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RESEARCH ARTICLE

Restricting the content of alcohol advertising and including text health warnings: A between-group online experiment with a non-probability adult sample in the United Kingdom

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Abstract

Background: Statutory options for restricting alcohol advertising include limiting it to product-orientated information and requiring health warnings. We assess the impact of removing positive contextual factors from alcohol advertising and including a health warning among adults in the United Kingdom (UK).

Methods: We conducted a 2×2 online between-group experiment with adults (18+) (n=2421) recruited from a non-probability research panel in the United Kingdom. Participants were randomized to see an alcohol (vodka) advertisement (advert) which varied by context (no context vs. imagery depicting positive social interactions around alcohol) and message (multiple text health warning vs. "drink responsibly"). The multiple text health warning, based on recent legislation in Ireland, comprised three separate warnings (liver disease, cancers, drinking during pregnancy) and a web address for alcohol-related information and support. The "drink responsibly" control reflected the self-regulatory messages commonly used by alcohol companies. Participants rated the advert on 7-point scales for advert attractiveness, product appeal, trial intentions, perceived harm, and whether it made drinking alcohol seem enjoyable.

Results: Removing the positive social context reduced positive advert and product reactions (difference in estimated marginal means [EMM]: −1.57 [makes drinking alcohol seem enjoyable] to −0.23 [intention to try]). Including the multiple text health warning also reduced positive advert and product reactions (difference in EMM: −0.55 [advert attractiveness] to −0.25 [intention to try]) and increased perceived product harm (difference in EMM: +0.25). There were no interactions between advert context and message for any outcome.

Conclusions: Restricting content and including a multiple text health warning (compared to a "drink responsibly" message) may attenuate the persuasive impact of alcohol advertising and increase perceived product harm. Further research is needed to examine different degrees of content restrictions, alternative warning content and design, generalizability to different alcohol products and advert formats, and whether the impact of content controls varies among population subgroups.

KEYWORDS
alcohol advertising, alcohol marketing, content controls, experimental research, health warnings

INTRODUCTION

In the United Kingdom, alcohol creates a substantial burden on health, society, and the economy (Burton et al., 2016; Ponce-Hardy & Giles, 2022). There is consistent evidence that exposure to, and engagement with, alcohol marketing is associated with alcohol use (e.g., Jernigan et al., 2017; Sargent & Babor, 2020). There is also increasing evidence of how marketing achieves this impact by influencing attitudes and norms toward alcohol and alcohol products (Henehan et al., 2020; Jackson & Bartholow, 2020; Maani Hessari et al., 2019; McClure et al., 2013; Murray et al., 2022; Petticrew et al., 2017).

The World Health Organization (WHO, 2017) recommend that countries introduce and enforce statutory restrictions on alcohol advertising, an approach already employed in several European countries (Purves et al., 2022; Scobie et al., 2022). One statutory option for controlling alcohol advertising is to restrict placement, thus reducing frequency and volume of exposure. Norway and Lithuania, for example, have comprehensive restrictions on alcohol advertising activities (Scobie et al., 2022). Where some alcohol advertising activities are still permitted, another statutory option is to restrict this advertising to only factual product-orientated information and/or mandate the presence and design of health information and warnings, an approach adopted in France and Estonia for instance (Scobie et al., 2022). This study is focused on the latter form of statutory restrictions, hereafter referred to as "content controls."

Research has demonstrated the potential consumer impact of content controls, with experimental studies finding that limiting alcohol advertising to neutral and product-orientated content reduces positive advertisement (advert) and product reactions, increases risk perceptions, and limits consumption intentions (Diouf et al., 2023; Gallopel-Morvan et al., 2022; MacKinnon & Lapin, 1998; Synder & Blood, 1992). Research has also found that including health warnings in alcohol advertising can increase risk perceptions and reduce both behavioral intentions and perceived product and brand benefits, albeit effectiveness varies based on warning design and content (Barlow & Wogalter, 1993; Diouf et al., 2023; Filipova, 2022; John et al., 2022; MacKinnon & Lapin, 1998; Noel & Lakhan, 2021; Slater & Domenech, 1995; Smith, 1990). Similar effects are also reported in studies examining the impact of health warnings on alcohol packaging (Dimova & Mitchell, 2022; Giesbrecht et al., 2022; Kokole et al., 2021). Evidence remains less clear on the interaction between limiting advertising content and including health warnings. Some research has suggested that attractive advertising may attenuate the impact of co-presented health warnings (Dossou et al., 2017; Synder & Blood, 1992), whereas other experimental research has found little confounding effect (Diouf et al., 2023; Filipova, 2022; MacKinnon & Lapin, 1998).

There is policy interest in the impact of content controls in the United Kingdom, with the Scottish Government including questions about limiting advertising to factual and product-orientated information in a recent consultation on restricting alcohol advertising and promotion (Scottish Government, 2022). To date, however, no studies have examined the consumer impact of this measure in the United Kingdom, which presents a barrier to policy consideration and development. Moreover, even though content controls have been studied in other countries, most research has focused on young adults. As content controls for alcohol advertising are a population-wide measure, it is important to explore the potential impact across adult groups. This study therefore assesses to what extent, if at all, removing positive contextual features from an alcohol advert and including a multiple text health warning impacts on the reactions of adults in the United Kingdom compared to adverts with a positive social context and self-regulatory style "drink responsibly" message, which is consistent with existing marketing practice in the United Kingdom.

MATERIALS AND METHODS

Design

We conducted a 2×2 between-group factorial experiment with adults (18+ years) in the United Kingdom. Each condition varied by context (no context vs. positive social context) and message (a multiple text health warning about liver disease, cancers, and drinking during pregnancy vs. a "drink responsibly" message). Data were collected through an online survey between 26th April and 3rd May 2023. Ethical approval was granted by the University of Stirling's General University Ethics Panel (GUEP: 12073). The study predictions, protocol, and analysis plan were not pre-registered.

Sample and recruitment

YouGov, a reputable market and social research company, recruited a sample of 2421 adults broadly representative of the UK adult population (range across conditions: $n = 570–625$). To be eligible, participants had to be 18 years or over, live in the United Kingdom, and members of YouGov's online panel. Participants received reward points for completing the experiment, which are redeemable to monetary value once thresholds are met. YouGov's non-probability adult panel has been used in multiple studies examining the impact of marketing and marketing controls in the United Kingdom (e.g., Moodie et al., 2023; Taylor et al., 2023; Wardle et al., 2022). The sample size was the maximum possible within the resources available, not an a

priori power calculation. This sample size exceeds many previous experiments examining content controls for alcohol advertising and is consistent with recent experimental research with young adults in France (Gallopel-Morvan et al., 2022).

We included all adults in the sample frame because, despite young adults typically being the focus of existing research, advertising content controls are population-level measures and middle and older-aged adults may also be targeted by, or vulnerable to, the effects of alcohol marketing, including higher-risk drinkers (Critchlow & Moodie, 2021; Meier, 2011; Murray et al., 2022). Middle and older-age adults may also be an important target audience for health warnings, as long-established perceptions of being a controlled drinker may reduce risk recognition (Bareham et al., 2019) and some adults may increase drinking in later life (Britton & Bell, 2015). We also considered it important not to limit the sample to drinkers. Recruiting new drinkers is a legitimate goal of alcohol marketing (Hastings et al., 2010; Maani Hessari et al., 2019) and non-drinkers or abstainers in the UK report exposure to alcohol marketing (e.g., Atkinson et al., 2022; Scottish Government, 2022). Alcohol marketing may also contribute to normative beliefs about the position and acceptability of alcohol in society, even among non-drinkers (Jackson & Bartholow, 2020; Petticrew et al., 2017).

Advertising stimuli

In each condition, participants were shown a mock advert for a spirits (vodka) brand that is not widely available in the United Kingdom and was not advertised for sale (online) in four leading supermarkets during experiment development (Asda, Morrison's, Tesco, Sainsbury's). An unfamiliar brand was selected to avoid outcomes being influenced by consumption of, and existing attitudes toward, a more familiar brand. While recent YouGov data has found that adult drinkers in the UK report most often consuming wine (36%) and beer (29%) ahead of spirits (20%), a spirit brand was preferred as the data showed that this product type had a narrower sex differential compared to beer and wine (Dinic, 2022). Vodka was chosen within the spirits category as a vodka brand had been ranked second in the top alcohol brands in the United Kingdom, based on total sales value, over the last 3 years (Tatum, 2023; The Grocer, 2022; Woolfson, 2021).

We only included one advert per condition. This was to limit the length of the experiment, which reduced the risk of participants identifying the study motive or becoming disengaged, and because of the limited funds available for fieldwork. All adverts were static images, as is standard for many types of advertising (e.g., print, out-of-home, some social media, etc.), which limited the potential for technical issues (e.g., playback or sound issues for videos). The adverts were created by a French advertising agency for research with young adults in France (Gallopel-Morvan et al., 2022), before being adapted for this study.

Experimental manipulation

Advert context

Participants were randomly assigned to view an alcohol advert containing either a positive social context or no context. In the no context condition, the branded product packaging and a brand logo were shown on a plain gray background (similar to Pantone® Cool Gray 2c), an approach consistent with some previous research on content controls (Gallopel-Morvan et al., 2022; MacKinnon & Lapin, 1998; Synder & Blood, 1992). In the positive social context condition, the same branded packaging and brand logo were shown alongside two female characters and one male character (~late 20s/early 30s) smiling with arms raised as if they were celebrating or enjoying themselves. The advert had a bokeh-style effect, which means the background was slightly blurred, but the characters remained in focus (BBC Maestro, 2023). We chose not to use an image with a specific background context (e.g., pub, bar, home, music concert) to avoid biasing reactions, as certain environmental cues may be more applicable or salient to some participant groups. Sociability was selected for the positive context advert as this has been documented as an important and recurrent theme of alcohol marketing in the United Kingdom (e.g., Atkinson et al., 2021; Hastings et al., 2010).

Provision of health information

Participants were randomly assigned to see an advert containing either a self-regulatory style "drink responsibly" message or a multiple text health warning, designed to match recent legislation in (the Republic of) Ireland. In the first condition, participants saw adverts with the phrase "Please drink responsibly" in the lower right-hand side, presented in a neutral black font without any distinguishing features (e.g., no border, web address, emblem, etc.) (Figure 1A). The wording, design, and positioning were based on real-world messages used by the alcohol industry under self-regulatory regimes (Critchlow & Moodie, 2023; Maani Hessari & Petticrew, 2017; Smith et al., 2014). We chose "drink responsibly" rather than a no message control to reflect existing advertising practice in the United Kingdom and to enable us to look at the difference between self-regulatory messages and potential mandatory health warnings.

In the health warning condition, participants were shown adverts with a multiple text health warning (Figure 1B). The warning content was based on the requirements outlined in Section 13 of Ireland's Public Health (Alcohol) Act (Irish Statute Book, 2018), namely: (1) a warning about the dangers of alcohol consumption; (2) a warning about the danger of alcohol consumption when pregnant; (3) a warning about the direct link between alcohol and fatal cancers and; (4) details of a website providing public health information in relation to alcohol. We chose to focus on the multiple text health warning planned in Ireland, rather than warnings developed iteratively through pre-testing, to be congruent with planned

FIGURE 1 (A) The drink responsibly message. (B) The multiple text health warning.

real-world legislation. We chose Ireland's legislation specifically because it was presented in English, refers to specific health conditions, and also plans to limit advertising to product-orientated information (as per our context factor). As this part of Ireland's legislation had not yet commenced at the time of investigation, this study also provided an opportunity to contribute to the emerging evidence base seeking to examine the potential impact the controls may have (Filipova, 2022).

Text for the general and cancer warnings were based on those Ireland plans to implement on alcohol packaging from 2026, with the general warning referring to liver disease (Irish Statute Book, 2023). Text for the pregnancy warning was adapted from the messages required on alcohol packaging in Australia (Food Standards of Australia and New Zealand, 2023). For the website link, a mock web address and accompanying text were based on tobacco packaging in the United Kingdom (Moodie et al., 2020). The text warnings were presented in a banner across the base of the advert, consistent with previous research on warnings in alcohol advertising (e.g., Diouf et al., 2023; Filipova, 2022; MacKinnon & Lapin, 1998; Synder & Blood, 1992), and covered approximately 20% of the advert space. This size threshold ensured the warnings were clear and legible, consistent with best practice guidance (Giesbrecht et al., 2022) and the warnings required in alcohol advertising in European countries such as Estonia and Poland (European Centre for Monitoring Alcohol Marketing, 2022; Scobie et al., 2022). The warnings were in black font on a yellow background (similar to Pantone® Yellow C), with the web address inversely presented in yellow text on a black background, similar to the style of warnings on tobacco packaging in the United Kingdom (Moodie et al., 2020). The warnings were text only. This is because Ireland's Act did not specify the inclusion of images in the primary legislation and because existing health warnings for alcohol are often text-based (Jané-Llopis et al., 2020).

Measures

Demographic characteristics

For each respondent, YouGov provided information on gender, age, UK region lived in, social grade, and highest level of educational attainment (Table 1). UK region was recoded into the four UK nations (England, Scotland, Wales, Northern Ireland). Social grade was assessed using the National Readership Survey social grade classification and collapsed into ABC1 (middle and upper classes) and C2DE (working classes and non-working). Highest level of educational attainment was recoded into those with at least degree-level qualifications (or equivalent), those with less than degree-level qualifications (or equivalent), and those who did not specify.

Alcohol use

Alcohol use was assessed via the Alcohol Use Disorders Identification Test-Concise (AUDIT-C). This scale measures frequency of consumption (0 = Never to 4 = Four or more times a week), number of units (one unit = 10 milliliters/8 grams of pure alcohol) consumed on a typical drinking occasion (0 = 1–2 units to 4 = 10 or more units), and past-year frequency of heavy episodic drinking (0 = Never to 4 = Daily or almost daily). Each item was scored on a five-point scale and had a "Don't know/prefer not to say" option. Participants were shown a diagram indicating the typical number of units in various alcoholic drinks to assist reporting. For frequency of heavy episodic drinking, the question text was rooted based on reported gender (≥8 units for males and ≥6 for females on a single occasion). Those who answered "never" or "don't know/prefer not to say" on the first frequency of consumption item did not complete the second and third items. All other respondents were classed as current drinkers and asked to

TABLE 1 Sample demography and drinking status in each experimental condition.

		Experimental condition					
	Overall ($n = 2421$)	Condition 1: No context/ drink responsibly ($n = 606$)	Condition 2: Positive social context/drink responsibly ($n = 625$)	Condition 3: No context/multiple text warning ($n = 620$)	Condition 4: Positive social context/multiple text warning ($n = 570$)	Test statistics	
Variable	%	%	%	%	%	χ^2	p
Gender							
Male	48.3	46.2	47.5	48.1	51.6	3.69	0.297
Female	51.7	53.8	52.5	51.9	48.4		
Age category							
18–29	16.9	16.5	18.1	15.5	17.4	13.23	0.585
30–39	19.6	20.6	20.8	21.0	15.8		
40–49	16.4	15.5	15.5	18.1	16.7		
50–59	15.4	15.2	15.5	14.2	16.7		
60–69	17.4	17.8	17.4	15.8	18.6		
70+	14.3	14.4	12.6	15.5	14.9		
UK nation							
England	84.0	83.0	82.2	86.9	83.9	9.88	0.360
Scotland	8.5	8.7	9.6	6.5	9.1		
Wales	4.8	5.3	4.8	5.0	4.2		
Northern Ireland	2.7	3.0	3.4	1.6	2.8		
Social grade							
ABC1 (higher)	57.2	55.9	57.6	57.1	58.2	0.69	0.875
C2DE (lower)	42.8	44.1	42.4	42.9	41.8		
Highest level of education							
Less than degree-level	57.6	58.9	57.0	55.3	59.3	3.82	0.701
At least degree/equivalent	38.1	37.5	39.0	39.7	36.1		
Not specified	4.3	3.6	4.0	5.0	4.6		
Drinking status							
Non-drinker	13.9	14.4	14.6	13.1	13.5	4.12[a]	0.661
Current drinker	85.4	85.0	84.8	85.6	86.1		
Not stated	0.7	0.7	0.6	1.3	0.4		

Note: Base = All participants.

[a]Fisher–Freeman–Halton Exact Test due to low cell counts for the not stated category.

complete the full scale. Among current drinkers, a composite score was computed for those who provided a valid answer to all items (i.e., did not say "don't know/prefer not to say" on the second and/or third item). Scores ranged 1–12, with ≥5 classified as higher-risk drinking (Office for Health Improvement and Disparities, 2020).

Alcohol category preference

Current drinkers were asked to report which types of alcohol they were likely to choose on a typical drinking occasion. They were shown a list of six alcohol product types (Table 2) and asked to select all that applied; we allowed multiple selections as drinking occasions may not be isolated to one product type. This information enabled us to examine whether any condition had a higher proportion who consumed spirits, the product category included in the advert stimuli, which could have confounded between-group effects.

Reactions

After viewing each advert, participants were presented with five reaction items scored on seven-point scales: (1) "To what extent, if at all, do you find the advert attractive to look at?" (1 = Not at all attractive to 7 = Very attractive); (2) "To what extent, if at all, do you find the alcohol product shown appealing?" (1 = Not at all appealing to 7 = Very appealing); (3) "If you were offered the alcohol product shown, how likely, if at all, would you be to try it"? (1 = Not at all likely to 7 = Very likely); (4) "To what extent, if at all, do you think the alcohol product shown would be harmful to your health?" (1 = Not at all harmful to 7 = Very harmful); and (5) "To what extent, if at all, does the advert make drinking alcohol appear enjoyable?" (1 = Not at all enjoyable to 7 = Very enjoyable). These measures were based on key marketing goals reported in reviews of alcohol industry documentation (e.g., attractiveness, appeal, and trial) (Hastings et al., 2010; Maani Hessari et al., 2019) and previous research into content controls for alcohol advertising (e.g., Diouf et al., 2023; Gallopel-Morvan et al., 2022; MacKinnon & Lapin, 1998).

Procedure

Participants were invited to take part through direct electronic invitations (e-mails or app notifications) from YouGov. The invitations were sent to panelists at random from the base sample requested (UK adults). The initial invitation included a generic invite to complete a survey, with an accompanying link.

Participants routed to our experiment were first shown an information sheet and consent form. This advised that the purpose of the study was to explore their thoughts on alcohol advertising, but it did not reveal the specific research questions to avoid biasing responses. If consenting to participate, respondents completed the first AUDIT-C question (frequency of consumption). Those categorized as current drinkers—that is, did not answer "never" or "don't know/prefer not to say"—were also shown the questions on alcohol category preference and the remaining AUDIT-C items. Participants were then automatically allocated to an experimental condition using a simple randomization method, thus giving every participant an equal probability of being allocated to each of the four conditions and eliminating the potential for self-selection bias. After randomization, each participant was prompted to "Please look at the advert shown below carefully before answering the questions that follow." All five reaction scale items and the advertising stimuli were shown on the same page. On the subsequent page, participants were shown a debriefing notice which revealed the aims of the experiment and signposted sources of alcohol-related health information. Participants could only navigate forward, to avoid altering results following exposure to the debrief information. Participants were prompted if they had not answered an item on each page, thus eliminating missing data.

Of the 2617 participants routed by YouGov to take part, 44 did not consent to take part and were screened away from the study. A further 152 "dropped out" during the experiment, with around half doing so at the information and consent form page (i.e., they neither consented nor rejected to take part), leaving a sample of 2421 participants. Including those who did not consent to take part, the response rate was 92.5% of those invited to participate. The average time taken to complete the experiment was 6 min.

Analysis

Data were analyzed using SPSS version 28. Frequencies and descriptive statistics were calculated for demographics [sample base = all participants], current drinking status [base = all participants], level of drinking risk [base = current drinkers], and alcohol category preference [base = current drinkers]. Pearson Chi-square tests and one-way ANOVAs examined the success of randomization across the experimental conditions (accepted alpha $p = 0.05$). Normality was assessed for each reaction outcome in each condition. Observed means and standard deviations, with 95% bootstrapped confidence intervals, were computed for each reaction outcome in each condition. Bootstrapping, based on 2000 samples, was applied due to slight variations in normality.

A series of 2×2 factorial ANOVAs examined the main effects of advert context (no context vs. positive social context) and message type (multiple text health warning vs. "drink responsibly") and whether there was an interaction between the two factors [sample base = all participants]. Separate ANOVAs were computed for each reaction outcome and the experimental effects are expressed via the F statistic, p values, Cohen's d, and difference in estimated marginal means (with 95% bootstrapped confidence intervals). Differences by estimated marginal means were preferred to differences in observed means for the experimental effect to adjust for minor variations in sample size across conditions (n range: 570–625). To protect against Type I error, a Bonferroni-adjusted alpha of $p = 0.005$ was used as the accepted threshold for statistical significance. This accounted for testing two independent variables across five dependent variables (i.e., $p = 0.05$/

TABLE 2 Alcohol use among current drinkers in each experimental condition.

Variable	Overall ($n = 2067$)	Condition 1: No context/drink responsibly ($n = 515$)	Condition 2: Positive social context/drink responsibly ($n = 530$)	Condition 3: No context/multiple text warning ($n = 531$)	Condition 4: Positive social context/multiple text warning ($n = 491$)	Test statistics	
	%	%	%	%	%	χ^2	*p*
AUDIT-C classification							
Lower-risk drinker (≤4)	47.8	48.7	47.4	46.7	48.5	4.12	0.661
Higher-risk drinker (≥5)	48.7	48.0	50.0	49.7	46.8		
Not stated	3.5	3.3	2.6	3.6	4.7		
Beer drinker							
No	52.3	53.4	50.8	52.7	52.3	0.80	0.850
Yes	47.7	46.6	49.2	47.3	47.7		
Cider drinker							
No	72.9	70.5	75.1	72.9	73.1	2.82	0.420
Yes	27.1	29.5	24.9	27.1	26.9		
Pre-mixed drinks/alcopop drinker							
No	87.6	87.2	86.0	87.2	90.2	4.47	0.215
Yes	12.4	12.8	14.0	12.8	9.8		
Spirits/liqueurs drinker							
No	48.1	43.5	50.2	50.1	48.5	6.17	0.103
Yes	51.9	56.5	49.8	49.9	51.5		
Wine drinker							
No	45.0	46.6	47.0	43.9	42.6	2.82	0.421
Yes	55.0	53.4	53.0	56.1	57.4		
Other alcohol category drinker							
No	97.0	97.3	97.4	96.4	97.1	1.02	0.796
Yes	3.0	2.7	2.6	3.6	2.9		
Alcohol preference not specified							
No	99.5	99.6	99.8	99.1	99.4	2.89[a]	0.355
Yes	0.5	0.4	0.2	0.9	0.6		

Note: Base = Current drinkers; Not stated for AUDIT-C score = those who said Don't know/Prefer not to say for second (units on typical drinking occasion) and/or third (frequency of heavy episodic drinking) AUDIT-C items; Columns for alcohol category preference do not sum to 100% as participants were asked to "select all that apply"; Participants were not able to select "don't know/prefer not say" and a valid category.

[a]Fisher–Freeman–Halton Exact test due to low cell counts for yes category.

number of comparisons [10]). For Cohen's *d*, 0.2 was considered a small effect size, 0.5 as medium, and 0.8 as large (Fritz et al., 2012).

RESULTS

Sample demography and drinking status

Table 1 reports the sample profile and distribution in each experimental condition. Approximately half of the overall sample were female (51.7%) and most participants were: current drinkers (85.4%), living in England (84.0%), of higher social grade (57.2%), and had less than degree-level education (57.6%). The Chi-square tests showed no statistically significant difference between experimental conditions for gender, age group, UK nation, social grade, highest level of educational attainment, and drinking status (Table 1). The mean age was 48.50 (SD = 17.64). A one-way ANOVA showed no statistically significant difference between conditions for age as a continuous variable (M range [SD]: 47.76 [17.72] to 49.27 [17.63]; $p = 0.532$).

Level of drinking risk

Table 2 reports the level of drinking risk in each experimental condition. Among current drinkers who completed the full AUDIT-C, the mean score was 4.92 (SD = 2.79). A one-way ANOVA showed no statistically significant difference in scores between conditions (M range [SD]: 4.79 [2.72] to 5.01 [2.88], $p = 0.658$). Around half of current drinkers (48.7%) were classified as higher-risk on the AUDIT-C (scored ≥5), around half (47.8%) were categorized as lower-risk (scored ≤4), and the remainder (3.5%) were not specified. A Chi-square test showed no statistically significant difference in level of drinking risk between experimental groups ($p = 0.661$).

Alcohol category preference

Table 2 shows the proportion of current drinkers in each experimental condition who said that they would select each alcohol category on a typical drinking occasion (multiple answer selections permitted). Among current drinkers, the top three categories were wine (55.0%), spirits and liqueurs (51.9%), and beers (47.7%). Chi-square tests showed no statistically significant differences in alcohol category preference between the experimental conditions, including for the product type featured in the experimental stimuli (spirits & liqueurs; $p = 0.103$).

Interaction between advert condition and health message

Table 3 reports the observed means and standard deviations for each reaction outcome in each condition. The two-way ANOVAs found no statistically significant interaction between advert condition (no context vs. positive social context) and message condition (drink responsibly vs. multiple text health warning) for advert attractiveness ($p = 0.254$), product appeal ($p = 0.208$), trial intentions ($p = 0.588$), perceived product harm ($p = 0.992$), or making alcohol appear enjoyable ($p = 0.219$). This indicates that the effect of removing advert

TABLE 3 Observed means, standard deviations, and 95% confidence intervals by message and advert condition.

	Drink responsibly message			
	No context ($n = 606$)		Positive social context ($n = 625$)	
Outcome	M	SD	M	SD
Advert attractiveness	3.37 [3.23, 3.51]	1.70 [1.63, 1.77]	4.03 [3.89, 4.16]	1.66 [1.58, 1.73]
Product appeal	3.06 [2.93, 3.20]	1.72 [1.65, 1.79]	3.35 [3.21, 3.48]	1.72 [1.65, 1.79]
Intention to try	3.20 [3.05, 3.37]	1.99 [1.91, 2.06]	3.39 [3.23, 3.55]	1.96 [1.87, 2.03]
Perceived harm to health	4.56 [4.43, 4.68]	1.44 [1.37, 1.50]	4.40 [4.29, 4.53]	1.55 [1.46, 1.62]
Makes drinking alcohol seem enjoyable	3.05 [2.92, 3.18]	1.60 [1.53, 1.67]	4.70 [4.57, 4.84]	1.69 [1.61, 1.77]
	Multiple text health warning			
	No context ($n = 620$)		Positive social context ($n = 570$)	
Outcome	M	SD	M	SD
Advert attractiveness	2.75 [2.63, 2.88]	1.62 [1.54, 1.70]	3.56 [3.42, 3.69]	1.64 [1.56, 1.70]
Product appeal	2.67 [2.54, 2.79]	1.60 [1.52, 1.68]	3.12 [2.99, 3.24]	1.59 [1.51, 1.65]
Intention to try	2.91 [2.77, 3.06]	1.84 [1.76, 1.92]	3.19 [3.03, 3.37]	1.85 [1.78, 1.92]
Perceived harm to health	4.80 [4.68, 4.91]	1.43 [1.36, 1.50]	4.65 [4.54, 4.76]	1.40 [1.32, 1.47]
Makes drinking alcohol seem enjoyable	2.61 [2.48, 2.73]	1.60 [1.52, 1.68]	4.10 [3.94, 4.25]	1.74 [1.66, 1.81]

Note: Base = All participants; All outcomes scored on a 1–7 scale; Figures in square brackets = 95% Confidence intervals based on 2000 bootstrap samples.

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context was not dependent on the presence or absence of the warning or vice versa. Consequently, the remaining results focus only the main effects of advert and message condition.

Advert condition

There was a main effect of removing advert context on four of the five reaction outcomes (Table 4). Specifically, the difference in estimated marginal means indicated that scores for advert attractiveness, product appeal, trial intentions, and making alcohol seem enjoyable were lower for the no context advert versus the positive social context advert. For most outcomes, the effect sizes were small (*d* range: −0.125 [intention to try] to −0.446 [advert attractiveness]), although there was a large effect for reducing perceptions that the advert made drinking alcohol seem enjoyable ($d = -0.947$). Under the Bonferroni-adjusted alpha criterion, there was no main effect of advert condition on perceived harm to health ($p = 0.010$, $d = 0.109$).

Message condition

There was a main effect of changing message type for all five reaction outcomes (Table 5). Specifically, the differences in estimated marginal means indicated that scores for advert attractiveness, product appeal, trial intentions, and making alcohol seem enjoyable were lower in the text health warning condition compared to the "drink responsibly" condition, whereas perceived product harm was higher in the multiple text health warning condition. The effect sizes for all reactions were small (*d* range: −0.335 [advert attractiveness] to 0.171 [perceived product harm]).

DISCUSSION

Consistent with past research, we observed that removing the positive social context from an alcohol advert reduced positive consumer reactions, with a small effect on advert attractiveness, product appeal, and trial intentions, and a large effect on perceived enjoyment of alcohol. We also found that inclusion of a multiple-text health warning led to a small, but statistically significant, reduction in positive advert and product reactions and increase in perceived product harm, relative to the self-regulatory style "drink responsibly" message. Moreover, consistent with other recent experimental research, we observed no interaction between the two factors, which suggests that the presence or absence of the positive social context in the advert did not significantly attenuate the impact of the multiple text health warnings, or vice versa.

TABLE 4 Difference in estimated marginal means (EMM) between no context advert versus positive social context advert with *F* statistic and Cohen's *d* effect sizes.

	Advert condition: No context vs. positive social context			
Reaction outcome	**EMM difference [95% CI]**	***F***	***p* Value**	**Cohen's *d***
Advert attractiveness	−0.73 [−0.87, −0.60]	118.53	<0.001	−0.446
Product appeal	−0.37 [−0.50, −0.23]	29.46	<0.001	−0.224
Intention to try	−0.23 [−0.38, −0.09]	8.97	0.003	−0.125
Perceived harm to health	0.15 [0.04, 0.27]	6.58	0.010	0.109
Makes drinking alcohol seem enjoyable	−1.57 [−1.70, −1.44]	544.00	<0.001	−0.947

Note: Base = All participants; 95% confidence interval (CI) for estimated marginal mean difference computed on 2000 bootstrapped samples; Accepted alpha $p = 0.005$, using Bonferroni correction for testing two independent variables on five dependent variables; All outcomes scored on a 1–7 scale.

TABLE 5 Difference in estimated marginal means (EMM) between the multiple text health warning versus drink responsibly message, with *F* statistic and Cohen's *d* effect sizes.

	Consumer protection message: Multiple text health warning vs. drink responsibly			
Reaction outcome	**EMM difference [95% CI]**	***F***	***p* Value**	**Cohen's *d***
Advert attractiveness	−0.55 [−0.68, −0.42]	65.84	<0.001	−0.335
Product appeal	−0.31 [−0.45, −0.18]	21.53	<0.001	−0.195
Intention to try	−0.25 [−0.40, −0.09]	10.18	0.001	−0.133
Perceived harm to health	0.25 [0.13, 0.36]	17.10	<0.001	0.171
Makes drinking alcohol seem enjoyable	−0.52 [−0.66, −0.40]	59.81	<0.001	−0.308

Note: Base = All participants; 95% confidence interval (CI) for estimated marginal mean difference computed on 2000 bootstrapped samples; Accepted alpha $p = 0.005$, using Bonferroni correction for testing two independent variables on five dependent variables; All outcomes scored on a 1–7 scale.

That the presence or absence of positive social context influenced consumer reactions reinforces the persuasive role such connotations play in alcohol marketing communications (e.g., Hastings et al., 2010; Maani Hessari et al., 2019) and demonstrates the utility of content controls in limiting this. For most outcomes, removing the positive social context had a small effect. There was large effect on reducing perceptions of drinking being enjoyable, although this exception is logical given that sociability and enjoyment were dominant themes in the positive context stimuli. It is possible that including other marketing features in the positive context stimuli, such as a call to action, may have increased effect size for outcomes such as intentions to try. Nevertheless, these small effects are only shown for one advert in an online experimental setting, yet consumers are exposed to an array of marketing activities in the real world (Critchlow et al., 2023) and the impact of marketing exposure is, at least partly, cumulative (Gordon et al., 2011). It is therefore plausible that the impact of content controls, even if small for individual exposures, may accumulate to a meaningful overall impact in real-world settings through repeated exposures and extrapolation to population-level effects.

Consistent with existing literature, the multiple text health warning both limited the persuasive appeal of the advert and increased perceived health harm. That the warnings had a greater impact than the "drink responsibly" message is consistent with literature which has questioned the efficacy of such industry-favored framing (Brennan et al., 2020; Jones et al., 2017; Maani Hessari & Petticrew, 2017; Smith et al., 2014). This experiment, however, was limited to a single item about perceived health harm. Future research should further examine how the impact of the health warning manifests through specific mechanisms identified in literature on alcohol warnings, such as increased negative emotions, disease risk perceptions, and health risk knowledge (Kokole et al., 2021). For all outcomes, the multiple-text health warnings had a small effect, albeit this may also accumulate to a meaningful real-world impact through repeated message exposures and extrapolation to population-level effects. It is plausible, however, that this small effect may be also a function of the warning design. The warning used in this experiment was only text-based and, as per our understanding of Ireland's legislation, contained multiple messages. Further research should examine whether the warning effect could be increased through further manipulation, such as changing content (e.g., single vs. multiple warnings, short vs. long-term risk messages, health risks vs. social costs) or design (e.g., images or pictograms) (Dossou et al., 2023; Filipova, 2022).

We observed no interaction between the factors, a finding consistent with other recent experiments on content controls (Diouf et al., 2023; Filipova, 2022). This indicates that the presence or absence of positive social context did not significantly attenuate the impact of the multiple-text health warning, or vice versa. Notably, however, mean scores for advert and product reactions were lowest, and mean scores for perceived health harm were highest, in the condition with no context and the multiple-text health warning, while the inverse was true for the condition with the positive social context and "drink responsibly" message. Taken together, these findings suggest that the two components of content controls (limiting content and mandating health warnings) could be considered separate policy levers whose impacts are not mutually dependent, albeit overall impact appears strongest when both are deployed together.

These findings contribute to current policy debates in three ways. First, to our knowledge, this is the first study to examine content controls for alcohol advertising in the United Kingdom, thus helping to inform policy interest in this area (Scottish Government, 2022). Second, evidence demonstrating the efficacy of content controls is also of interest to policymakers where such statutory restrictions already exist, particularly France where the Évin law has long been challenged by the industry (Millot et al., 2022). Finally, while Ireland's Public Health (Alcohol) Act became law in 2018, the individual sections are being phased in by the incumbent Minister for Health and, at the time of writing, it is unknown when the Section 13 content controls for alcohol advertising will commence. This study therefore builds on the findings of Filipova (2022) by seeking to demonstrate the potential consumer impact these measures may have, if and when they are introduced. If Ireland does implement content controls, it will provide an important and rare opportunity to gather naturalistic experimental data to determine whether the effects observed in artificial settings translate to the real-world, such has been shown for health warnings on alcohol packaging in Yukon (e.g., Hobin et al., 2020; Zhao et al., 2020) and standardized packaging and pictorial health warnings for tobacco products in the United Kingdom (e.g., Aleyan et al., 2020; Moodie et al., 2023).

This study is only a "test of concept" of content restrictions among adults in the United Kingdom and future research is needed to address key limitations. For example, we only examined the presence or absence of any context. Future research should replicate experiments which have tested different degrees of content restrictions, such as removing characters (but not environmental cues) versus removing all context (Gallopel-Morvan et al., 2022). Data were also self-reported and only relate to a limited number of attitudinal outcomes. Future studies should assess other relevant attitudinal or behavioral outcomes (e.g., warning recall and salience) and consider using objective methods such as eye-tracking to measure attention to advertising content and warnings (Diouf et al., 2023; John et al., 2022; Rossheim et al., 2022). Future research should also assess the impact of content controls on consumption, such as using experimental designs where exposure takes place in settings where participants can select and consume alcoholic drinks (Stautz et al., 2016). It is also noted as a limitation that our predictions, design, and analysis were not pre-registered.

There may also be limits to how far the results generalize. Within the available resources, participants were only exposed to one static advert for an unfamiliar vodka brand. Future research should examine whether the findings generalize to different forms of alcohol advertising, for example by manipulating brand familiarity and advertising format (e.g. static images, adverts with audio, motion video adverts etc.) as experimental factors. To increase generalizability and validity, future research should also consider manipulating what

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types of alcoholic drinks are shown, either by randomizing which beverage category is shown or by routing participants to see an advert based on pre-existing drink preference (e.g., Clarke et al., 2021). In terms of recruitment, participants were members of the public who had chosen to sign up to the non-probability online market research panel maintained by YouGov. Although this is a large panel, and the sample obtained was broadly representative of the demography of the UK adult population, some groups may be underrepresented (e.g., those with limited internet access). Further research is also needed to examine the potential impact of content controls among children and young people and to explore whether impact is moderated by demographic and alcohol use profiles in the adult population.

Finally, we used a Bonferroni correction to mitigate the potential for Type I error when testing two independent variables on five dependent variables. This conservative approach can, however, increase the likelihood of Type II error (Sedgwick, 2014). In this experiment, removing the positive social context from the advert was not considered to have a statistically significant impact on perceived harm to health under the corrected alpha, although the result would have been interpreted as statistically significant without the correction. In support of our more conservative interpretation, we note that this outcome still had the lowest effect size and the smallest difference in estimated marginal means of all the comparisons. Nevertheless, due to the preliminary nature of our investigation, we suggest this finding is prudently interpreted as being inconclusive about whether removing positive social context influences perceived product harm. This should be explored further in content control research, and future studies may consider using alternative methods of correction, such as false positive rate adjustment.

In conclusion, this between-group experimental data provides preliminary evidence about the potential impact of content controls for alcohol advertising among adults in the United Kingdom. It also provides insight into the potential impact of Ireland's planned content controls. Specifically, removal of the positive advert context and inclusion of a multiple text health warning reduced positive advert and product reactions and reduced trial intentions, while the inclusion of a multiple text health warning increased perceived health risk compared to a "drink responsibly" message. To strengthen the evidence base, future research is needed to test different levels of context removal, alternative warning content and design, generalizability to other alcohol products and advert formats, other consumer outcomes (including consumption), and whether the impact of content controls varies among population subgroups.

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CONFLICT OF INTEREST STATEMENT

Nathan Critchlow was on the board of directors at Alcohol Focus Scotland between 2017 and 2022. Nathan Critchlow and Karine Gallopel-Morvan were part of Alcohol Focus Scotland's Expert Network on Alcohol Marketing between 2020 and 2022. The University of Stirling has received funds for consultancy work undertaken by Nathan Critchlow for the Public Health Alcohol Research Group, which was appointed by the Minister for Health in Ireland to advise on monitoring and evaluating the Public Health (Alcohol) Act 2018. The University of Stirling has also received funding from the Institute of Public Health in Ireland to support Nathan Critchlow's fellowship research into the marketing restrictions under the Act. Crawford Moodie reports no declaration of interest.

DATA AVAILABILITY STATEMENT

The data and materials that support the findings of this study are available from the corresponding author upon reasonable request.

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