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Enhancing the Effectiveness of Alcohol Warning Labels With a Self-Affirming Implementation Intention

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Brief Report: Enhancing the Effectiveness of Alcohol Warning Labels With a Self-Affirming Implementation Intention

Objective. Excess alcohol consumption extorts significant social and economic costs that are increasing despite the presence of mandatory warning labels on packaged alcoholic beverages. We used a novel approach by adding a brief statement based on self-affirmation theory (Steele, 1988) to alcohol warning labels.

Method. In two studies ($N = 85$; $N = 58$), we randomized regular wine drinkers recruited from University campuses to complete a wine pouring task with bottles that had standard labeling, or bottles that added a self-affirming implementation intention to the standard labeling. Alcohol consumption, behavioral intention and self-efficacy were measured pre-manipulation; message acceptance was measured post-manipulation; and alcohol consumption, behavioral intention and self-efficacy were measured again at follow-up.

Results. In both studies, the self-affirming implementation intention significantly reduced subsequent alcohol consumption (ds = 0.70 and 0.91, respectively). However, message acceptance, behavioral intention, and self-efficacy did not significantly mediate the observed effects.

Conclusions. Self-affirming implementation intentions augmented the effect of alcohol warning labels to reduce subsequent alcohol consumption, but – consistent with the broader self-affirmation literature – it was not clear what mediated the effects. Further research is required to examine whether self-affirming implementation intentions could augment the effects of other kinds of public health-related labeling.

KEY WORDS: brief intervention; self-affirmation; health behavior change; implementation intentions; alcohol; labeling.

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Excess alcohol consumption extorts significant social and economic costs that are increasing despite the presence of mandatory warning labels on packaged alcoholic beverages. Research shows that people react defensively to the information on the labels meaning that their alcohol consumption remains unaffected (Andrews, 1995). According to self-affirmation theory (Steele, 1988), defensiveness arises because people are motivated to defend their global sense of self-worth, which is threatened by alcohol warning labels. However, accumulated empirical evidence demonstrates that affirming the self leads consistently to improvements in the way in which threatening health messages are processed and to increases in people's motivation to act in accordance with the message (Epton, Harris, Kane, van Koningsgruggen, & Sheeran, 2015).

A self-affirming implementation intention has been developed that significantly reduces alcohol consumption (Armitage, Harris, & Arden, 2011; Armitage, Rowe, Arden, & Harris, 2014) and could be adapted for use on alcohol warning labels. The self-affirming implementation intention works on the principles that: (a) specifying the critical situation "feeling threatened or anxious" increases the salience of that critical situation when it is aroused by an alcohol warning label, and (b) linking "feeling threatened or anxious" to an appropriate affirming response (e.g., "thinking about the things that are important to me") ensures that the affirming response is triggered automatically (e.g., Gollwitzer, 1993).

Two studies to date show that when adults (Armitage et al., 2011) and adolescents (Armitage et al., 2014) are asked to form self-affirming implementation intentions, subsequent alcohol consumption is significantly reduced. Of particular relevance in the present context is that significant reductions in alcohol consumption occurred even when the self-affirming implementation intention was not copied out in full (as per the instructions),

and was instead ticked or circled (Armitage et al., 2011; Armitage et al., 2014). The implication is that even minimal processing of self-affirming implementation intentions, such as might occur when reading the label on a wine bottle, might reduce alcohol consumption.

The principal aim of the present research is to see whether standard warning information can be augmented with a self-affirming implementation intention to bring about reduced alcohol consumption. A second aim was to address limitations in Armitage et al.'s (2011, 2014) operationalization of message acceptance and motivation as potential mediators of the effects of self-affirming on alcohol consumption.

Two studies were designed to test the hypotheses that: (a) alcohol warning labels augmented with a self-affirming implementation intention would significantly decrease subsequent alcohol consumption, and (b) any effect of self-affirmation on alcohol consumption would be mediated by greater message acceptance and increased motivation.

Method

Participants

Regular wine drinkers were invited to take part in a study on alcohol consumption. Participants were recruited from University campuses and via advertisements placed on student PC screensavers and in staff e-newsletters, and made appointments to attend the laboratory via e-mail. Eighty-five agreed to participate in Study 1 (Table 1) and fifty-eight people agreed to participate in Study 2 (Table 2). Participants were paid £5 (circa US$7.50) in high street vouchers (Study 1) or received course credit (Study 2). The study received full ethical approval from the appropriate University research ethics committee. Assuming .80 power and alpha = .05 we required at least 58 participants in total at follow-up to test repeated measures differences between intervention and control groups based on the average effect size of implementation intentions, namely, $d = 0.65$ (Gollwitzer & Sheeran, 2006). Participants were randomly allocated using online randomization software to one of the two

conditions. Participants were blind with respect to condition.

Design and Procedure

On arrival at the laboratory, participants were provided with information about the study, reminded of their right to withdraw, and asked to sign a consent form. Participants were then asked to complete a pre-manipulation questionnaire. On completion of the pre-manipulation questionnaire participants were led to an adjacent room in which there was a set of written instructions, a wine bottle and four empty wine glasses. Participants were presented with a standard 750ml wine bottle that appeared to contain white wine and instructed to read the labels on the bottle. In fact, the bottle was filled with water colored with three drops of yellow food coloring to resemble a light colored white wine (e.g., Pinot Grigio). The labels on the back of the wine bottles included standard UK government information about alcohol intake; the experimental label additionally included a self-affirming implementation intention: "If I feel threatened or anxious, then I will think about the things that are important to me" (supplemental material; Armitage et al., 2011, 2014).

Participants were instructed to pour what they thought would be a safe amount to drink in a single session into one (or more) of four empty wine glasses. The wine glasses and bottles were weighed before and after the experiment. Given that 1g of water equals 1ml of water and that there are 9 units of alcohol in a 750ml bottle of wine (12% alcohol by volume), then: Units poured = weight of water (g) *x* (9/750). The correlation between the amount poured into the glasses and the amount remaining in the bottle was, $r = 0.98$, $p < .001$, and so the number of units poured into the glass(es) was used in subsequent analyses.

After the task participants completed the post-manipulation questionnaire. Following completion of the post-manipulation questionnaire, participants were invited to provide contact details. All participants chose to be contacted by e-mail and were sent an online questionnaire one month post-manipulation. Contact details were kept separate from

participants' anonymized data and all participants were successfully contacted.

Measures

Pre-manipulation questionnaires measured age, gender, ethnicity, alcohol consumption, and motivation. Alcohol consumption was measured using an adapted version of the timeline follow-back technique (Sobell & Sobell, 1992). Behavioral intention was measured with three items, including: "I intend to drink within [safe levels, Study 1]/[government recommended levels, Study 2] *definitely do not* (1)-*definitely do* (7)." Internal reliability was high in both Study 1 (α = .94) and Study 2 (α = .81). Self-efficacy was measured with three items, including: "How confident are you that you will be able to drink within [safe levels, Study 1]/[government recommended levels, Study 2]? *not very confident* (1)-*very confident* (7)." Cronbach's α indicated high internal reliability in both Study 1 (α = .88) and Study 2 (α = .86).

Post-manipulation questionnaires assessed message acceptance. In Study 1, *message derogation* (Witte, 1994) was measured with four items, e.g., "The information on the alcohol label was exaggerated *strongly disagree* (1)-*strongly agree* (7)," and *anger* (Dillard & Peck, 2001) also consisted of four items, e.g., "The information on the alcohol label made me feel angry *not at all* (1)-*very much* (7)." Cronbach's α indicated high internal reliability (αs = .88 and .95, respectively). In Study 2, message acceptance was operationalized in terms of perceived expertise (2 items e.g., expert *not at all* [1]-*very* [7], α = .84) and perceived credibility (3 items e.g., reliable *not at all* [1]-*very* [7], α = .74; Wu & Shaffer, 1987); and message utility (4 items e.g., useful *not at all* [1]-*very* [7], α = .71) and message satisfaction (6 items e.g., interesting *not at all* [1]-*very* [7], α = .54, Moon & Nass, 1996).

Follow-up questionnaires were administered online one month post-intervention and included repeat measures of alcohol consumption, behavioral intention ($\alpha_{\text{Study 1}}$ = .89; $\alpha_{\text{Study 2}}$ = .87) and self-efficacy ($\alpha_{\text{Study 1}}$ = .85; $\alpha_{\text{Study 2}}$ = .88).

Results

MANOVA and chi-square were used to test whether the intervention and control groups were equivalent at baseline. All the multivariate and univariate tests were nonsignificant (Tables 1 and 2), showing equivalence between groups at baseline in terms of age, gender, ethnicity, behavioral intention, self-efficacy, and alcohol consumption.

MANOVA was used to test whether intervention and control groups differed post-manipulation in terms of the amount of wine poured and message acceptance. In both studies, there were no significant main effects of condition, ps > .28; no significant main effects of gender, ps > .28; and no significant condition *x* gender interactions, ps > .28.

MANCOVA was used to test whether intervention and control groups differed in behavioral intention, self-efficacy and the amount of alcohol consumed at follow-up controlling for baseline measures of each. There was a significant multivariate main effect of condition in both Study 1, $F(3, 71) = 3.69$, $p = .02$, $\eta_p^2 = .13$, and Study 2, $F(3, 49) = 3.74$, $p = .02$, $\eta_p^2 = .19$. However, there were no significant main effects of gender, $F_{\text{Study 1}}(3, 71) = 1.07$, $p = .37$, $\eta_p^2 = .04$; $F_{\text{Study 2}}(3, 49) = 1.15$, $p = .34$, $\eta_p^2 = .07$, and no condition *x* gender interactions, $F_{\text{Study 1}}(3, 71) = 1.64$, $p = .19$, $\eta_p^2 = .06$; $F_{\text{Study 2}}(3, 49) = 1.02$, $p = .39$, $\eta_p^2 = .06$.

Scrutiny of the univariate tests revealed no significant differences in behavioral intention, $F_{\text{Study 1}}(1, 73) = 0.78$, $p = .38$, $\eta_p^2 = .01$; $F_{\text{Study 2}}(1, 51) = 1.76$, $p = .19$, $\eta_p^2 = .30$; and self-efficacy, $F_{\text{Study 1}}(1, 73) = 0.29$, $p = .59$, $\eta_p^2 = .004$; $F_{\text{Study 2}}(1, 51) = 1.51$, $p = .22$, $\eta_p^2 = .03$, at follow-up in either study. However, participants exposed to the self-affirming label were consuming significantly fewer units of alcohol at follow-up than those exposed to the standard label in both Study 1, $F(1, 73) = 8.86$, $p < .01$, $\eta_p^2 = .11$, $d = 0.70$ and in Study 2, $F(1, 51) = 10.59$, $p < .01$, $\eta_p^2 = .17$, $d = 0.91$.

Discussion

We adopted a novel approach by adding a brief statement based on self-affirmation

theory (Steele, 1988) to alcohol warning labels. In two studies, we showed that engaging in a wine pouring task and being exposed to a self-affirming implementation intention led to significant decreases in alcohol consumption at follow-up. Given the brevity of the intervention and the multiple domains in which it might be deployed (e.g., cigarette packaging), the present findings are encouraging and warrant further investigation.

Consistent with the broader literature on self-affirmation theory (e.g., Epton et al., 2015) and the self-affirming implementation intention (Armitage et al., 2011; 2014), we were unable to identify significant mediators of the observed effects, which is potentially problematic for self-affirmation theory (Steele, 1988). One possible avenue for further research might be to consider whether implicit – as opposed to explicit – measures mediate the effects of self-affirming. Another possible avenue is to consider whether motivation provides an adequate explanation of the effects of self-affirming; one possibility is that self-affirming might prompt self-regulatory mechanisms, as opposed to behavioral intention and self-efficacy. Consistent with this view, recent research suggests that the effects of implementation intentions on behavior change can at least partly be explained by changes in self-monitoring (Armitage, in press).

Although the present research takes the literature on self-affirmation forward in some important respects, it is important to take note of some potential limitations. First, participants were invited to take part in a laboratory task that potentially lacked ecological validity when compared with a regular shopping experience and it would be valuable to test the effects of self-affirming implementation intentions in a more naturalistic setting. Nevertheless, it is notable that participants in both the intervention and control conditions poured out similar amounts of wine, which implies that the wine pouring task might not be necessary to exert the observed effects. Second, although the effects of the manipulation persisted beyond the experimental session, it would be valuable to see whether the effects are

sustained over a period of time longer than a month. It is worth noting, however, that greater ecological validity and longer follow-up periods may end up being confounded with repeated exposures to the intervention. Third, alcohol consumption was measured using self-report and it would be valuable to obtain reliable and valid objective data about the main outcome measure. However, we have confidence in the reliability and validity of our dependent variable because, when used in similar situations to the present study, self-reports have been shown to agree 97.1% with biological measures (for a discussion, see Armitage et al., 2011; 2014). Fourth, we did not include a manipulation check and in future research it would be valuable to ascertain whether participants reported giving increased thought to personally-salient goals/outcomes as a result of forming a self-affirming implementation intention.

Two studies showed that standard information augmented with a self-affirming implementation intention was capable of significantly reducing alcohol consumption. Although it is not yet clear which variables mediate the observed effects, the present research demonstrates potential for deploying a simple intervention with considerable public health "reach" both in reducing alcohol consumption specifically and health behaviors more generally.

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Table 1

Effect of the Self-Affirming Implementation Intention (Study 1)

	Intervention, $n = 42$		Control, $n = 43$		
	M	*SD*	*M*	*SD*	*p*
Pre-Manipulation					
Age (years)[a]	23.93	3.55	23.44	3.67	.54
Alcohol Consumption (units/week)[a]	24.05	16.87	18.60	11.97	.09
Behavioral Intention[a]	4.94	1.48	4.68	1.53	.42
Self-Efficacy[a]	5.56	1.19	5.64	1.33	.75
	n	%	*n*	%	
Gender[b]					.72
Women	27	64.29	26	60.47	
Men	15	35.71	17	39.53	
Ethnicity[b]					.17
Asian	2	4.76	3	6.98	
Black	1	2.38	0	0.00	
Mixed Race	0	0.00	2	4.65	
White	39	92.86	38	88.37	
	M	*SD*	*M*	*SD*	
Post-Manipulation					
Units Poured[a]	4.02	1.48	4.28	1.44	.72
Message Derogation[a]	3.08	1.21	3.25	1.09	.73
Anger[a]	1.48	1.11	1.62	0.99	.57
Follow-Up					
Alcohol Consumption (units/week)[c]	13.71	10.29	21.85	16.42	< .01
Behavioral Intention[c]	4.38	1.29	4.56	1.25	.38
Self-Efficacy[c]	5.39	0.99	5.49	1.19	.59

Note. [a]*p* values are associated with the univariate *F* tests testing for differences in values between intervention and control conditions. [b]*p* values are associated with the chi-square tests for differences in between intervention and control conditions. [c]*M* values are "raw" and not adjusted for baseline; *p* values are associated with the univariate *F* tests testing for differences in values at follow-up between intervention and control conditions controlling for baseline values.

Table 2

Effect of the Self-Affirming Implementation Intention (Study 2)

	Intervention, $n = 29$		Control, $n = 29$		
	M	*SD*	*M*	*SD*	*p*
Pre-Manipulation					
Age (years)[a]	19.07	1.33	19.69	0.47	.10
Alcohol Consumption (units/week)[a]	16.73	12.55	18.78	14.44	.57
Behavioral Intention[a]	3.85	1.53	3.59	1.71	.54
Self-Efficacy[a]	5.85	1.13	5.41	1.28	.17
	n	%	*n*	%	
Gender[b]					1.00
Women	22	75.86	22	75.86	
Men	7	24.14	7	24.14	
Ethnicity[b]					.52
Asian	7	24.14	5	17.24	
White	22	75.86	24	82.76	
	M	*SD*	*M*	*SD*	
Post-Manipulation					
Units Poured[a]	3.59	1.75	3.70	1.69	.82
Source Expertise[a]	4.98	1.22	5.26	0.86	.32
Source Credibility[a]	4.86	1.07	5.19	0.87	.20
Message Utility[a]	4.64	1.05	4.71	0.91	.79
Message Satisfaction[a]	3.81	0.66	3.71	0.78	.59
Follow-Up					
Alcohol Consumption (units/week)[c]	13.87	9.61	20.76	17.93	< .01
Behavioral Intention[c]	4.54	1.33	3.87	1.68	.19
Self-Efficacy[c]	5.74	1.21	5.09	1.38	.22

Note. [a]*p* values are associated with the univariate *F* tests testing for differences in values between intervention and control conditions. [b]*p* values are associated with the chi-square tests for differences in between intervention and control conditions. [c]*M* values are "raw" and not adjusted for baseline; *p* values are associated with the univariate *F* tests testing for differences in values at follow-up between intervention and control conditions controlling for baseline values.