Perceptions of alcohol health warning labels in a large international cross sectional survey of people who drink alcohol

AUTHORS

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ABSTRACT

Aims: This paper aimed to explore perceptions of alcohol health warning labels among a large international sample of people who drink alcohol.

Methods: The Global Drug Survey (GDS) is the world's largest annual cross sectional survey of drug use. Seven health warning labels were presented (relating to heart disease, liver, cancer, calories, violence, taking two days off and the myth of benefits to moderate drinking). People were asked if they were aware of the information, believed it, if it was personally relevant, and if it would change their drinking. This paper included data from 75,969 respondents from 29 countries/regions who reported the use of alcohol in the last 12 months, collected during November-December 2017 (GDS2018).

Results: The fact that drinking less can reduce the risk of seven types of cancer was the least well known, and yet was demonstrated to encourage almost 40% of drinkers to consider drinking less. Women and high risk drinkers were more likely to indicate they would reduce their drinking in response to all labels. Personal relevance was identified as a key predictor of individual responses.

Conclusions: Findings highlight the potential of a range of health messages displayed on alcoholic beverages to raise awareness of alcohol related harms and potentially support a reduction in drinking. Further research should explore what influences personal relevance of messages as this may be a barrier to effectiveness.

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INTRODUCTION

The alcohol industry often reminds consumers of the positive benefits associated with their products, including relaxation, social integration, and celebration, but they less often draw attention to information about the harms. In 2016, alcohol caused 2.8 million deaths and it is the seventh leading cause of death and disability worldwide (GBD 2016 Alcohol Collaborators, 2018). Alcohol consumption is a cause of seven different types of cancer; namely those of the mouth, upper throat, larynx, oesophagus, breast (female), liver and bowel (colorectal) and many other cancers show a dose response relationship with alcohol (Grewal and Viswanathen, 2012; Shield et al., 2016). Furthermore, in many Western countries, liver disease is the only major cause of death still increasing year-on-year, and in England for example, around a third of such cases are related to excessive drinking (Public Health England, 2016).

While legislative changes, such as minimum unit pricing, are likely to bring about the greatest changes in population level alcohol consumption (Burton et al., 2017) alcohol health warning labels provide a possible opportunity to intervene at the moment of purchase and consumption, prompting the consumer to reflect on their behaviour.   Mandatory product warning labels were first introduced in the United States (US) in 1989, with initial labels providing information about the risks of drink-driving, and the risks of drinking in pregnancy. Such messages appeared to be successful in increasing awareness of these risks in the general population (Kaskutas and Greenfield, 1992; Mazis et al., 1991), but there was scant evidence to suggest they would change people's drinking behaviours (Stockwell, 2006). Furthermore, these messages were only presented as text, rather than using pictures, and they did not adhere to the recommendations for best practice relating to their size, visibility or use of rotating messages. There was increasing recognition of the need for a more targeted approach to alcohol

messaging, taking into account consumer demographics and preferences (Andrews, 1995), alongside a need for messages to be have better clarity (Wigg and Stafford, 2016) and be more specific (Pettigrew et al., 2014). In light of this need, a number of researchers started to explore the potential effectiveness of messages about specific health impacts of drinking, and in particular the risks of alcohol and cancer.

Alcohol was first categorized as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC) in 1988 (IARC, 1988). Globally alcohol is responsible for about 10% of cancer deaths in Europe (Roswall and Weiderpass, 2015) and 3.5% in the USA (Nelson et al., 2013), where alcohol is responsible for 88,000 deaths and 2.5 million years of potential life lost (YPLL) each year (NIAAA, 2018). Despite compelling evidence linking alcohol to cancer, awareness among the general population is low. In a 2016 study of 2,100 adults in the UK, only 12.9% of respondents identified cancer as a potential health outcome of alcohol consumption without being prompted (Bates et al., 2018). Another study of UK drinkers identified that while two thirds were aware of the link between alcohol and cancer, one third of people perceived this as new information (Maynard et al., 2018). Whilst Marteau (2016) considers information to be a 'weak driver of change', there is an acknowledgement that novel information on health risks may have the potential to change behaviour.

Alcohol product information labels may, therefore, have a role to play in increasing levels of awareness of the links between alcohol and health harms such as cancer. However, despite this opportunity, in most countries a voluntary labelling code dominates. Voluntary agreements between governments and industry often means they are not taken up at all, or incorporated at levels unlikely to have a meaningful impact (Petticrew et al., 2016). The adoption of a voluntary code and self-regulation has allowed the following messages to be adopted widely –'enjoy responsibly', 'drink responsibly' and 'Know Your Limits'. These are an example of strategic ambiguity that Smith et al (2006) explain as seemingly 'prohealth' messages which can serve to

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subtly advance both industry sales and public relations interests, but do little to inform consumers of the harms (Babor et al., 2018).

The use of alcohol health warning labels also appears to have support from the public (Maynard et al., 2018) and may be able to increase awareness of the risks of drinking (Wilkinson and Room, 2009). Evidence also suggests messages that provide specific (e.g. mentioning a specific type of cancer) rather than general information can change drinking intentions (Pettigrew et al., 2014). In another Australian study, six statements about cancer changed drinking intentions in high risk drinkers(Pettigrew et al., 2016). Although some qualitative evidence suggests people might prefer positively worded messages (e.g. 'drinking less reduces your risk of cancer') (Pettigrew et al., 2014), other evidence suggests caution is needed because positively worded messages may actually lead to increases in consumption (Jarvis and Pettigrew, 2013). Experimental studies have shown that negatively framed messages (e.g. 'alcohol increases your risks of cancer') appear to be more effective in changing drinking intentions (Blackwell et al., 2018), particularly for higher risk drinkers (Jarvis and Pettigrew, 2013). Hence, there is a need to further explore the potential impacts of different kinds of health warning labels in different groups of drinkers.

Factors that might influence people's responses to different labels include prior awareness of the message, its believability, and the perceived relevance of the message. In a UK study, there were low levels of awareness of the link between alcohol and cancer, but a third of participants reported that this would make them consider drinking less if they saw it on a bottle or can (Maynard et al., 2018). Research on tobacco health warning labels has consistently shown the importance of believability and trustworthiness of messages (Beltramini, 1988; Berry et al., 2018), as health beliefs are consistently linked to subsequent behaviour (Sheeran et al., 2016). Personally relevant alcohol labels have also been shown to be more appealing (Pettigrew et al., 2014; Thomson et al., 2012), highlighting the need to ensure messages are tailored to specific consumer groups.

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The overall purpose of the current study was to explore perceptions of alcohol health warning labels in a large international sample of drinkers. The aims were as follows

1) Firstly, to identify perceptions of a range of alcohol health related harms and behaviours, including the links between alcohol and cancer, and to explore whether or not people were a) aware of the messages b) believed them, c) whether they were personally relevant and d) whether they would make the person consider drinking less.

2) Secondly, the study aimed to determine whether demographic factors, awareness, believability and relevance were associated with whether each message would make people consider drinking less.

3) Thirdly the study explored what factors would predict the likelihood of the messages making people consider drinking less alcohol.

METHOD

The Global Drug Survey (GDS) is an independent research organisation that takes no funding from government or the tobacco, cannabis and alcohol industries. Using encrypted on-line survey methods, GDS conducts an annual, cross sectional, self-report survey of alcohol and other drug use amongst people over the age of 16 years (Ashton et al., 2017; Barratt et al., 2017; Davies et al., 2017). Since 2012, over 700,000 people have taken part in our research project.

More information about the construction and history of GDS and the recruitment and sampling strategies are available elsewhere (Barratt et al., 2017). GDS recruits people opportunistically and thus does not claim to be representative of the population in the included countries. Nevertheless, GDS has recruited similar samples of cannabis and alcohol users compared to general household surveys in terms of age and sex within Australia, the United States and Switzerland (Barratt et al., 2017). Ethical approval was obtained from the University College London Research Ethics Committee 11671/001: Global Drug Survey,University of Queensland

(No: 2017001452) and The University of New South Wales (HREC HC17769) Research Ethics

Committees.

GDS2018 launched online in November 2017 and ran for 7 weeks until Dec 30 2017.   It was

translated into 18 languages; English, German, Serbian, Czech, Georgian, Azerbaijani, Hebrew,

Polish, French, Italian, Spanish (S American Spanish), Portuguese, Flemish, Hungarian, Turkish,

Finnish and Danish). GDS collaborates with global media partners and harm reduction

organisations who promote the survey through their various platforms (newspapers, TV,

magazines) and social media networks. Following a brief demographic and drug screen,

participants are requested to answer sections of the survey each addressing different

substances or related activities. Alcohol is the most commonly used substance among GDS

participants and this section is presented prior to those about other substances.

Measures

Socio-demographic data were collected on age, sex, and country of residence. Alcohol

consumption was measured using the Alcohol Use Disorders Identification Test (AUDIT) (Babor

et al., 2001). Participants received a score from 0-40 (0-7= low risk, 8-15= increasing risk 16-

19= higher risk; 20+= possible dependence).

The survey included seven health messages that could be used on alcohol products (see Box 1).

The messages were developed after discussion between the authors and review of the

literature. Of note, two of three messages addressing specific diseases condition (cancer and

liver disease) were framed positively, with reduction of drinking linked to a reduction in risk.

Respondents were asked if the information was *new to them* (no/yes) if they *believed* it

(no/unsure/yes – for subsequent analysis no and unsure were combined), if it was *personally*

relevant (1-totally irrelevant, 2, - not very relevant, 3 –unsure, 4- a bit relevant and – 5 very

relevant – for subsequent analysis 1,2 and 3 were combined and 4 and 5 were combined), and if

it would make them *would make them consider drinking less* (no/unsure/maybe/yes – for subsequent analysis no and unsure were combined and maybe and yes were combined).

[Insert Box 1]

Study population

In total, 101,093 respondents reported drinking alcohol in the last 12 months and 75969 completed all alcohol label questions and had no missing data for the other variables of interest.

Statistical methods

Descriptive statistics were used to compare sociodemographic details about the sample and Chi Square was used to compare responses to label questions by label type. Bivariable and multivariable logistic regression (Hosmer Jr et al., 2013)was used to predict the likelihood of saying whether each label would change drinking (yes and maybe combined and compared to no/unsure). Data were analysed using SPSS version 25 (SPSS, Inc).

Results

Descriptive statistics

The final sample included 75,969 respondents from 28 different countries, and the Balkan region. Descriptive statistics relating to the study population are shown in Table 1. The sample was around two-thirds male, with most people falling into the 0-7 (low risk) AUDIT category. Denmark and Scotland had greater proportions of people in the AUDIT 16+ (higher risk and possible dependence) categories. The sample age range was from 16-85 (*M*= 27.0; *SD*=10.5) with 40,460 (53.3%) aged under 25 and 35,509 (46.7%) aged 25+.

[Insert Table 1]

Table 2 shows descriptive statistics and bivariate analyses relating to each alcohol message.
New information: The message about cancer had the greatest proportion of people reporting that this information was new to them (61.8%), and the violence label had the smallest proportion saying it was new information (11.2%). Females were more likely than males to rate the heart and cancer messages as new, and males were more likely than females to say calories, two days off, health myth and violence were new. Age was significant for all labels, with the younger group more likely than the older to say the information was new – for example 65.1% vs 58.1% for the cancer message. In terms of AUDIT scores, newness was associated with low risk AUDIT and increasing risk category for cancer and the low risk category for calories, but the high risk and possible dependence categories for most of the other labels.

Believability: The message about health myths had the lowest percentage for believability (62.3%), while violence had the highest (89.4%). Females believed the calories (81.4%) and health myth (63.1%) and violence (89.9%) messages more than males (calories = 77.6%; health myth = 61.8%; violence = 89.0%) and males believed the other four labels more than females, including cancer (males = 65.8%, females = 64.1%). Older participants believed all the labels more than younger, except for the heart label. Differences in AUDIT scores were observed for two days off (more believed – 77.6% - by those in the 8-15 – increasing risk - group), health myth and violence (both more believed by people scoring 0-7 – low risk – 63.8% and 91.6% respectively).

Personal relevance: Violence was rated the most personally relevant (40.1%), with the health myth the least relevant message (15.1%). Females were more likely to say all labels were more relevant than males, other than two days off, for which we did not observe a meaningful difference between males and females. Age was only significant for two labels. Older participants said that the two days off label was more relevant (<25 = 22.9%; 25+ = 28.0%) whereas younger participants said the violence message was more relevant (<25 = 42.6%; 25+ = 37.1%). People in higher risk and possibly dependent AUDIT categories rated most labels as

more relevant. Interestingly, people in the low risk group rated heart, health myth and violence as more relevant than people in the increasing risk group.

[Insert Table 2]

Potential behaviour change: The cancer message had the highest proportion of respondents say it would make them consider drinking less (39.6%), followed by the liver message (31.0). The alcohol myth message had the lowest proportion of respondents say it would make them consider drinking less (14.2%).   Females were more likely than males to say that cancer, calories, health myth and violence would make them consider drinking less – for example 44.2% of females compared to 37.0% males).   The under 25 group were more likely than the 25+ group to say that heart, liver, cancer, health myth and violence make them consider drinking less. The 25+ group were more likely than the under 25s to say that the calories (<25 = 27.7%; 25+ = 29.1%) and two days off message (<25 = 23.8%; 25+ = 26.9%) would make them consider drinking less. Differences in AUDIT categories were observed for all labels, except calories. For heart disease, it was the low risk and possible dependence group more likely to say that it would make them consider drinking less. People in the high risk and possible dependence AUDIT categories were more likely to respond to the liver, cancer, two days off and violence labels.

Logistic regression exploring factors that predict potential behaviour change within each label

Table 3 presents the results of the binary logistic regression analyses predicting whether each different label would make people consider drinking less. For all labels, information being new, believed and personally relevant was positively associated with potential changes in drinking behaviour. Personal relevance had the highest adjusted odds ratio for all seven labels. Compared to women, men were less likely to say that all the labels would make them consider drinking less other than for the heart label for which gender was not significant. Compared to

younger drinkers the 25+ group were more likely to respond to the 2 days off message and calories message than under 25s, and less likely to respond to the cancer, health myth and violence messages. For many of the labels (but not calories) the respondents in heavier drinking categories were more likely to say the labels would make them consider drinking less.

[Insert Table 3]

DISCUSSION

This paper explored awareness of a range of alcohol health related harms that could be presented on alcohol labels and whether they were believed, personally relevant and would make people consider drinking less. The strengths of this analysis are the large, international sample and the range of alcohol health warning label messages explored. Our paper highlights the potential value of diverse health messages on alcoholic beverage containers and how novelty of information is associated with personal relevance to determine the potential impact on drinking within different groups. Overall being female and being in the higher AUDIT categories were associated with participants being more likely to report that the labels would change drinking behaviour, with older drinkers being more likely to respond to messages about calories and having 2 days off per week compared to those under 25.

The salience of cancer messaging was one of major findings of the study. Almost two thirds of people said the information about cancer was new and this message was also rated as the message most likely to change behaviour. This finding was consistent across demographic groups. The newness of the information is in line with a UK study where only 12.9% of respondents identified a link between alcohol consumption and cancer without being prompted, when they were prompted it rose to 34% (Bates et al., 2018). While it was the second highest ranked message in terms of personal relevance (after violence) it had the second lowest levels of believability (65.2%). It is of note that while higher risk drinkers rated the cancer message both as significantly more personally relevant and more likely to result in reduced drinking

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there was no difference in its believability across risk drinking groups. We suggest that the link between alcohol and cancer needs to be universally promoted as a health warning for alcoholic beverages, since all populations may benefit, with those most at risk seemingly most susceptible to behaviour changes related to this message. Our findings are consistent with those from smaller studies (Maynard et al., 2018) and confirm the potential utility of cancer health warning messages to bring about reduced drinking (Pettigrew et al., 2016). While our analysis of global drinkers support the use of cancer messages that are positively framed (drinking less reduces your risk), it is likely that there are differences across cultures. For example while an Australian study found that positive frames appeared to be more effective, a UK sample found negatively framed messages to be more effective (Blackwell et al., 2018).

One reason why there may be a relatively low awareness of the link between alcohol and cancer is that compared to other harms such as drink driving and harms during pregnancy, cancer risk has received little public attention or health promotion. While there may be many reasons for this, recent evidence suggests that the alcohol industry itself may be a playing a role by supporting the dissemination of information that can be regarded as extensive misrepresentation of evidence (Petticrew et al., 2018).

Across the sample, cancer was consistently rated as the newest message, and was most likely to make respondents consider drinking less, and the violence message was consistently the most believable and relevant piece of information. However, our study also confirms that demographic factors such as gender and age as well as levels of alcohol consumption may an important role in determining whether a particular health warning label will have an impact (Miller et al., 2016). Men were less likely to say that the messages would change their drinking compared to women for all messages except the heart disease label. Our findings are in line with a study of wine drinkers in which women were more likely to be influenced by labels giving health information (Annunziata et al., 2016).

Our findings related to age and gender differences suggest that different messages could be placed on different types of drinks. People aged 25 and over were more likely to respond to the messages about calories and having two days off drinking each week. Women were more likely than men to respond to the cancer and calories messages.   Such findings could be incorporated into different messaging design for certain beverages and targeted on line health promotion via advertising or apps. Targeted messaging for different groups is also supported by the importance of personal relevance which in our logistic regression had the highest adjusted odds ratio for all seven labels.   Our analyses confirm that the determinants of a positive responses to health label are complex and that in some cases personal relevance (and believability) of the messages are more important predictors of the message effectiveness than individual differences (Blackwell et al., 2018; Pettigrew et al., 2016).

Limitations

The GDS survey recruits higher proportions of people who report illicit substance use than the general population (Barratt et al., 2017).   Nonetheless the sample does appear to share characteristics with other international surveys finding similar regional variations in drinking patterns (Barratt et al., 2017), and it is a strength that higher proportions of male respondents take part as they tend to be underrepresented in other surveys. A large proportion of the sample was from Germany, whereas there were considerably fewer respondents from other countries, which is in line with previous waves of data collection. This imbalance is due to the methods of recruitment used in different countries, with more media outlets and partner organizations in Germany than in other counties at present, which we hope to address in future years. A further consideration when looking at the bivariate analyses is that they do not take into account country differences.

The study also suffers from a lack of ecological validity and response options were limited. Some research suggests picture labels may be more effective than text only labels (Wigg and Stafford,

2016). Even if detailed health information is mandated, the alcohol industry may attempt to thwart such initiatives, as was recently the case in Canada (Austen, 2018).

Conclusions

While there is little evidence that health warnings would change alcohol consumption behaviours, exploring ways to raise awareness of the risks of drinking is important (MacKinnon et al., 2001). Focus group research with young adults in Australia suggests consumers are critical of ambiguous messages that are currently displayed on products in many countries, believing the alcohol industry to be doing the bare minimum in term of warning consumers of the risks (Coomber et al., 2017).

Moving forward there needs to be a new focus on reducing alcohol consumption with the same vigour and scope that tobacco has been tackled. A recent review highlights that there is a lack of theoretically driven research in this area (Hassan and Shiu, 2018). It is important to understand the psychological mechanisms that may mediate the relationship between health warning message and people's responses. Focusing on crafting optimal health messages for alcohol can be greatly informed by the large body of evidence on tobacco warnings.   For example, images in tobacco labels are perceived as more effective than text alone and are more likely to change behaviour (Noar et al., 2016).   Such provision of health warnings can provide a relatively cheap approach to delivering information to target consumers as if they are mandated, then costs fall to the manufacturer rather than to public health authorities. Our study suggests that a similar approach to that used for tobacco should be considered for alcohol as awareness of some of the impacts of drinking is still low. Alongside specialist counselling services and tailored tools such as online apps, the provision of health warning labels on alcohol products can play a vital role in reducing the burden of alcohol harm by increasing awareness of its risks.

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TABLES

Box 1: The seven messages about alcohol health harms that were included in GDS2018.

1 Heart disease is a major cause of death among people with heavy alcohol use (negative frame).
2 Even people with heavy alcohol use can reduce their risk of liver disease by cutting down by even a small amount (positive frame).
3 Drinking less reduces your risk of 7 different sorts of cancer (positive frame).
4 A bottle of wine or 6 bottles of beer contain as many calories as a burger and fries (specific).
5 Experts recommend having at least 2 alcohol free days per week. This can help you reduce and control your drinking (specific).
6 Most people get little or no health benefit from alcohol use, even at low levels of drinking (general).
7 Alcohol use increases the risk of violence and abuse (negative frame).

Table 1: *Demographic information about the sample including country, age, gender and median AUDIT score % low risk and % 16%*

Country	N (%)	Mean age (SD)	% male	AUDIT Median	% Low risk (0-7) AUDIT	% AUDIT 16+
Australia	1721 (2.3)	25.1 (10.4)	67.0	10	33.2	21.2
Austria	2520 (3.3)	28.0 (9.6)	60.6	8	46.8	10.4
Belgium	507 (.07)	24.8 (8.2)	66.9	10	37.1	16.0
Brazil	1201 (1.6)	29.8 (10.0)	66.1	7	51.5	13.2
Canada	1019 (1.3)	27.0 (9.8)	64.8	8	49.4	14.2
Columbia	951 (1.3)	27.9 (9.0)	69.4	7	53.2	10.2
Czech Republic	631 (.08)	23.3 (6.0)	66.7	8	45.0	13.9
Denmark	8608 (11.3	20.4 (5.6)	61.8	11	20.5	24.7
Finland	912 (1.2)	27.7 (8.0)	70.3	9	40.2	21.1
France	396 (0.5)	28.1 (11.2)	62.9	9	41.4	15.7
Germany	30057 (39.6)	29.9 (11.0)	60.5	7	51.1	10.3
Hungary	1258 (1.7)	26.3 (7.9)	75.6	8	45.2	12.4
Republic of Ireland	306 (0.4)	26.2 (10.5)	69.3	9	40.2	17.0
Israel	939 (1.2)	24.7 (7.2)	72.9	5	70.9	5.5
Italy	1413 (1.9)	26.7 (7.8)	70.8	7	53.8	10.1

Mexico	250 (0.3)	25.9 (9.0)	65.2	7	52.8	16.8
Netherlands	2164 (2.8)	23.6 (6.9)	51.2	9	37.6	14.6
New Zealand	1932 (2.5)	40.9 (14.6)	56.3	7	56.5	11.5
Norway	254 (0.3)	25.5 (8.9)	75.2	8	40.6	11.8
Poland	4530 (6.0)	19.8 (4.5)	83.0	8	43.5	14.0
Russian Federation	299 (0.4)	23.4 (6.3)	53.5	7	53.8	11.4
Scotland	823 (1.1)	26.7 (9.1)	74.5	11	26.5	26.9
Slovakia	2353 (3.1)	22.9 (7.2)	66.1	8	43.3	15.5
Spain	270 (0.4)	30.1 (11.2)	61.5	7.5	50.0	12.2
Sweden	375 (0.5)	26.0 (9.1)	75.2	8	44.5	12.0
Switzerland	3136 (4.1)	28.8 (10.8)	65.7	8	48.3	11.3
England	2346 (3.1)	26.4 (9.8)	67.1	9	37.4	18.2
United States	3621 (4.8)	25.0 (10.5)	73.3	6	59.1	10.5
Balkans	1177 (1.5)	25.38 (8.6)	58.1	6	58.2	8.8
Whole sample	**75969**	**27.0 (10.5)**	**64.3**	**8**	**45.6**	**13.5**

Table 2: *Percentage of respondents for each alcohol warning label who said the **information was new to them, they believed, it, it was personally relevant and would it change their drinking** and bivariate associations between demographic characteristics and responses. Where associations are significant at p<.001 bold typeface is used to indicate which group were more likely to respond.*

Label	Heart	Liver	Cancer	Calories	2 days off	Health myth	Violence
Information was new (% yes)							
Whole sample	32.2	27.9	61.8	36.1	44.9	34.0	11.2
Sex: χ^2 p	p<.001	ns	p<.001	p<.001	p<.001	p<.001	p<.001
Female	33.5	28.1	64.8	34.4	42.6	32.6	10.1
Male	31.4	27.8	60.2	37.1	46.1	34.7	11.8
Age: χ^2 p	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
Under 25	34.3	31.9	65.1	41.8	50.9	36.5	13.6
25+	29.8	23.4	58.1	29.6	38.0	31.0	8.4
AUDIT categories: χ^2 p	ns	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
AUDIT 0-7	32.6	27.3	62.0	37.6	44.0	33.5	9.8
AUDIT 8-15	32.1	27.9	62.5	34.6	44.8	33.9	12.1
AUDIT 16-19	31.1	29.8	59.7	35.6	46.9	34.9	12.8
AUDIT 20+	31.0	29.8	58.0	36.4	49.3	36.5	12.9

Label	Heart	Liver	Cancer	Calories	2 days off	Health myth	Violence
Information was believed (% yes)							
Whole sample	74.2	79.7	65.2	79.0	76.7	62.3	89.4
Sex: χ2 p	p<.001	p<.001	p<.001	p<.001	ns	p<.001	p<.001
Female	73.0	78.3	64.1	81.4	76.2	63.1	89.9
Male	74.8	80.4	65.8	77.6	77.0	61.8	89.0
Age: χ2 p	ns	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
Under 25	73.7	77.2	63.3	76.4	75.4	61.1	86.9
25+	74.6	82.4	67.3	81.9	78.2	63.6	92.2
AUDIT categories: χ2 p	ns	ns	ns	ns	p<.001	p<.001	p<.001
AUDIT 0-7	73.8	79.9	65.3	78.6	76.1	63.8	91.6
AUDIT 8-15	74.5	79.7	65.0	79.4	77.6	61.7	87.7
AUDIT 16-19	74.0	78.9	65.0	79.2	77.0	58.7	86.8
AUDIT 20+	74.4	79.1	65.9	79.1	75.0	59.1	86.7

Label	Heart	Liver	Cancer	Calories	2 days off	Health myth	Violence
Message was personally relevant (% a bit or very)							
Whole sample	26.5	28.7	35.1	28.9	25.3	15.1	40.1
Sex: χ2 p	p<.001	p<.001	p<.001	p<.001	ns	p<.001	p<.001
Female	28.2	30.4	39.8	37.2	25.1	16.0	45.8
Male	25.6	27.7	32.5	24.2	25.4	14.7	36.9
Age: χ2 p	ns	ns	ns	ns	p<.001	ns	p<.001
Under 25	26.9	28.3	35.0	28.8	22.9	14.8	42.6
25+	26.1	29.1	35.2	29.0	28.0	15.5	37.2
AUDIT categories: χ2 p	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
AUDIT 0-7	27.2	27.2	35.1	27.1	22.3	17.0	40.9
AUDIT 8-15	25.1	27.9	34.8	29.4	25.7	13.3	39.2
AUDIT 16-19	27.8	33.9	36.7	32.4	31.3	12.9	39.0
AUDIT 20+	29.8	38.3	38.5	34.1	38.2	15.8	41.2

Label	Heart	Liver	Cancer	Calories	2 days off	Health myth	Violence
It would change drinking behaviour (%yes and maybe)							
Whole sample	12.5	31.0	39.6	28.4	25.3	14.2	26.9
Sex: χ2 p	ns	ns	p<.001	p<.001	p<.001	p<.001	p<.001
Female	12.3	31.3	44.2	39.0	24.4	15.3	29.0
Male	12.7	30.8	37.0	22.5	25.8	13.6	25.7
Age: χ2 p	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
Under 25	13.0	32.7	40.7	27.7	23.8	15.1	31.8
25+	12.0	29.1	38.3	29.1	26.9	13.2	21.3
AUDIT categories: χ2 p	p<.001	p<.001	p<.001	ns	p<.001	p<.001	p<.001
AUDIT 0-7	13.5	26.7	38.2	27.9	20.7	15.6	26.4
AUDIT 8-15	11.2	32.1	40.3	28.4	26.4	12.7	26.4
AUDIT 16-19	12.3	40.5	41.7	29.2	34.0	13.3	28.5
AUDIT 20+	15.0	44.5	42.5	30.0	41.2	14.8	32.0

Table 3: *Results of logistic regression models predicting whether each label would change drinking behaviour (yes+ maybe compared to no + unsure)*

Label	Heart	Liver	Cancer	Calories	2 days off	Health Myth	Violence
AOR (95% CI) p							
New = yes	1.66 (1.58-1.75)**	1.64 (1.57-1.70)**	1.90 (1.83-1.97) **	1.19 (1.14-1.24) **	1.43 (1.38-1.49) **	1.74 (1.64-1.83) **	1.62 (1.53-1.72) **
Believe = yes	1.94 (1.82-2.09)**	1.81 (1.72-1.90)**	2.13 (2.05-2.22) **	1.87 (1.76-1.98) **	2.02 (1.91-2.13) **	2.43 (2.29-2.58) **	3.06 (2.79-3.35) **
Relevance = a bit or very relevant	6.27 (5.98-6.58)**	6.64 (6.40-6.89)**	8.65 (8.34-8.97) **	14.08 (13.53-14.65) **	8.90 (8.55-9.26) **	12.34 (11.75-12.97) **	8.27 (7.93-8.61) **
Age 25+	1.36 (0.98-1.09) ns	0.97 (0.93-1.01) ns	0.92 (0.89-0.96) **	1.05 (1.01-1.10) *	1.27 (1.22-1.32) **	0.88 (0.84-0.93) **	0.69 (0.66-0.74) **
Male	0.99 (0.94-1.04) ns	0.86 (0.83-0.90) **	0.75 (0.72-0.78) **	0.51 (0.49-0.53) **	0.93 (0.89-0.97) **	.080 (0.76-0.84) **	0.86 (0.83-0.89) **
AUDIT 8-15	0.82 (0.78-0.87)**	1.42 (1.36-1.48) **	1.22 (1.18-1.27) **	1.05 (1.01-1.10) *	1.46 (1.40-1.52) **	0.90 (0.86-0.95) **	1.02 (0.98-1.07) ns
AUDIT 16-19	0.85 (0.78-0.93)*	1.99 (1.86-2.13) **	1.29 (1.21-1.38) **	1.03 (0.95-1.11) ns	2.10 (1.95-2.26) **	1.01 (0.92-1.11) ns	1.14 (1.06-1.23) **
AUDIT 20+	0.96 (0.87-1.06) ns	2.10 (1.95-2.26) **	1.26 (1.16-1.36) **	1.01 (0.93 -1.10) ns	2.60 (2.39-2.81) **	0.99 (0.89-1.10) ns	1.27 (1.18-1.38) **

Note: These analyses control for country of origin, which was a significant predictor in all models. Country differences in responses to labels are explored in another paper (Davies et al, in preparation).
Reference category for new = no, believe = no and unsure, relevance = unsure, not very or totally irrelevant, male=female, age 25+ = <25, AUDIT = 0-7.
** p<.001 *p<.05 ns not significant