Short Communication

Content analysis of targeted food and beverage advertisements in a Chinese-American neighbourhood

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Abstract

Objectives: The current descriptive study aimed to: (i) quantify the number and type of advertisements (ads) located in a Chinese-American neighbourhood in a large, urban city; and (ii) catalogue the targeted marketing themes used in the food/beverage ads.

Design: Ten pairs of trained research assistants photographed all outdoor ads in a 0.6 mile^2 (1.6 km^2) area where more than 60.0% of residents identify as Chinese American. We used content analysis to assess the marketing themes of ads, including references to: Asian cultures; health; various languages; children; food or beverage type (e.g. sugar-sweetened soda).

Setting: Lower East Side, a neighbourhood located in the borough of Manhattan in New York City, USA.

Subjects: Ads (*n* 1366) in the designated neighbourhood.

Results: Food/beverage ads were the largest ad category (29.7%, *n* 407), followed by services (e.g. mobile phone services; 21.0%, *n* 288). Sixty-seven per cent (66.9%) of beverages featured were sugar-sweetened, and 50.8% of food ads promoted fast food. Fifty-five per cent (54.9%) of food/beverage ads targeted Asian Americans through language, ethnicity of person(s) in the ad or inclusion of culturally relevant images. Fifty per cent (50.2%) of ads were associated with local/small brands.

Conclusions: Food/beverage marketing practices are known to promote unhealthy food and beverage products. Research shows that increased exposure leads to excessive short-term consumption among consumers and influences children's food preferences and purchase requests. Given the frequency of racially targeted ads for unhealthy products in the current study and increasing rates of obesity-related diseases among Asian Americans, research and policies should address the implications of food and beverage ads on health.

Obesity, diabetes and hypertension disproportionately affect racial/ethnic minority groups and diverse Asian-American ethnic subgroups face unique challenges related to chronic health problems. Diet-related health conditions including cancer, heart disease and stroke are among the leading causes of death in Asian-American subgroups[1]. Further, estimates of diabetes rates range from 3.9% for Chinese individuals to 36.4% for Filipino women[2]. Asian Americans are also often diagnosed with diabetes at a lower BMI threshold than other ethnic groups[3], creating added risk for delayed or missed diabetes diagnoses. Furthermore, obesity prevalence tripled among Asian-American adults from 2.7% in 1992 to 13.3% in 2010 and overweight prevalence nearly doubled from 23.2 to 43.1%[4]. In contrast, the obesity prevalence for the US adult population doubled during the same time interval[4]. In New York City, obesity prevalence among adults and children is 42.9 and 24.6%, respectively[5,6].

Food marketing has been identified as a major driver of obesity and diet-related diseases, which is largely due to promotion of products high in fat and/or energy[7]. Companies advertise products in ways that create positive attitudes that influence social norms towards increased consumption of products[8]. Targeted marketing refers to the use of common characteristics, needs and behaviours that appeal to a certain consumer group and the positioning of products in the mediums most likely to reach those consumers (e.g. McDonald's television advertisement (ad) in Mandarin)[9]. While targeted marketing campaigns can serve as health promotion tools, targeted ads have also been shown to promote unhealthy products (e.g. tobacco) to communities of colour[4]. Most public health research on racial/ethnic-targeted food marketing has focused primarily on Black and Latino communities, showing disproportionate promotion of high-energy and low-nutrient foods to these groups[9,10], despite industry leaders' recognition that Asian-American communities represent a critical growth sector across all industries[11]. Additionally, research on tobacco point-of-sale advertising shows that placing ads where the product can be purchased influences access to products, experimentation with products and increases the likelihood of future purchases[12,13].

Given Asian Americans are the fastest growing minority group in the USA, increasing in size by 43·3 % between 2000 and 2010[14] and are expected to comprise 9·0 % of the total US population by 2050[15], more research is needed to assess factors that can negatively influence the dietary choices of Asian Americans. The current study aimed to: (i) quantify the number and type of ads located in a Chinese-American neighbourhood in New York City; and (ii) catalogue the targeted marketing themes used in the food/beverage ads (e.g. language).

Methods

Researchers developed a qualitative codebook based on content analysis guidelines described by Lombard and colleagues[16]. The ten-item codebook was based on a similar tool[17] and addressed the following factors: type of product advertised (e.g. movies, foods/beverages); type of food/beverage (e.g. pizza); location of the ad (e.g. billboard, front-of-store display); street name where the ad was seen; cultural relevance of beverage (e.g. pearl tea (Asian) v. Coca-Cola (generic)); company that advertised the product (e.g. Coca-Cola); individual featured in the ad (e.g. character holding product); use of imagery that targeted children (e.g. cartoon characters); relevance to Asian culture (e.g. Asian flags); and relevance to any Asian language.

Food products were coded using the following categories: candy/dessert (e.g. cake); sauce/snack/processed/grocery store items (e.g. granola bars); fruits; vegetables;

away-from-home fast food (e.g. Subway; street food vendor); and away-from-home restaurant (e.g. Denny's; P.F. Chang's China Bistro). Food/beverage ads were categorized based on the type of product rather than the type of food/beverage brand. 'Non-dessert fast food' refers to food (e.g. burgers, fries) purchased in carry-out eating establishments without wait service[18] while dessert items from fast-food venues were included in the 'dessert' category. The distinction between fast food and desserts was made to fully characterize these categories and to prevent the dessert category from being overlooked by or subsumed under 'fast food'. 'Restaurants' refers to establishments where staff members service customers at their tables. This distinction between fast-food venues and restaurants was made because research suggests that consumption of fast food, but not restaurant food, is positively associated with negative health outcomes[19,20]. Researchers looked through the window and noted whether the venue was a restaurant (i.e. table service) or fast-food establishment (i.e. counter service).

All ads were coded once unless more than one type of food or beverage product was featured in the same ad (i.e. an ad with soda and fries was coded to acknowledge both products). Beverages were coded into these categories: yoghurt drinks, teas, sodas, bubble/pearl teas, energy drinks, canned drinks, fruit beverages (e.g. smoothies), coconut milk/water, brewed tea, ethnic beverage (e.g. plum drink), alcohol, coffee and milk.

The Social Explorer Demographic Research Tool was used to find New York City neighbourhoods where more than 60·0 % of residents identify as Asian/Asian American. A 0·6 mile^2 (1·6 km^2) area where 85·0 % of residents identify as Chinese/Chinese American met this criterion and was selected as the data collection site. Ten pairs of research assistants visited thirty streets in this area during July 2015 and photographed every outdoor ad including signs, front-of-store displays and billboards, and excluding graffiti. Because the study was observational and research assistants did not enter any of the stores, storeowners were not alerted about data collection beforehand.

Research assistants were trained to use the codebook with pilot images not associated with the collected data. Ten per cent (10·0 %) of the photographs were randomly chosen and coded, and researchers assessed intercoder reliability, requiring a Krippendorf's α value of at least 0·7 or percentage agreement of 90·0 %[16]. After establishing reliability and excluding variables that were associated with unreliable coding results, the remaining 90·0 % of photos were then coded. Each ad was coded once, unless a duplicate ad was photographed at a different location. Finally, the entire data set was analysed using the statistical software package IBM SPSS Statistics version 23.0, and frequencies were run to determine the percentage of ads associated with various codebook items.

Results

Researchers photographed 1366 ads in the designated neighbourhood. Based on the results of inter-rater reliability assessments, all variables met the cut-off for Krippendorf's α and percentage of agreement and were included in the final analyses.

In the current study, most ads appeared as signs (53·5 %, n 731; e.g. sidewalk chalkboard) or front-of-store displays (35·7 %, n 488; e.g. deli window ad). Ad prevalence was calculated to demonstrate the percentage of each ad type in this area (Table 1). The sample included food ads (n 183), beverage ads (n 181), and food and beverage ads (n 43), making the total 407 food and beverage ads. Thirty per cent (29·7 %, n 407) of ads in the sample featured food and/or beverage products (Table 1), while 'services' (e.g. bus ads) were the second largest category (21·0 %, n 288). Ads featured Asian and English text (n 559, 40·9 %) and English text (n 557, 40·8 %) most frequently in comparison to ads written in Asian text (n 209, 15·3 %), English and non-Asian text (n 8, 0·6 %) and non-Asian/non-English text (e.g. Spanish; n 5, 0·4 %).

Sugar-sweetened beverages (SSB) are drinks that contain added caloric sweeteners (e.g. sucrose) and include regular sodas, fruit drinks, sports drinks, sweetened teas and pre-mixed sweetened coffees[21]. This beverage ad type accounted for 66·9 % (n 113) of all beverage ads. The three largest beverage categories included bubble/pearl teas (28·2 % of beverage ads, n 51), alcoholic beverages (26·5 % of food/beverage ads, n 48) and sodas (12·7 % of beverage ads, n 23; Table 2).

Fast food accounted for 42·5 % (n 89) of the food ads (Table 3), followed by candy/desserts (24·8 %, n 52) and sauce/snack/processed/grocery store items (14·8 %, n 31). Additionally, there were slightly more ads for non-Asian foods/beverages (n 210, 51·6 %) than Asian foods/beverages (n 201, 49·4 %).

Over half of food/beverage ads (54·9 %, n 200) were relevant to Chinese culture (e.g. Asian model). Fifty-one per cent (51·1 %, n 186) of food/beverage ads used English text only, while 36·0 % used both Chinese text and English, and 8·2 % used Chinese text only. Fifty-nine per cent (58·6 %) of food/beverage ads were for products sold by small companies (i.e. fewer than twenty chain restaurants), while 21·9 % of ads were for a major multinational company (e.g. McDonald's). Only 8·2 % of food/beverage ads were child-targeted.

Discussion

Findings from the current study reflect previous research results showing that outdoor ads promote unhealthy food/beverage products more often than healthy products, which may contribute to obesogenic food environments[7]. Food/beverages were the largest category

Table 1 Descriptive summary of advertisement (ad) type and location in the Chinese-American neighbourhood, Lower East Side, New York City, USA, July 2015

Type of ad	Ad prevalence		Non-Asian-American food/beverage		Asian food/beverage		Sign		Billboard		Bus stop		Front-of-store display	
	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Food only	13·4	183	43·7	80	50·3	92	43·2	79	0·0	0	0·0	0	50·3	92
Beverage only	13·3	181	54·7	99	43·6	79	44·8	81	0·5	1	0·6	1	39·8	72
Food and beverage	3·1	43	37·2	16	48·8	21	48·8	21	0·0	0	0·0	0	48·8	21
Total food and beverage ads	29·7	407	47·9	195	47·2	192	44·5	181	0·2	1	0·2	1	45·5	185
Services (e.g. mobile phone carrier, bus travel, laundry, banking, electric utility company)	21·0	288	–	–	–	–	60·8	175	0·7	2	1·4	4	31·6	91
Beauty and health	17·8	243	–	–	–	–	50·2	122	1·6	4	0·0	0	40·3	98
Miscellaneous (e.g. lottery ticket, cigarettes, cooking appliances)	9·7	132	–	–	–	–	40·9	54	3·0	4	0·0	0	50·8	67
Entertainment	7·9	108	–	–	–	–	67·6	73	1·9	2	2·8	3	7·4	8
Fashion	3·0	41	–	–	–	–	56·1	23	0·0	0	2·4	1	34·1	14
Total ads	100·0	1366	14·3	195	14·1	192	46·0	628	1·0	13	0·7	9	33·9	463

Table 2 Descriptive summary of 224 advertisements (ads) featuring beverages and 203 beverage products in the sample from a Chinese-American neighbourhood, Lower East Side, New York City, USA, July 2015

Theme	Count %	Count n	SSB count %	SSB count n	Child-targeted %	Child-targeted n	Chinese-targeted %	Chinese-targeted n	Chinese text only %	Chinese text only n	Chinese and English text %	Chinese and English text n	English text only %	English text only n
Beverage ad type														
Bubble tea ads	23·8	51	100·0	51	9·8	5	100·0	51	7·8	4	66·7	34	23·5	12
Alcoholic beverage ads	22·4	48	0·0	0	4·2	2	16·7	8	0·0	0	10·4	5	83·3	40
Soda ads	10·7	23	95·7	22	8·7	2	21·7	5	0·0	0	21·7	5	78·3	18
Coffee ads	8·9	19	26·3	5	0·0	0	3·7	7	0·0	0	3·7	7	63·2	12
Fruit beverage (e.g. smoothies) ads	8·4	18	100·0	18	5·6	1	38·9	7	0·0	0	33·3	6	61·1	11
Brewed tea ads	7·0	15	6·7	1	6·7	1	60·0	9	0·0	0	53·3	8	40·0	6
Ethnic drink ads*,†	4·9	11	72·7	8	0·0	0	90·9	10	9·1	1	54·5	6	36·4	4
Energy drinks ads	4·2	9	44·4	4	33·3	3	44·4	4	33·3	3	11·1	1	55·6	5
Bottled/canned tea ads	3·3	7	100·0	7	0·0	0	42·9	3	14·3	1	28·6	2	42·9	3
Coconut milk/coconut water ads	2·8	6	0·0	0	0·0	0	33·3	2	0·0	0	16·7	1	83·3	5
Canned or bottled juice drink ads	1·4	3	100·0	3	0·0	0	0·0	0	0·0	0	0·0	0	100·0	3
Yoghurt drink ads	0·9	2	100·0	2	0·0	0	0·0	0	0·0	0	0·0	0	100·0	2
Milk product ads	0·9	2	0·0	0	50·0	1	0·0	0	0·0	0	0·0	0	100·0	2
Total beverage ads‡,§,‖,¶	95·5	214	54·0	121	6·7	15	47·3	106	4·0	9	32·1	72	54·9	123
Beverage product type														
SSB products**	52·8	113	100·0	113	6·1	11	38·7	70	4·4	8	29·8	54	26·5	48
Non-SSB products**	39·3	84	0·0	0	1·7	3	13·3	24	0·0	0	33·1	60	11·0	20
Other products*	2·8	6	0·0	0	0·0	0	1·1	2	0·6	0	5·0	1	3·9	4
Total beverage products	100·0	203	55·7	113	6·9	14	47·3	96	3·9	8	56·7	115	35·5	72

SSB, sugar-sweetened beverage.
*Aloe drinks, plum drinks and jelly drinks with unclear nutrition information.
†Added sugar content for three of eleven beverages was unavailable and they were not included in the SSB count.
‡Seven beverage products did not feature any text.
§Forty-three ads featured food and beverage products.
‖Total number of beverage ads was calculated by adding beverage only and food and beverage only ads.
¶Ten ads featuring a food and beverage product were coded as 'Unknown' because they featured a generic cup that was also opaque.
**Some ads showed more than one beverage. As a result, the number of beverage products exceeds the number of beverage ads.

Table 3 Descriptive summary of the 183 advertisements (ads) featuring foods and 209 food products in the sample from a Chinese-American neighbourhood, Lower East Side, New York City, USA, July 2015

Theme	Count		Child-targeted		Chinese-targeted		Chinese text only		Chinese and English text		English text only	
	%	n	%	n	%	n	%	n	%	n	%	n
Food only ads	100.0	183	3.4	14	27.5	112	5.4	22	16.2	66	20.9	85
Food products												
Candy/desserts*	24.8	52	11.5	6	50.0	26	5.8	3	38.5	20	50.0	26
Snacks/processed/grocery	14.8	31	6.5	2	54.8	17	19.4	6	35.5	11	38.7	12
Condiments	2.8	6	0.0	0	100.0	6	0.0	0	100.0	6	0.0	0
Fruits	9.0	19	5.3	1	68.4	13	0.0	0	26.3	5	73.7	14
Vegetables	0.9	2	0.0	0	100.0	2	50.0	1	50.0	1	0.0	0
Fast food	42.5	89	6.7	6	56.2	50	6.7	6	30.0	30	55.1	49
Restaurants	4.7	10	10.0	1	90.0	9	20.0	2	40.0	4	40.0	4
Total food products†,‡	100.0	209	7.7	16	58.9	123	8.6	18	58.4	122	50.2	105

*Only two ads coded as 'dessert' were from non-dessert food companies.
†Some ads showed more than one food product.
‡Forty-three ads featured food and beverage products.

(26.6 %) of ads in the sample and the prominence of SSB ads (66.9 % of beverage ads) in this area is alarming given the high rates of diabetes in some Asian subgroups. In fact, a large study of outdoor ads targeting White, Latino and Black neighbourhoods reported that SSB ads made up just 4.1 % of ads in zip codes from four major cities (Austin, TX; Los Angeles, CA; New York, NY; Philadelphia, PA)[10], whereas SSB ads made up 8.7 % of ads in this sample.

The current findings also suggest a need to tailor policies and interventions to address unique products that may contribute to poor health outcomes. Several major food/beverage companies in this sample used elements of Asian culture to appeal to Asian consumers. Further, the majority of ads promoted food products from small businesses (58.6 %) compared with national mainstream brands (21.9 %), highlighting a need to engage small businesses in advancing patron-level healthy living initiatives (e.g. energy labelling). The targeted nature of the food/beverage ads in our sample demonstrates companies' ability to tailor ads to specific ethnic groups based on their prevalence in particular neighbourhoods, which can be a public health asset when ads promote health (e.g. health insurance) or a liability (e.g. SSB ads).

The high prevalence of ads (n 1366) in this 0.60 mile^2 (1.55 km^2) area in New York City is concerning because 29.7 % of ads featured foods or beverages. Given research showing the negative effects of food ad exposure on eating behaviours[22] and that obesity prevalence ranges from 2.4 to 47.0 % among Chinese Americans in the USA[3], there is a need for policies to promote healthier lifestyle choices. Tailored policies are particularly important for Asian-American communities because their obesity rates vary widely. For instance, the obesity rate for third-generation (i.e. US-born parents and children) Chinese Americans is 22.1 % compared with 2.6 % for first-generation (i.e. foreign-born parents and children) Chinese Americans[23]. This difference reinforces the environment's impactful role in contributing to unhealthy dietary behaviours.

In the current study, ad prevalence varied by street, where some featured no ads while others featured over 100 ads. Other studies show that outdoor food ads were clustered in Black communities[24] and unhealthy food ads in subway stations were clustered more heavily in neighbourhoods with higher poverty rates and Latino residents[25]. These findings suggest communities of colour face high levels of food ad exposure, but we did not collect data on the types of surrounding venues in our study and cannot report whether the distribution of ads on these streets might cluster in ways that expose certain populations to more ads. Still, identifying culturally relevant food ads is important because research shows that various marketing strategies act as environmental cues, triggering consumers to make unplanned purchases and increase consumption of unhealthy food/beverage products[26,27]. Alternatively, research shows that health

promotion efforts (e.g. food labels) do not significantly reduce consumption[28-30] yet high demand for unhealthy products remains, driving heavy promotion by food/beverage companies[31]. Additionally, advertising is protected under the First Amendment, preventing restriction of its messages, ideas, subject matter or content[31], which limits consumers' ability to avoid unhealthy ads. Because these protections also prevent zoning restrictions on advertising, our findings could instead be utilized by community organizations and government agencies when developing counter-advertising campaigns (e.g. 'Pouring on the Pounds')[32], which should include ethnically relevant foods/beverages (e.g. bubble tea).

Limitations

The current study is limited by the small scale of the 0·60 mile^2 (1·55 km^2) area of focus as well as the focus on one neighbourhood, which prohibits our ability to compare the extent of targeted marketing across demographic groups. However, the present study is the first, to our knowledge, to systematically assess food/beverage ads in neighbourhoods where residents are predominantly Chinese American and where ads target a variety of Asian ethnic subgroups. Findings suggest a need for policies and interventions to address the unique food/beverage products and advertising techniques that may negatively contribute to health in Asian-American communities.

Acknowledgements

References

1. Centers for Disease Control and Prevention (2015) Health of Asian or Pacific Islander Population. http://www.cdc.gov/nchs/fastats/asian-health.htm (accessed February 2016).
2. Staimez LR, Weber MB, Narayan KMV et al. (2013) A systematic review of overweight, obesity, and type 2 diabetes among Asian American subgroups. *Curr Diabetes Rev* **9**, 312–331.
3. World Health Organization (2004) Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet* **363**, 157–151.
4. Singh GK & Lin SC (2013) Dramatic increases in obesity and overweight prevalence among Asian subgroups in the United States, 1992–2011. *ISRN Prev Med* **2013**, 898691.
5. Au L, Kwong K, Chou JC et al. (2009) Prevalence of overweight and obesity in Chinese American children in New York City. *J Immigr Minor Health* **11**, 337–341.
6. Rajpathak SN & Wylie-Rosett J (2011) High prevalence of diabetes and impaired fasting glucose among Chinese immigrants in New York City. *J Immigr Minor Health* **13**, 181–183.
7. Seiders K & Petty RD (2004) Obesity and the role of food marketing: a policy analysis of issues and remedies. *J Public Policy Mark* **23**, 153–169.
8. Grier SA, Mensinger J, Huang SH et al. (2007) Fast-food marketing and children's fast-food consumption: exploring parents' influences in an ethnically diverse sample. *J Public Policy Mark* **26**, 221–235.
9. Grier SA & Kumanyika S (2010) Targeted marketing and public health. *Annu Rev Public Health* **31**, 349–369.
10. Yancey AK, Cole BL, Brown R et al. (2009) A cross-sectional prevalence study of ethnically targeted and general audience outdoor obesity-related advertising. *Milbank Q* **87**, 155–184.
11. The Nielsen Company (2012) State of the Asian American Consumer. http://www.nielsen.com/content/dam/corporate/us/en/microsites/publicaffairs/StateoftheAsianAmericanConsumerReport.pdf (accessed February 2016).
12. Centers for Disease Control and Prevention (2002) Point-of-purchase tobacco environments and variation by store type – United States, 1999. *MMWR Morb Mortal Wkly Rep* **51**, 184–187.
13. Donovan RJ, Jancey J & Jones S (2002) Tobacco point of sale advertising increases positive brand user imagery. *Tob Control* **11**, 191–194.
14. Hoeffel EM, Rastogi S, Kim MO et al. (2012) *The Asian Population: 2010.* Washington, DC: US Department of Commerce, Economics and Statistics Administration, US Census Bureau.
15. Passel J & Cohn D (2008) US Population Projects: 2005–2050. http://pewresearch.org/pubs/729/united-states-population-projections (accessed February 2016).
16. Lombard M, Snyder-Duch J & Bracken CC (2007) Content analysis in mass communication: assessment and reporting of intercoder reliability. *Hum Commun Res* **28**, 587–604.
17. Bragg MA, Liu PJ, Roberto CA et al. (2013) The use of sports references in marketing food and beverage products in supermarkets. *Public Health Nutr* **16**, 738–742.
18. French SA, Harnack L & Jeffery RW (2000) Fast food restaurant use among women in the Pound of Prevention study: dietary, behavioral and demographic correlates. *Int J Obes Relat Metab Disord* **24**, 1353–1359.
19. Duffey KJ, Gordon-Larsen P, Jacobs DR et al. (2007) Differential associations of fast food and restaurant food consumption with 3-y change in body mass index: the Coronary Artery Risk Development in Young Adults Study. *Am J Clin Nutr* **85**, 201–208.

20. Duffey KJ, Gordon-Larsen P, Steffen LM *et al.* (2009) Regular consumption from fast food establishments relative to other restaurants is differentially associated with metabolic outcomes in young adults. *J Nutr* **139**, 2113–2118.

21. Healthy Eating Research (2013) Recommendations for Healthier Beverages. http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2013/rwjf404852 (accessed June, 2016).

22. Cairns G, Angus K, Hastings G *et al.* (2013) Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. *Appetite* **62**, 209–215.

23. Bates L, Acevedo-Garcia D, Alegría M *et al.* (2008) Immigration and generational trends in body mass index and obesity in the United States: results of the National Latino and Asian American Survey, 2002–2003. *Am J Public Health* **98**, 70–77.

24. Hillier A, Cole BL, Smith TE *et al.* (2009) Clustering of unhealthy outdoor advertisements around child-serving institutions: a comparison of three cities. *Health Place* **15**, 935–945.

25. Lucan SC, Maroko AR, Sanon OC *et al.* (2017) Unhealthful food-and-beverage advertising in subway stations: targeted marketing, vulnerable groups, dietary intake, and poor health. *J Urban Health* **94**, 220–232.

26. Pasch KE, Komro KA, Perry CL *et al.* (2007) Outdoor alcohol advertising near schools: what does it advertise and how is it related to intentions and use of alcohol among young adolescents? *J Stud Alcohol Drug* **68**, 587–596.

27. Moodie R, Stuckler D, Monteiro C *et al.* (2013) Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *Lancet* **381**, 670–679.

28. Sharma LL, Teret SP & Brownell KD (2010) The food industry and self-regulation: standards to promote success and to avoid public health failures. *Am J Public Health* **100**, 240–246.

29. Elbel B, Gyamfi J & Kersh R (2011) Child and adolescent fast-food choice and the influence of calorie labeling: a natural experiment. *Int J Obes (Lond)* **35**, 493–500.

30. Harnack LJ, French SA, Oakes JM *et al.* (2008) Effects of calorie labeling and value size pricing on fast food meal choices: results from an experimental trial. *Int J Behav Nutr Phys Act* **5**, 63.

31. Polin KL (1988) Argument for the ban of tobacco advertising: a First Amendment analysis. *Hofstra Law Rev* **17**, 99–136.

32. *New York Times* (2009) New targets in the fat fight: soda and juice. http://www.nytimes.com/2009/09/01/nyregion/01fat.html (accessed March 2017).