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Children's exposure to food advertising on free-to-air television: an Asia-Pacific perspective

Abstract

There is an established link between food promotions and children's food purchase and consumption. Children in developing countries may be more vulnerable to food promotions given the relative novelty of advertising in these markets. This study aimed to determine the scope of television food advertising to children across the Asia-Pacific to inform policies to restrict this marketing. Six sites were sampled, including from China, Indonesia, Malaysia and South Korea. At each site, 192 h of television were recorded (4 days, 16 h/day, three channels) from May to October 2012. Advertised foods were categorized as core/healthy, non-core/unhealthy or miscellaneous, and by product type. Twenty-seven percent of advertisements were for food/beverages, and the most frequently advertised product was sugar-sweetened drinks. Rates of non-core food advertising were highest during viewing times most popular with children, when between 3 (South Korea) and 15 (Indonesia) non-core food advertisements were broadcast each hour. Children in the Asia-Pacific are exposed to high volumes of unhealthy food/beverage television advertising. Different policy arrangements for food advertising are likely to contribute to regional variations in advertising patterns. Cities with the lowest advertising rates can be identified as exemplars of good policy practice.

Keywords

food, air, advertising, free, perspective, asia, pacific, television, children, exposure

Disciplines

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Children's exposure to food advertising on free-to-air television: an Asia-Pacific perspective

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Abstract

Objective: There is an established link between food promotions and children's food purchase and consumption. Children in developing countries may be more vulnerable to food promotions given the relative novelty of advertising in these markets. This study aimed to determine the scope of television food advertising to children across the Asia-Pacific to inform policies to restrict this marketing.

Methods: Six sites were sampled, including from China, Indonesia, Malaysia and South Korea. At each site, 192 hours of television were recorded (four days, 16 hours/day, three channels) from May-October 2012. Advertised foods were categorised as core/healthy, non-core/unhealthy or miscellaneous, and by product type.

Findings: 27% of advertisements were for food/beverages, and the most frequently advertised product was sugar-sweetened drinks. Rates of non-core food advertising were highest during viewing times most popular with children, when between three (South Korea) and 15 (Indonesia) non-core food advertisements were broadcast each hour.

Conclusion: Children in the Asia-Pacific are exposed to high volumes of unhealthy food/beverage television advertising. Different policy arrangements for food advertising are likely to contribute to regional variations in advertising patterns. Cities with the lowest advertising rates can be identified as exemplars of good policy practice.

Key words: Food; Marketing; Advertising; Television; Asia

Introduction

In 2010, the World Health Organization (WHO) endorsed a set of recommendations to guide policy on restricting the promotion of foods and non-alcoholic beverages high in fat, sugar and/or salt to children, placing this issue on the international health agenda (World Health Organization, 2010). The need to protect children from this marketing is grounded in evidence from systematic reviews demonstrating its effects on children's food preferences, purchases and consumption (Cairns et al., 2013; Institute of Medicine of the National Academies, 2005). Children in developing countries may be more vulnerable to food promotions as they are less familiar with, and potentially less critical of, advertising than children in developed countries, and they may be specifically targeted as an entry point into developing markets as children have been seen to be more flexible than their parents (Hastings et al., 2006).

Food promotion in low- and middle-income countries (LMIC) has expanded rapidly, with multi-national soft drink and fast-food companies shifting into Asia-Pacific markets to capitalise on the lack of regulation (Hawkes, 2002; Consumers International, 2008). Despite this, there is limited evidence on the extent of food marketing to children in these countries. Available evidence indicates that over half of all television advertisements broadcast during children's programming in Asia-Pacific countries are for foods/beverages (Escalante de Cruz et al., 2004). In one international study, Hong Kong had one of the highest rates of television food advertising during children's peak viewing times, compared with other countries studied (mostly from Western Europe and North America), with chocolate and confectionery being the most frequently advertised products (Kelly et al., 2010). In 2009, South Korean children were exposed to 2.6 food advertisements per day, the greatest proportion of which were for beverages and fast-foods (Han et al., 2013). In 2006, the products most frequently advertised during children's peak viewing times on Malaysian television were snack foods, ice cream and biscuits (Karupaiah et al., 2008).

Restricting unhealthy food marketing to children has been identified as a cost-effective strategy for reducing the prevalence of childhood obesity (Magnus et al., 2009; Swinburn et al., 2004). Epidemiological evidence indicates that while the prevalence of overweight and obesity is lower in many developing countries across the Asia Pacific region, the rate of increase in prevalence in the previous few decades is much higher than that of developed countries (Asia Pacific Cohort Studies Collaboration, 2007; Chong et al., 2014). Yet few

LMIC (and indeed developed countries) have regulations to limit children's exposure to this form of marketing. Monitoring the nature and extent of television food advertising in the Asia-Pacific is essential to provide information on the degree of this issue to support policy action. This study aimed to compare advertising for foods and beverages to children on free-to-air television across cities within the Asia-Pacific.

Methods

Six independent research teams from academic institutions in China (Heilongjiang, Shanghai and Xi'an); Yogyakarta, Indonesia; Kuala Lumpur (KL), Malaysia; and Seoul, South Korea agreed to participate in a regional comparison of food advertising. A study protocol was provided detailing the methods for data collection and coding to be undertaken by each research team.

Data samples

Between May and October 2012, 192 hours of television broadcasting was recorded by each team, providing an overall sample of 1,152 hours. All teams recorded four days of broadcasting (two weekdays and two weekend days) from 6:00 to 22:00 daily, for the three channels most popular with children (<13 years). The team from Xi'an recorded five channels, as popular channels differed on weekdays and weekends, although the total amount of recording was the same. Each team recorded their sample either within the same week or over successive weeks; in the latter case the same days of the week were recorded. Popular channels were identified using different approaches: KL and Heilongjiang had access to television audience data; Yogyakarta, Shanxi and Shanghai administered surveys with a small purposive sample of school children to identify popular channels; while Seoul selected the country's three national free-to-air channels. National holidays, large sporting competitions and special events were excluded, although data from Heilongjiang included one day during the London Olympic Games. Comparing this day of data to one day on the same channel and weekday collected during a pilot study identified similar rates of advertisements and type of foods advertised. Data were recorded from live television broadcasts onto DVDs or hard disks, with the exception of Seoul, where data were obtained from a commercial media monitoring company.

Data coding

All advertisements were coded for channel, date, time and product type. A ‘food advertisement’ included any advertisement for a retail food/beverage product, supermarket or restaurant. For each food advertisement, the main product advertised was identified. In cases where equal attention was given to two or more products, the first product shown was identified. Food products were coded into three major food groups (core/healthy, non-core/unhealthy or miscellaneous) and 37 minor food product codes based on those used in earlier research (Kelly et al., 2010), but adapted to the Asia-Pacific food supply (see Table 3). Advertisements were also coded as broadcast during children’s peak or non-peak viewing times (Table 1). For sites with data on audience viewing times (Heilongjiang, KL and Seoul), peak viewing times were defined as periods when $\geq 25\%$ of the maximum child audience for the day was viewing (Kelly et al., 2010). For Yogyakarta, Shanxi and Shanghai, peak times were determined from surveys with children identifying times most commonly spent watching television. Discussions between the three Chinese teams led to the adoption of common peak viewing times. Use of promotional characters (celebrities, branded characters, licensed characters and sports figures) and premium offers (giveaways, competitions, vouchers and rebates) in food advertisements were recorded.

Insert Table 1 about here

Reliability

For each site, a one-hour sample of television data was randomly selected. Each advertisement within the samples was re-coded by YX according to whether the advertisement was for a food or non-food, and for major food group. Coding was compared between research teams and YX using Cohen’s Kappa statistic. Agreement for food/non-food advertisements was 1.0 for all sites. Agreement for food coding was 1.0 for all sites except Xi’an (0.82, representing almost perfect agreement) and Seoul (0.65, substantial agreement). As more than one person coded the data from Heilongjiang, Yogyakarta and KL, inter-rater reliability within research teams was assessed in the same way, with percentage agreement calculated to estimate coding consistency. Percentage agreement was 100% for food/non-food and food coding for all teams, except Yogyakarta (88% for food coding).

Data analysis

Coded datasets were cleaned and merged. The primary outcome was the extent of food advertising and advertising for major food groups. Extent of food advertising was measured as the mean number (rate) of advertisements per hour, per channel. To test whether the extent of advertising differed across sites, Zero-Inflated Poisson (ZIP) regression models were computed using SAS version 9.2 (SAS Institute Inc., Cary, NC, USA), with advertisement type as the predictor variable. Chi-square tests on the difference in the log likelihood of the full and null ZIP models were computed, and indicated that each of the full ZIP models which included site as the explanatory variable were a significantly better fit for the data compared with the null ZIP models that only included the predictor variable (advertisement type). Differences in the extent of advertising for major food groups and the use of persuasive marketing techniques between peak and non-peak viewing times were examined using independent samples t-tests. In all instances, statistical significance was accepted at the level of $\alpha=0.05$.

Results

Extent of food/beverage advertising

Overall, 37,789 advertisements were identified, of which 27% were for food (25% for retail products, 2% for restaurants, 0% for supermarkets). The overall rate of advertising was 33 advertisements per hour. Table 2 shows differences in the rates of total advertising, food advertising and food group advertising across sites. Food was the most frequently promoted product for all sites, with the exception of KL, where channel promotions and toiletries were most frequently advertised. The overall rate of food advertising was nine food advertisements per hour. Yogyakarta had the highest rate of food advertising, at 21 food advertisements per hour; almost three to four-fold higher than rates at other sites (Table 2).

Insert Table 2 about here

Types of foods advertised

Food advertisements promoted predominantly non-core foods, with a rate of six non-core food advertisements per hour overall, compared with one advertisement per hour for core foods and for miscellaneous foods (Table 2). For every one core food advertisement there were between 1.3 (Xi'an) and 27.8 (Yogyakarta) non-core food advertisements shown. Overall, the most frequently advertised food product types were sugar-sweetened drinks

(19%), high fat dairy and low fat dairy (9% each), baby and toddler formula (7%) and ice cream (6%). In an average hour of television broadcasting, a child may be exposed to between one (KL, Seoul and Xi'an) and four (Yogyakarta) advertisements for sugar-sweetened drinks (Table 3).

Insert Table 3 about here

Children's peak versus non-peak viewing times

The rate of total food advertising, and advertising for non-core and core foods, was higher during children's peak viewing times for all sites, except Yogyakarta (Figure 1). Excluding Yogyakarta, non-core food advertising was 11% (KL) to 310% (Heilongjiang) higher during peak times compared with non-peak times. This compares with advertising for core foods being 19% (Shanghai) to 133% (KL) higher during peak, compared with non-peak times (Figure 1).

Insert Figure 1 about here

Persuasive marketing

Overall, 9% of food advertisements contained premium offers and 34% contained promotional characters. On average, almost one food advertisement per hour contained premium offers, while three contained promotional characters. Most advertisements containing persuasive techniques were for non-core products (0.6 non-core food ads per hour using premium offers and 2.1 non-core ads per hour using promotional characters vs. 0.1 and 0.4 core food ads using these techniques, respectively). The rate of food advertisements containing promotional characters was highest during children's peak viewing times (4.2 vs. 2.7 ads per hour in non-peak times; $t_{360}=3.47, P=0.001$), while rates of food advertisements containing premium offers was similar between peak and non-peak times (1.0 vs. 0.7; $t_{1136}=1.12, P=0.2$).

Insert Table 4 about here

Discussion

This study provides a detailed comparison of television food advertising patterns across six cities in the Asia-Pacific and highlights the predominance of non-core food promotions. On average, a child watching television may be exposed to one unhealthy food/beverage advertisement every four minutes in Yogyakarta, 12 minutes in Shanghai, 13 minutes in Heilongjiang, 16 minutes in KL, 17 minutes in Xi'an and every 26 minutes in Seoul. This compares with children seeing one advertisement promoting a healthy food/beverage every 22 minutes in Shanghai and Xi'an, 43 minutes in Seoul, 100 minutes in Yogyakarta, 120 minutes in KL and every 150 minutes in Heilongjiang.

The most frequently advertised product across all sites was sugar-sweetened drinks. Sugar-sweetened drinks have been identified as a probable causal factor in weight gain and obesity (World Health Organization, 2003). This association has been specifically identified in Asian populations (Li et al., 2010). One survey of adolescents in China found that sugar-sweetened drink consumption had a dose-response association with obesity risk, with those having one bottle a day 50% more likely, and those consuming more than two bottles per day 70% more likely, to be overweight or obese (Li et al., 2010).

The next most frequently advertised foods were low fat dairy, high fat dairy, baby and toddler formula and ice cream. This contrasts with findings from other countries, which indicate the most frequently promoted foods to be sugar-sweetened breakfast cereals, savoury snacks, fast food, confectionery and soft drinks (Cairns et al., 2013). However, low rates of advertising for vegetables and fruit were identified in the previous study (comprising 2% of food advertisements), which is similar to other research.

Yogyakarta had extremely high rates of total food and non-core food advertising. While the rates of advertising in other cities were relatively lower, these were comparable to earlier studies assessing food advertising exposures. In one study comparing television advertising patterns across 13 cities in Australasia, North and South America, and Eastern and Western Europe in 2009, the rate of non-core food advertising during children's peak viewing times was between two (Brazil) and six (Germany) per hour (Kelly et al., 2010). In the current study, after excluding Yogyakarta, there was an average of four non-core food advertisements per hour during peak viewing times.

Seoul had the lowest rate of non-core food advertising. Further, persuasive marketing techniques in Seoul were more frequently used in advertisements for core and miscellaneous foods. These advertising patterns can be at least partially attributed to pioneering advertising regulations in South Korea. The *Special Act on Safety Management of Children's Dietary Life*, introduced in 2010, restricts advertisements for energy dense, nutrient poor 'children's foods' from being advertised on television between 17:00 and 19:00 daily and during children's programs outside of these times (Korean Ministry of Food and Drug Safety, 2010; Kim et al., 2013). The impact of this regulation on advertising exposures has been assessed by comparing gross ratings points (GRPs) for food advertisements before and after the introduction of the Act (Kim et al., 2013), where GRPs represent the size of the audience exposed to an advertisement within a given period. GRPs for energy dense, nutrient poor foods decreased by 82% during restricted broadcast times and by 50% at other times after the introduction of the regulations (Kim et al., 2013). In comparison, in other countries where industry self-regulations have been enacted on responsible marketing to children, independent studies have demonstrated that these policies have had no impact on children's exposure to unhealthy food advertising on television, including in countries such as Australia (Hebden et al., 2011; King et al., 2011), Canada (Potvin Kent et al., 2012), and the USA (Kunkel et al., 2009).

Other than differing regulatory provisions, other explanations for the variations in advertising patterns observed between cities may include the extent of Westernisation of the food supply (Harris, 2002), the use of television as the primary entertainment media (Chong et al., 2014), and population density (with large populations attracting greater industry attention). There may also be potential differences arising from the use different data collection methods in Seoul, where advertising data were purchased from a commercial media monitoring company, compared with the method of physically recording television broadcasting used by other cities.

The major objective of food advertising regulations should be to limit the impact of marketing of unhealthy foods on children (World Health Organization, 2010), whereby 'impact' refers to both the extent of exposure to advertising, as indicated by the advertising rate; and the power of advertising, including the use of persuasive marketing techniques (World Health Organization, 2012). In this study, the rate of advertising of non-core foods/beverages was highest during children's peak viewing times for all sites, with the

exception of Yogyakarta. Therefore, total exposures to non-core food advertising, as a function of the total child audience and the advertising rate, were highest during these times. Further, food advertisements containing promotional characters were most prevalent during peak viewing times. Our findings suggest that regulations that limit the rate of non-core food advertising during peak viewing times, and the use of persuasive techniques during these times would greatly reduce the impact of unhealthy food marketing to children.

Also of concern are the high rates of advertising for baby and toddler formulae, which were frequently advertised products in China, KL and Yogyakarta. The WHO International Code of Marketing of Breast-Milk Substitutes precludes all forms of advertising for breast milk substitutes, and all of the countries included in this study are signatories to this code (UNICEF, 2012). The findings support the need for systems to monitor and enforce existing marketing codes to limit the promotion of breast milk substitutes, and the need to introduce and enforce penalties for non-compliance (Soekarjo and Zehner, 2011).

Limitations of the study include the different methods for selecting popular channels and peak viewing times, including the use of purposive surveys of children in three of the study areas. However in China, survey data for children to identify popular channels/viewing times were compared to audience data collected for one province to confirm validity. Peak viewing times were identified as earlier in the afternoon in Yogyakarta, while for all other sites peak times were in the evening. It is possible that viewing patterns differ between countries; however there may have been differences in the classification of peak times based on the methods used to define these periods. Study strengths included the consistency in data coding both within and between sites. All teams piloted this protocol to ensure coding consistency and to verify that the food classification system was relevant to the local food supply.

Conclusion

Overall, children in the Asia-Pacific are exposed to high volumes of unhealthy food advertising on television, particularly for sugar-sweetened drinks. Findings from the current study guide regulatory specifications, including the need to restrict unhealthy food advertising during times when the highest numbers of children are watching television, and the use of promotional characters in advertisements promoting unhealthy products. Evidence from this and other studies (Kim et al., 2013) highlight the positive impact that meaningful government regulations can have on reducing children's exposure to unhealthy food

marketing, as demonstrated by comparatively low advertising rates for these foods in Seoul. Hence, food marketing restrictions recently introduced in South Korea can provide good practice guidelines for adoption in other jurisdictions.

References

- Asia Pacific Cohort Studies Collaboration. (2007). The burden of overweight and obesity in the Asia–Pacific region. *Obesity Reviews*, **8**, 191-196.
- Cairns, G., Angus, K., Hastings, G. and Caraher, M. (2013). Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. *Appetite*, **62**, 209-215.
- Chong, PN., Teh, CP, Poh, BK. and Noor, MI. (2014). Etiology of obesity over the life span: ecological and genetic highlights from Asian countries. *Current Obesity Reports*: DOI 10.1007/s13679-013-0088-1.
- Consumers International. (2008). The junk food trap: marketing unhealthy food to children in Asia Pacific. United Kingdom, London.
<http://www.consumersinternational.org/news-and-media/publications/junk-food-trap-a-survey-of-food-marketing-to-children-in-asia-and-the-pacific-region>. (last accessed 23 March 2012).
- Escalante de Cruz, A., Phillips, S., Visch, M. and Saunders, DB. (2004). The junk food generation. A multi-country survey of the influence of television advertisements on children. Consumers International Asia Pacific Office, Kuala Lumpur.
- Han, E., Powell, L. M. and Kim, TH. (2013). Trends in exposure to television food advertisements in South Korea. *Appetite*, **62**, 225-231.
- Harris, S. (2002). Globalisation in the Asia-Pacific context. Parliament of Australia.
http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp0102/02RP07#willthe. (last accessed 9 April 2014).
- Hastings, G., McDermott, L., Angus, K., Stead, M. and Thomson, S. (2006). The extent, nature and effects of food promotion to children: a review of the evidence., Technical Paper prepared for the World Health Organization.
- Hawkes, C. (2002) Marketing activities of global soft drink and fast food companies in emerging markets: a review. In *Globalization, Diets and Noncommunicable Diseases*. World Health Organization, Geneva.
- Hebden, L. A., King, L., Grunseit, A., Kelly, B. and Chapman, K. (2011). Advertising of fast-food to children on Australian television: Impact of industry self-regulation. *Medical Journal of Australia*, **195**, 20-24.
- Institute of Medicine of the National Academies (2005). *Food Marketing to Children and Youth: Threat or Opportunity?* Washington DC: The National Academies Press.

- Karupaiah, T., Chinna, K., Mee, L. H., Mei, L. S. and Noor, M. I. (2008). What's on Malaysian television? - A survey on food advertising targeting children. *Asia Pacific Journal of Clinical Nutrition*, **17**, 483-491.
- Kelly, B., Halford, J. G., Boyland, E. J., Champman, K., Bautista-Castaño, I., Berg, C. et al. (2010). Television food advertising to children: a global perspective. *American Journal of Public Health*, **100**, 1730-1736.
- Kim, S., Lee, Y., Yoon, J., Chung, S.J., Lee, S. K. and Kim, H. (2013). Restriction of television food advertising in South Korea: impact on advertising of food companies. *Health Promot International*, **28**, 17-25.
- King, L., Hebden, L., Grunseit, A., Kelly, B., Chapman, K. and Venugopal, K. (2011). Industry self regulation of television food advertising: Responsible or responsive? *International Journal of Pediatric Obesity*, **6**, e390-398.
- Korean Ministry of Food and Drug Safety. (2010). The Special Act on the Safety Management of Children's Dietary Life. Korea.
<http://www.kfda.go.kr/eng/index.do?nMenuCode=66> (last accessed 17 April 2013).
- Kunkel, D., McKinley, C. and Wright, P. (2009). The impact of industry self-regulation on the nutritional quality of foods advertised on television to children. University of Arizona, Tuscon.
- Li, M., Dibley, MJ., Sibbritt, D. W. and Yan, H. (2010). Dietary habits and overweight/obesity in adolescents in Xi'an City, China. *Asia Pacific Journal of Clinical Nutrition*, **19**, 76-82.
- Magnus, A., Haby, MM., Carter, R. and Swinburn, B. (2009). The cost-effectiveness of removing television advertising of high-fat and/or high-sugar food and beverages to Australian children. *International Journal of Obesity*, **33**, 1094-1102.
- Potvin Kent, M., Dubois, L. and Wanless, A. (2012). A Nutritional Comparison of Foods and Beverages Marketed to Children in Two Advertising Policy Environments. *Obesity (Silver Spring)*, **20**, 1892-1837.
- Soekarjo, D. and Zehner, E. (2011). Legislation should support optimal breastfeeding practices and access to low-cost, high-quality complementary foods: Indonesia provides a case study. *Maternal and Child Nutrition*, **7**, 112-122.
- Swinburn, B.A., Caterson, I. Seidell, J. C. and James, WPT. (2004). Diet, nutrition and the prevention of excess weight gain and obesity. *Public Health Nutrition*, **7**, 123-146.

- UNICEF. (2012). International Code of Marketing of Breast-milk Substitutes. WHO, Geneva. http://www.unicef.org/nutrition/index_24805.html. (last accessed 11 March 2013).
- World Health Organization. (2003). Diet, nutrition and the prevention of chronic diseases. World Health Organization, Geneva.
- World Health Organization. (2010). Set of recommendations on the marketing of foods and non-alcoholic beverages to children. WHO Press, Geneva.
- World Health Organization. (2012). A framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children. World Health Organization, Geneva.

Table 1: Peak commercial television viewing times for children aged < 13 years of age, by site

Research team	Weekday peak viewing times (hours/day)	Weekend peak viewing times (hours/day)
Shanghai, China	17:00 to 20:00 (3)	17:00 to 20:00 (3)
Heilongjiang, China	17:00 to 20:00 (3)	17:00 to 20:00 (3)
Shanxi, China	17:00 to 20:00 (3)	17:00 to 20:00 (3)
Yogyakarta, Indonesia	14:00-17:00 (3)	10:00-12:00 (2)
Kuala Lumpur, Malaysia	19:00-22:00 (3)	15:00-16:00 and 19:00-22:00 (4)
Seoul, South Korea	17:00-22:00 (5)	9:00-11:00 and 18:00-20:00 (4)

Table 2: Rate of all advertising and food advertising, by site

City, country	Rate of advertisements (ads/hr/channel)					Ratio core : non-core
	Total	Food	Non-core food	Core food	Misc. food	
Yogyakarta, Indonesia	60.8	20.6	16.7	0.6	3.4	1: 27.8
Shanghai, China	31.4	8.3	5.0	2.7	0.6	1: 1.9
Xi'an, China	28.8	7.3	3.6	2.7	1.0	1: 1.3
Heilongjiang, China	28.5	5.3	4.5	0.4	0.5	1: 11.3
Kuala Lumpur, Malaysia	25.3	5.2	3.8	0.5	0.9	1: 7.6
Seoul, South Korea	22.0	5.0	2.3	1.4	1.3	1: 1.6
Wald Chi-square	93.22 *	157.96 *	276.10 *	92.49 *	91.09 *	

* P < 0.0001

Table 3: Frequency of advertisements for food and beverage types, by site

	Rate of advertisements (ads/hr/channel)					
	Yogya karta	Shan ghai	Heilong jiang	Kuala Lump ur	Xi'an	Seoul
<i>NON-CORE FOOD</i>	16.7	5.0	4.5	3.8	3.6	2.3
Sugar-sweetened drinks	4.3	1.6	1.8	0.7	0.7	0.9
Full cream milks and yoghurts (> 3g fat /100g) and cheese (>15g fat /100g) and alternatives	3.6	0.5	0.2	0.0	0.3	0.0
Ice cream, iced confection and desserts	2.5	0.0	0.0	0.3	0.4	0.0
Sweet breads/cakes/muffins/buns/biscuits, glutinous rice balls/cakes/pudding, high fat savoury biscuits, pies, pastries	1.6	0.3	0.0	0.6	0.3	0.1
Meat and meat alternatives processed/preserved in salt	1.2	0.0	0.1	0.0	0.1	0.2
Flavoured/fried instant rice and noodle products	1.0	0.0	0.0	0.2	0.1	0.5
Chocolate and candy	1.0	0.2	0.0	0.2	0.3	0.0
High sugar and/or low fibre breakfast cereals (>20g sugars /100g or <5g dietary fibre /100g)	0.5	0.0	0.0	0.1	0.0	0.3
Fruit juice/drinks (<98% fruit)	0.4	0.0	0.1	0.2	0.7	0.0
Fast food (<u>not only</u> healthier options advertised)	0.3	1.0	0.3	0.4	0.4	0.4
Sweet snack foods - jelly, sugar-coated dried fruits or nuts, nut/seed based bars and slices, sweet rice bars, and tinned fruit in syrup	0.2	0.1	0.0	0.1	0.1	0.0
Savoury snack foods (added salt or fat) - chips, dried spicy peas, fruit chips, savoury crisps, extruded snacks, popcorn (exclude plain), salted or coated nuts, other fried snacks	0.2	1.3	0.0	0.6	0.0	0.2
High fat/salt meals – frozen, packaged meals (>6g saturated fat /serve, >900mg sodium /serve)	0.0	0.0	0.0	0.1	0.0	0.0
Other high fat/salt products – high fat savoury sauces (>10g fat /100), soups (>2g fat /100g; all dehydrated)	0.0	0.0	0.2	0.2	0.0	0.0
Alcohol	0.0	0.0	1.7	0.0	0.3	0.0
<i>CORE FOOD</i>	0.6	2.7	0.4	0.5	2.7	1.4
Water	0.4	0.0	0.2	0.1	0.2	0.3
Breads, rice and rice products without added fat, sugar or salt	0.1	0.0	0.0	0.1	0.0	0.1
Baby foods (exclude milk formulae)	0.1	0.0	0.0	0.0	0.0	0.0
Milks and yoghurts (≤3g fat /100g), cheese (≤15g fat /100g) and alternatives	0.0	1.6	0.0	0.2	2.0	0.6
Fruits and fruit products without added fats, sugars or salt	0.0	0.5	0.0	0.0	0.0	0.1
Healthy Snacks – < 600kJ/serve, <3g saturated fat/serve and <200mg sodium/serve	0.0	0.5	0.0	0.0	0.0	0.1
Oils high in mono- or polyunsaturated fats, and low fat sauces (<10g fat /100g)	0.0	0.1	0.1	0.1	0.1	0.0
Vegetables and vegetable products without added fats, sugars or salt	0.0	0.0	0.0	0.0	0.2	0.0
Low sugar, high fibre breakfast cereals (<20g sugar /100g and >5g fibre /100g)	0.0	0.0	0.0	0.0	0.1	0.0
Meat and meat alternatives	0.0	0.0	0.0	0.0	0.0	0.1
Low fat/salt meals – meals (≤6g saturated fat/serve, ≤900mg sodium/serve), soups (<2g fat /100g, exclude dehydrated), sandwiches, mixed salads	0.0	0.0	0.0	0.0	0.0	0.0
<i>MISCELLANEOUS FOOD/FOOD-RELATED</i>	3.4	0.6	0.5	0.9	1.0	1.3
Baby and toddler milk formulae	1.6	0.6	0.4	0.3	0.4	0.1
Recipe additions (including soup cubes, oils, dried herbs and seasonings)	1.2	0.0	0.0	0.1	0.0	0.4
Tea and coffee	0.3	0.0	0.0	0.2	0.2	0.0
Vitamin/mineral or other dietary supplements, and sugar-free chewing gum	0.2	0.0	0.1	0.2	0.4	0.2
Fast food (<u>only</u> healthier options advertised)	0.0	0.0	0.0	0.1	0.0	0.1
Fast-food restaurant (<u>no</u> foods or beverages advertised)	0.0	0.0	0.0	0.0	0.0	0.0
Local restaurant	0.0	0.0	0.0	0.0	0.0	0.2

Supermarkets (<u>only</u> core and healthy foods advertised)	0.0	0.0	0.0	0.0	0.0	0.0
Supermarkets (<u>not only</u> core and healthy foods advertised)	0.0	0.0	0.0	0.0	0.0	0.0
Supermarkets (<u>no</u> foods or beverages advertised)	0.0	0.0	0.0	0.0	0.0	0.0

Figure 1: Rate of advertising of major food groups during children’s peak and non-peak viewing times, by site

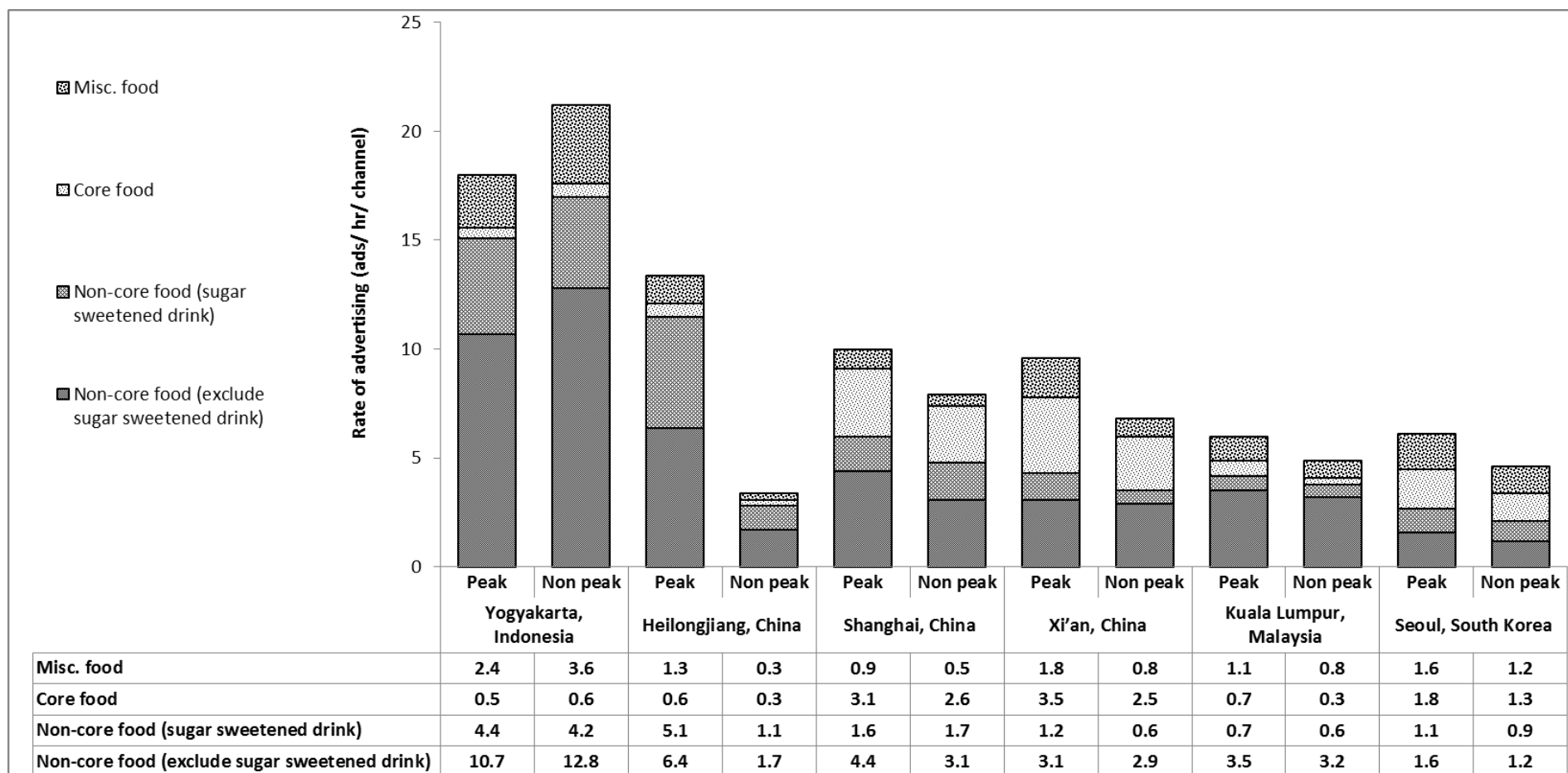


Table 4: Rate of food advertisements containing persuasive marketing techniques, by site

City, country	Premium offers		Promotional characters	
	Rate/hour/channel (% for non-core food)	Example	Rate/hour/channel (% for non-core food)	Example
Shanghai, China	1.2 (97)	“Win a trip to Beijing Bird’s Nest and be the title sponsor of a skateboard match” (sugar-sweetened drink ad)	3.1 (68)	Branded character – The Prince from the “kingdom of magic” (sweet biscuit ad)
Yogyakarta, Indonesia	1.1 (95)	1000 chances to win an iPad (unhealthy meat ad)	4.0 (97)	Undefeated World Boxing Boxing Association champion Chris John (sugar-sweetened drink ad)
Xi’an, China	0.8 (63)	“Win a trip to Disneyland and \$4999 cash prize” (low fat milk ad)	2.8 (60)	Mickey Mouse (low fat milk ad)
Kuala Lumpur, Malaysia	0.8 (88)	"Win a chance to party at Old Trafford, United Kingdom and meet with Manchester United players... 12 Grand Prizes to be won" (unhealthy savoury snack ad).	2.3 (77)	Branded character -Mat Kool (ice cream ad).
Heilongjiang, China	0.4 (100)	Rebate for meal (unhealthy fast food ad)	1.5 (85)	Olympic athlete Liu Xi (sugary drink ad)
Seoul, South Korea	0.3 (25)	“Get a super junior T-shirt for...if you purchase fried chicken more than...” (unhealthy fast food ad)	4.0 (48)	Korean singing group ‘Super Junior’ (unhealthy fast food ad)