ACCEPTED MANUSCRIPT: LAVRIŠA et al. 2016. Television food advertising to children in Slovenia : analyses using a large 12-month advertising dataset. International Journal of Public Health. 61(9): 1049-1057. DOI: 10.1007/s00038-016-0896-7.

Television food advertising to children in Slovenia: Analyses using a large 12-month advertising dataset

Živa Korošec,[1] Igor Pravst[1]*

[1] Nutrition Institute, Tržaška cesta 40, 1000 Ljubljana, Slovenia

*Corresponding author:

Prof. Igor Pravst, Ph.D.
Nutrition Institute, Tržaška cesta 40, 1000 Ljubljana, Slovenia
tel. +386 590 68871
fax. + 386 1 3007981
e-mail: igor.pravst@nutris.org

Television food advertising to children in Slovenia: Analyses using a large 12-month advertising dataset

Abstract

Objectives: The marketing of energy-dense foods is recognised as a probable causal factor in children's overweight and obesity. To stimulate policymakers to start using nutrient profiling to restrict food marketing, a harmonised model was recently proposed by the WHO. Our objective is to evaluate the television advertising of foods in Slovenia using the above-mentioned model.

Methods: An analysis is performed using a representative dataset of 93,902 food-related advertisements broadcast in Slovenia in year 2013. The advertisements are linked to specific foods, which are then subject to categorisation according to the WHO and UK nutrient profile model.

Results: Advertising of chocolate and confectionery represented 37% of food-related advertising in all viewing times, and 77% in children's (4–9 years) viewing hours. During these hours, 96% of the food advertisements did not pass the criteria for permitted advertising according to the WHO profile model.

Conclusions: Evidence from Slovenia shows that, in the absence of efficient regulatory marketing restrictions, television advertising of food to children is almost exclusively linked to energy-dense foods. Minor modifications of the proposed WHO nutrient profile model are suggested.

Keywords: food advertising, nutrient profile, regulation, children, television, marketing

Introduction

Childhood obesity is one of major global public health issues (WHO 2013a). In contrast to genetic factors, the social environment is known to be an important modifiable factor influencing obesity. The issue is also very relevant in Slovenia where among 6-year-olds 28% of boys and 24% of girls are overweight, and 12% and 8%, respectively, are obese (WHO 2013b). It is alarming that among OECD countries (Organisation for Economic Co-operation and Development) only Portugal, Canada, Greece and the USA have higher children obesity levels (UNICEF 2013). Within adults, 63% of the adult population is overweight and almost 30% is obese (WHO 2013b). These facts make obesity a major public health issue in Slovenia and call for additional policy actions. On the other hand, eating disorders such as anorexia and bulimia are also a problem, especially among adolescents (Tomori and Rus-Makovec 2000).

It is recognised that the prevalence of obesity in children is closely related to time spent in front of television (Caroli et al. 2004; Crespo et al. 2001; Gortmaker et al. 1996; Machado-Rodrigues et al. 2015; Robinson et al. 1993). Watching television shortens the time in which children can be more physically active (Caroli et al. 2004) and already now only 20% of Slovenian adolescents meet the recommendations for physical activity (WHO 2013c). Adolescents who are not sufficiently physically active are more often classified as overweight and obese (Carson et al. 2015). While watching television children are exposed to numerous promotions of foods, often those with a less appropriate nutritional composition (Cairns et al. 2013). This can significantly affect their food preferences and eating habits (Boyland and Halford 2013; Caroli et al. 2004; Keller et al. 2012; Olafsdottir et al. 2014). Like in other developed countries, in Slovenia processed foods are easily available and accessible in all types of food stores (Pravst and Kusar 2015).

Marketing of energy-dense foods is recognised as a probable causal factor in children's overweight and obesity, and more than a decade ago it was proposed that global public health interventions should seek to limit children's exposure to the marketing of unhealthy foods(WHO 2013a; WHO/FAO 2003). Notwithstanding such recommendations, nutrient profiling is used to restrict the marketing of foods only in a very few European countries (WHO 2015b) – in Great Britain (DH 2011), Norway (Helsedirektoratet 2013) and Denmark (FRFMC 2010). Despite the high rates of overweight and obesity in children, restrictions on the marketing of unhealthy foods are not yet implemented in Central and Eastern European countries, including Slovenia. Different stakeholders have very different views on the regulation of food marketing and the selection of a suitable nutrient profile model is considered a major issue that is hindering the introduction of such restrictions on the national level. This problem was also recognised by the World Health Organisation (WHO) which recently proposed a harmonised

nutrient profile model for European countries (WHM) (WHO 2015b). The model is based on allocating foods to specific categories, which are connected with international customs tariff codes. For some food categories, certain additional rules on nutritional composition apply.

In 2015 the Slovenian Government accepted a new resolution on nutrition for health (RS 2015) with the overall goal to increase nutrition-related research to provide data for future evidence-based policy decisions. Another particular objective of the resolution is to limit advertising of energy-dense foods to children. The reported study was conducted to provide evidence on the need to implement food marketing restrictions within national regulation, and to develop an efficient methodological toolbox for use in supporting assessment of the efficiency of such a policy intervention. The fact that policy interventions can have major population-wide health effects may be shown in the example of the successful application of nutritional guidelines for preparing meals in kindergartens and schools (Gabrijelčič Blenkuš Mojca 2005). Five years after this intervention, cholesterol levels among school children had decreased significantly (Sedej et al. 2014).

The primary objective of this study is to identify the food categories most frequently advertised on Slovenian television in children's peak viewing times. Secondary objectives are to evaluate the nutritional composition of the advertised foods, and to compare two relevant nutrient profile models.

Methods

Food-related advertisements on television

Data on food-related advertisements (and their duration) on television channels were provided by agency AGB Nielsen. In Slovenia, the agency captures television viewing in 450 households with about 1,300 individual viewers. Households in the panel represent a cross-section of representative homes across the country. Measurements are performed using a peoplemeter system that provides information about who is watching which television channel at what time. The dataset altogether included 93,902 food-related advertisements (615 unique advertisements) broadcast from January 2013 to December 2013 on the following seven television channels: RTV SLO1, RTV SLO2, POP TV, Kanal A, Planet TV, OTO, and Minimax. Considering viewing ratings and the distribution of viewers among television channels at particular viewing times (AVR – Average Minute Ratings, ADH – Adhesion; the weight of the selected target on total viewing at a specific time), peak viewing hours were determined for children of two different age groups. The viewing hours used for all further analyses therefore include: (a) peak viewing hours for the children's age group 4–9 years [PVH4-9]; (b) peak viewing hours for the children's age group 10–14 years [PVH10-14]; and (c) all viewing hours [AVH]. Peak viewing hours for both age groups are provided in Supplementary Tables 1 and 2.

All advertisements were analysed to identify the advertised specific food products. When a specific food could not be extracted from the name/description of the advertisement, a recording of the advertisement was used to identify the product. All advertisements were categorised in food categories defined in the WHO nutrient profile model (WHO 2015b). To enable all food-related advertisements to be classified, the WHO categorisation scheme was extended with the following additional categories: (a) product lines; (b) food supplements; (c) coffee; (d) condiments; and (e) alcoholic beverages. The category *product lines* included advertisements referring to a variety of foods from different food categories. Mostly, these were umbrella brand advertisements, and were not subject to nutrient profiling.

Collection of data on nutritional composition

Data on the composition of the foods advertised in children's peak viewing hours (PVH4-9, PVH10-14) were collected to enable nutrient profiling. The data were extracted from the labels of advertised foods, which were searched for in a local supermarket, and completed using a food composition database (IJS 2010; Korosec and Pravst 2014) where necessary. This was mostly done for products not labelled with a nutrition declaration, using a previously reported procedure (Erzen et al. 2015). In the data extraction process, the following parameters were obtained: energy value, proteins, carbohydrates, sugar, fat, saturated fats, dietary fibre and sodium.

Classification according to the WHO nutrient profile model (WHM) and analyses

The foods advertised in children's peak viewing hours were classified as permitted or not permitted for advertising to children according to the WHO nutrient profiling model (WHO 2015b). While in some food categories the classification depends on the product's nutritional composition (for example the content of fat, sugar, salt per 100 g of food), some food categories are classified as permitted (*fruits and vegetables*, *eggs*) or not permitted (i.e. *chocolate & confectionery*; *cakes & biscuits*; *juices*; *energy drinks*, *edible ices*) by default.

Classification according to the UK nutrient profile model (UKM)

The foods advertised in children's peak viewing hours were also classified as "healthier" or "less healthy" according to the UK nutrient profile model (DH 2011; Rayner 2009). The model is used to restrict the marketing of unhealthy foods to children in the United Kingdom. It is based on scoring points for the content of positive (protein; dietary fibre; and fruits, vegetables and nuts) and negative (energy; saturated fats; sugar; and sodium) constituents of foods and provides a final score which depends on the nutritional composition of 100 g of food, as it is consumed.

Data analysis

Food advertising information was collected for all advertisements broadcast in a calendar year and therefore all ratios are given as exact values and no confidence intervals are presented. Considering all advertisements aired during PVH4-9, PVH10-14 and AVH, we calculated the distribution of the advertisements by food category. The proportion of the total food marketing in a specific food category was calculated using the: (a) number of unique advertisements; (b) number of all advertisements; and (c) duration of advertisements. For unique advertisements, this proportion was calculated as a ratio between the number of unique advertisements in a specific food category and the number of unique advertisements observed during a 12-month observation period. Similar ratios were calculated for all advertisements (including repetitions of unique advertisements) and the total duration of the advertisements (PD: the percentage of the duration of advertisements in selected food categories). A pairwise comparison between the two nutrient profile models (WHM, UKM) was made using the *percentage agreement* and *Cohen's kappa statistic (κ)*. *Percentage agreement* is a measure of agreement between observers (Birkimer and Brown 1979; Rayner 2013); in our case, this is the percentage of foods for which the two different nutrient profiling systems gave a comparable classification result (permitted–healthier; not permitted–less healthy). *Cohen's kappa statistic (κ)* accounts for the level of agreement that is expected between observers or models by chance (Haley and Osberg 1989; Sim and Wright 2005) and was used as a measure of the 'true' agreement between the two different profiling systems. These systems are in complete agreement when $\kappa = 1$, while lower κ values reveal less agreement. In interpreting the results, we used a rating system devised by Landis and Koch (1977). Statistical analyses were performed using Microsoft Excel 2013 (Microsoft, Redmond, Washington, USA).

Results

Placing the advertisements into food categories

Altogether, 93,902 food-related advertisements were broadcast on the selected television channels during the observation period; 615 of them were unique advertisements. *Chocolate and confectionery* was the most advertised food category in all selected viewing hours (AVH, PVH4-9, PVH10-14). The percentage of the duration of advertisements (PD) in selected food categories for different viewing hours is presented in **Figure 1**. *Chocolate and confectionery* was the most advertised food, particularly in peak viewing hours for the children's age group 4–9 years [PVH4-9] (77%). The second most frequently advertised food category was *product lines* (15%), followed by *food supplements* (3%), *cakes & biscuits* (1%) and *other beverages* (1%). In peak viewing hours for the children's age group 10–14 years [PVH10-14] *chocolate and confectionery* advertisements accounted for 43% of the

advertisements' duration, followed by *other beverages* (10%), *cakes & biscuits* (8%), and *food supplements* (8%).

[FIGURE 1 ABOUT HERE]

Interestingly, most of the advertising was not related with food (**Table 1**). During PVH4-9, the average number of advertisements per hour (frequency) was 5.8, of which 0.6 (10%) were food-related advertisements. Quite higher frequencies, but with a comparable ratio (13%), were observed during PVH10-14.

[TABLE 1 ABOUT HERE]

Classification of the advertised foods using nutrient profiling

Advertisements aired during PVH4-9 and PVH10-14 were classified by both the WHO nutrient profile model (WHM) (WHO 2015b) and the *UK nutrient profile model* [UKM] (DH 2011). In the PVH4-9 dataset, 96% and 95% of the advertisements were classified as *not permitted* [by the WHM] and *less healthy* [by the UKM], respectively. In the PVH10-14 dataset, 81% of the advertisements were classified as *not permitted*, and 76% as *less healthy*. The differences in nutrient profiling by both selected models within the food categories are presented in **Figure 2** (for both PVH4-9 and PVH10-14 datasets). Despite notable differences between the models, full agreement was observed in a number of food categories. Very good overall agreement was observed in both datasets ($\kappa = 0.99$ and 0.80, PVH4-9 and PVH10-14, respectively). In PVH4-9, comparable classifications were observed for 2,998 out of 3,110 advertisements (percentage agreement: 99%), while in the PVH10-14 dataset this was the case in 87% of cases (N=3919).

[FIGURE 2 ABOUT HERE]

Discussion

The obesity epidemic is a key public-health issue both in Slovenia (UNICEF 2013; WHO 2013b) and globally, with a number of causes (Boing and Subramanian 2015; McAllister et al. 2009) that show no signs of abating. Efficient targeted interventions are therefore needed (Mardon et al. 2015). Restrictions on food marketing to children are proposed as one of such interventions (WHO 2015b).

The selection of an appropriate food categorisation system presents a key challenge in studies investigating the food supply and marketing. A variety of categorisation schemes has been used in previous studies (Boyland and Halford 2013; Neville et al. 2005). We decided to use the food

categorisation system recently proposed in the WHO nutrient profile model (WHO 2015b) extended with a few additional categories (*product lines, food supplements*, *coffee*, *condiments* and *alcohol;* see Methods section for details*)*.

Television advertisements are characterised by several different parameters, including the content, length, airing frequency and time etc., which makes analyses of television advertising very complex. Most previously reported studies operated with a number of broadcast advertisements (Boyland et al. 2011; Kelly et al. 2007; Neville et al. 2005), which also enable better analyses of viewers' exposure to advertising than by using a number of unique advertisements. However, such a methodology can be further improved with the use of advertisement duration time. The majority of analyses in this study were therefore conducted considering the number of broadcast advertisements, and their duration. The importance of the methodology used for interpreting the results can be seen in the category of *chocolate and confectionery* during PVH4-9, where the share of unique advertisements in this category was 27%, yet these accounted for 77% of the duration of all food-related advertising time (**Figure 3**). Notable differences were also observed in other food categories and/or in other viewing hours.

[FIGURE 3 ABOUT HERE]

Considering the high obesity rates in Slovenia in both children and adults (WHO 2013b) it is alarming that *chocolate and confectionery* was the most advertised food category in all selected viewing hours (AVH, PVH4-9, PVH10-14) (**Figure 1**). In PVH4-9, advertising was almost exclusively related to *chocolate and confectionery*; the PD values exceeded 3% in only 3 out of 25 categories. In PVH10-14 and AVH, greater diversity was observed. For example, in PVH10-14 the PD values exceeded 3% in 8 out of 25 categories, while in AVH this was the case in 10 categories. These results reveal several notable differences and similarities between Slovenia and other countries in terms of television food marketing. Interestingly, we did not observe any advertising of fast foods or fast food restaurants, which are heavily advertised in many other countries (e.g. in Ireland (Scully et al. 2014), Switzerland (Keller and Schulz 2011), the UK (Boyland et al. 2011), Australia (Kelly and Chapman 2007; Neville et al. 2005), the USA (Powell et al. 2013; Powell et al. 2011), South Africa (McHiza et al. 2013)). In a number of studies, sweets were also among the most advertised food categories (Galcheva et al. 2008; Kelly et al. 2007; McHiza et al. 2013; Powell et al. 2011), however not as dominantly as in Slovenia.

Interestingly, notable advertising rates were observed for *food supplements*, which are not categorised in the WHO *nutrient profile model.* This might raise the question of whether such products are eligible for advertising to children. Given that certain foods high in specific bioactive ingredients, or food supplements may provide beneficial health effects as part of a healthy diet (Ciccone 2014, Scicchitano,

2014), their advertising is not such a concern compared to energy-dense foods. Yet a question remains about whether children are able to understand the health claims made in such communications.

To gain an insight into children's exposure to food marketing, we also investigated the frequency of food advertising during PVH4-9 and PVH10-14 on different television channels (**Table 1**). A comparison of different television channels reveals substantially higher exposure to food advertising on commercial channels. It should be noted that national channels in Slovenia are mostly funded from public sources and therefore depend less on commercial advertising than commercial channels, which may partially explain the lower frequency of (food-related) advertising. However, the observed frequencies of food advertising are still lower than in many other countries. In a global perspective on television food advertising, Kelly et al. (2010) reported on average five food-related advertisements per hour, with over half of those referring to non-core foods.

In further analyses, advertisements were subject to classification using the nutrient profile models. In Europe, the use of nutrient profile models to restrict food marketing to children is only endorsed in the UK, Norway and Denmark. Very recently, an important step towards combatting the above-mentioned challenges was taken by the WHO Regional Office for Europe which published a harmonised WHO nutrient profile model (WHM) (WHO 2015b), which was used for nutrient profiling in this study. In addition, advertised foods were subject to nutrient profiling with the *UK nutrient profile model* [UKM], which was developed by the Food Standards Agency for the UK regulatory body for communication industries (DH 2011) and has been used to restrict food marketing to children in Great Britain since 2008. A key difference between the two models is that the UKM scores foods based on their composition (content of nutrients and other constituents), while the WHM is a food-category-based profile model with thresholds for the content of selected nutrients, and therefore a little easier to use and adapt. Classification using the WHM results in foods which are either *permitted* or not *permitted* for advertising to children, while the UKM distinguishes between *healthier* and *less healthy* foods. The majority of the food advertisements in the two datasets did not meet the criteria for advertising to children when using both WHM and UKM models (PVH4-9: 96% and 95%; PVH10-14: 81% and 76%, respectively). This can be partially explained by the fact that the marketing of food to children is currently unregulated in Slovenia. However, these results indicate that marketing restrictions could have considerable implications for food marketing irrespective of the particular classification system used. It is very interesting to compare our results with other studies. Scarborough et al. (2013) compared several different nutrient profile models on a set of advertisements broadcast in 2008 during television programmes viewed by children in the UK. Analyses included the UKM and the Danish nutrient profile model, and resulted in 53% and 67% of less healthy advertisements, respectively (2013). The UKM was also tested on a New Zealand dataset from 2007 where 67% of

advertisements were classified as *less healthy* (Jenkin et al. 2009). Watson et al. (2014) performed a similar study in Australia, but using a different model; 56% of the advertisements did not pass the Food Standards Australia New Zealand nutrient profiling model criteria.

A major challenge for successful implementing food marketing restrictions is the selection of an efficient classification system. Although the design of the two selected nutrient profile models (WHM, UKM) is very different, very good overall agreement was observed in both datasets. Food categories where we observed notably different classifications include *yoghurt & fermented milk* (**Figure 3**), where the differences in classifications are mostly due to the total fat content. While the WHM prohibits the advertising of products with a total fat level exceeding 2.5 g/100 g, many of such products can be classified as *healthier* according to the UKM. Similarly, a very different classification was observed for *juices*. In the WHO Guidelines on Sugars Intake for Adults and Children (WHO 2015a) fruit juices are recognised as a significant source of free sugars and therefore classified as *not permitted* in the WHM. However, the proposed WHO model notes that national policymakers can decide to permit the marketing of 100% fruit juices in small portions (WHO 2015b).

The results provided herein show that broadcast advertising of food to children in Slovenia is almost exclusively linked to energy-dense foods and confirm the need for regulatory marketing restrictions. However, experiences from other countries show that food marketing restrictions might result in changes in food advertising strategies and therefore their efficiency should be carefully monitored. It has been noted that food advertisements can be moved from children's viewing hours to prime time hours where television is watched by both adults and children (Adams et al. 2012). In addition, food producers can depict healthy foods in their television advertisements to children. A typical example is the advertising of healthy alternatives under umbrella brands, which are mostly made up of less healthy foods. Very recently, such a strategy was shown to be efficient for promoting fast foods among children (Boyland et al. 2015). These examples indicate that, along with regulating food advertising, obesity prevention actions should also focus on the education of parents so they will be able to properly discuss healthy food choices with their children. It is important for parents to have at least basic knowledge of nutrition to manage family nutrition and food choices. Nutrition education programmes, such as the "Peer nutrition programme" led by Toronto Public Health (TPH 2016), could help parents acquire knowledge about nutrition.

A major strength of the reported study lies in the large dataset of food advertisements broadcast on all major television channels in Slovenia in a 12-month period. This approach enabled us to overcome seasonal variations in food advertising. Another important strength of this study is that the analysis is

based on both the number of broadcast advertisements and their duration. In addition, the study protocol is very robust and enables changes in food advertising to be efficiently surveyed over time.

However, while a very large dataset of advertisements allows a very reliable assessment of food advertising, some limitations of this approach should be mentioned. First, while such a dataset contains a number of advertisements in certain food categories, it contains a few or no advertisements from some poorly advertised food categories, limiting the assessment of pairwise agreement between the selected nutrient profile models. Second, long observation times (12 months) result in a large number of advertisements, which need to be recorded and analysed. This issue was addressed by using advertising data, collected as part of regular television audience measurements. A similar approach was taken in a few other studies performed in the USA (Elsey and Harris 2016; Powell et al. 2011; Powell et al. 2007) and Australia (Neville et al. 2005; Watson et al. 2014).

In conclusion, evidence from Slovenia shows that in the absence of efficient regulatory marketing restrictions the broadcast advertising of food to children is almost exclusively linked to energy-dense foods. The proposed WHO category-based nutrient profile model was easy applicable, however, when implementing the model policymakers should ensure the model will enable a clear categorisation of all foods. Therefore, a suitable nutrient profile model might need to be modified according to a particular national context and national food-based dietary guidelines to assure a wide consensus on the application of food marketing restrictions.

Compliance with ethical standards

Funding: This study was funded by the Slovenian Research Agency (Research programme P3-0395: Nutrition and Public Health). The funding organisation had no role in the design, analysis or writing of this article.

Conflict of interest: The authors declare that they have no other potential conflicts of interest.

Ethical approval: This article does not contain any studies with human participants performed by any of the authors.

Acknowledgements: The authors would like to thank AGB Nielsen (Slovenia) and Mr Boštjan Kušnjerek for support in access to and analyses of the advertising data. We also acknowledge the help of food science and technology students (University of Ljubljana, Slovenia) in the data collection, and Murray Bales for providing assistance with the language. The authors would also like to acknowledge that Igor Pravst has led/participated in various other research projects in the area of nutrition/public

health/food technology, which were (co)funded by the Slovenian Research Agency, Ministry of Health of the Republic of Slovenia, the Ministry of Agriculture, Forestry and Food of the Republic of Slovenia, and in case of specific applied research projects also by food businesses.

References

Adams J, Tyrrell R, Adamson AJ, White M (2012) Effect of restrictions on television food advertising to children on exposure to advertisements for 'less healthy' foods: repeat cross-sectional study. PLoS One 7(2):e31578 doi:10.1371/journal.pone.0031578

Birkimer JC, Brown JH (1979) Back to basics: Percentage agreement measures are adequate, but there are easier ways. J Appl Behav Anal 12(4):535-43

Boing A, Subramanian SV (2015) The influence of area-level education on body mass index, waist circumference and obesity according to gender. Int J Public Health 60(6):727-736 doi:10.1007/s00038-015-0721-8

Boyland EJ, Halford JCG (2013) Television advertising and branding. Effects on eating behaviour and food preferences in children. Appetite 62(0):236-241 doi:http://dx.doi.org/10.1016/j.appet.2012.01.032

Boyland EJ, Harrold JA, Kirkham TC, Halford JCG (2011) The extent of food advertising to children on UK television in 2008. Int J Pediatr Obes 6(5-6):455-461 doi:doi:10.3109/17477166.2011.608801

Boyland EJ, Kavanagh-Safran M, Halford JC (2015) Exposure to 'healthy' fast food meal bundles in television advertisements promotes liking for fast food but not healthier choices in children. Br J Nutr 113(6):1012-8 doi:10.1017/s0007114515000082

Cairns G, Angus K, Hastings G, Caraher M (2013) Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. Appetite 62(0):209-215 doi:http://dx.doi.org/10.1016/j.appet.2012.04.017

Caroli M, Argentieri L, Cardone M, Masi A (2004) Role of television in childhood obesity prevention. Int J Obes Relat Metab Disord 28 Suppl 3:S104-8 doi:10.1038/sj.ijo.0802802

Carson V, Faulkner G, Sabiston CM, Tremblay MS, Leatherdale ST (2015) Patterns of movement behaviors and their association with overweight and obesity in youth. Int J Public Health 60(5):551-9 doi:10.1007/s00038-015-0685-8

Crespo CJ, Smit E, Troiano RP, Bartlett SJ, Macera CA, Andersen RE (2001) Television watching, energy intake, and obesity in US children: results from the third National Health and Nutrition Examination Survey, 1988-1994. Arch Pediatr Adolesc Med 155(3):360-5

DH (2011) Nutrient profiling technical guidance. In: Department of Health. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216094/dh_123492.pdf

Elsey JW, Harris JL (2016) Trends in food and beverage television brand appearances viewed by children and adolescents from 2009 to 2014 in the USA. Public Health Nutr 19(11):1928-1933 doi:doi:10.1017/S1368980015003274

Erzen N, Rayner M, Pravst I (2015) A comparative evaluation of the use of a food composition database and nutrition declarations for nutrient profiling. J Food Nutr Res 54(2):93-100

FRFMC (2010) Code of responsible food marketing communication to children In: Forum of Responsible Food Marketing Communication. http://kodeksforfoedevarereklamer.di.dk/SiteCollectionDocuments/Code%20with%20guide%20english%20aug%202010.pdf

Galcheva SV, Iotova VM, Stratev VK (2008) Television food advertising directed towards Bulgarian children. Arch Dis Child 93(10):857-861 doi:10.1136/adc.2007.134437

347 Gortmaker SL, Must A, Sobol AM, Peterson K, Colditz GA, Dietz WH (1996) Television viewing as a
348 cause of increasing obesity among children in the United States, 1986-1990. Arch Pediatr
349 Adolesc Med 150(4):356-62
350 Haley SM, Osberg JS (1989) Kappa Coefficient Calculation Using Multiple Ratings Per Subject: A
351 Special Communication. Phys Ther 69(11):970-974
352 Helsedirektoratet (2013) Appendix 1 to Draft Regulations. Foods and beverages that are considered
353 unhealthy under these Regulations In. http://www.eftasurv.int/media/notification-of-
354 dtr/Appendix-to-Regulations.-Unhealthy-foods---9005.pdf
355 IJS (2010) OPKP - odprta platforma za klinično prehrano. In. www.opkp.si
356 Jenkin G, Wilson N, Hermanson N (2009) Identifying 'unhealthy' food advertising on television: a case
357 study applying the UK Nutrient Profile model. Public Health Nutr 12(05):614-623
358 doi:doi:10.1017/S1368980008003029
359 Keller KL, et al. (2012) The impact of food branding on children's eating behavior and obesity. Physiol
360 Behav 106(3):379-386 doi:http://dx.doi.org/10.1016/j.physbeh.2012.03.011
361 Keller SK, Schulz PJ (2011) Distorted food pyramid in kids programmes: a content analysis of
362 television advertising watched in Switzerland. Eur J Public Health 21(3):300-5
363 doi:10.1093/eurpub/ckq065
364 Kelly B, Chapman K (2007) Food references and marketing to children in Australian magazines: a
365 content analysis. Health Promot Int 22(4):284-291 doi:10.1093/heapro/dam026
366 Kelly B, et al. (2010) Television food advertising to children: a global perspective. Am J Public Health
367 100(9):1730-6 doi:10.2105/ajph.2009.179267
368 Kelly B, Smith B, King L, Flood V, Bauman A (2007) Television food advertising to children: the extent
369 and nature of exposure. Public Health Nutr 10(11):1234-1240
370 doi:doi:10.1017/S1368980007687126
371 Korosec Z, Pravst I (2014) Assessing the average sodium content of prepacked foods with nutrition
372 declarations: the importance of sales data. Nutrients 6(9):3501-15 doi:10.3390/nu6093501
373 Landis JR, Koch GG (1977) The measurement of observer agreement for categorical data. Biometrics
374 33(1):159-74
375 Machado-Rodrigues AM, et al. (2015) Metabolic risk and television time in adolescent females. Int J
376 Public Health 60(2):157-65 doi:10.1007/s00038-014-0625-z
377 Mardon J, Thiel E, Laniau M, Sijtsema S, Zimmermann K, Barjolle D (2015) Motives underlying food
378 consumption in the Western Balkans: consumers' profiles and public health strategies. Int J
379 Public Health 60(5):517-526 doi:10.1007/s00038-015-0684-9
380 McAllister EJ, et al. (2009) Ten Putative Contributors to the Obesity Epidemic. Crit Rev Food Sci Nutr
381 49(10):868-913 doi:10.1080/10408390903372599
382 McHiza ZJ, Temple NJ, Steyn NP, Abrahams Z, Clayford M (2013) Content analysis of television food
383 advertisements aimed at adults and children in South Africa. Public Health Nutr 16(12):2213-
384 2220 doi:10.1017/s136898001300205x
385 Neville L, Thomas M, Bauman A (2005) Food advertising on Australian television: the extent of
386 children's exposure. Health Promot Int 20(2):105-112 doi:10.1093/heapro/dah601
387 Olafsdottir S, et al. (2014) Young children's screen habits are associated with consumption of
388 sweetened beverages independently of parental norms. Int J Public Health 59(1):67-75
389 doi:10.1007/s00038-013-0473-2
390 Powell LM, Schermbeck RM, Chaloupka FJ (2013) Nutritional content of food and beverage products
391 in television advertisements seen on children's programming. Childhood obesity (Print)
392 9(6):524-31 doi:10.1089/chi.2013.0072
393 Powell LM, Schermbeck RM, Szczypka G, Chaloupka FJ, Braunschweig CL (2011) Trends in the
394 nutritional content of television food advertisements seen by children in the United States:
395 analyses by age, food categories, and companies. Arch Pediatr Adolesc Med 165(12):1078-86
396 doi:10.1001/archpediatrics.2011.131

Powell LM, Szczypka G, Chaloupka FJ (2007) Exposure to food advertising on television among US children. Arch Pediatr Adolesc Med 161(6):553-560 doi:10.1001/archpedi.161.6.553

Pravst I, Kusar A (2015) Consumers' exposure to nutrition and health claims on pre-packed foods: use of sales weighting for assessing the food supply in Slovenia. Nutrients 7(11):9353-68 doi:10.3390/nu7115474

Rayner M, Mizdrak, A., Logstrup, S. , Kestens, M. (2013) Reducing children's exposure to marketing of foods and drinks that are high in fat, salt or sugar: what would be the best nutrient profile model? In: European Heart Network. http://www.ehnheart.org/component/downloads/downloads/1481.html

Rayner M, Scarborough, P., Lobstein, T. (2009) The UK Ofcom Nutrient Profiling Model. In. http://www.dph.ox.ac.uk/bhfhprg/publicationsandreports/acad-publications/bhfhprgpublished/nutrientprofilemodel

Robinson TN, et al. (1993) Does television viewing increase obesity and reduce physical activity? Cross-sectional and longitudinal analyses among adolescent girls. Pediatrics 91(2):273-80

RS (2015) Resolution on national programme on nutrition and physical activity 2015-2025 (In Slovenian: Resolucija o nacionalnem programu o prehrani in telesni dejavnosti za zdravje 2015 – 2025). In. http://www.mz.gov.si/fileadmin/mz.gov.si/pageuploads/javna_razprava_2015/Resolucija_o_nac_programu_prehrane_in_in_tel_dejavnosti_jan_2015.pdf

Scarborough P, et al. (2013) How important is the choice of the nutrient profile model used to regulate broadcast advertising of foods to children[quest] A comparison using a targeted data set. Eur J Clin Nutr 67(8):815-820 doi:10.1038/ejcn.2013.112

Scully P, Macken A, Leddin D, Cullen W, Dunne C, Gorman CO (2014) Food and beverage advertising during children's television programming. Ir J Med Sci doi:10.1007/s11845-014-1088-1

Sim J, Wright CC (2005) The kappa statistic in reliability studies: use, interpretation, and sample size requirements. Phys Ther 85(3):257-68

Tomori M, Rus-Makovec M (2000) Eating behavior, depression, and self-esteem in high school students. J Adolesc Health 26(5):361-7

TPH (2016) Peer nutrition program. In: Toronto public health. https://www1.toronto.ca/wps/portal/contentonly?vgnextoid=c6b9ce7e2b322410VgnVCM10000071d60f89RCRD Accessed 5.5.2016

UNICEF (2013) Child well-being in rich countries: A comparative overview. In: UNICEF Office of Research. https://www.unicef-irc.org/publications/pdf/rc11_eng.pdf

Watson WL, Johnston A, Hughes C, Chapman K (2014) Determining the 'healthiness' of foods marketed to children on television using the Food Standards Australia New Zealand nutrient profiling criteria. Nutr Diet 71(3):178-183 doi:10.1111/1747-0080.12127

WHO (2013a) Global Strategy on Diet, Physical Activity and Health: Childhood overweight and obesity. In. http://www.who.int/dietphysicalactivity/childhood/en/

WHO (2013b) Nutrition, physical activity and obesity: Slovenia. In: WHO. http://www.euro.who.int/__data/assets/pdf_file/0019/243325/Slovenia-WHO-Country-Profile.pdf?ua=1 Accessed 5.5.2016

WHO (2013c) Slovenia physical activity factsheet. In. http://www.euro.who.int/__data/assets/pdf_file/0007/288124/SLOVENIA-Physical-Activity-Factsheet.pdf Accessed 5.5.2016

WHO (2015a) Guideline: Sugars intake for adults and children. In. http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf?ua=1

WHO (2015b) WHO Regional Office for Europe nutrient profile model. In. http://www.euro.who.int/__data/assets/pdf_file/0005/270716/Nutrient-Profile-Model.pdf?ua=1

446 WHO/FAO (2003) Diet, nutrition and prevention of chronic diseases: Report of a joint WHO/FAO
447 expert consultation. In.
448 http://www.who.int/dietphysicalactivity/publications/trs916/download/en/

449

Table 1: Average number of advertisements per hour per selected television channels (Slovenia, 2013)

Type of advertisements	Channel / viewing hour[2]	All channels[3]	National channels		Commercial channels (general public)			Children's channels	
			CH1	CH2	CH3	CH4	CH5	CH6	CH7
All advertisements	PVH4-9	5.8	6.6	7.0	17.0	6.1	NA	10.5	2.5
Food-related advertisements		0.6	0.2	0.0	3.6	0.8	NA	0.3	0.4
Chocolate/cakes[1] adv.		0.4	0.1	0.0	2.4	0.8	NA	0.1	0.4
All advertisements	PVH10-14	18.2	6.7	7.0	28.9	6.1	24.4	NA	NA
Food-related advertisements		2.4	0.3	0.0	4.8	0.8	2.4	NA	NA
Chocolate/cakes[1] adv.		1.2	0.1	0.0	2.4	0.8	0.9	NA	NA

Notes: [1] Advertisements for *chocolate and confectionery*, and *cakes and biscuits;* [2]PVH 4-9: peak viewing hours of children 4–9 years of age; PVH 10-14: peak viewing hours of children aged 10–14 years, [3]CH: channel

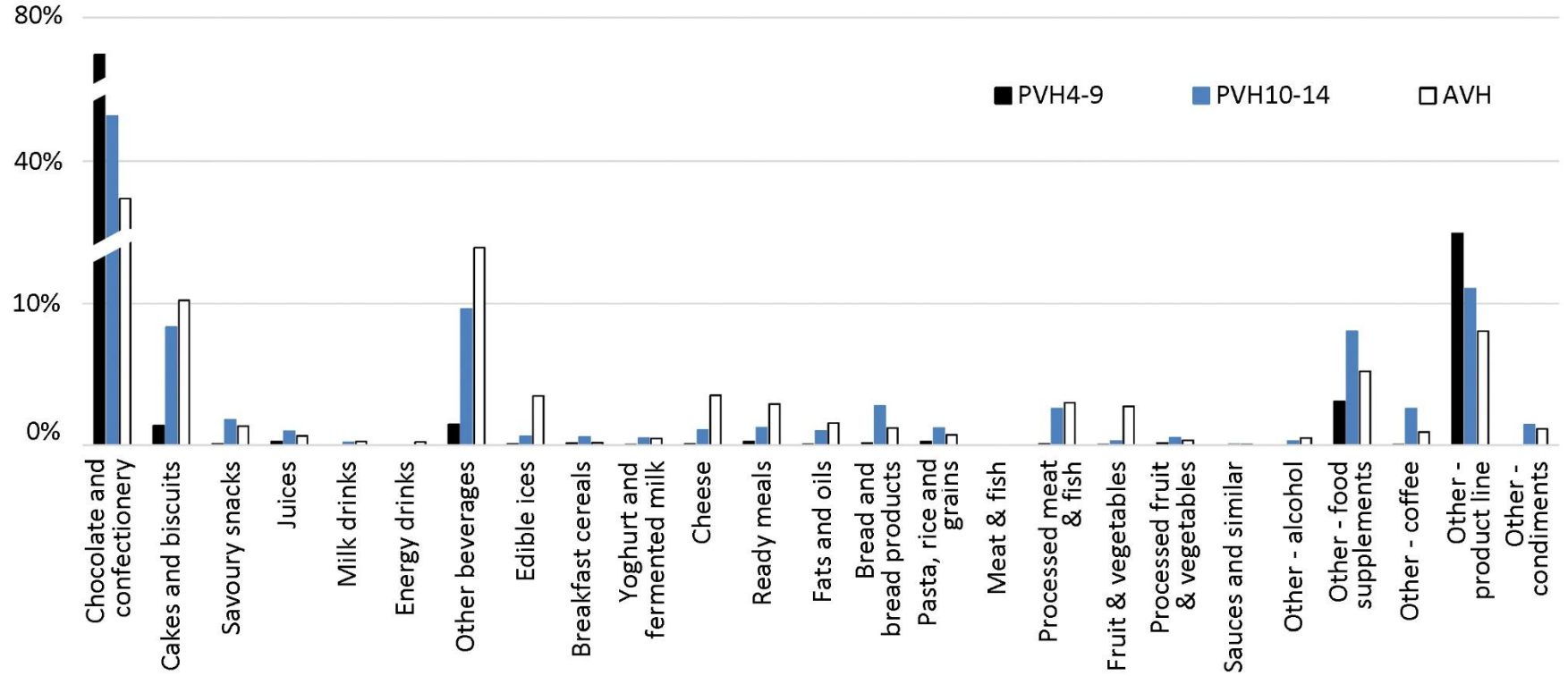

Figure 1: Percentage of duration of advertisements in selected food categories for different viewing hours (Slovenia, 2013)

Notes: PVH 4-9: peak viewing hours of children 4–9 years of age; PVH 10-14: peak viewing hours of children aged 10–14 years; AVH: all viewing hours

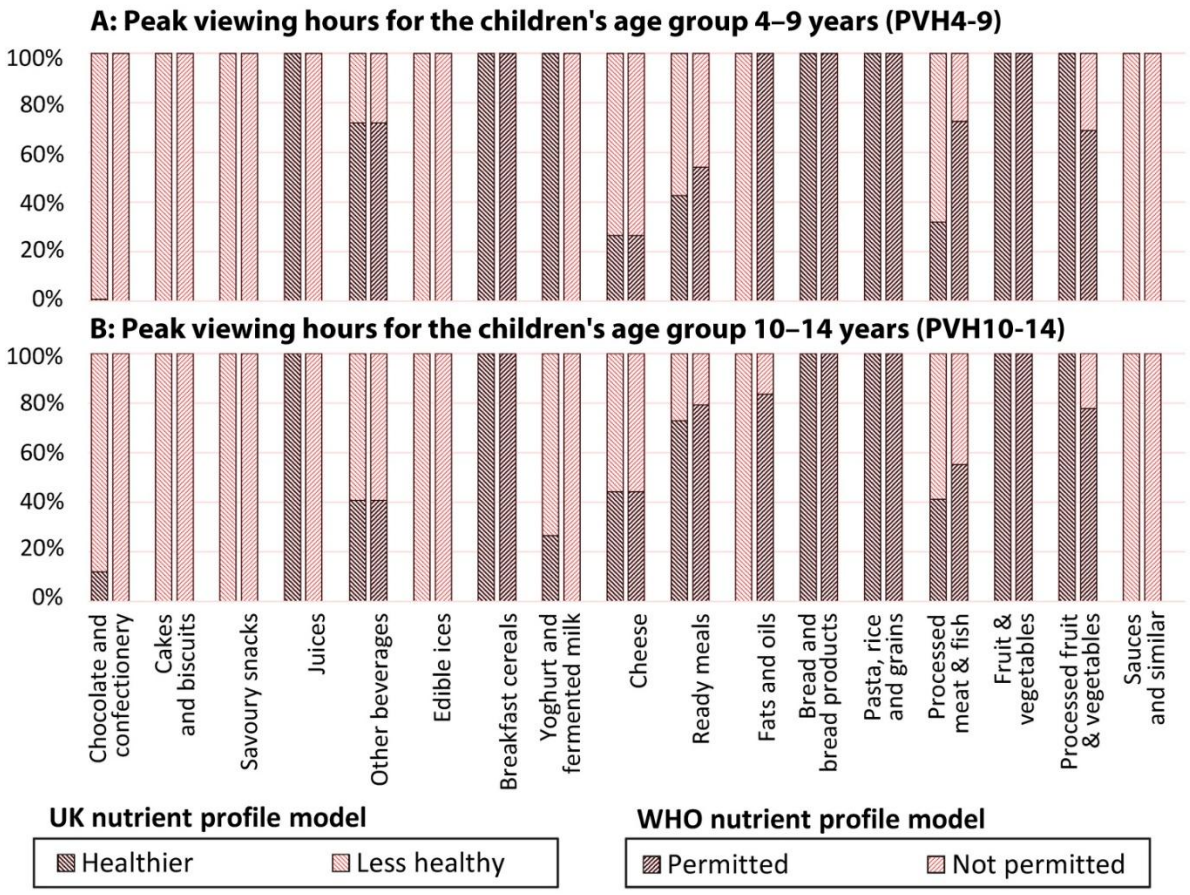

Figure 2: Percentage of the duration of all advertisements within a food category in specific viewing hours (A: PVH4-9; B: PVH10-14), classified using the UK and the WHO nutrient profile models (Slovenia, 2013)

Notes: PVH 4-9: peak viewing hours of children 4–9 years of age; PVH 10-14: peak viewing hours of children aged 10–14 years.

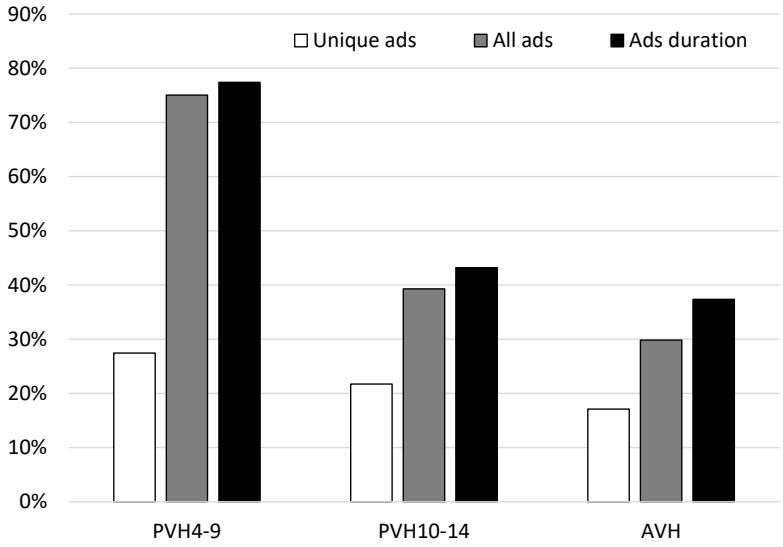

Figure 3: Chocolate and confectionary advertisements (ads) in viewing hours for different age groups as a percentage (%) of all food-related unique advertisements, all advertisements (including repetitions of unique advertisements) and duration of advertisements (Slovenia, 2013)

Notes: PVH 4-9: peak viewing hours of children 4–9 years of age; PVH 10-14: peak viewing hours of children aged 10–14 years; AVH: all viewing hours