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Assessing the Impact of Stricter Alcohol Advertising Standards: The Case of Beam Global Spirits

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Summary

Reducing youth exposure to alcohol advertising is a global health priority. In most countries around the world, the alcohol industry is given the opportunity to regulate itself with respect to advertising practices. Generally, the alcohol industry self-regulations are lax, allowing youth to be disproportionately exposed to alcohol advertising. However, Beam Global Spirits and Wine (Beam) voluntarily adopted more restrictive advertising standards in the United States in 2007. This study assessed Beam's compliance with their new standard and estimates its effect on youth exposure and advertising costs. We found that Beam's compliance with its more restrictive standards was imperfect, but never-the-less, we estimated that youth exposure to alcohol advertising was reduced compared to other spirits brands. Beam's more restrictive standards did not increase their advertising costs and therefore other alcohol companies should consider adopting similar standards around the world.

Keywords

Alcohol Advertising; Self-regulation; Advertising Policy

Background

Alcohol consumption is the number one modifiable risk factor for disease and disability globally for persons ages 15 to 49 (Lim et al., 2012). Evidence is growing that alcohol advertising and promotion is associated with alcohol initiation, consumption, and health consequences (Anderson, de Bruijn, Angus, Gordon, & Hastings, 2009; Grenard, Dent, & Stacy, 2013; Smith & Foxcroft, 2009). Reducing exposure to alcohol marketing and promotion has been identified globally as a public health priority (World Health Organization, 2010). Even so, in most countries around the world alcohol companies have been granted the privilege to regulate their own advertising and marketing practices (EGTA The Association of Television and Radio Sales Houses, 2011; J. Evans et al., 2003; J. Evans & Kelly, 1999; J. Evans, Marcus, & Engle, 2008; J. M. Evans et al., 2014; Jones & Donovan, 2002). For the most part, these regulations are lax, permitting youth to be disproportionately

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exposed to alcohol advertising (D. H. Jernigan, J. Ostroff, & C. Ross, 2005). Only one alcohol company has stepped forward to implement more stringent alcohol advertising policies – Beam Global Spirits and Wine (Beam) now part of Suntory. In 2007 in the United States, Beam voluntarily adopted advertising policies that would reduce the proportion of youth in the audience for Beam brand advertisements. This study evaluates the performance of Beam against its unique alcohol advertising policies and estimates the impact of these more stringent policies on both youth exposure and Beam's realized advertising costs.

We begin with a review of the evidence of an association between exposure to alcohol marketing and drinking behavior. Two review studies have been published that summarize findings from 14 longitudinal studies of the association between alcohol advertising and drinking behaviors including drinking initiation, drinking frequency, and binge drinking (Anderson et al., 2009; Grenard et al., 2013; Smith & Foxcroft, 2009), usually defined as consuming five or more drinks in a short period of time (Miller, Naimi, Brewer, & Jones, 2007). Generally, these studies have found that exposure to alcohol marketing is associated with increased risk of drinking initiation, increased consumption, binge drinking, and negative health consequences (Anderson et al., 2009; Grenard et al., 2013; Smith & Foxcroft, 2009).

For the most part, the associations revealed in these studies have been small, leading critics to suggest that the measured effects must be attributable to some unmeasured confounding factor or to a miss-specification of the model (Nelson, 2010). However, advertisers learned many years ago from seminal research conducted by Anheuser-Busch that advertising effects are non-linear, with the greatest impact with the first few advertising exposures and diminishing effects thereafter (Ackoff & Emshoff, 1975a, 1975c; Wind & Sharp, 2009). Most public health studies of advertising effects have not considered these non-linear associations and have measured population samples where rates of exposure are extremely high – factors that may have contributed to findings of small effects (Collins, Ellickson, McCaffrey, & Hambarsoomians, 2007; Connolly, Casswell, Zhang, & Silva, 1994; Ellickson, Collins, Hambarsoomians, & McCaffrey, 2005; Fisher, Miles, Austin, Camargo, & Colditz, 2007; Grenard et al., 2013; Robinson, Chen, & Killen, 1998; Snyder, Milici, Slater, Sun, & Strizhakova, 2006). More recent studies that have examined populations with both high and low rates of exposure and have considered non-linear effects have found stronger associations (Ross, 2014; Ross et al., 2014). Thus the evidence of alcohol marketing's association with drinking behavior continues to grow and strengthen.

Across the globe, alcohol advertising is subject to different levels of regulation. In the World Health Organization's Global Status Report on Alcohol, a survey of 159 countries reported on marketing restrictions for different alcoholic beverages in different media (World Health Organization, 2014). The largest group of countries (39.6%) reported no legislative restrictions on alcohol advertising, leaving the alcohol industry to develop its own advertising self-regulatory guidelines (World Health Organization, 2014). Some countries have limited regulations, for example restricting alcohol advertising to programming after a certain time in the evening (World Health Organization, 2014). However, we have published a study showing that such time restrictions may actually increase adolescent exposure to

alcohol advertising by increasing the number of alcohol ads during times when youth are more concentrated in the audience for the program (Ross, de Bruijn, & Jernigan, 2013).

Generally, self-regulatory guidelines for alcohol advertising focus on a maximum underage audience composition (Distilled Spirits Council of the United States, 2011a, 2011c; The Beer Institute, 2011; The Wine Institute, 2011). For example, guidelines may suggest that no alcohol ads be placed on programming when youth under age 18 make up 30% or more of the audience. However, in many countries, youth under age 18 make up considerably less than 30% of the population. For example, in Hungary where a 30% guideline is in place, youth under age 18 make up only 18% of the population and adolescents ages 12-17 make up only 6% of the population (European Commission, 2012). Thus, in Hungary youth may be disproportionately exposed to $30\%/18\%=1.67$ or $30\%/6\%=5.0$ times the advertising weight of other age groups without violating the self-regulatory guidelines.

In 2003 in the United States, trade associations for the beer and distilled spirits companies joined the wine industry in adopting guidelines to advertise only in media where the underage audience composition was below 30%. However, this standard permits alcohol companies to place ads in media in which the youth age 12-20 audience may be double its proportion in the population, causing significant overexposure of this high-risk group (D. Jernigan, J. Ostroff, & C. Ross, 2005). Thus, the Institute of Medicine (Bonnie & O'Connell, 2004) and 24 U.S. state and territorial attorneys general (Shurtleff et al., 2011) have called for more restrictive advertising placement standards.

In 2007, with support from 37 state Attorneys General, Beam Global Spirits and Wine (Beam), then the fourth largest spirits marketer in the U.S., adopted a stricter youth audience composition threshold for print, television, and radio advertising, which was in full force on January 1, 2008 (Beam Global Spirits and Wine, 2007). Under this standard, Beam agreed to place ads only in media where the underage audience composition was less than 25%, which was 5 percentage points lower than the industry standard at that time. Beam also committed that no more than 15% of its aggregate audience for all advertising would be under the legal drinking age (i.e., total youth exposure as a percent of total exposure for all ages $\leq 15\%$), annually by brand and by medium.

In this study, we evaluated a) whether Beam was able to meet its goal of restricting alcohol advertising to programming where the underage audience composition was less than 25% on television and in magazines; b) whether Beam was able to meet its goal of achieving an average underage audience composition less than 15% per brand per medium per year on television and in magazines; c) whether Beam paid a higher advertising cost relative to other brands for its advertising on programs with more restrictive youth audience limits; and d) whether compliant Beam advertisements generated less youth exposure than matched advertisements from other spirits brands.

Methods

Data Sources

Television advertising occurrence and audience data for all Beam brands and all other distilled spirits brands were licensed from Nielsen's Monitor-Plus software for the years 2008-2011. Data on magazine ad occurrences were licensed from Nielsen Monitor-Plus (New York, NY), and were matched to audience data from Gfk MRI (New York, NY). To restrict the analysis to full-run national editions of magazines, we licensed data from Kantar Media, Inc. (New York, NY), and removed any advertisements that were placed in demographic, regional, or split editions of magazines.

In each year, the audience demographics for ages 18 and older were sourced from the corresponding Gfk MRI Spring Adult survey, and audience demographics for ages 12 to 17 were sourced from the Gfk MRI TwelvePlus survey. Details of our data processing methods have been published elsewhere (CAMY, 2010). Briefly, data were extracted from Monitor-Plus, classified as product, “responsibility”, or other types of advertising, standardized to brand names according to Impact Databank (Impact Databank, 2012) and loaded into a Microsoft SQL*SERVER R8 database (Microsoft, Redmond, WA). Only product advertisements were included in this analysis.

Measures

An advertising *impression* is a measure of advertising exposure that corresponds to a single person seeing a single advertisement. *Audience composition* is the proportion of impressions seen by a particular demographic group. In this study, we assessed the audience composition of youth under the legal drinking age (underage) for individual ad placements on television and in magazines. Television audience composition uses a base of viewers ages 2 and older, since age 2 is the youngest age tracked in Nielsen's surveys. Magazine audience composition uses a base of readers ages 12 and older, since this is the youngest age tracked by Gfk MRI in their magazine audience surveys. *Aggregate average audience composition* is the weighted average audience composition for each brand in each medium, and is calculated by summing all underage advertising impressions for a brand in each medium, and dividing by the total advertising impressions for all ages for each brand in each medium. *Gross rating points (GRPs)* are per-capita advertising exposure measures calculated by dividing advertising impressions by the population and multiplying by 100. *Cost-per-thousand impressions* is an estimate of advertising cost calculated by dividing the “rate book” advertising cost reported by Nielsen Monitor-Plus by the number of advertising impressions times 1000. The “rate book” advertising costs are the published advertising prices used as standard rates. Actual advertising costs will vary depending on the final price negotiated between the advertiser and the network. This actual advertising cost data is proprietary to the advertiser and the network; therefore advertisers rely on rate book prices for comparisons among different advertisers. In this analysis, we calculated the cost-per-thousand young adult (ages 21-34) advertising impressions.

Analysis

Youth exposure to alcohol advertising varies by brand, since alcohol advertising decisions are made at the brand level, by medium. Youth also have distinct preferences for specific alcohol brands (Michael Siegel et al., 2013; Siegel et al., 2011). Therefore, we evaluated Beam's compliance with their 25% placement standard by advertising medium (i.e., in magazines and on TV) for each individual Beam brand.

We assessed compliance with the 25% standard by summing underage advertising impressions (ages 12-20 for magazines and ages 2-20 for television) for ads placed above the 25% threshold and taking this sum as a percentage of all underage advertising impressions (i.e., the percent of underage advertising exposure from ad placements that did not meet Beam's new standard). We assessed compliance with the 15% underage audience annual aggregate composition limit by summing total underage impressions for each brand in each medium per year and taking these as a percentage of total impressions (ages 12 and older for magazines and ages 2 and older for television) per brand, per medium, per year.

To estimate the impact of the new standard on youth exposure and advertising cost, we restricted the analysis to just those Beam advertisements placed below the 25% youth composition limit. Each compliant Beam advertisement was matched to a randomly-selected ad from other spirits advertisers using the following method. To assess the impact of the new advertising standard on youth exposure, we matched each Beam advertisement that complied with the 25% composition placement standard to a randomly-selected control advertisement from another spirits producer, matched on year and advertising cost (age 21-34 cost-per-thousand impressions). The control ad selected in this manner represented the counterfactual condition had Beam not changed their advertising standards. Total youth exposure for compliant Beam ads was compared to the average youth exposure from 250 repetitions of this matching method.

Similarly, to assess the impact on advertising cost, we matched each compliant Beam advertisement to a randomly-selected control ad from a different spirits advertiser, matched on year and age 21-34 audience rating (audience size). Average cost-per-thousand age 21-34 impressions was compared for compliant Beam advertisements relative to the average cost-per-thousand age 21-34 impressions from 250 repetitions of matched ads from other spirits producers. The youth exposure and cost analyses were conducted across all Beam brands rather than individual brands to stabilize the results.

Results

25% Placement Standard

Magazines—Most Beam advertising in magazines was in compliance with the 25% underage audience composition standard from 2008 through 2011 (Table 1). The two exceptions were advertising by Jim Beam Bourbon, which in 2008 placed an ad in *Vibe* magazine; and Courvoisier Rose Liqueur, which in 2011 placed multiple ads in *Life & Style* magazine (data not shown).

Television—Compared to its performance in magazines, Beam brands were less likely to comply with the 25% limit on television. The percentage of youth exposure from noncompliant advertising ranged from 11% (Maker's Mark Bourbon) to 32% (Jim Beam Black Bourbon). One brand that advertised only in a single television market, Windsor Canadian Blended Whisky, succeeded in complying with the 25% standard.

15% Annual Aggregate Youth Audience Composition

Magazines—Overall, 14 brands that advertised in magazines met the new 15% annual aggregate composition from 2008-2011 (Table 2). Performance against this standard was inconsistent, with 6 of 8 brands hitting the standard in 2008; all 7 brands in 2009; 4 of 5 brands in 2010; and 9 of 15 brands in 2011.

Television—Beam brands did not consistently meet the 15% standard on television. The one brand advertising on television in 2008 was over this limit; 2 of 3 brands achieved the standard in 2009; 2 of 3 brands in 2010; and 3 of 5 brands in 2011.

Beam Standards and Advertising Cost

In magazines, we found that Beam's cost per thousand impressions for advertising that met the new standard was higher than for matched distilled spirits advertisements in two years (2009 and 2010), and lower than matched distilled spirits advertisements in two years (2008 and 2011) (Table 3). Across all four years, the average advertising cost for Beam brands was effectively the same as that for matched advertisements from other distilled spirits brands. On television, we found the same pattern with comparable costs in two years and lower costs for Beam in 2 years. Across all four years, the average advertising cost for Beam brands on television was 15% lower than that for matched advertisements from other spirits brands.

Beam Standards and Youth Exposure

In magazines, compliant Beam advertisements generated 6% less youth exposure than matched advertisements from other distilled spirits brands across all four years of the study. On television, compliant Beam ads generated 10% less youth exposure than matched ads from other spirits brands.

Discussion

From 2008 to 2011, Beam's record with regard to compliance with its new advertising standards has been mixed. Generally, compliance has been better for advertisements placed in magazines than for those placed on television. Almost all Beam brands advertising in magazines met the 25% placement standard but Beam did not consistently achieve an annual aggregate 15% audience composition particularly in 2011. On television, 10 to 32 percent of youth exposure was generated by ads placed on programs with a youth audience composition above 25% and the 15% annual aggregate standard was met by a minority of brands advertising on television in most years. For those ads that did comply with the new standards, we estimate that Beam was able to reduce youth exposure to both its television and magazine ads compared to matched control advertisements, and we did not find any evidence that they paid higher advertising costs than other spirits brands.

Beam's use of two different compliance standards – the 25% maximum youth audience composition placement standard and the 15% annual aggregate composition standard – has some benefits. The 25% placement standard sets a threshold that works well in media such as magazines where audiences are measured annually and the youth composition is relatively stable. It is important to note, however, achievement of the 25% standard does not guarantee achievement of the 15% annual aggregate standard. Beam placed many advertisements in magazines that, for example, had youth audience composition in the range 20-25%. However, if the advertising plan included too many of these magazines, the annual aggregate 15% target was compromised, as occurred for many brands in 2011.

On the other hand, television audience data are measured for each advertising placement and have high variability, particularly for lower rated programs with smaller audiences. Therefore, we found that 10-32% of youth exposure to Beam television ads was generated from advertisements that did not meet the 25% placement standard. Television media present special challenges when planning for advertising purchases since audiences are measured for each advertisement and may vary considerably from one week to the next. However, a usual practice in many industries when attempting to meet performance goals in the presence of highly variable processes is to use a more conservative standard (i.e., a “guardbanded” standard) (Shector, 1992). Beam, and other alcohol companies, could use a 15% underage audience limit when placing ads on lower-rated (smaller audience) cable television programs to improve performance against their published 25% standard on television. In its most recent report on alcohol advertising (J. M. Evans et al., 2014), the Federal Trade Commission (FTC) endorsed the use of a more restrictive (i.e., lower youth audience composition) advertising placement standard when audience measures for a given medium have a high degree of variability.

In previous research, the authors of the current study estimated that youth exposure to alcohol advertising could be decreased by 14% if the Beam standard of 25% were adopted and effectively implemented by all alcohol advertisers (Center on Alcohol Marketing and Youth, 2007). The current study estimated that Beam's ads that adhered to the stricter standard reduced youth exposure by 10.3% relative to matched control ads from other spirits advertisers. The reduction in youth exposure in magazines was lower, possibly as a consequence of the more limited selection of publications with a young-adult audience profile that is desirable to alcohol advertisers.

Determining whether the reduction in youth exposure to advertising for compliant Beam brands has resulted in a reduction in youth drinking of Beam products is beyond the scope of the current study. However, we noted that in a recent national survey of youth alcohol consumption by brand, no Beam brands appeared in the list of 25 products most likely to have been consumed by underage drinkers (M. Siegel et al., 2013). Future research may attempt to assess the impact of reduced youth exposure to brand advertising on youth consumption of the advertised brands.

This study is limited in its ability to find an overall trend relative to the more restrictive placement standards adopted by Beam because of the variation in compliance with the standard across Beam brands, and because of year-to-year variation in alcohol advertising on

a brand-specific basis. In addition, television audience data are not stable for many low-rated cable television programs, making it difficult for advertisers to plan their advertising purchases. However, the audience data used in this study are reportedly the same as those used by the alcohol industry to purchase and monitor its advertising performance. Our analysis was also limited to magazine and television media and did not assess compliance with the Beam standards for radio or digital advertising. Alcohol companies are increasing spending in digital advertising but television and magazines still represent the bulk of advertising spending (J. M. Evans et al., 2014). Finally, our cost analysis considered only the advertising costs associated with Beam's more restrictive advertising placement guidelines, and did not take into consideration other opportunity costs Beam may have incurred as a result of adopting this standard ahead of its competitors.

The findings presented in this paper support the recommendation of the National Research Council and the Institute of Medicine in 2003 that compliance with tighter standards can reduce youth exposure to alcohol advertising (Bonnie & O'Connell, 2004). Beam has demonstrated an effective strategy for reducing youth exposure to alcohol advertising that did not result in higher advertising prices. Implementation of stricter advertising standards could make a significant contribution to efforts to reduce youth alcohol consumption, and complement other effective strategies such as raising alcohol excise taxes and reducing alcohol outlet density (Centers for Disease Control and Prevention, 2012).

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Table 1
Percent of Beam Advertisements by Brand in Media with Underage Composition Above 25%, 2008 to 2011

Brand	Underage Exposure in Magazines ^d			Underage Exposure on Television ^d		
	All Exposure	Above 25% Youth Composition	% Exposure Above 25% Composition	All Exposure	Above 25% Youth Composition	% Exposure Above 25% Composition
Basil Haydens Bourbon Whiskey	3,514	0	0%	NA	NA	NA
Canadian Club Whiskies	32,312	0	0%	NA	NA	NA
Courvoisier 21 ^b	229	0	0%	NA	NA	NA
Courvoisier Cognacs ^b	144	0	0%	NA	NA	NA
Courvoisier Rose Liqueur ^b	18,758	6,900	37%	NA	NA	NA
Cruzan Flavored Rums	43	0	0%	NA	NA	NA
Cruzan Rums	86	0	0%	NA	NA	NA
Effen Vodka ^c	2,977	0	0%	NA	NA	NA
Jim Beam Black Bourbon Whiskey	10,136	0	0%	44,864	14,490	32%
Jim Beam Bourbon Whiskey	25,560	2,532	10%	321,729	64,203	20%
Jim Beam Devils Cut	19,357	0	0%	NA	NA	NA
Knob Creek Kentucky Straight Bourbon Whiskey	12,567	0	0%	NA	NA	NA
Maker's Mark Bourbon	53,018	0	0%	8,380	909	11%
Makers Mark Makers 46	4,639	0	0%	NA	NA	NA
Pucker Flavored Vodka	49,611	0	0%	106,040	27,977	26%
Red Stag by Jim Beam	4,117	0	0%	109,466	24,739	23%
Sauza Hornitos Tequila	20,615	0	0%	378,833	65,676	17%
Sauza Silver Tequila	7,163	0	0%	NA	NA	NA
Sauza Tequilas	16,253	0	0%	NA	NA	NA
Windsor Canadian Blended Whisky	NA	NA	NA	0	0	0%

NA=No advertising in the selected medium

^a Underage exposure is measured in advertising impressions (000). Underage is ages 2 to 20 on television and ages 12 to 20 in magazines since audiences under age 12 are not measured in magazines.

^b Courvoisier 2009-2011 (years under Beam's control)

^c Effen Vodka 2010-2011 (years under Beam's control)

Table 2
Average Annual Youth Audience Composition by Brand, 2008 to 2011
 Underage Impressions / All Impressions in Magazines^d Underage Impressions / All Impressions on Television^d

Brand	2008	2009	2010	2011	2008	2009	2010	2011
Basil Haydens Bourbon Whiskey	22%	11%	9%	10%	NA	NA	NA	NA
Canadian Club Whiskies	13%	9%	NA	NA	NA	NA	NA	NA
Courvoisier 21 ^b	NB	NA	0%	0%	NA	NA	NA	NA
Courvoisier Cognacs ^b	NB	0%	NA	NA	NA	NA	NA	NA
Courvoisier Rose Liqueur ^b	NB	NA	NA	0%	NA	NA	NA	NA
Cruzan Flavored Rums	2%	NA	NA	NA	NA	NA	NA	NA
Cruzan Rums	2%	NA	NA	NA	NA	NA	NA	NA
Effen Vodka ^c	NB	NB	0%	0%	NA	NA	NA	NA
Jim Beam Black Bourbon Whiskey	NA	NA	NA	13%	NA	20%	NA	NA
Jim Beam Bourbon Whiskey	18%	13%	NA	23%	19%	15%	14%	17%
Jim Beam Devils Cut	NA	NA	NA	15%	NA	NA	NA	NA
Knob Creek Kentucky Straight Bourbon Whiskey	12%	9%	5%	6%	NA	NA	NA	NA
Maker's Mark Bourbon	12%	NA	NA	17%	NA	NA	NA	14%
Makers Mark Makers 46	NA	NA	NA	14%	NA	NA	NA	NA
Pucker Flavored Vodka	NA	NA	NA	19%	NA	NA	NA	14%
Red Stag by Jim Beam	NA	NA	NA	24%	NA	15%	16%	18%
Sauza Hornitos Tequila	13%	14%	NA	4%	NA	NA	13%	15%
Sauza Silver Tequila	NA	NA	NA	5%	NA	NA	NA	NA
Sauza Tequilas	NA	4%	7%	14%	NA	NA	NA	NA
Windsor Canadian Blended Whisky	NA	NA	NA	NA	NA	NA	0%	0%

NA=No advertising in the selected medium

^aUnderage impressions in magazines are ages 12 to 20 and all impressions are ages 12 and older. Underage impressions on television are ages 2 to 20 and all impressions are ages 2 and older.

^bCourvoisier 2009-2011 (years under Beam's control)

^cEffen Vodka 2010-2011 (years under Beam's control)

Table 3
Average Advertising Cost-per-Thousand Impressions for Compliant Beam Ads vs. Other Distilled Spirits Ads Matched by Young Adult Rating

Year	Ads ^b	Magazine Ad Average Cost ^a			Relative Cost	Ads ^b	Television Ad Average Cost ^a			Relative Cost
		Beam	Other	Spirits			Beam	Other	Spirits	
2008	96	\$50.38	\$54.45	-7.5%	102	\$159.56	\$159.08	0.3%		
2009	23	\$61.32	\$57.73	6.2%	1,049	\$22.98	\$22.20	3.5%		
2010	31	\$72.40	\$55.24	31.1%	3,886	\$14.70	\$15.84	-7.2%		
2011	143	\$52.51	\$54.74	-4.1%	4,203	\$15.73	\$21.89	-28.1%		
Avg	293	\$54.61	\$54.93	-0.6%	9,240	\$17.71	\$20.90	-15.3%		

^a Advertising cost is age 21 to 34 cost-per-thousand impressions

^b Beam advertisements that did not exceed 25% youth composition

Table 4
Youth Exposure for Compliant Beam Brand Ads vs. Other Distilled Spirits Brands Matched by Advertising Cost^a

Year	Magazine Advertising Exposure (Gross Rating Points ^d)			Television Advertising Exposure (Gross Rating Points ^d)		
	Compliant Beam Ads	Matched Ads for Other Spirits	Relative Exposure	Compliant Beam Ads	Matched Ads for Other Spirits	Relative Exposure
2008	292	319	-8.5%	1	2	-40.7%
2009	75	83	-9.2%	324	342	-5.3%
2010	153	157	-2.6%	818	924	-11.4%
2011	657	694	-5.3%	752	846	-11.1%
All	1,177	1,253	-6.0%	1,894	2,113	-10.3%

^aGross Rating Points are a per-capita advertising exposure measure calculated by dividing advertising impressions by the size of the population and multiplying by 100