Does self-regulation work?
The case of television food advertisement to children in Germany

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Introduction

The prevalence of childhood overweight and obesity has been increasing at an alarming rate (Ng et al., 2014). This holds for both developed and developing countries (e.g. Gupta et al., 2012; Ng et al., 2014). In Germany, 15 % of children and adolescents aged 3-17 years are classified as overweight and 6.3 % are obese (Kurth and Schaffrath Rosario, 2007). Childhood obesity is known to contribute to the development of serious chronic diseases as well as social and psychological problems in childhood, adolescence and adulthood (Dietz, 1998; Karnik and Kanekar, 2012). In Germany alone, obesity related health care costs amount to € 16,797 million annually (Lehnert et al., 2015). Health care costs of overweight adults are three times higher if people have already been overweight or obese during childhood (Sonntag et al., 2015). Besides genetic predisposition, behavioral and environmental factors cause childhood obesity (Karnik and Kanekar, 2012). Regarding behavioral factors a predominantly sedentary lifestyle combined with excessive energy intake may result in weight gain (Karnik and Kanekar, 2012; Lobstein et al., 2004). With respect to environmental factors homes, schools and neighborhood settings play a decisive role (Hartmann and Maschkowski, 2009). Advertisement of food and beverage products high in sugar, saturated fat or sodium is considered as another environmental factor acting as catalyst for the development of childhood obesity (Cairns et al., 2009; Calvert, 2008; Harris et al., 2009; Hartmann and Maschkowski, 2009; Linn and Novosat, 2008; McGinnis et al., 2006). Marketing of such energy-dense, nutrient-poor (EDNP) food and drink products to children is omnipresent and makes use of different media, though the largest part of food related marketing expenditures still accounts for television advertising (Effertz, 2008; McGinnis et al., 2006). The latter is partly due to the fact that television is still the media children want to forsake the least (MPFS, 2014): The average German child aged 3 to 13 years watches 162 minutes of television per day (Feierabend and Klingler, 2014). At the same time, cognitive research reveals that children under the age of 12 lack the capability for effectively recognizing the

persuasive intent of advertising. This implies that children cannot defend themselves from the manipulating effects which may lead to biased product evaluation (Boyland and Halford, 2013; Carter et al., 2011; Graff et al., 2012)[1] thereby influencing children's food preferences, purchase requests and consumption patterns towards advertised products (Boyland and Halford, 2013; Cairns et al., 2013; McGinnis et al., 2006).

To reduce the risks to children's health linked to the promotion of foods that are high in fats, sugars or salt the WHO recommends the development, implementation and monitoring of policy frameworks to considerably reduce the exposure and impact of marketing activities for EDNP products to children (World Health Organization, 2010). In several countries respective schemes have been implemented over the last decades (e.g. Sweden: ban of television advertising to children under 12 years; UK: ban of television advertising of EDNP products to children). In addition, and potentially to preempt (further) government regulation, food and beverage corporations launched self-regulation initiatives in a number of countries, pledging to limit marketing communication activities to children under 12 years (e.g. USA: Children's Food and Beverage Advertising Initiative (CFBAI), Australia: Australian Food and Grocery Council (AFGC), Canada: Canadian Children's Food and Beverage Advertising Initiative (CAI) (Chambers et al., 2015; Hawkes and Harris, 2011; Hawkes and Lobstein, 2011).

The EU Pledge, which was introduced in 2007 by 11 globally leading food and beverage corporations[2] falls into that latter group (Galbraith-Emami and Lobstein, 2013). Signatory companies agreed to restrict child-targeted television and internet advertising at European level as well as promotional activities in schools. More specifically, they commit to abstain from the advertisement of EDNP products not in line with specific nutritional criteria to

[1] Connell et al. (2014)show in their study that advertising exposure at young age can results in biased product evaluations that even prevails in adulthood. This makes children an even more economically relevant target group of food companies' promotional activities (McGinnis et al., 2006; Nicholls and Cullen, 2004).

[2] Founding members: Burger King, Coca-Cola, Danone, Ferrero, General Mills, Kellogg, Mars, Mondelez, Nestlé, PepsiCo and Unilever (European Advertising Standards Alliance 2015)

children younger than 12 years. Products not in compliance with pre-defined nutritional criteria are not to be advertised in television program with at least 35 % child audience[3]. While initially, each participating company defined their own specific nutritional criteria, in 2012 signatory companies agreed on a common nutrient profiling system, which has to be adopted by the end of 2014. The system defines benchmark criteria for nine food categories, taking into account 'negative' as well as 'positive' nutrients (European Advertising Standards Alliance, 2015) with companies being free to implement stricter criteria. In 2016, 21 companies responsible for 80 % of Europeans food-related advertisement had joined this voluntary self-regulation initiative (European Advertising Standards Alliance, 2016).

Previous studies investigating the impact of self-regulatory initiatives[4] in limiting food and beverage advertisement to children primarily focus on North America and Australia (Harris et al., 2013; Harris et al., 2015; Kunkel et al., 2009; Kunkel et al., 2015; Lewin et al., 2006; Potvin Kent et al., 2011). According to Galbraith-Emami and Lobstein (2013) research studies provide ample evidence that industry's self-commitments have not been able to reduce the exposure and impact of advertising for EDNP products targeting children (see also Chambers et al., 2015; Hawkes and Lobstein, 2011) while, however, industry-sponsored reports arrive at a positive evaluation regarding the effectiveness of self-regulatory initiatives. To the knowledge of the authors the assessment by Effertz and Wilcke (2012) are the only research studies investigating the impact of the EU Pledge. The analysis covers the periods 2007/2008 as well as 2010. Our study focuses as well on Germany but goes beyond the work by Effertz and Wilcke (2012) in that first, we cover three periods, including two more current ones. This allows us to investigate the impact of recent developments regarding the EU Pledge (e.g. benchmark nutritional profile). Second, we do not only investigate the development of commercials at the aggregate level but in addition, differentiate in our analysis between

[3] Previously this share was 50% (European Advertising Standards Alliance 2016).
[4] For an overview see Galbraith-Emami and Lobstein (2013).

advertisement of signatory and non-signatory corporations over the period. Third, we explicitly investigate whether commercials are in accordance with EU Pledge criteria and to what extent they comply with the Ofcom Nutritional Profiling Model, a score introduced by the UK government to regulate food and drink television advertisement in children program. Thus, the aim of our study is to provide detailed insights regarding the effectiveness of the EU Pledge in reducing children's exposure to television advertisement of EDNP food and beverage products in Germany.

Methodology

Data sample

In October 2011, 2012 and 2014, television program of children's ten most popular German television networks (Feierabend and Klingler, 2014) was recorded between 7:00 a.m. and 10:00 p.m. each on one week-day and one week-end day. With children's channels as well as general public and commercial television broadcasters the sample covers the programs and time slots most popular with children according to recent media analyses (iconkids & youth, 2011, 2013, 2015; MPFS, 2014). We made sure that recording took not place during public holidays or vacation periods. In total, 892 hours of television program were taped.

Coding

Data was analyzed using quantitative content analysis. A detailed coding instrument was developed to record all items of interest. First, we distinguished between television program and television advertisement. Food and beverage advertisement was, secondly, further separated from other commercials and the former was in a third step subdivided in **c**hildren's **f**ood **a**dvertisement (CFA) and other food advertisement. Food commercials were coded as CFA based on visual and auditory cues such as promotional characters (licensed characters, cartoon figures, testimonials or celebrities popular with children), child actors or narrators,

animated, brightly colored elements, kind language and content (e.g., references to school) of communication, premium offers or claims particular directed at children's health or nutrition (see Harrison and Marske, 2005). If respective cues were lacking the commercial was categorized as 'other food advertisement'. In line with Harrison and Marske (2005), we define the target audience at the level of the advertisement spot and not the network level as networks not specifically addressing children are very popular with German children (iconkids & youth, 2011, 2013, 2015). In addition, the fact that food corporations use those child oriented cues indicate that this group is their target even outside children program. Advertisings for formula or infant food were not included. For every CFA we classified the network the commercial was broadcasted (e.g. children's network, general public networks and commercial networks), the length and frequency a commercial was presented, the company launching the advertisement and whether the company is a Pledge-member or Non-member, the product category (beverages, cereals, convenience food, dairy products, fast food, fruit juices, meat products, salty snacks, and sweets), and nutritional value. Nutrient data was obtained from product packaging or company websites and coded per 100 g/100 ml with respect to protein, carbohydrates, total sugar, total fat, saturated fat, fiber, sodium, and energy value. In addition, all items on the list of ingredients, food additives, and portion size were coded. Compliance of the advertised products' nutritional value with (i) the common criteria of the EU Pledge introduced in 2012 and mandatory for all members of the EU Pledge by the end of 2014 and (ii) the Ofcom Nutrient Profiling Model was evaluated. The latter model was selected as additional benchmark as it was introduced in the UK in 2008 to specifically determine whether food products are appropriate for being advertised during children's television program in the UK (Rayner et al., 2009).[5]

[5] In 2008, the UK Office of Communications (Ofcom) developed and introduced a nutrient profiling model to prohibit advertisings for products high in sugar, fat or sodium to children younger than 16 years. The model is used to examine all products in accordance to their nutritional value. Foods and beverages not matching the requirements are prohibited to be advertised during children's program (Rayner et al. 2009).

Analysis

Coding of the television material was conducted by one of the authors. In a pre-test intercoder reliability was assessed according to Holsti's method (Krippendorff, 2004), resulting to scores above 0.90 for all variables. These scores can be considered as good and in line with publication standards for refereed journals (Rössler, 2010).

Data was analyzed using IBM SPSS Statistics software Version 23. Chi-square tests were applied to evaluate changes over time and differences between Pledge-members and Non-members. T-tests and Mann-Whitney-U-tests were performed to examine differences among the groups' nutrient content.

Results

Characteristics of television advertising over time

The 892 hours of television material recorded contains 127.6 hours of television advertising with a total of 21,950 television commercials (see Table 1). Of those, 4,569 (20.8 %) are advertisement for food or beverage products, and 1,069 (4.9 %) for CFA. Table 1 illustrates changes in overall advertisement, food advertisement and CFA over the periods 2011, 2012 and 2014. From 2011 to 2014 the share of food commercials targeted at children in total broadcasted television spots declined significantly ($p < 0.001$) as did the total CFA time and the average length per CFA ($p < 0.001$).

Table 1. Characteristics of television advertising sample, 2011, 2012 and 2014

	2011	2012	2014[a)]
Television sample [h]	296.0	296.0	300.0
Television advertisement			
Duration [h]	43.3	39.6	44.7
No. of broadcasted spots	7,441	6,776	7,733
Food advertisement			
No. of broadcasted spots	1,554	1,522	1,493
Share of total commercials [%]	20.9	22.5	19.3
No. of advertised products	144	134	127
Children's food advertisement			
Duration [h]	2.45	2.25	1.63
No. of broadcasted spots	402	372	295
Share of total commercials [%]	5.4	5.5	3.8
No. of advertised products	26	26	20
Avg. commercial length [sec]	23.9	21.9	19.9

a) Number of total hours recorded in 2014 slightly differ from previous years as Nickelodeon extended broadcasting television program until 10 p.m. compared to 8 p.m. in 2011 and 2012

Comparison of CFA of Pledge-members and Non-members

In the sample 57.4 % (n = 614) of all CFAs have been launched by corporations that signed the EU Pledge. As shown in Table 2, CFAs' share in total commercials declined in both groups, Pledge-members and Non-members, over the period 2011 to 2014 to a similar extent. Also regarding the number of advertised CFAs, the number of companies engaged in advertising in each group, or the average length per CFA no significant differences exist between companies that signed the EU Pledge and those that did not.

Table 2. Children's food advertisement (CFA) of Pledge-members and Non-members, 2011, 2012 and 2014

	2011		2012		2014	
	Pledge-member	Non-member	Pledge-member	Non-member	Pledge-member	Non-member
No. of broadcasted CFA spots	239	163	203	169	172	123
Share of total commercials [%]	3.2	2.2	3.0	2.5	2.2	1.6
No. of advertising companies	6	8	7	12	6	8
No. of advertised products	12	14	12	14	10	10
Avg. commercial length [sec]	24.8	23.1	23.5	20.6	20.6	19.2

Comparison of television network types

Investigating the relevance of different television network types and whether Pledge-members and Non-members differ regarding the kind of broadcasting network primarily used reveals some interesting findings. For both groups general public networks play no (Pledge-members) or only a minor role (Non-members: 1.2 to 2.4 % of total CFAs) as outlet for CFAs. In 2011 52.7% (n = 126) of CFA spots of Pledge-members were shown in children's network. This share is with 48.5 % somewhat but not significantly lower for Non-members. For signatory companies the respective share, however, significantly declined to 44.3 % in 2012 and further to 37.8 % in 2014 while the group of Non-members shows a more heterogeneous picture. From 2011 to 2012 this group increases its share in total CFA in children's networks; however, between 2012 and 2014 the respective share drops again. Thus, in 2012 and 2014 the share of CFAs shown in children's network as % of total CFAs is significantly smaller for corporations that signed the EU Pledge compared to those that did not.

Table 3. Number of CFAs by broadcasting networks and group membership, 2011, 2012 and 2014

	2011 n = 402		**2012** n = 372		**2014** n = 295	
	Pledge-member	Non-member	Pledge-member	Non-member	Pledge-member	Non-member
Public networks	0	3	0	2	0	3
Commercial networks	113	81	113	69	107	60
Children's networks	126	79	90	98	65	60
Total	239	163	203	169	172	123

Nutritional value

Table 4 summarizes the average nutrient content per 100 g of food or 100 ml of drinks advertised to children by Pledge-members and Non-members. The results indicate that CFA products from Pledge signatory companies are significantly higher in proteins, a 'nutrient to encourage', but also in total fat, total energy, saturated fat (only 2012 and 2014), and thus

'nutrients to limit' according to different nutrient profiles including the criteria of the EU Pledge and the Ofcom Nutrient Profiling Model.

Table 4. Nutrients of CFAs per 100 g of food or 100 ml of drink, 2011, 2012 and 2014

	2011			2012			2014		
	Pledge-member x̄ (SD)	Non-member x̄ (SD)	p	Pledge-member x̄ (SD)	Non-member x̄ (SD)	p	Pledge-member x̄ (SD)	Non-member x̄ (SD)	p
Carbohydrate [g]	43.2 (22.1)	52.2 (28.5)	-	44.7 (20.1)	55.6 (32.9)	-	47.5 (18.5)	45.6 (33.0)	-
Sugar [g]	34.3 (16.3)	38.2 (17.7)	-	34.4 (20.4)	37.7 (24.4)	-	30.2 (24.1)	38.6 (22.9)	-
Protein [g]	7.6 (3.2)	4.0 (3.0)	**[1]	9.1 (2.9)	3.8 (3.7)	**[1]	8.2 (4.3)	4.6 (3.0)	*[1]
Total fat [g]	17.0 (14.3)	10.6 (11.8)	-	23.0 (12.4)	8.7 (10.1)	**[2]	25.1 (10.3)	9.7 (15.7)	**[2]
Saturated fat [g]	9.4 (9.0)	6.9 (7.0)	-	13.0 (8.9)	4.4 (5.1)	**[2]	12.1 (9.4)	6.1 (9.7)	*[2]
Sodium [g]	183.4 (195.0)	115.8 (111.4)	-	197.1 (172.4)	219.2 (306.7)	-	252.0 (94.6)	188.5 (153.8)	-
Energy [kcal]	405.9 (145.9)	322.4 (174.1)	-	425.9 (153.6)	317.6 (151.6)	*[1]	454.7 (125.6)	320.2 (197.6)	*[1]

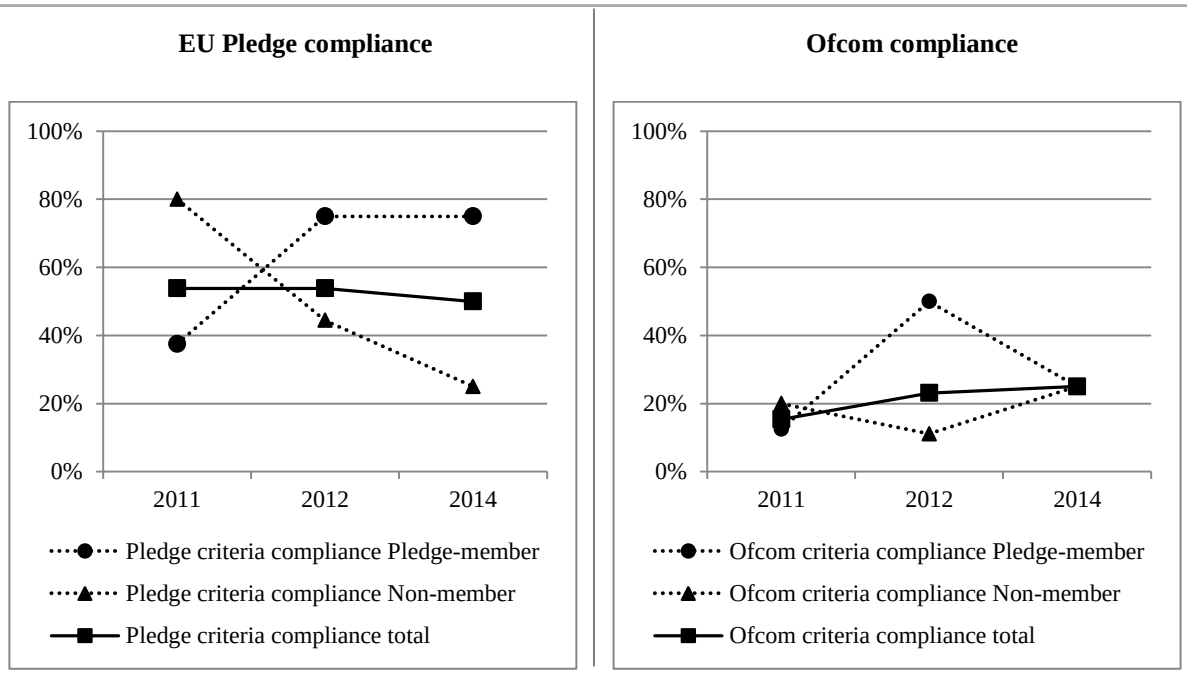
Note: ** $p < 0.05$; * $p < 0.1$; [1]T-test; [2]Mann-Whitney-U-test

Consistency with EU Pledge criteria

The EU Pledge implies that products not in compliance with pre-defined nutritional criteria are from 2015 up not to be advertised in television program with at least 35 % child audience. Children programs clearly fall into that category. Figure 1 reveals that the share of products in children program consistent with the harmonized criteria of the EU Pledge has remained almost constant (2011 and 2012: 53.8 %; 2014: 50 %). However, Figure 1 also indicates that the development over the analyzed period has been quite different for signatory compared to non-signatory companies of the Pledge. Compliance with the Pledge criteria was with 37.5 % in 2011 low for members. However, in 2012 and 2014 the majority of CFA Pledge-members broadcasted in children programs were in line with the pledge commitments (75.0 % in both years). Non-member corporations fulfilled the EU Pledge nutrition criteria regarding CFA in children program to a significantly higher degree in 2011 (80.0 %) compared to member

companies. However, compliance considerably declined in the former group in the subsequent years (2012: 44.4 %; 2014: 25.0 %). Thus, the respective shares are in 2011 significant higher and in 2012 and 2014 significant lower for non-member companies compared to signatory companies.

Figure 1. Compliance of CFA products with EU Pledge and Ofcom criteria in during children's program, 2011, 2012, 2014



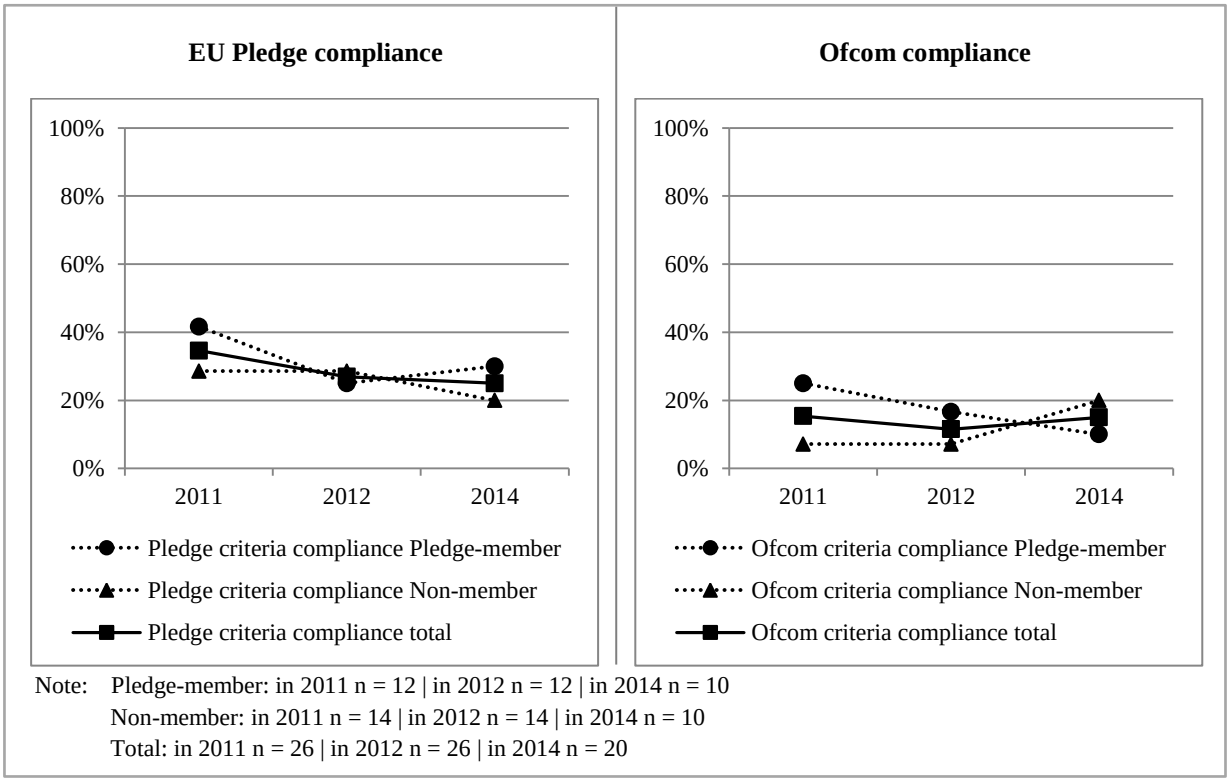
Note: Pledge-member: in 2011 n = 8 | in 2012 n = 4 | in 2014 n = 4
Non-member: in 2011 n = 5 | in 2012 n = 9 | in 2014 n = 4
Total: in 2011 n = 13 | in 2012 n = 13 | in 2014 n = 8

Figure 1 also provides information on the compliance of EU pledge and non-member corporations with the Ofcom criteria, a nutritional profile model that imposes stricter requirements for nutrient content scores, a fact that is reflected in the results. Only 20.6 % (over all three years) of the CFAs broadcasted in children networks would be allowed to be advertised during children's program according to the Ofcom model. The EU Pledge was much more lenient permitting 52.9 %. Compliance with the Ofcom model shows, however, a slight increase over time (2011: 15.4%; 2012: 23.1% and 2014: 25%). While the respective shares are similar for signatory and non-signatory corporations in 2011 (Pledge-members: 12.5 %; Non-members: 20.0 %) and 2014 (Pledge-members and Non-member: 25.0 %,

respectively), in 2012 pledge member countries have a much higher share of compliance (50.0 % Pledge-members versus 11.1 % Non-members).

According to iconkids & youth (2015) a number of non-children networks such as Pro 7 and RTL have been very popular with German children, especially with children older than 9 years. Thus, children are to a considerable extent exposed to CFA not only in children programs but in other commercial and public networks. Extending the analysis to all television programs reveals that the share of CFA spots in accordance with the EU Pledge criteria is with 29.1 % (see Figure 2) considerable lower compared to results obtained for children networks (52.9 %) and declines further over time (2011: 34.6 %; 2012: 26.9 %; 2014: 25.0 %). Member corporations have a slightly higher share of compliance (32.4 %) compared to non-members (26.3 %), but in both groups there is no clear trend over the period analyzed.

Figure 2. Compliance of CFA products with EU Pledge and Ofcom criteria in entire television sample, 2011, 2012, 2014



Note: Pledge-member: in 2011 n = 12 | in 2012 n = 12 | in 2014 n = 10
Non-member: in 2011 n = 14 | in 2012 n = 14 | in 2014 n = 10
Total: in 2011 n = 26 | in 2012 n = 26 | in 2014 n = 20

Finally, Figure 2 reveals that in our sample only 13.8 % of the CFA broadcasted in children and non-children channels would be permitted to be advertised according to the Ofcom model. This share shows no trend over the analyzed years (2011: 15.4 %; 2012: 11.5 %; 2014: 15.0 %), though, the overall number of CFA not in compliance with the Ofcom criteria declined from 22 in 2011 to 17 in 2014. Over the three years analyzed the share of CFAs of pledge signatories companies complying with the Ofcom criteria is with 17.6 % higher than the respective share of the group of Non-members (10.5 %). However, while the latter show a positive trend the opposite holds for the Pledge-members.

Discussion

According to signatory companies the EU Pledge changes the way Pledge-members advertise to children, with the aim "to support parents in making the right diet and lifestyle choices for their children" (European Advertising Standards Alliance, 2016). Given this background the present study analyzed the relevance and development of food advertisements to children for the years 2011, 2012 and 2014 as well as the nutritional content and the nutritional value of the food products advertised.

Our results reveal that food advertisement to children measured in the number of broadcasted spots, the overall time of advertisement as well as the number of advertised products has declined over the analyzed period. This reduction was similar by pledge-member and non-member companies. While, however, Non-members cut their CFA for children and other networks to an equal extent, the Pledge-members primarily reduced the broadcasting of CFA in children networks. The latter can be explained by the fact that the EU Pledge applies to television advertisement in networks with an audience of at least 35 % children younger than 12 years. This clearly holds for children network and thus restricts the advertisements options of members in those programs if they want to comply with the Pledge. The 35 % criteria is, however, in general assumed to be not binding in case of most other networks.

Moving from quantity to quality of products advertised to children reveals a heterogeneous picture. First, our analysis shows that the relevance of 'nutrients to encourage' and of 'nutrients to limit' - as defined in the EU Pledge - do not change over the years 2011, 2012 and 2014 in the desired direction. To the contrary, the content of total fat, saturated fat and sodium and the energy per 100 g/100 ml of products considerably increased over time. This holds especially for the Pledge signatory companies. Comparing the nutritional value of products advertised to children of member with non-member corporations reveals an ambiguous picture as the content of several 'nutrients to limit' but also of protein and thus a 'nutrient to encourage' is higher in the former. Nutrient profile models consider the whole nutritional composition of the product and thus are especially suitable to guide the regulation of CFA (Scarborough et al., 2013). Analyzing CFA products broadcasted in children networks with respect to the EU Pledge nutritional criteria reveals that compliance has increased for products advertised by Pledge-members with the majority of products fulfilling the respective criteria in the two more recent years analyzed. For Non-members, however, an opposite development took place over the same period, leading to a low share of compliance in the most recent year. Those finding might lead to the conclusion that the EU Pledge has been effective in restricting children's exposure regarding commercials for EDNP products with respect to signatory companies. However, the results change considerable once we apply another nutrient profile scheme and extent the analysis to the ten television channels most popular with German children. Using first, the Ofcom Nutrient Profiling Model still focusing on children networks, reveals that the majority of products of Pledge-members and Non-members are not conform with the respective guidelines and thus according to this scheme a large share of products would not be permitted to be advertised. Extending the analysis to all television networks preferred by German children shows that in this case the majority of CFA even does not comply with the EU Pledge criteria and only about every fifth of the CFA products are in accordance with the Ofcom criteria. The share of products in line with the EU

Pledge criteria is slightly higher for member companies compared to non-member corporations while the opposite holds for compliance with the Ofcom criteria. This result is in line with Potvin Kent et al. (2011) who evaluated Canadian television advertising to children and concluded that products of CAI-signatory companies meet the Ofcom score less often.

The relevance of the nutrient profile chosen for regulating food advertising to children has also been demonstrated by Scarborough et al. (2013), Brinsden and Lobstein (2013) and Potvin Kent et al. (2011), revealing that industry-led nutrient profiling schemes are often less effective in restricting EDNP products (Brinsden and Lobstein, 2013; Potvin Kent et al., 2011). Our analysis in addition stresses the relevance of the channels investigated. CFAs are directed at children and would not be broadcasted in television networks of little relevance for the target audience. Thus, limiting the EU Pledge to television programs with an audience of at least 35% children less than 12 years impedes the effectiveness of the scheme. Our analysis indicates that given this restriction compliance with the EU Pledge has been possible by shifting CFA for EDNP products from children to other networks.

Conclusion

The commitments made by signatory companies of the EU Pledge had so far little impact on the nutritional value of food and beverages advertised to children. Nevertheless, the marketing of foods through television advertising targeting children during children's program declined considerably. Therefore, increased participation of food corporations in the EU Pledge, adoption of stricter criteria (nutritional content), extension to all advertisements designed in a child-appealing way (not just to media audiences of minimum 35 % children), and more effective controls are required to reduce the exposure of food advertising of EDNP products to children and thus to improve children's health.

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