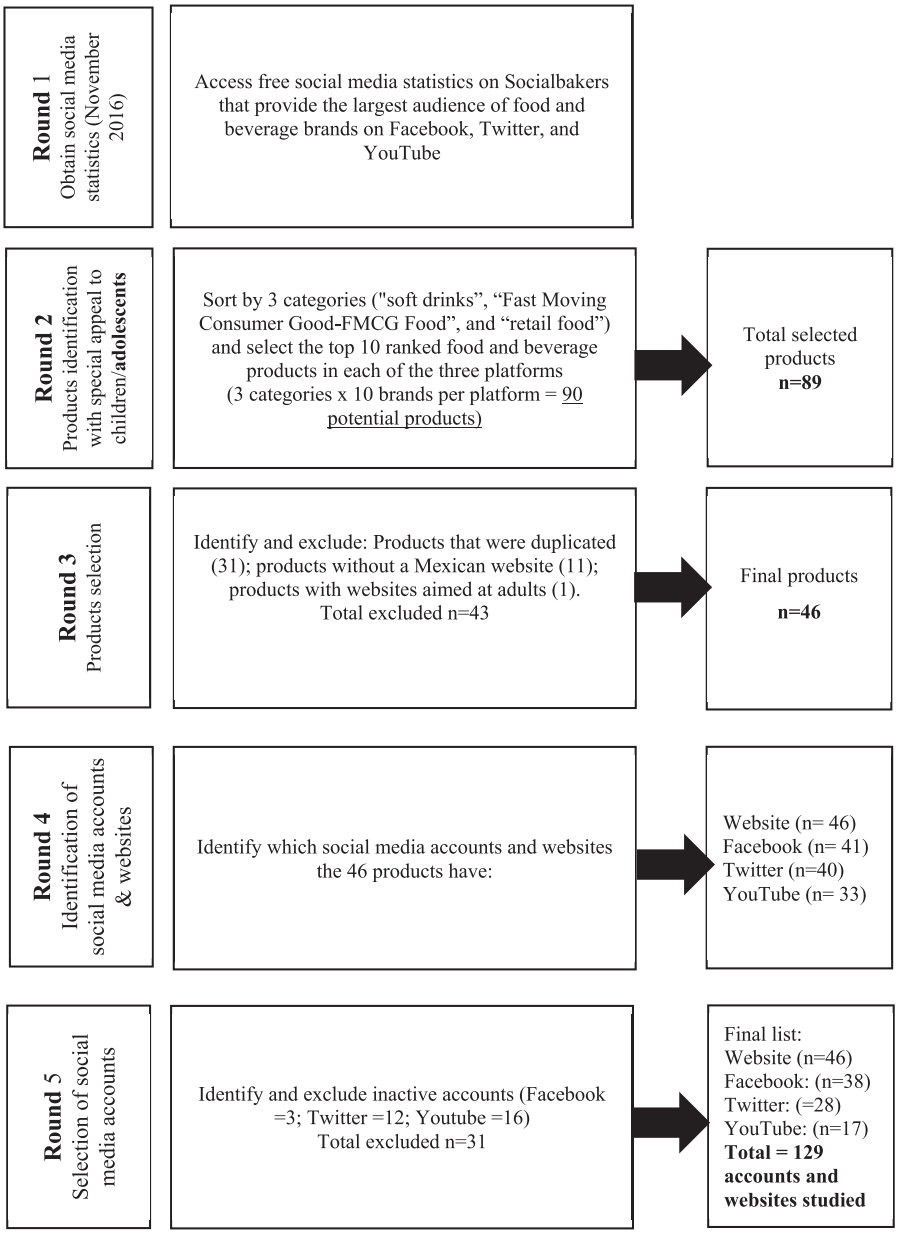

Fig. 1. Sampling process.

placement n = 1) from the list. #4. We identified 46 products/brands with websites, 41 with a Facebook account, 40 with a Twitter account, and 33 with a YouTube account. # 5. We excluded 31 accounts that were inactive in the month prior to data collection. All platforms had an attractive element to children (games, characters, bright colors, etc.);[19] therefore, we did not have to remove any platforms from our sample.

We studied a total of 129 platforms.

Food categories

The samples of products/brands, all ultra-processed food,[20] were organized into seven groups promoted to children worldwide and in Mexico;[3,4] (1) candies and sweets; (2) cookies, industrial cakes, cereal bars, sweetened cereals; (3) cola, soft drinks; (4) sweetened juices and energy beverages; (5) ice cream, yogurt, sugary milk beverages; (6) salty snacks, and (7) pizzas, hamburgers, sausages, and breaded products.

Pan American health organization nutrient profile model

Nutrition quality was evaluated according to the thresholds of the Pan American Health Organization (PAHO) Nutrient Profile Model, designed to identify the less healthy processed and ultra-processed foods and beverages[20] to limit their consumption (as a public health priority) through regulations such as front-of-pack labeling, taxes, and advertising to children. Information on the energy and nutrient content of the food and beverages was obtained through each brand's official website, and when insufficient, we checked it directly on the packaging and captured the information in electronic spreadsheets. The information for energy and nutrients of concern (free sugars, sodium, total fat, saturated fat, and trans-fat) was standardized by 100 g; the cut-off points to identify as 'excessive in' were the same as recommended by PAHO. When the product did not report the content of free sugars, it was calculated according to the algorithms proposed by the PAHO nutrient profile model.

Study variables

Utilizing the coding system previously developed by Mexican and international teams to characterize advertisements on television and the internet,[16,21,22] six variables were selected for websites and social networks: #1 **Product/brands information**: (logo, image, claims, type of product/brand, company); #2 **Media information** (for website: color/animation, children's online privacy protection; for social media: last postdate, video); #3 **Association** -Tie-in with logos or links to websites and social networks from other brands and products, links to the product's social network); #4 **Featuring of characters** (licensed characters, cartoon, celebrities, famous athletes, anonymous children or teenagers or influencers, among others); #5 **incentives** for children/adolescents to consume the products (gifts, contests or raffles, collector's item, concert tickets, product samples, sales); #6 **downloads** of applications or games related to the promoted product. Only for social media, #7 **digital techniques** encouraging 'consumer brand engagement' through peer communication and two-way communication with food companies, the share of content or tag, hashtags, and creating affective 'positive experiences' with the brand/product through quizzes, Advergames and the use of emoticons.

The power of techniques aimed at influencing children and adolescents was studied through variables #4–6.

Data collection procedure and analysis

One researcher collected each product/brand data displayed in the website and the social network (February–May 2017). On social networks, we reviewed all posts of the previous month and included all those with at least one post. When an account had a single post in the previous month, we registered the information from the last five posts.

We calculated frequencies and proportions of persuasive techniques used (promotional characters, incentive, downloads, digital interactive techniques), as well as the combination of 2 or more strategies. All data were captured in Excel matrices, validated by the research leader, and the descriptive analysis was conducted with Stata 15.

Results

Products/brands with the greatest number of followers and views

For all products/brands, Facebook accounts had more followers than Twitter. As presented in Table 1, the first three groups of products with the greatest number of followers on **Facebook** were: Cola and soft drinks (13,321,274); salty snacks (11,943,187) and pizzas, hamburgers, sausages, and breaded products (8,505,930). On **Twitter**: cola and soft drinks (1,020,504); sweetened juices and energy beverages (808,345) and pizzas, hamburgers, sausages, and breaded products (581,913). Finally, on **YouTube**, the products with the most views were pizzas, hamburgers, sausages, and breaded products (75,068,896); cola, soft drink (58,844,364) and ice cream, yogurt, and sugary milk beverages (57,407,160).

General characteristics of the food and beverage websites and social networks

The websites and social media accounts of the food and beverage products/brands contained different identification elements of the brands and products: Logos (100%), images (93.8%), or slogans (76%).

Table 1
Followers and views according to the type of food and beverage categories.

Food and beverage categories	Facebook[a]	Twitter[a]	YouTube[b]
Candies and sweets in general	4,223,754	59,927	24,170,692
Cola, soft drinks	13,321,274	1,020,504	58,844,364
Cookies, industrial cakes, cereal bars, and sweetened cereals	3,732,588	38,631	12,462,460
Ice cream, yogurt, and sugary milk beverages	7,889,427	191,160	57,407,160
Pizzas, hamburgers, sausages, and breaded products (nuggets)	8,505,930	581,913	75,068,896
Salty snacks	11,943,187	353,294	14,551,853
Sweetened juices and energy beverages	7,239,008	808,345	33,530,660

[a] The scope was measured by the number of fans or followers.
[b] The scope was measured by the number of views.

The most common use of Tie-ins involved links to platforms of 'foreign' brands of food and beverages (website = 50%, Facebook = 47.4%. Twitter = 67.9% and YouTube = 47.1%) (Table not presented).

Very few websites had a child protection strategy; 4 of the 46 evaluated asked for parental consent, and only one blocked the access linked to age (0.8%) (Table not presented).

Main persuasive techniques used in websites and social networks

Companies used diverse persuasive techniques to enhance the power of DM (Table 2).

In all platforms, *traditional* techniques are the most used: promotional character (79.1%) and incentives (65.1%). These were massively combined with digital techniques (78.3%). Facebook and Twitter accounts used: response from the page administrator (respectively 94.7% and 92.9%), Hashtags (86.8% and 92.9%); emoticons (successively 81.6% and 78.6%); comment function for the consumers (81% and 78.6%); content adaptation to dates or events (successively 84.2% and 71.4%)

Extensive use of digital techniques

Most accounts of food and beverages on Facebook and Twitter used four to five digital techniques (Table 3).

On Facebook, pizza, hamburger, sausage, and breaded product (Group 8) accounts used mostly six to eight digital techniques (71.4%). On Twitter, Cola and soft drinks accounts also used six to eight digital techniques (66.7%).

Nutritional quality of the promoted products

Table 4 details the nutritional quality of products according to the PAHO nutrient profile model thresholds. In general, the highest proportion of food and beverages contained excessive free sugars (84.5%) and saturated fats (68.2%).

Twitter was the social network with the highest proportion of products considered excessive in total fats (53.6%), saturated fats (71.4%), trans fats (17.9%), and sodium (60.7%) compared to Facebook, YouTube, and websites. The highest proportion of products containing excessive free sugars was identified on YouTube (88.2%). According to persuasive techniques, incentive marketing strategies were more frequent for products excessive in total fat (54.8%), saturated fat (71.4%), and sodium (53.6%). Downloads were the strategy with the highest proportion of products that were excessive in free sugars (90.0%) and trans fats (20.0%), compared to other persuasive techniques.

Discussion

Our research highlights active DM of food and drinks in Mexico with the greatest number of followers and views (Facebook, YouTube, and Twitter), with specific appeal to children/adolescents. The studied DM accounts had three main traits that imperil the health and integrity of our youth.

First, DM, with the greatest number of followers and views, promoted unhealthy food as previously documented all over the world.[3,23,24] Drinks and foods promoted on social networks with the largest audience all belong to the group of the '*big five*'[3] (sugary cereals, sweet beverages, sweet or salty snacks, fast food), previously identified as the most promoted on television to children/

Table 2
Main persuasive techniques used in websites and social networks.

	Total (n = 129)		Facebook (n = 38)		Twitter (n = 28)		You Tube (n = 17)		Website (n = 46)	
	n	%	n	%	n	%	n	%	n	%
Promotional characters	**102**	**79.1**	**30**	**78.9**	**23**	**82.1**	**11**	**64.7**	**38**	**82.6**
Children's characters (cartoon)	17	13.2	5	13.2	4	14.3	3	17.6	5	10.9
Licensed characters	42	32.6	13	34.2	11	39.3	4	23.5	14	30.4
Artists	8	6.2	1	2.6	1	3.6	2	11.8	4	8.7
Famous athletes	16	12.4	5	13.2	6	21.4	1	5.9	4	8.7
Anonymous children or teenagers	32	24.8	15	39.5	8	28.6	5	29.4	4	8.7
Influencers	8	6.2	2	5.3	1	3.6	2	11.8	3	6.5
Other[a]	9	7.0	2	5.3	3	10.7	0	0	4	8.7
Incentive marketing	**84**	**65.1**	**25**	**65.8**	**19**	**67.9**	**10**	**58.8**	**30**	**65.2**
Gift	16	12.4	4	10.5	3	10.7	2	11.8	7	15.2
Contest and raffles	38	29.5	12	31.6	10	35.7	3	17.6	13	28.3
Collector's item	4	3.1	1	2.6	0	0	2	11.8	1	2.2
Concert or event tickets	11	8.5	4	10.5	4	14.3	1	5.9	2	4.4
Product samples	7	5.4	4	10.5	2	7.1	0	0	1	2.2
Product reduced price[b]	16	12.4	6	15.8	5	17.9	2	11.8	3	6.5
Discount	10	7.8	3	7.9	3	10.7	1	5.9	3	6.5
Downloads[c]	**30**	**23.3**	**3**	**7.9**	**4**	**14.3**	**2**	**11.8**	**21**	**45.7**
Apps	22	17.1	3	7.9	4	14.3	2	11.8	13	28.3
Digital techniques	**101**	**78.3**	**38**	**100.0**	**28**	**100.0**	**17**	**100.0**	**18**	**39.1**
Games	33	25.6	11	28.9	5	17.9	1	5.9	16	34.8
Quizzes	50	38.8	27	71.1	19	67.9	4	23.5	0	0
Trivia	9	7.0	6	15.8	3	10.7	0	0	0	0
Possibility to share content or to tag other users	27	20.9	17	44.7	10	35.7	0	0	0	0
Possibility for the users to answer	53	41.1	26	68.4	10	35.7	17	100.0	0	0
The page administrator responded to page member posts and comments.	66	51.2	36	94.7	26.0	92.9	4	23.5	0	0
Possibility to answer with emoticons	55	42.6	31	81.6	22.0	78.6	2	5.0	0	0
Hashtags	80	62.0	33	86.8	26.0	92.9	4	10.0	17	37.0
Content adaptation to important dates or events	59	45.7	32	84.2	20.0	71.4	7	17.5	0	0

Rows in bold represent the main set of persuasive techniques listed in Table.
[a] Includes any other promotional character.
[b] Purchases at 2 × 1, 3 × 1, or with extra product.
[c] Web pages have other types of downloads such as backgrounds/screensavers, crafts, coupons, and ringtones.

Table 3
Percentage distribution of the number of digital techniques according to food category.

Food and beverage categories	Facebook				Twitter				YouTube			Website[a]		
	n	1–3	4–5	6–8	n	1–3	4–5	6–8	n	1–3	≥4	n	1–3	≥4
Candies and sweets in general	6	33.3	66.7	0	2	50.0	50.0	0	1	100	0	6	66.6	0
Cola, soft beverages in general	5	0	100	0	3	33.3	0	66.7	3	66.7	33.3	5	80.0	0
Cookies, industrial cakes, cereal bars, and sweetened cereals	2	0	100	0	1	0	100	0	NDA	–	–	4	25.0	0
Ice cream, yogurt, and sugary milk beverages	7	28.6	42.9	28.6	5	40.0	60.0	0.0	4	100	0	9	77.8	0
Pizzas, hamburgers, sausages, and breaded products (nuggets)	7	0	28.6	71.4	7	28.6	42.9	28.6	4	100	0	7	42.8	0
Salty snacks	6	0	66.7	33.3	6	0.0	83.3	16.7	1	100	0	6	50.0	0
Sweetened juices and energy beverages	5	20.0	80.0	0	4	50.0	50.0	0.0	4	100	0	9	77.8	0
Total	**38**	**13.2**	**63.2**	**23.7**	**28**	**28.6**	**53.6**	**17.9**	**17**	**94.1**	**5.9**	**46**	**63.0**	0

Numbers in bold represent the total of digital techniques analyzed by website and social networks.
Abbreviations: No Data Available (NDA).
[a] The websites only had hashtags, YouTubers, and download options. 36.9% did not register the use of any type of new strategies. For completing each line by type of product, the rest is provided by the use of any new strategy.

Table 4
Nutritional quality of food and beverages analyzed by website and social network and by marketing techniques.

	Excessive in free sugars		Excessive in total fats		Excessive in saturated fats		Excessive in trans fats		Excessive in sodium		Non-sugar sweeteners	
	n	%	n	%	n	%	n	%	n	%	n	%
Total	109	84.5	62	48.1	88	68.2	19	14.7	57	44.2	25	19.4
By website and social network												
Facebook	32	84.2	20	52.6	27	71.1	6	15.8	16	42.1	7	18.4
Twitter	22	78.6	15	53.6	20	71.4	5	17.9	17	60.7	4	14.3
YouTube	15	88.2	6	35.3	10	58.8	2	11.8	6	35.3	3	17.7
Website	40	78.6	21	45.7	31	67.4	6	13.0	18	39.1	11	23.9
By marketing techniques												
Promotional characters	84	82.4	46	45.1	66	64.7	13	12.8	45	44.1	21	20.6
Incentive marketing	65	77.4	46	54.8	60	71.4	12	14.3	45	53.6	11	13.1
Downloads	27	90.0	14	46.7	19	63.3	6	20.0	16	53.3	7	23.3
Digital interaction techniques	92	82.9	52	46.1	73	65.8	14	12.6	47	42.3	24	21.6

Nutritional quality according to the Pan American Nutrient Profile Model. Non-sugar sweeteners refer to the proportion of products containing sweeteners different from free sugars.

adolescents. Cola and soft drinks were among the three products with the greatest number of followers for all platforms using extensive persuasive techniques. In 2015, an exploratory study by UNICEF products with the greatest followers and views were different in Mexico (industrial cakes, cereal bars, and sweetened cereals, and salty snacks).[23] According to our evaluation of nutritional quality, the social media studied promoted products excessive in free sugars and in saturated fats. The gap is not yet clear, but it is known that free sugars make up 13% of energy intake in Mexican children's diet (mainly from sugar-sweetened beverages).[25] Our results were consistent with studies evaluating the nutritional quality of products that were popular on children's websites, reporting that 60.8% of the advertised products were classified as less healthy, attributable to the high content of sugars and fat.[16] Other studies reported similar results for the products announced on YouTube, of which 49.4% were classified as unhealthy, and most of the products, such as chocolate and confectionery, cakes, and desserts, correspond to high sugar categories.[26] The marketing of sugary drinks (including in digital media) may be linked to high levels of consumption of sugary drinks in the country, one of the highest *per capita* worldwide and up to three times above nutritional recommendations.[27]

Second, children/adolescents have easy access to DM: few websites had a child protection strategy; the minimum age to open an account is 14 years on Facebook and 13 years for Twitter in Mexico, and this can be easily bypassed.[28] This easy access to social networks contributes to harming their health and undermines children's and adolescents' right to health,[29] to 'nutritious food', and 'to freedom from obesity',[30] and finally, to privacy and not to be exploited because of intensive use of their personal data[31] by exposing them to unhealthy food and beverage DM.

Additionally, because of the 'tie-ins' practice, when a child accesses social media or websites, he or she can be drawn into a virtual labyrinth and may 'walk around' several pages of Facebook, Twitter, or websites of unhealthy food and drink. Qualitative research exploring the experience of children in this virtual labyrinth is necessary to thoroughly understand DM, the way children and adolescents use it, and how it influences their preferences and nutrition.

Third, DM uses a wide range of persuasive techniques. The 'traditional' ones, such as promotional characters or incentive marketing, are more commonly used on websites, Facebook, Twitter, and YouTube, a trend that has already been observed in Australia[17,32] and Brazil[33] in the Facebook pages. A study in New Zealand found that 39% of the sites contained characters, while this proportion was the most common in our findings (79.1%).[34] More disturbing is the combination of traditional techniques with several digital techniques (more than five on platforms) aimed at encouraging 'consumer brand engagement' and affective 'positive experiences' to promote loyalty and purchase of food. The use of these techniques is based on a body of knowledge about consumer behavior.[16] Advergames, one of these digital techniques, provide evidence of their positive impact on children/adolescents' preference and consumption of the brand/product promoted.[35]

This study presents several limitations related to our sample. We focused our study on the DM of food and beverages with the largest followers and views and with attractive elements for children/adolescents. However, there is no guarantee that children/adolescents followed the **social networks** selected and conversely, there may be social networks of food products popular with children/adolescents without attractive elements for them. As highlighted previously, a precise description of childhood/adolescent

exposure to DM represents a methodological challenge since there is a difference between 'targeted at, or popular with'.[28] Our results refer to DM in Mexico, and it is possible that children/adolescents surf global rather than national social media and which could be using techniques that are still unknown to us. Because of the fast-changing nature of this type of marketing, the advent of new social networks such as Tik Tok means those studied are now less popular among children/adolescents. Constant monitoring of DM is required.

This research shows high exposure to persuasive techniques promoting unhealthy food and beverages combined with easy access of children and adolescents to social networks and argues in favor of regulation of DM in the world and in Mexico.

It is also important to acknowledge that DM allows, with few resources, to feed and update the contents of social media. Finally, it is important to consider that through the accounts of the different social networks, food companies can have access to a large volume of information about users and thus insert customized advertisements, tracking and targeting, for example, children and adolescents.[36]

On considering the foregoing, the regulation of advertising could be a useful strategy to discourage the consumption of foods and beverages with low nutritional value. The marketing of food shall be controlled where it appears and not limited only in public television and movie theatres. Challenges that are specific to food digital marketing regulation include its continuous evolution and ability to strengthen forms of interaction with users, as well as the presence of extraterritorial digital marketing.

DM represents a major threat for children and adolescents in Mexico and probably all over the world; because of its persuasive techniques, it must be regulated. More recently, due to the global Covid-19 pandemic, many children and adolescents have now to rely on digital technology for their education[37] so they are probably spending more time online, where they are exposed to and influenced by food and beverage marketing which, perhaps more now than ever, should be properly regulated.

Author statements

Acknowledgments

To Mariel White and Ana Paula Bonner for the English revision.

Ethical approval

The Research Ethics Committee established that no revision was necessary because there was no individual data (folio number: 00115605).

Funding

This study was funded with support from Bloomberg Philanthropies (number project: 43003) and from the National Commission for Science and Technology for the master's scholarship of one coauthor (CONACYT, Mexico).

Competing interests

None declared.

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