An on-product self-affirmation intervention to promote alcohol consumption within government recommended guidelines: A pilot study

Report for the
Alcohol Education and Research Council

Dr Madelynne A. Arden C.Psychol

Sheffield Hallam University

&

Dr Christopher J. Armitage C.Psychol

University of Sheffield

November 2011

Small grant number SG 10/11 158

Sheffield Hallam University

The University Of Sheffield.

Contents

KEY FINDINGS

- ***Some participants were surprised about the information contained in the alcohol label and many had additional questions about the message.***

- ***Some participants found the message threatening and engaged in maladaptive coping including avoiding the message contents and derogating the message.***

- ***Participants overestimated the safe levels of 'wine' in a wine pouring task after exposure to UK government recommended information. This was not affected by the presence of the self-affirmation slogan.***

- ***A short self-affirming slogan placed alongside standard UK Government health information resulted in lower levels of alcohol consumption one month later for participants who were identified as harmful and hazardous drinkers. This approach therefore shows promise as a public health intervention to reduce the alcohol consumption of harmful/hazardous drinkers who are not seeking treatment.***

- ***The reduction in alcohol consumption was not accompanied by changes in people's motivation to drink within safe levels or other psychological variables.***

- ***This is the first study to show a positive effect of an ecologically valid self-affirmation intervention.***

INTRODUCTION

This report contains findings from a pilot study designed to investigate whether a short on-product psychological intervention could reduce people's alcohol consumption to within government recommended levels. Specifically, the study aimed to investigate whether a short, ecologically valid, self-affirmation manipulation could influence judgements of safe alcohol consumption, judgements of the information contained in the message, social cognitive variables, and alcohol consumption. The study involved data collection at two time-points, with data collected prior to the intervention, immediately after the intervention and 1 month later.

BACKGROUND

Thirty-seven percent of men and twenty-nine percent of women in England drank more than the government recommended amount (2-3 units a day for women and 3-4 units a day for men) at least one day per week in 2009 (ONS, 2011). In the UK, labels informing the public of these guidelines are encouraged through a voluntary agreement between the government and drinks industry (UK Department of Health, 2007). The UK Government recommends that alcohol warning labels contain five elements: i) Know your limits/Enjoy responsibly/Drink responsibly heading, ii) Unit content, iii) Government recommended unit advice, iv) 'Avoid alcohol if trying to conceive' or equivalent logo, and v) www.drinkaware.co.uk or Drinkaware logo. However, these guidelines have not been applied universally (CCFRA, 2008) and there is little evidence that such labels influence drinking behaviour, although they may raise awareness of the risk factors (Stockwell, 2006; Wilkinson & Room, 2009). On-product labels offer the opportunity to provide a brief universal intervention to promote moderate alcohol consumption (in line with UK government recommendations). The identification of effective label content is therefore of critical importance.

Health warning labels present potentially threatening information (depending on whether one is engaging in the unhealthy behaviour) that arouse unpleasant emotional states. According to Protection Motivation Theory (Rogers, 1983) this unpleasant emotional state can be reduced by either: a) an adaptive response (e.g. reducing the risk behaviour), or b) a maladaptive response (e.g. downplaying the risk or questioning the accuracy of the information, DeWit et al., 2008). At-risk individuals are more likely to question the quality of health information, perceive the risk to be less serious and recall the health information less accurately than their low-risk counterparts (e.g. Croyle, Sun & Hart, 1997) and thereby maintain a maladaptive response. Appropriate processing of risk information is therefore essential if health information is to have beneficial effects on behaviour.

Self-affirmation theory (Steele, 1988) explains how individuals are motivated to maintain a sense of self-integrity. Threatening messages can be detrimental to people's sense of self and lead individuals to process the information in a way that is consistent with their existing beliefs. However when participants are given a self-affirming manipulation, where they reflected on their positive qualities in a domain other than health, they process warning labels as more threatening and personally relevant, perceive higher levels of self-efficacy and have higher levels of intention for behaviour change (Harris, Mayle, Mabbott & Napper, 2007). Similar findings have been established across a range of domains (Harris & Napper, 2005; van Koningsbruggen,

Das & Roskos-Ewoldsen, 2009; Sherman, Nelson & Steele, 2000) including alcohol (Armitage, Harris, & Arden, 2011; Klein & Harris, 2009). There is also some evidence that the effects of self-affirmation can last as long as 2 years (Cohen, Garcia, Purdie-Vaughns, Apfel & Brzustoski, 2009).

Self-affirmation has most often been manipulated by asking people to recall acts of kindness or to write about important values (see McQueen & Klein, 2006 for a review). While these methods have been shown to be effective, they offer limited scope for a large scale universal intervention and are not applicable to the health warning label context. Drawing on the work of Harris, Napper, Griffin, Schuez, and Stride (2011), Armitage, Harris & Arden (2011) presented participants with the stem, "If I feel threatened or anxious, then I will…" (see Harris et al., 2011) and combined it with a self-affirming statement (e.g. "I will think about things that are important to me", see Harris et al., 2011) to create a brief (one sentence long) but effective self-affirmation intervention that reduced alcohol intake by more than 1 unit per day. This kind of brief self-affirmation intervention could be used within an ecologically valid on-product health warning label.

Arden, O'Neill & Armitage (2010) conducted a pilot study that showed that participants who poured 'wine' (actually water) from a bottle with a standard label that included the self-affirming slogan: "If I feel threatened or anxious I will remember that I am a kind person", poured significantly less 'wine' when they were asked to pour an amount that corresponded with the UK government recommendation. This suggests that affirmed individuals were able to process and make more use of the information contained in the label by going on to pour an amount of 'wine' that was closer to that recommended by the government. However, Arden et al's (2010) study utilised a small (n = 60), female student sample of moderate drinkers at a single time-point and thus the generalisability of the findings are not yet established. A number of key questions remain: a) Is this effect robust? b) Are the effects restricted to judgements of safe alcohol volume or do they extend to judgements of the message, social cognitive variables and alcohol consumption? c) Are they equally effective for lower and higher risk drinkers?

In summary, self-affirmation offers a potential means by which alcohol information labels may be more fully processed and result in appropriate changes in alcohol consumption. Developing a slogan to deliver the self-affirmation intervention offers the opportunity to devise an ecologically valid intervention which could be incorporated into the on-product alcohol information label.

Aims and Hypotheses

This pilot project aimed to investigate the feasibility and efficacy of a short self-affirmation intervention to influence four key variables:

- Judgements of the alcohol information message
- Judgements of safe alcohol volume
- Psychosocial predictors of behaviour change
- Changes in alcohol consumption over the following month

Methods and Measures

Design

The study took the form of a small-scale experiment in which participants were randomly allocated to one of two conditions. All participants completed baseline questionnaires, were exposed to one of two types of alcohol information labels, undertook a wine pouring task and completed post-task questionnaires. They were then contacted 1 month later and completed time 2 questionnaires. The study received full ethical approval from the relevant committee.

Participants

The plan for the study was to recruit 120 participants: 60 males and 60 females. Participants were recruited from University campuses and via advertisements placed on student PC screensavers and in staff e-newsletters from March 2011-July 2011. 113 completed time 1 of the study, although this sample included more females than was originally intended (70 females and 41 males). Data collection was stopped in mid-July in order to ensure that the time 2 data could be collected within the timeframe of the project. Participants were sent a link to an online questionnaire or a paper questionnaire (depending on their preference) 1 month later. 101 participants responded online and 6 by post providing a response rate of 94.7%. Participants' mean age was 23.4 years (standard deviation = 3.73 years). Participants were mainly students (62.8%), with the remainder being made up of administrative/support staff (18.6%) or other workers (15.9%). One participant was unemployed.

Procedure

Prior to the experiment commencing the wine glasses to be used were individually weighed and unobtrusively marked on the underside for later identification. Likewise, the weights of the empty bottles were noted. Each bottle was filled up to a mark with water coloured with 3 drops of yellow food colouring so that it resembled a light coloured white wine (e.g. Pinot Grigio)

Once initial contact had been made with participants they were questioned informally to ensure that they met the inclusion criteria for the study: i) aged between 18 and 30 years old; ii) regular drinkers who consumed alcohol at least once a week; and iii) drank wine. If they met these criteria they were invited to attend the first part of the study.

On arrival at the appointment participants were provided with information about the study and their right to withdraw and signed a consent form. The researcher assigned them a numerical code according to their gender, which was noted on all of the questionnaires that they completed. Assignment of each numerical code to condition was done randomly in advance using online randomization software.

Participants were asked to complete the baseline questionnaire (see measures). On completion they were given the following instructions and led to an adjacent room where there was a wine bottle with 2 labels (which varied according to condition to which they had been assigned - see stimuli) and 4 empty wine glasses:

- *"I'm shortly going to ask you to read some instructions and then to complete a wine pouring task. This is not real wine so please don't drink it. I'm going to leave the room while you do this task. I will give you some written instructions which I'd like you to read very carefully before you perform the task. Once you have completed the task please come to the door so that I know you have finished. Here are the instructions, the wine bottle and glasses."*
- The written instructions read as follows:
    - *Please follow these instructions carefully:*
        - *1. Read the labels on the bottle of wine provided*
        - *2. Pour into one or more glasses the amount of wine that you think would be safe to drink on a single occasion (e.g. an evening).*
        - *3. Let the researcher know when you have completed the task*

Once participants had completed this task and informed the researcher they completed a post-task questionnaire (see measures). Participants were then asked whether they would like to receive the time 2 questionnaire online via a link in an email or in paper form through the post and the relevant contact details were recorded, and were given a £5 High Street voucher to thank them for their time and participation.

The researcher then weighed each of the glasses which had been filled during the wine pouring task and subtracted this from the weight of the specific glasses that had been used to provide a total weight of water poured. The partially empty wine bottle was also weighed and the weight of water remaining calculated as a verification check.

One month after their initial appointment the participant was sent the time 2 questionnaire (see measures) either by post with a freepost envelope for return or in an email containing a link to an online questionnaire. Paper copies of the questionnaire were labeled with the participant code for later matching with the time 1 data. Emails contained the code and participants were asked to enter this into the online survey. On receipt of the completed time 2 questionnaire (participants provided their email address on the online survey for this purpose: this was later removed from the data to maintain confidentiality), participants were sent some debriefing information and a £5 voucher to thank them for their participation. For postal responses this was a high street voucher, for online responses this was an e-voucher for www.amazon.co.uk as this could be sent by email.

Measures

Baseline Questionnaire

The baseline questionnaire included the following measures.

Demographics

- Gender
- Age
- Occupation
- Ethnic origin.

Alcohol use history

- Age at first consumption of alcohol
- Age at which began drinking alcohol regularly (at least once a week).
- Alcohol Use Disorders Identification Test (AUDIT; Babor , Higgins-Biddle, Saunders & Monteiro, 2001)
    - 10 questions with responses scores 0 (low risk)-4 (high risk) e.g.
      How many alcoholic drinks do you have on a typical day when you are drinking?
      Has a relative, friend, doctor or health care worker been concerned about your drinking, or suggested that you cut down?
    - A score of 0-7 indicates sensible drinking; 8-15 indicates hazardous drinking; 16-19 harmful drinking; and 20+ possible dependence.
- Alcohol diary measure (Sobell & Sobell, 1992)
    - Participants were presented with a day by day diary and asked:
      Please use the diary below to describe all of the alcohol you drank on each day last week. Please describe the type of drink and size of drink for each day.
    - The Units of alcohol contained in the drinks described were calculated using the unit calculator available http://www.drinkaware.co.uk/tips-and-tools/drink-diary/ . Where participants had provided brands (e.g. 'pint of Carling') the Units were calculated according to that specific brand. Where participants had not specified a brand (e.g. 'pint of lager') the average abv for that kind of drink was used to calculate units.

Protection Motivation Theory (PMT) questionnaire

- included questions of the following variables all measured on 7 point likert scales:
    - Severity: 4 items for example
        - *If I did not drink alcohol within safe levels I would become addicted to alcohol*
          (Strongly disagree - Strongly agree)
        - Cronbach's alpha for this scale at baseline was 0.62, post-task was 0.64, and at Time 2 was 0.62.

- Vulnerability: 4 items for example (2 items reversed)
    - *My chances of developing alcohol-related health problems in the future are:*
      (Not very high - Very high)
    - Cronbach's alpha for this scale at baseline was 0.63, post-task = 0.69 and at Time 2 was 0.68.
- Response costs: 4 items for example
    - *Drinking alcohol within safe levels will spoil the fun of a night out*
      (Strongly disagree - Strongly agree)
    - Cronbach's alpha for this scale at baseline was 0.52, however this rose to 0.65 with the removal of one item: '*One of the difficulties of drinking alcohol within safe levels is the inconvenience of explaining to others why I restrict my drinking*' and this item was therefore removed from subsequent analysis. Cronbach's alpha for this scale post-task was 0.74 and at Time 2 was 0.76.
- Fear: 4 items for example:
    - *The thought of developing alcohol-related health problems makes me feel:*
      (Not at all frightened - Very frightened)
    - Cronbach's alpha for this scale at baseline was 0.94, at post-task = 0.96 and at Time 2 was 0.97.
- Self-efficacy: 3 items for example (1 item reversed)
    - *It is easy for me to drink alcohol within safe levels*
      (Strongly disagree - Strongly agree)
    - Cronbach's alpha for this scale at baseline was 0.88, at post-task = 0.87 and at Time 2 was 0.87.
- Response-efficacy: 4 items for example
    - *If I drank alcohol within safe levels I would lessen my chances of developing alcohol-related health problems*
      (Strongly disagree - Strongly agree)
    - Cronbach's alpha for this scale at baseline was 0.76, at post-task = 0.70 and at Time 2 was 0.78.
- Rewards: 3 items for example
    - *I sometimes don't drink alcohol within safe levels to help me to relax*
      (Strongly disagree - Strongly agree)

        - Cronbach's alpha for this scale at baseline was 0.62, at post-task = 0.69 and at Time 2 was 0.78.

    - Intention: 3 items for example

        - *I intend to drink alcohol within safe levels*
        (Strongly disagree - Strongly agree)

        - Cronbach's alpha for this scale at baseline was 0.94, at post-task = 0.93 and at Time 2 was 0.96.

POST-TASK QUESTIONNAIRE

The post- wine pouring task questionnaire included the following measures.

Thought -listing procedure

- Adapted from Cacioppo and Petty (1981). Participants were provided with the following instructions:

    - *Please write down all of the thoughts that crossed your mind when viewing the alcohol information label. There are 8 boxes below in which you should write these thoughts. Please write down as many thoughts as you can: one in each box. Please be brief with each thought and ignore spelling, grammar and punctuation. You do not have to fill every box but please continue until you have exhausted all of your thoughts.*

- Below the 8 boxes were the following instructions and an example completed box

    - *Please re-read each of the thoughts that you have written above and indicate whether they are in favour of, against or irrelevant to the alcohol information label that you read. Please place a symbol in the box to the right of each box:*

    - *Use + for in favour, - for against and ^ for irrelevant*

Perceived Message Strength

- adapted from Zhao, Strasser, Cappella, Lerman and Fishbein (2011) and included 9 items measures on 7-point scales for example:

    - *The information on the alcohol label was convincing*
    (Strongly disagree - Strongly agree)

    - As per the authors instructions a single favourability item was calculated by subtracting '*The information on the alcohol label put thoughts in my mind about wanting to drink less alcohol*' from '*The information on the alcohol label put thoughts in my mind about wanting to drink alcohol*', dividing the new value by 2 and adding a constant of 4 to create a 7 point scale as for the other items.

    - Cronbach's alpha for the 8 item scale was 0.74.

Message Derogation

- adapted from Witte (1994) and included 4 items for example:
    - *The information on the alcohol label was exaggerated*
      (Strongly disagree - Strongly agree)
    - Cronbach's alpha for this scale was 0.87.

Anger

- adapted from Dillard and Peck (2001) and included 4 items for example:
    - *The information on the alcohol label made me feel angry*
      (Not at all - Very much)

Protection Motivation Theory (PMT) questionnaire

- see Baseline questionnaire.

Time 2 questionnaire

The time 2 questionnaire included the following measures. See appendix 3 for the full questionnaire

Alcohol diary measure (Sobell et al. 1986)

- Participants were presented with a day by day diary and asked:
    - *Please use the diary below to describe all of the alcohol you drank on each day last week. Please describe the type of drink and size of drink for each day.*

Protection Motivation Theory (PMT) questionnaire

- see Baseline questionnaire.

Stimuli

The wine bottle used in the wine-pouring task was a green glass bottle with 2 labels on the body. The front label was identical for both conditions (see Figure 1). The back label varied by condition:

- Control condition (see Figure 2) contained the 5 elements recommended by the UK government
    - Know your limits
    - Unit content (9 Units assuming 12% abv)
    - Government unit advice
    - 'Avoid alcohol if pregnant or trying to conceive'
    - www.drinkaware.co.uk

- Experimental condition (see Figure 3) contained the 5 elements recommended by the UK government and a self-affirmation slogan:
    - *If I feel threatened or anxious, then I will think about things that are important to me*

Figure 2: Experimental back label

Figure 2: Control back label

Figure 1: Front label

Results

Baseline Alcohol consumption

Prior to analysis the data were examined for outliers. Two participants reported drinking in excess of 135 Units of alcohol per week (142.3 and 139.9 units respectively). These values were considerable higher than the next highest value (71.8) and they were therefore excluded from further analysis. Both male and female participants were, on average, consuming more alcohol per week than UK Government recommended guidelines (see Table 1). Friday and Saturday alcohol consumption exceeded daily UK recommended maximums (see Table 1), for both males and females while consumption on other days of the week was more moderate on average.

Table 1: Mean and standard deviations for Units of alcohol consumed by day of week at baseline

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Males N = 41	2.86 (5.98)	1.94 (3.32)	1.34 (2.35)	3.19 (5.31)	8.16 (7.65)	8.36 (8.56)	2.42 (4.64)	28.27 (18.01)
Females	1.12	2.15	2.22	1.86	4.29	4.68	1.74	18.06

N = 70	(2.18)	(5.99)	(4.50)	(3.63)	(5.20)	(5.39)	(3.24)	(12.38)

A 2x2 ANOVA with condition and gender as independent variables was performed to assess whether there were differences in alcohol consumption between conditions at baseline. This revealed there to be a significant interaction ($F[1,107] = 11.29$, $p = 0.001$) such that while there were no significant differences between conditions for females (mean for condition 1 = 17.41 Units; mean for condition 2 = 18.71 Units) there were significant differences between conditions for males (mean for condition 1 = 36.99 Units; mean for condition 2 = 19.97 Units). Subsequent analyses therefore control for time 1 alcohol consumption.

Participants included sensible drinkers, through to possible dependence according to AUDIT scores (see Table 2), with the majority of participants classified as hazardous drinkers. There was a significant positive correlation between AUDIT score and number of Units of alcohol consumed per week ($r = 0.44$, n = 111, $p < 0.001$).

Table 2: Frequencies and percentages of participants by AUDIT category

	Frequency	Percentage
Sensible drinkers (AUDIT scores = 0-7)	14	12.6
Hazardous drinkers (AUDIT scores = 8-15)	71	64.0
Harmful drinkers (AUDIT scores = 16-19)	14	12.6
Possible dependent drinkers (AUDIT scores = 20+)	12	10.8
Missing data	1	

A chi-square test revealed that there was no association between condition and AUDIT category at baseline (Chi-square(3) = 3.25, p = 0.35), thus randomization according to this variable was successful.

Baseline PMT variables

Mean values were calculated for each participant for each PMT variable and then means calculated for males and females. One participant did not complete this part of the questionnaire.

Table 3: Mean and standard deviations for PMT variables at baseline

	Severity	Vulner-ability	Response costs	Fear	Self-efficacy	Response-efficacy	Rewards	Intention
Males N = 41	4.46 (1.21)	2.92 (1.24)	4.07 (1.18)	3.97 (1.60)	5.31 (1.40)	4.71 (0.97)	4.66 (1.28)	4.65 (1.61)
Females N = 69	4.61 (1.22)	2.59 (0.95)	3.61 (1.38)	4.76 (1.31)	5.70 1.26	4.54 (1.37)	4.49 (1.33)	5.04 (1.47)
Total N = 110	4.55 (1.21)	2.71 (1.07)	3.77 (1.33)	4.47 (1.47)	5.55 (1.33)	4.60 (1.23)	4.55 (1.31)	4.89 (1.53)

A 2x2 MANOVA with condition and gender as independent variables and PMT variables as dependent variables was performed to assess whether there were differences in PMT variables at baseline. This revealed no significant difference by condition ($F[8,99] = 0.78$, $p = 0.62$) and no interaction ($F[8,99] = 0.72$, $p = 0.68$), although there was a significant effect of gender ($F[8,99] = 2.20$, $p = 0.03$). Univariate tests revealed that this effect was due to females having higher baseline levels of fear than males (see Table 3; $F[1,106] = 15.95$, $p = 0.006$).

Intervention Results: Time 1

Wine-pouring task

The weight of water poured in the wine-pouring task was converted to units using the following formula. This based on the weight of 1g of water being equal to 1 ml of water and there being 9 units of alcohol in a 750ml bottle of wine.

$$\text{Units poured} = \text{weight of water (grams)} \times (9/750)$$

There was a very high correlation between the amount poured into the glasses and the amount remaining in the bottle ($r = 0.98$, $p < 0.001$) and therefore the number of units poured into the glass was used in subsequent analyses.

The mean Units poured was greater for males than for females (see Table 4) reflecting their higher recommended limits. The mean total Units poured by gender was slightly higher than the higher recommended limit for both males and females (4 Units and 3 Units respectively). One-sample t-tests revealed that both men and women poured significantly more wine than the higher recommended limits (For men: $t[40]=2.36$, $p = 0.01$; For women: $t[69] = 5.78$, $p < 0.001$).

Table 4: Mean and standard deviations for Units poured by condition and gender

	Control condition	Experimental condition	Total
Males	4.81 (1.78)	4.45 (1.66)	4.63 (1.71)
Females	3.71 (1.34)	4.22 (1.42)	3.96 (1.39)
Total	4.11 (1.59)	4.31 (1.51)	

Differences between Units poured by condition appeared to follow different patterns for males and females such that males in the experimental condition poured less than the control condition, while females in the experimental condition poured more than the control condition. A 2x2 ANOVA was performed with gender and condition as independent variables and Units poured as the dependent variable. This revealed there to be no effect of condition ($F[1,104]= 0.065$, $p = 0.80$) and no significant interaction ($F[1,1070] = 2.16$, $p = 0.140$) but a significant effect of sex such that females poured fewer Units than males ($F[1, 107] = 5.07$, $p = 0.03$). There was no correlation between Units poured and Units of alcohol consumed per week at baseline ($r = 0.15$, $n = 111$, $p = 0.12$).

Thought-listing procedure

It was originally intended that the thought-listing task would be analysed according to the polarity dimension (See Cacioppo & Petty, 1981) whereby the frequency of favorable, unfavourable and neutral statements is calculated. However, it became apparent that the classification of thoughts into these categories by participants was highly inconsistent. For example the thought "9 units in a bottle" was coded as a 'favourable' thought by one participant, while the statement "Is there only 9 units in a bottle" was coded as an 'unfavourable' thought by another, and "Units in the bottle are 9" as a 'neutral' thought by a third. An alternative means of analysing the thoughts was therefore devised.

The thoughts were all entered into NVivo 8 and this package was used to code each of the listed thoughts into categories. During this process the coders were blind to condition except where

the thoughts referred to the self-affirmation slogan, which was present only in the experimental condition.

Table 5: Coding of Thoughts listed by Category and Frequency

Thought category	*Examples*	*Number of thoughts*	
		Experi-mental condition	*Control condition*
Approving of or agreeing with information	" I agree that mens tolerance or unit levels should be greater than that of ladies" " Good to give information to pregnant women who may be unaware of the dangers"	7	5
Avoiding information	" I never take notice of alcohol warning messages on alcohol bottles" "I know my limits so I don't usually worry about information labels like that"	9	4
Disagreeing with or questioning the validity of the information	" Why is that the recommended limit? " Its an average, some people can drink more/less"	10	24
Drink driving concerns	" Its hard to know what it would be safe to drive after" "I wouldn't have any if I was driving"	2	4
Emotional reactions to information	" Concerned for my health" "Shocked"	5	4
Not knowing or being surprised by the information	" I was unaware before reading the label how many units a man was allowed to drink" " it surprised me that there were 9 units in a bottle, I thought there were less."	17	22
Interpreting information in relation to wine pouring task	"The label made me consider the units but normally I wouldn't do this" " I wonder how you divide that bottle up to 9"	22	31
Misreading information	" How alcoholic the wine was, i.e. 8 units in a bottle" " 9 units seemed a fairly high percentage for one glass"	2	2
Noticing self-affirmation slogan	" The statement about being anxious about my drinking - worrying" " I wondered if the 'anxious' thing was something to do with how alcohol can make you feel"	12	0
Questions about the information on the label	" Don't know the brand of wine or alcohol percentage" " When it says 2-3 units is safe, how big a glass does it refer to?"	22	25

Thought category	*Examples*	*Number of thoughts*	
		Experi-mental condition	*Control condition*
Reflecting on own drinking behaviour	" How much of this wine would I actually drink compared to what I know I should?" " I drink a lot more than I should"	23	23
Reflecting on others drinking behaviour	" People in my generation don't realise how much is too much" " My mom drinks that amount, if not more of wine, every night. I don't like this thought"	2	6
Repeating information from the label	" 9 units in the bottle" " Women are not meant to exceed 2-3 units a day"	11	9
Thoughts about alcohol	" Happy about drinking wine" " how much do I like white wine"	4	6
Other	" is it a test, will I get it wrong" " thirsty"	13	12

condition. Each thought was coded into a single mutually exclusive category. Where the thought could be coded into more than one category, the category that best fitted the thought was chosen. This process was performed by the first author, and discussed and checked by the second author.

Once all of the data had been coded and checked, information about condition was entered into the case information in NVivo. This was then used to create a matrix table that compared the number of thoughts under each category for participants in the control and experimental conditions (see Table 5)

A Chi-square test revealed that there was no association between categories[1] and experimental condition (Chi-square = 11.48, df = 13, p = 0.57).

Perceived Argument Strength

A 2 x 2 ANOVA with gender and condition as independent variables showed that the arguments were perceived to be stronger by females than males (F[1,105] = 5.99, p = 0.016, see Table 6 for

1 The category 'Noticing self-affirmation slogan' was omitted from this analysis as this could only apply to those in the experimental condition.

mean values). There were no significant differences according to condition and no interaction (Fs[1,105] = 0.24 - 1.17, p >0.05).

Table 6: Mean and standard deviations for Perceived Argument Strength scale by condition and gender

	Control condition	Experimental condition	Total
Males	4.27 (0.77)	3.96 (0.95)	4.12 (0.87)
Females	4.58 (0.81)	4.46 (0.81)	4.52 (0.81)
Total	4.46 (0.80)	4.26 (0.89)	

Message Derogation

A 2 x 2 ANOVA with gender and condition as independent variables and message derogation score as the dependent variable showed that females reported significantly lower message derogation (F[1,106] = 5.21, p = 0.024, see Table 7 for mean values), but there were no differences by condition and no interaction (F's[1,106] = 0.14-1.53, p's >0.05).

Table 7: Mean and standard deviations for message derogation scale by condition and gender

	Control condition	Experimental condition	Total
Males	3.61 (1.30)	3.42 (0.95)	3.52 (1.12)
Females	2.86 (0.97)	3.21 (1.12)	3.03 (1.05)
Total	3.14 (1.15)	3.29 (1.05)	

Anger

A 2 x 2 ANOVA with gender and condition as independent variables showed that there were no differences by gender or condition for anger scores and no interaction (Fs[1, 106] = 0.09-1.23, ps > 0.05, see Table 8 for mean values).

Table 8: Mean and standard deviations for anger by condition and gender

	Control condition	Experimental condition	Total
Males	1.51 (1.22)	1.79 (1.25)	1.65 (1.23)
Females	1.39 (0.88)	1.54 (0.68)	1.46 (0.79)
Total	1.43 (1.01)	1.64 (0.94)	

Intervention Results: Time 2

Alcohol Consumption

An ANCOVA was used to assess the effect of condition and gender on alcohol consumption at time 2, controlling for baseline alcohol consumption. As expected, there was an effect of gender such that women drank significantly fewer Units of alcohol than men (F[1,100] = 5.45, p = 0.022) but there was no effect of condition and no interaction (Fs[1,100] = 0.29-1.57, p >0.05).

Table 9: Mean Alcohol consumption (Units) at time 2 by condition and gender

	Control condition		Experimental condition	
	Time 2	Adjusted for baseline	Time 2	Adjusted for baseline
Males	34.69 (22.40)	25.80	19.51 (24.31)	20.46
Females	14.31 (11.08)	17.06	13.48 (9.50)	14.98

PMT variables

A MANOVA was conducted on variables from PMT with time (baseline, post-task and time 2) as a within subjects variable and condition and gender as between subjects variables (see Table 10 for descriptive statistics). This revealed a significant main effect of time ($F[16,82] = 4.11$, $p < 0.001$) and further univariate investigations revealed that this effect was due to significant differences in severity, fear, self-efficacy, response efficacy, rewards and intention between the 3 time-points ($Fs[2, 194] = 3.84\text{-}14.52$, $ps < 0.02$, see Figure 4). Post-hoc pairwise comparisons adjusted with Bonferroni's correction showed that Severity decreased from baseline to time 2 ($p = 0.01$). Fear was significantly lower at post-task and time 2 compared to baseline ($p = 0.002$ and 0.04 respectively). Self-efficacy was significantly lower at post-task compared to baseline ($p = 0.003$) although there was not a difference between self-efficacy at baseline and time 2 ($p = 0.27$). Response efficacy post task was significantly higher than at baseline ($p = 0.006$) and time 2 ($p = 0.014$). Rewards were significantly higher at time 2 than at baseline ($p < 0.001$) and post-task ($p = 0.002$). Intentions to drink within safe levels were lower at time 2 compared to baseline and post-task ($ps = 0.007$).

Figure 4. PMT variables over time.

Table 10: Mean and standard deviations for PMT variables by time (baseline, post-task and time 2), condition and gender.

	Control condition						Experimental condition					
	Baseline		Time 2				Post-task				Time 2	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Severity	4.53 (1.25)	4.58 (1.26)	4.46 (1.00)	4.51 (1.19)	4.16 (1.03)	4.15 (0.96)	4.45 (1.20)	4.65 (1.22)	4.28 (1.23)	4.46 (1.23)	4.41 (1.11)	4.23 (1.12)
Vulnerability	3.32 (1.29)	2.51 (0.88)	2.90 (1.33)	2.61 (0.96)	3.16 (1.30)	2.69 (0.99)	2.56 (1.10)	2.58 (0.99)	2.79 (1.22)	2.76 (1.02)	2.66 (1.00)	2.46 (0.99)
Response Cost	4.10 (1.38)	3.48 (1.37)	4.32 (1.37)	3.78 (1.38)	4.26 (1.38)	3.53 (1.37)	4.10 (0.97)	3.74 (1.44)	4.07 (1.20)	3.88 (1.50)	4.02 (1.29)	3.90 (1.13)
Fear	4.30 (1.67)	4.80 (1.21)	4.06 (1.67)	4.24 (1.72)	4.33 (1.53)	4.29 (1.43)	3.55 (1.46)	4.69 (1.43)	2.86 (1.68)	4.74 (1.68)	3.08 (1.66)	4.24 (1.53)
Self-efficacy	5.10 (1.48)	5.81 (1.10)	4.67 (1.68)	5.48 (1.12)	4.88 (1.55)	5.53 (0.91)	5.48 (1.37)	5.61 (1.44)	5.50 (1.30)	5.19 (1.53)	5.25 (1.19)	5.39 (1.36)
Response-efficacy	4.81 (1.01)	4.58 (1.31)	4.81 (0.89)	4.94 (1.18)	4.46 (1.07)	4.54 (1.11)	4.64 (0.96)	4.58 (1.42)	4.83 (0.81)	5.08 (1.13)	4.70 (1.10)	4.91 (1.19)
Rewards	4.67 (1.29)	4.35 (1.51)	4.75 (1.45)	4.64 (1.37)	5.21 (1.12)	4.73 (1.28)	4.75 (1.26)	4.68 (1.15)	4.70 (1.27)	4.93 (1.01)	5.44 (1.13)	5.13 (1.07)
Intention	4.77 (1.60)	5.35 (1.31)	4.63 (1.59)	5.05 (1.22)	4.37 (1.74)	4.73 (1.28)	4.48 (1.68)	4.80 (1.59)	4.57 (1.60)	4.82 (1.34)	4.02 (1.63)	4.68 (1.37)

Results: Interim Summary

There were no significant differences in perceived argument strength, message derogation or anger between the two label conditions, and no differences in the amount of 'wine' poured following exposure to the message, or the amount of alcohol consumed 1 month, although in both cases females poured/drank significantly fewer Units of alcohol than males. There were some differences in PMT variables over time, although these were not modified by the effects of condition and did not follow any clear pattern.

Looking back to Table 2, it is clear that this sample included some individuals for whom we might not expect the intervention to be effective. Fourteen participants were sensible drinkers. For these individuals the alcohol information label is unlikely to be perceived as threatening and therefore the self-affirmation intervention in unlikely to have an effect. Their weekly alcohol consumption at baseline confirms this with a mean consumption of 11.53 Units (standard deviation = 9.24 Units). Likewise, 12 participants were classified as possible dependent drinkers and may be addicted to alcohol. Brief alcohol interventions have been suggested to be less effective in individuals with more severe alcohol problems (Moyer, Finney, Swearingen, & Vergun, 2002), and we might therefore expect that the intervention may have less effect for this group. Therefore hazardous and harmful drinkers, defined as having an AUDIT score of 8-19 were selected and the analyses repeated for this sub-sample.

Intervention Results: Time 1 (hazardous and harmful drinkers)

Wine-pouring task

A 2x2 ANOVA was performed with gender and condition as independent variables and Units poured as the dependent variable. This revealed no significant effects (Fs[1,81] = 0.13-2.64, ps>0.05). See Table 11 for mean values.

Table 11: Mean and standard deviations for Units poured by condition and gender (Hazardous and Harmful drinkers)

	Control condition	Experimental condition	Total
Males	4.52 (1.38)	4.10 (1.41)	4.30 (1.39)
Females	3.75 (1.48)	4.39 (1.47)	4.07 (1.50)
Total	4.02 (1.48)	4.28 (1.44)	

Perceived Argument Strength

A 2 x 2 ANOVA with gender and condition as independent variables showed no significant effects (Fs[1,80] = 0.50-3.40, ps >0.05), see table 12 for means.

Table 12: Mean and standard deviations for Perceived Argument Strength scale by condition and gender (Hazardous and Harmful drinkers

	Control condition	Experimental condition	Total
Males	4.28 (0.85)	3.93 (1.03)	4.10 (0.95)
Females	4.51 (0.81)	4.45 (0.87)	4.48 (0.83)

Total	4.43 (0.82)	4.24 (0.96)	

Message Derogation

A 2 x 2 ANOVA with gender and condition as independent variables showed there to be no significant effects (Fs[1,81] = 0.12-1.38, ps >0.05), see table 13 for means.

Table 13: Mean and standard deviations for message derogation scale by condition and gender (Hazardous and Harmful Drinkers)

	Control condition	Experimental condition	Total
Males	3.45 (1.42)	3.24 (0.92)	3.34 (1.17)
Females	2.86 (1.05)	3.26 (1.20)	3.06 (1.13)
Total	3.08 (1.21)	3.25 (1.09)	

Anger

A 2 x 2 ANOVA with gender and condition as independent variables showed that there were no differences by gender or condition for anger scores and no interaction (Fs[1, 81] = 0.02-0.47, ps > 0.05, see Table 14 for mean values).

Table 14: Mean and standard deviations for anger by condition and gender (Hazardous and Harmful Drinkers)

	Control condition	Experimental condition	Total
Males	1.57 (1.36)	1.74 (1.31)	1.66 (1.31)
Females	1.44 (0.97)	1.54 (0.74)	1.49 (0.86)
Total	1.48 (1.11)	1.62 (0.99)	

Intervention Results: Time 2 (hazardous and harmful drinkers)

Alcohol Consumption

An ANCOVA was used to assess the effect of condition and gender on alcohol consumption at time 2, controlling for baseline alcohol consumption. The means and adjusted means are presented in table 15. There was a main effect of condition such that those in the experimental condition drank significantly fewer units of alcohol than those in the control condition at time 2 (F[1,76] = 7.76, p = 0.007). There was no effect of gender and no interaction (F's[1,76] = 1.64-2.77, p > 0.05).

Table 15: Mean Alcohol consumption (Units) by time, condition and gender (Hazardous and Harmful Drinkers).

	Control condition			Experimental condition		
	Baseline	Time 2	Time 2 Adjusted for baseline	Baseline	Time 2	Time 2 Adjusted for baseline
Males	40.20 (18.80)	34.54 (17.08)	25.88	17.63 (11.72)	13.35 (13.74)	15.02

Females	14.71 (7.12)	14.75 (11.08)	17.76	19.77 (12.27)	13.41 (7.62)	14.11

PMT variables

A MANOVA was conducted on variables from PMT with time (baseline, post-task and time 2) as a within subjects variable and condition and gender as between subjects variables (see Table 16 for descriptive statistics). This revealed there to be a significant effect of time ($F[16,58] = 2.64$, $p = 0.004$) and a significant time x gender interaction ($F[16,58] = 1.89$, $p = 0.041$). Further univariate investigations of the time effect revealed that this was due to significant differences in response efficacy, rewards and intention between the 3 time-points ($Fs[2, 146] = 3.31$-10.07, $ps < 0.04$). Post-hoc pairwise comparison adjusted with Bonferroni's correction for these variables showed that response efficacy significantly increased from baseline to post-task ($p = 0.009$), rewards significantly increased at time 2 relative to both baseline ($p = 0.001$) and post-task (0.018). Differences between intention over time were not sufficient to produce significant effects with bonferroni adjustments.

Univariate tests revealed that the time x gender interaction was due to a significant interaction for fear ($F[2, 146] = 3.24$, $p = 0.042$). Means showed that this was due to fear levels for females gradually decreasing over the three time-points in the study such that there was a significant reduction between baseline and time 2 ($p = 0.004$), while for males (who had a lower fear level throughout), fear levels decreased from baseline to post-task ($p = 0.005$), but then increased again at time 2 to near baseline levels (although this increase did not reach statistical significance, $p = 0.06$).

Hazardous and harmful drinkers summary

For hazardous and harmful drinkers there was a reduction in alcohol consumption at time 2 for participants who had been exposed to the self-affirmation slogan alongside the UK government recommended alcohol information label. Despite this, however, there was no clear indication as to what mechanism might explain this effect.

Table 16: Mean and standard deviations for PMT variables by time (baseline, post-task and time 2), condition and gender for Harmful and Hazardous drinkers.

	Control condition						Experimental condition					
	Baseline		Time 2				Post-task				Time 2	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Severity	4.32 (1.27)	4.34 (1.16)	4.34 (1.06)	4.49 (1.31)	4.30 (1.08)	4.09 (1.03)	4.67 (1.00)	4.69 (1.28)	4.32 (1.17)	4.64 (1.22)	4.52 (0.98)	4.31 (1.15)
Vulnerability	3.30 (4.41)	2.47 (0.80)	3.04 (1.48)	2.54 (0.92)	3.25 (1.43)	2.78 (1.03)	2.58 (1.07)	2.39 (0.95)	2.67 (1.29)	2.59 (0.95)	2.60 (1.05)	2.33 (0.92)
Response Cost	4.17 (1.06)	3.48 (1.39)	4.45 (1.18)	3.80 (1.49)	4.26 (1.29)	3.67 (1.47)	3.80 (0.92)	3.81 (1.56)	3.78 (1.17)	3.92 (1.60)	4.00 (1.29)	3.91 (1.14)
Fear	4.00 (1.82)	4.78 (1.26)	3.71 (1.84)	4.35 (1.77)	4.32 (1.71)	4.37 (1.41)	3.48 (1.41)	4.78 (1.50)	2.91 (1.61)	4.77 (1.79)	3.15 (1.73)	4.16 (1.60)
Self-efficacy	5.10 (1.43)	5.75 (1.06)	4.83 (1.49)	5.41 (1.03)	5.02 (1035)	5.46 (0.86)	5.67 (1.18)	5.55 (1.49)	5.71 (1.21)	5.09 (1.56)	5.58 (1.06)	5.40 (1.28)
Response-efficacy	4.82 (1.15)	4.42 (1.20)	4.73 (1.01)	4.79 (1.30)	4.66 (1.07)	4.50 (1.09)	4.77 (0.83)	4.62 (1.45)	5.02 (0.70)	5.30 (1.01)	4.80 (1.15)	4.86 (1.00)
Rewards	4.83 (1.24)	4.57 (1.55)	4.98 (1.28)	4.91 (1.40)	5.43 (0.84)	5.06 (1.24)	4.60 (1.28)	4.71 (1.15)	4.51 (1.26)	5.01 (0.96)	5.51 (0.98)	5.05 (1.03)
Intention	4.74 (1.75)	5.00 (1.36)	4.71 (1.59)	4.86 (1.25)	4.48 (1.68)	4.70 (1.11)	4.53 (1.37)	4.73 (1.58)	4.69 (1.34)	4.64 (1.27)	4.22 (1.34)	4.55 (1.48)

Discussion & Implications

The short self-affirmation slogan presented alongside the alcohol information label in this study did not affect how much alcohol was judged to be safe in a wine-pouring task. This is at odds with previous pilot work, which showed that participants exposed to this slogan poured significantly less 'wine' than those exposed to a government recommended message (Arden et al., 2010). There are a number of possible explanations for this discrepancy. The data for Arden et al.'s (2010) study was collected by a student, with fellow students as participants. This may have provided a relaxed atmosphere in testing in which participants felt less pressure to conform to the recommended guidance. In contrast, the present study was conducted by a research assistant in a laboratory setting that may have increased the demand characteristics of the test situation and resulted in increased compliance (see Orne, 1962). This may have resulted in a ceiling effect whereby participants in both conditions processed the information and poured an amount of wine close to that recommended. Indeed the mean Units poured by women in the Government recommended information condition of Arden et al.'s, (2010) study were substantially higher (mean = 5.92 Units) than for the present study (mean = 3.71 Units). A second explanation is that the original finding was an artefact caused by a very small sample size.

The self-affirmation slogan did not affect alcohol consumption one month after exposure for the sample as a whole. However for participants categorised as Hazardous or Harmful drinkers by the AUDIT scale, the self-affirmation slogan did result in a significant reduction in Units of alcohol consumed in the past week at Time 2 compared to the control condition. This is consistent with research that shows that short self-affirmation slogans can be effective at reducing alcohol consumption (Armitage et al., 2011).

The present study is important because it shows that an on-product self-affirmation slogan can result in significant changes in alcohol consumption. This ecologically valid intervention is more practical than other widely-used self-affirmation manipulations such as writing essays: the slogan used in this study was short, simple and could conceivably be routinely added to the alcohol information currently displayed on alcohol products. However, it is not currently clear whether self-affirming slogan would have similar effects in the field. For example, the experimental procedure instructed participants to read the information yet it was clear from some participants' comments that they rarely read this information outside of the experimental setting (e.g. "I never take notice of alcohol warning messages on alcohol bottles"), meaning that the self-affirming slogan might have limited effects. That said, this limitation also applies to the current Government recommended information, and given that the experimental labels used in the present study were shown to raise awareness of the risk factors and change behaviour (Stockwell, 2006; Wilkinson & Room, 2009), it is plausible that the self-affirming slogan might at least enhance the effectiveness of Government information.

The participants in the study significantly overestimated the volume of wine that would be safe to drink. Thus the UK government recommended information was insufficient to enable them to judge an amount of 'wine' that was 2-3 units (for women) or 3-4 units (for men). This suggests that the recommended information needs to be modified to make it easier to understand and interpret in terms of volume of alcohol. Further research is required to establish the best way to present this information.

Contrary to previous research which has shown an effect of self-affirming on behavioural intentions (Armitage, Harris, Hepton, & Napper, 2008), the present research did not show any effects of the intervention on intention, or any other social cognitive variables. However, this finding is not unique in self-affirmation research of this kind: Armitage, Harris, Arden, & Rowe (2011) report a similar finding in their study of self-affirmation in adolescents. However this begs the question as to how this effect might have occurred . Self-affirmation theory would suggest that being self-affirmed should allow individuals to process threatening information more objectively. Thus we expected that participants in the experimental condition might perceive that the argument was stronger, be less angry, be less likely to derogate the message and process the message differently to those in the control condition. The present findings did not support these expectations: there were no significant differences between conditions for these variables. However the content analysis of the thought listing data indicated that some participants found the alcohol information to be threatening (e.g. "Concerned for my health"), and some engaged in maladaptive processing of the information; both avoidance and derogation. Although these did not differ by condition it would suggest that the information label was sufficiently threatening for self-affirmation to be an appropriate intervention. It is therefore plausible that although our psychometric analyses suggested that our measures of these constructs was reliable, the measures were not sensitive to changes as a result of self-affirmation.

Contrary to expectations there were some significant effects of time on PMT variables i.e. irrelevant of condition something caused there to be changes in variables over time. Given that all participants were exposed to, and read the Government recommended alcohol information this would seem likely to be the cause of these changes. Although the pattern of results is somewhat difficult to interpret, one possibility is that the alcohol information caused participants to perceive less threat (severity and fear decreased while rewards increased) and greater coping demands (self-efficacy decreased) and this together resulted in intentions to drink within safe levels decreasing over the course of the study. This may be related to the increased awareness of the extent of the Government recommended limits as a result of being exposed to this information: the thought listing results indicated that a large number of participants expressed surprise or a lack of information about the safe amounts of alcohol, and in many cases a greater awareness of how their past and current behaviour was inconsistent with this message. Thus the perceived meaning of the word 'safe' within the items might have changed over the course of the study e.g. "I intend to drink within *safe* levels".

A number of limitations of the study need to be acknowledged. Firstly, the sample sizes were quite small and this may have resulted in reduced power and type 2 errors. This may have particularly been the case for the male sample. Although the intention was to recruit equal numbers of male and female participants, the practicalities of the gender split of those who volunteered, and the limited time in which testing took place meant that we ended up with more females than males. Second, a majority of the sample were students. This has both benefits and disadvantages. Students are known to have high levels of binge drinking (Gill, 2002) and are thus an appropriate group to target with alcohol interventions. However, the findings may not be as generalisable to a general population sample.

In conclusion, an on-product self-affirmation intervention did not affect judgements about the alcohol information message or affect judgements of safe alcohol volume in a wine pouring task, however for harmful and hazardous drinkers, exposure to the self-affirmation message did

reduce alcohol consumption one month later. Further research is required to access the robustness of this effect and the extent to which these findings might be valid in the field.

References

Arden, M.A., O'Neill, C. & Armitage, C.J. (2010) Self-affirmation and judgements of 'safe' alcohol volume in female students. *Proceedings of the British Psychological Society, 2010 Annual conference of Division of Health Psychology*. Available http://www.bps.org.uk/conferences-and-events/events-home.cfm

Armitage, C. J., Harris, P. R., & Arden, M. A. (2011). Evidence that self-affirmation reduces alcohol consumption: Randomized exploratory trial with a new, brief means of self-affirming. *Health Psychology, 30,* 633-641.

Armitage, C. J., Harris, P. R., Arden, M. A., & Rowe, R. (2011). *Unpublished raw data*. University of Sheffield, UK.

Armitage, C. J., Harris, P. R., Hepton, G., & Napper, L. (2008). Self-affirmation increases acceptance of health-risk information among UK adult smokers with low socioeconomic status. *Psychology of Addictive Behaviors, 22*, 88-95.

Babor, T.F., Higgins-Biddle, J.C., Saunders, J.B., and Monteiro, M.G. (2001). *The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care.* 2nd ed. World Health Organization, Department of Mental Health and Substance Dependence: Geneva, Switzerland.

Cacioppo, J.T., & Petty, R.E. (1981). Social Psychological Procedures for Cognitive Response Assessment: The Thought -Listing Technique. In T.V. Merluzzi, CR.Glass & M. Genest (Eds.) *Cognitive Assessment* pp. 309-392. New York: Guilford Press.

Campden & Chorleywood Food Research Association Group (2008). *Monitoring Implementation of Alcohol Labelling Regime. http://www.cspinet.org/new/pdf/alcohollabelingstudy.pdf*

Cohen, G.L., Garcia, J., Purdie-Vaughns, V., Apfel, N. & Brzustoski, P. (2009) Precursive processes in self-affirmation: Intervening to close the minority achievement gap. *Science, 324*(5925), 400-403.

Croyle, R.T., Sun, Y-C., & Hart, M. (1997) Processing risk factor information: defensive biases in health-related judgements and memory. In K.J.Petir & J.A. Weinman (Eds.) *Perceptions of Health and Illness* pp. 267-290. Amsterdam: Harwood Academic.

De Wit, J.B.F., Das, E., & Vet, R. (2008). What works best: Objective statistics or a personal testimonial? An assessment of the persuasive effects of difference types of message evidence on risk perception. *Health Psychology, 27,* 110-115.

Dillard, J. P., & Peck, E. *(*2001*)*. Persuasion and the structure of affect: Dual systems and discrete emotions as complementary models. Human Communication Research, ***27***, 38–68.

Gill, J.A. (2002). Reported levels of alcohol consumption and binge drinking within the UK undergraduate student population over the last 25 years. *Alcohol & Alcoholism, 37,* 109-120.

Harris, P.R., & Napper, L. (2005). Self-affirmation and the biased processing of threatening risk information. *Personality and Social Psychology Bulletin, 31,* 1250-1263.

Harris, P. R., Napper, L., Griffin, D. W., Schuez, B., & Stride, C. (2011). *Developing a measure of spontaneous self-affirmation.* Manuscript in preparation.

Harris, P.R., Mayle, K., Mabbott, L., & Napper, L., (2007). Self-affirmation reduces smokers' defensiveness to graphic on-pack cigarette warning labels. *Health Psychology, 26,* 437-446.

Klein, W.P. & Harris, P.R. (2009) Self-affirmation enhances attentional bias toward threatening components of a persuasive message. *Psychological Science, 20*(12), 1463-1467.

van Konnigsbruggen, G.M., Das, E., & Roskos-Ewoldsen, D.R. (2009). How self-affirmation reduced defensive processing of threatening health information: Evidence at the implicit level. *Health Psychology, 28*(5), 563-568.

McQueen, A. & Klein, W.M.P. (2006). Experimental manipulations of self-affirmation: A systematic review. *Self & Identity, 5,* 289-354.

Moyer, A., Finney, J.W., Swearingen. C.E., & Vergun, P. (2002). Brief interventions for alcohol problems: A meta-analytic review of controlled investigations in treatment seeking and non-treatment-seeking populations. *Addiction, 97*, 279-292.

Office for National Statistics (2011). *Statistics on Alcohol: England, 2011*. The Health and Social Care Information Centre. Available: http://www.ic.nhs.uk/webfiles/publications/003_Health_Lifestyles/Alcohol_2011/NHSIC_Statistics_on_Alcohol_England_2011.pdf

Orne, M.T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist, 17*(11), 776-783.

Rogers, R.W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. Cacioppo & R. Petty (Eds.) *Social psychophysiology.* New York: Guilford, pp. 153-176.

Sherman, D.K., Nelson, L.D., & Steele, C.M. (2000). Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation. *Personality and Social Psychology Bulletin, 26,* 1046-1058.

Sobell, L.C., & Sobell, M.B. (1992). Timeline follow-back: a technique for assessing self-reported alcohol consumption. In J.P. Allen & R.Z. Litten (Eds.), *Measuring Alcohol Consumption: Psychosocial and Biochemical Methods*, pp. 41-72. Totowa, NJ : Human Press.

Steele, C.M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.) *Advances in experimental social psychology, Vol. 21,* pp. 261-302*.* New York: Academic Press.

Stockwell, T. (2006) *A Review of Research Into The Impacts of Alcohol Warning Labels On Attitudes and Behaviour*. Centre for Addiction Research of British Columbia, Canada.

Wilkinson, C. & Room, R. (2009) Warnings on alcohol containers and advertisements: International experience and evidence on effects. *Drug & Alcohol Review, 28,* 426-435.

Witte, K. (1994). Fear control and danger control: A test of the extended parallel process model (EPPM). Communication Monographs, ***61***, 113–134.

Zhao, X., Strasser, A., Cappella, J.N., Lerman, C., & Fishbein, M. (2011). A Measure of Perceived Argument Strength: Reliability & Validity. *Communication Methods and Measures, 5,* 1-28.