INTRODUCTION

‘ Went to a party, danced all night/had 16 beers, started up a fight’ (Dead Kennedys, 1987) vividly illustrates a core problem around young adults’ excessive alcohol consumption—increased likelihood for violence and violence-related injuries (Hingson et al., 2009). Together with road accidents under the influence of alcohol (Hingson et al., 2009) and alcohol-related embarrassing situations (Cooke et al., 2007), such consequences of excessive alcohol consumption are increasingly used in emotive public health campaigns targeted at younger adults such as the ‘Don’t turn a night out into a nightmare’ campaign by the Australian Department of Health and Ageing (DoHA, 2009b) or the ‘Two Drinks Ago’ campaign by the New York City Department of Health and Mental Hygiene (2010). Young adults between 18 and 24 are particularly at risk, because almost a third of this population consumes alcohol in such a way that puts them at high risk for alcohol-related injury and of alcohol-related harm over their lifetime (Australian Institute of Health and Welfare, 2011).

However, such campaigns are often rendered less effective than desired, because people are surprisingly resistant to accepting health risk messages highlighting negative consequences of their behaviours (Sherman and Cohen, 2006). In the alcohol domain, this is particularly the case in younger adults who have not yet experienced immediate negative consequences of excessive alcohol consumption (Larsman et al., 2012). When exposed to messages highlighting negative consequences of excessive alcohol consumption, they often engage in defensive responses such as systematic underestimation of illness risks (Harris and Napper, 2005), or pay less attention to graphic emotive health messages (Brown and Locker, 2009). This is particularly evident in people with higher consumption levels. These findings pose an immense challenge to effective alcohol prevention, since they suggest that cost-effective health promotion campaigns, such as health risk information or emotive graphic campaigns might be less effective than desired due to cognitive biases.

Recent approaches in Social Psychology explain such defensive responses with the premise that people are fundamentally motivated to maintain a positive view of themselves, and that health messages highlighting detrimental behaviours challenge this self-view (Sherman and Cohen, 2006). There is, however, accumulating evidence that enhancing health messages with self-affirmation, the process of focusing on cherished aspects of oneself, increases intentions to reduce alcohol consumption and reduces actual alcohol consumption. It was also examined whether these effects differ by risk status as indicated by standard drinks consumed in an average week. Method: Participants (n=121) were randomly allocated to a self-affirmation or matched control condition before viewing emotive graphic alcohol warning posters in a questionnaire-based study. Results: There were significant increases in intentions to reduce alcohol consumption in self-affirmed participants, and these effects were stronger in participants with higher behavioural risk. Intentions in turn significantly predicted a reduction in self-reported alcohol consumption. Conclusions: These findings support the use of self-affirmation to enhance alcohol awareness campaigns, particularly in individuals with high behavioural risk.

Abstract — Aims: This study tests whether enhancing alcohol risk messages with self-affirmation, the process of focusing on cherished aspects of oneself, increases intentions to reduce alcohol consumption and reduces actual alcohol consumption. It was also examined whether these effects differed by risk status as indicated by standard drinks consumed in an average week. Methods: Participants (n=121) were randomly allocated to a self-affirmation or matched control condition before viewing emotive graphic alcohol warning posters in a questionnaire-based study. Results: There were significant increases in intentions to reduce alcohol consumption in self-affirmed participants, and these effects were stronger in participants with higher behavioural risk. Intentions in turn significantly predicted a reduction in self-reported alcohol consumption. Conclusions: These findings support the use of self-affirmation to enhance alcohol awareness campaigns, particularly in individuals with high behavioural risk.
consumption at follow-up. We further examined whether self-affirmation would affect message derogation as an indicator of defensive responses.

**METHODS**

**Design**

A randomized control design with two independent variables was used. The independent variables were condition (Active control and self-affirmation) and level of risk (self-reported Australian standard drinks in an average week). The dependent variables were message derogation, intention to reduce alcohol consumption, and alcohol intake in the week following the intervention in Australian standard drinks. One Australian standard drink is defined as containing 10g of alcohol, which is equivalent to a 375ml can of mid-strength (3.5% abv) of beer, 100ml of red wine (13.5% abv) or a nip (30ml) of spirits (40% abv; DoHA, 2009a). Ethics approval was obtained from the university’s Social Sciences Human Research Ethics Committee.

**Participants**

Participants were an opportunity sample of 121 undergraduate students at an Australian university. The inclusion criterion was being aged 18–24, as this age group is known to be prone to risky alcohol consumption (Australian Institute of Health and Welfare, 2011). Psychology students received course credit, and all participants entered a prize draw for 5 x AU$50 cash prizes. Participants were recruited via advertisements in undergraduate psychology lectures and advertisements distributed around campus. In total, 94 females and 27 males (total n = 121; M_age = 20.29 years, SD = 1.75) were recruited into the study. All participants completed both baseline and 1-week follow-up measurements. Cross-sectional missing data (<5% on any variable) were imputed using the EM algorithm (Molenberghs et al., 1997) in SPSS.

**Procedure**

Participants were cluster-randomized by use of a random number generator (Urbaniak and Plous, 2012) to either the self-affirmation (n = 54) or control condition (n = 67). Participants were tested in groups of one to nine. After reading an information sheet and providing informed consent, participants completed demographic questions, including the pre-manipulation measures of alcohol consumption. Participants then completed Napper et al.’s (2009) self-affirmation manipulation described in more detail below. Participants were then exposed to four posters from the Australian government health promotion campaign ‘Don’t turn a night out into a nightmare’ (DoHA, 2009b) on separate laminated A4 sheets of paper. This campaign highlights the immediate social and physical consequences of excessive alcohol consumption in young adults such as becoming a victim of assault, traffic accidents or embarrassment. Accompanying each poster was a written statement that reinforced the message such as ‘70 Australians aged under 25 will be hospitalised due to alcohol-caused assault in an average week’. Participants then completed the outcome measures. After 1 week, participants returned for their course credit and completed a question on their alcohol consumption during the previous 7 days.

**Measures**

Alcohol consumption was measured using items adapted from Harris and Napper (2005). These involve a self-report measure in response to the questions ‘How many standard drinks do you consume in an average week?’ and ‘How many standard drinks did you consume in the past 7 days?’, the latter being assessed both before the intervention and 1-week post-test. Participants were provided with the Australian standard drinks guidelines (DoHA, 2009a). This document shows illustrative examples of wine, beer, spirits and ready-mixed drinks and the number of standard drinks that correspond to each. Similar self-report measures have been shown to agree to up to 97.1% with biological measures (Babor et al., 2000).

Intentions were assessed as per Harris and Napper (2005) with the item ‘I intend to cut down on the amount of alcohol I drink in the next 7 days’ on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree.

Message derogation was assessed using four items adapted from Jessop et al. (2009), rated on a 9-point scale ranging from 1 = totally disagree to 9 = totally agree, e.g. ‘The message about alcohol consumption strained the truth.’

**Self-affirmation manipulation**

This study used the validated questionnaire method developed by Napper et al. (2009) to manipulate self-affirmation. Participants in the experimental group rated the extent to which a positive value or characteristic applies to themselves, using a 5-point scale ranging from 1 = very much like me to 5 = very much unlike me, e.g. ‘Being able to come up with new and different ways of doing things is one of my strong points’. Participants in the control group rated the extent to which each characteristic applies to a well-known celebrity, in this case David Beckham as per Napper et al. (2009). This procedure has been shown to produce substantial self-affirmation effects (Napper et al., 2009, Schüz et al., 2013).

**RESULTS**

A 2(control/self-affirmation)*3(pre-test/average week alcohol consumption/age) MANOVA was conducted to test whether randomization had been successful. This test emerged non-significant F(3117) = 0.79, P = 0.50, suggesting that randomization was successful. There also was no significant difference between the proportion of men and women in each group (χ² = 0.81, df = 1, P = 0.37).

**Alcohol consumption**

Participants reported consuming a mean of 5.01 (SD = 6.28, range 0–40) Australian standard drinks in the week preceding the study, 5.79 (SD = 7.65, range 0–35) drinks in an average week and 5.41 (SD = 8.61, range 0–40) in the week between baseline and follow-up. This roughly equals to 5–6 cans of mid-strength beer or 5–6 small glasses of red wine per week. The change in alcohol consumption between pre-test and follow-up was not significant (repeated measures ANOVA,
Consumption in the week preceding the study and consumption in an average week correlated at $r = 0.76$, $P < 0.01$. Alcohol consumption at follow-up correlated with consumption pre-test at $r = 0.76$, $P < 0.01$.

**Direct effects of self-affirmation**

To test the hypotheses that the effects of self-affirmation on intention, message derogation and changes in alcohol consumption would depend on individual levels of alcohol consumption, a series of moderated regression analyses using PROCESS (Hayes, 2013) with 5000 bootstrapping resamples to obtain estimates of asymptotic confidence intervals were conducted in SPSS 20. In these analyses, condition (control vs. self-affirmation) was the predictor, alcohol consumption in an *average week* was the moderator and intention, message derogation and changes in alcohol consumption were the dependent variables. Changes in alcohol consumption were measured as standardized residuals from regressing follow-up consumption on pre-test consumption, thus obtaining an indicator of change with positive values indicating increases and negative values indicating decreases in consumption. Significant interactions were decomposed using simple slopes analyses (Aiken and West, 1991), and the Johnson–Neyman technique (Preacher et al., 2007) was applied to identify regions of significance, i.e. to identify the ranges of average alcohol consumption at which self-affirmation had significant effects. All analyses were controlled for age and sex.

**Intention**

Table 1 shows that there were no main effects of risk or the self-affirmation manipulation on the reactions to the alcohol health message. However, as predicted, a significant interaction between risk (standard drinks in an average week) and the self-affirmation manipulation emerged ($B = 0.07$, $P < 0.01$). Simple slopes analyses revealed that the slopes of the intervention in predicting intention changed from $-0.52$ at risk 1 SD below the mean over $-0.07$ at the mean to $0.38$ at risk 1 SD above the mean, indicating higher intentions following self-affirmation with increasing alcohol consumption. The Johnson–Neyman technique revealed that the effects of the self-affirmation condition became significant in participants consuming $13.98$ standard drinks in an average week, and that they increased with risk (Fig. 1). Being in the self-affirmation as opposed to the control condition increased intention by 1 unit in participants consuming $>22$ standard drinks in an average week, and by 2 units in participants consuming $>35$ standard drinks in an average week.

**Message derogation**

Table 1 shows a significant effect of risk on message derogation ($B = 0.09$, $P < 0.01$) indicating higher levels of message derogation in individuals with higher behavioural risk. There also was a significant interaction of self-affirmation and risk ($B = 0.08$, $P = 0.02$). Disentangling this interaction, we found that with increasing behavioural risk, the self-affirmation manipulation predicted higher message derogation ($B = -40$ at $-1$ SD, $B = 0.08$ at M and $B = 0.56$ at $+1$ SD of risk). The Johnson–Neyman technique revealed that the effect of the self-affirmation manipulation became significant at $>13.85$ standard drinks in an average week (see Fig. 2).

**Alcohol consumption**

Table 1 shows no significant direct effects of the intervention ($B = -0.13$, $P = 0.51$), risk ($B = 0.01$, $P = 0.63$) or the risk*intervention interaction ($B = 0.04$, $P = 0.57$) on changes in alcohol consumption.

**Indirect effects of self-affirmation on alcohol consumption**

To test the hypothesis that self-affirmation would indirectly affect alcohol consumption via intentions to reduce alcohol consumption, we run moderated mediation analyses (Preacher et al., 2007) using the PROCESS macro (Hayes, 2013) with 5000 bootstrapping resamples to obtain estimates of asymptotic confidence intervals in SPSS20. In this analysis, we first regressed intentions to reduce alcohol consumption on the self-affirmation intervention, risk and the interaction of self-affirmation on risk, followed by a regression of changes in alcohol consumption on intention and condition. The conditional indirect effect is the product of the effect of intentions on changes in alcohol consumption and the conditional effect of self-affirmation on intentions at various levels of the moderator (i.e. risk, standard drinks in an average week).

We found a significant interaction effect of self-affirmation and risk on intention ($B = 0.06$, $P = 0.03$) and a significant effect of intentions on changes in alcohol consumption ($B = -0.20$, $P < 0.01$). The conditional indirect effect was significant at levels of alcohol consumption over 14.78 Australian standard drinks (i.e. more than roughly 15 cans of mid-strength beer or 2 bottles of red wine) per week, which

Table 1. Summary of moderated regression analyses

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Predictor</th>
<th>$B$</th>
<th>SE</th>
<th>$t$</th>
<th>$P$</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>Intervention*</td>
<td>-0.07</td>
<td>0.23</td>
<td>-0.29</td>
<td>0.77</td>
<td>-0.52, 0.39</td>
</tr>
<tr>
<td></td>
<td>Risk: standard drinks in an average week</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.73</td>
<td>0.47</td>
<td>-0.04, 0.02</td>
</tr>
<tr>
<td></td>
<td>Interaction intervention*risk</td>
<td>0.07</td>
<td>0.02</td>
<td>2.65</td>
<td>&lt;0.01</td>
<td>0.02, 0.13</td>
</tr>
<tr>
<td>Message derogation</td>
<td>Intervention*</td>
<td>0.08</td>
<td>0.26</td>
<td>0.31</td>
<td>0.76</td>
<td>-0.43, 0.59</td>
</tr>
<tr>
<td></td>
<td>Risk: standard drinks in an average week</td>
<td>0.09</td>
<td>0.02</td>
<td>4.72</td>
<td>&lt;0.01</td>
<td>0.05, 0.12</td>
</tr>
<tr>
<td></td>
<td>Interaction intervention*risk</td>
<td>0.08</td>
<td>0.03</td>
<td>2.33</td>
<td>0.02</td>
<td>0.01, 0.14</td>
</tr>
<tr>
<td>Changes in alcohol consumption</td>
<td>Intervention*</td>
<td>-0.13</td>
<td>0.19</td>
<td>-0.67</td>
<td>0.51</td>
<td>-0.51, 0.26</td>
</tr>
<tr>
<td></td>
<td>Risk: standard drinks in an average week</td>
<td>0.01</td>
<td>0.03</td>
<td>0.48</td>
<td>0.63</td>
<td>-0.04, 0.07</td>
</tr>
<tr>
<td></td>
<td>Interaction intervention*risk</td>
<td>0.04</td>
<td>0.07</td>
<td>0.57</td>
<td>0.57</td>
<td>-0.09, 0.17</td>
</tr>
</tbody>
</table>

All analyses controlled for age and sex. *coded control = 1, self-affirmation = 2.*
means that self-affirmation led to reductions in alcohol consumption via increased intentions in individuals who consumed above this level. Figure 3 illustrates the conditional indirect effect of self-affirmation on changes in alcohol consumption.

**DISCUSSION**

This is the first study to examine the effects of self-affirmation on responses to a government-funded emotive alcohol warning campaign targeting the at-risk population of younger adults aged 18–24. A brief self-affirmation manipulation prior to being exposed to the Australian ‘Don’t turn a night out into a nightmare’ campaign (DoHA, 2009b) significantly and meaningfully increased participants’ intentions to reduce alcohol consumption, particularly if they reported higher levels of risk (standard drinks in an average week). This effect of self-affirmation on intentions translates into lower alcohol consumption levels at follow-up. However, these effects seem not to be due to changes in the perceived credibility of the health message, as message derogation increased along with intentions in individuals with higher levels of risk in the self-affirmation condition.

particularly the finding that self-affirmation led to higher intentions to reduce alcohol consumption in individuals with higher behavioural risk status is encouraging. The results suggest that the effectiveness of emotive graphic public health campaigns to reduce alcohol consumption for at-risk populations can be improved by allowing people to self-affirm prior to message exposure. Emotive campaigns form the backbone of health promotion, particularly for younger adults, yet it has been shown that such messages can backfire in increasing defensive responses (Brown and Locker, 2009). Our finding of increased message derogation with increasing consumption is consistent with this prior research. However, our results also reveal that such programmes can indeed produce increased intentions to reduce alcohol consumption if combined with self-affirmation. This is important, as intentions are crucial predictors of actual consumption (Cooke et al., 2007; Gagnon et al., 2012) and mark the first step of behaviour change (Harris and Napper, 2005). Our study accordingly found a small indirect effect of the intervention on changes in alcohol consumption via the increases in intentions. The current finding further corroborates previous research on self-affirmation in alcohol prevention (Harris and Napper, 2005; Klein and Harris, 2009; Armitage et al., 2011; Klein et al., 2011; Pavey and Sparks, 2012) and adds to the literature in demonstrating that the effects of simple, economic graphic health messages can be enhanced using self-affirmation, particularly if at-risk populations are to be reached, such as younger adults with higher levels of alcohol consumption (Australian Institute of Health and Welfare, 2011). Our results indicate that self-affirmation effects are particularly pronounced in individuals drinking above 14 Australian standard drinks per week, which is considered the limit for safe drinking in Australia (DoHA, 2012). This finding is crucial, since previous research also suggests that at-risk populations with higher alcohol consumption are harder to reach, and that effects of health promotion in these populations are often smaller (Weisner and Matzger, 2002, Green et al., 2010a, b).
Combining health risk messages with self-affirmation, the process of strengthening one’s idea of self by focusing on cherished aspects of oneself such as specific values, can improve adaptive responses to such messages, particularly in populations with high behavioural risk. This has been shown in various health behaviour domains from graphic warning labels on cigarette packages (Harris et al., 2007) to UV-based skin cancer risk messages (Schüz et al., 2013) and the acceptance of alcohol risk information (Harris and Napper, 2005). It is theorized that the stronger effects in at-risk populations are due to the fact that in these populations, engaging in risk behaviours such as excessive alcohol consumption can be a core aspect of individuals’ ideas of themselves (Schmitt and Branscombe, 2001; Kuther and Higgins-D’Alessandro, 2003; Livingstone et al., 2011). Risk messages targeting negative effects of alcohol consumption therefore can threaten a key component of these individuals’ ideas of themselves, which increases the likelihood of defensive responses (Sherman and Cohen, 2006). According to theory, allowing these individuals to self-affirm prior to being exposed to potentially threatening alcohol warning messages decreases the need of the self-system to respond defensively and make it more open towards processing health risk information more objectively and accordingly respond by, e.g. increasing intentions to reduce alcohol consumption.

However, our study also showed that these effects of self-affirmation on responding to graphic alcohol warning messages are most likely not due to changes in message derogation, as we found an increase in message derogation in individuals with high-risk levels who self-affirmed. This finding seemingly contradicts previous literature finding lower levels of derogation in self-affirmed, high-risk participants (Jessop et al., 2009). However, it is possible that while derogation of the specific message source increased, the actual message content was accepted. Previous research shows that people can be accepting of messages that challenge relevant issues, but at the same time derogate or dislike the message format or source (Rhine and Severance, 1970). In the self-affirmation domain, research accordingly showed that message acceptance is not necessarily affected by self-affirmation, but negative affect due to a mismatch between current behaviour and message content is (Harris and Napper, 2005). This needs to be explored in future research. In addition, previous research has also demonstrated that if a message is not perceived as threatening, individuals are more likely to derogate the message, even if they have self-affirmed and hold more positive attitudes to the actual message content (van Koningsbruggen et al., 2009; Harris, 2011). In the case of this study and bearing in mind the relatively low levels of consumption of our sample, the messages could have been perceived as not particularly threatening and therefore be derogated. Other psychological factors such as increased risk perceptions (Klein et al., 2011) could be responsible for the effects of self-affirmation on intentions, and future research needs to examine this.

Individuals with higher behavioural risk (above 14 standard drinks a week) in the self-affirmation condition significantly increased their intentions to reduce alcohol after they saw the emotive alcohol risk messages. These intentions in turn significantly predicted a reduction in alcohol consumption. This corroborates previous studies finding effects of self-affirmation on health alcohol consumption (Harris and Napper, 2005; Klein and Harris, 2009; Armitage et al., 2011; Klein et al., 2011) and suggests that the effects of self-affirmation on changes in risk behaviour might be due to increased intentions to change behaviour. Nevertheless, the effects in our study were small, with one unit increase in intentions to reduce consumption predicting a little more than a reduction of one standard drink in the week following the intervention. However, as this pilot study involved a very short follow-up, future studies with longer follow-up intervals might be able to measure alcohol consumption over a longer time period with a chance to measure sustained intended behaviour changes.

Although the findings presented in this study seem to support the use of self-affirmation for enhancing emotive graphic alcohol messages, there were some limitations that need to be kept in mind when interpreting the current study. First, as this was an exploratory trial, we used a relatively small sample of undergraduate students, and thus, the results are not generalizable to general population of 18–24-year-olds. This sample had relatively low levels of alcohol consumption, as evidenced in the means of around five Australian standard drinks per week, which roughly translates into five cans of mid-strength beer or five small glasses of red wine per week. In the most recent Australian guidelines, it was recommended that healthy men and women consume no more than two standard drinks on any day in order to reduce the lifetime risk of harm from alcohol-related disease or injury (NHMRC, 2009). However, the finding that the hypothesized interaction of risk and self-affirmation was found even in this relatively well-adjusted sample is promising, especially given that the effects of self-affirmation on intentions increased with risk. In addition, our study only examined self-affirmation effects on alcohol consumption. As there is good evidence that other behaviour change techniques such as implementation intentions can reduce alcohol consumption (Arden and Armitage, 2012), a combined intervention might be even more effective. A third limitation relates to the fact that, due to being an exploratory trial, our behavioural measures were self-reported. However, comparative studies suggest that self-reports with 7-day recalls, such as in our study, have up to 91.7% convergence with biomarkers (Babor et al., 2000).

Notwithstanding these limitations, this study has considerable implications. Our results show that simple, economic emotive graphic alcohol warning messages targeting social and health consequences of alcohol consumption in the risk group of 18–24-year-olds (Australian Institute of Health and Welfare, 2011) can be made more effective if combined with self-affirmation. The finding that these effects are strongest in participants with higher baseline consumption levels suggests that self-affirmation interventions can make public health campaigns more effective in reaching at-risk populations. One of the challenges for further research is in developing easy-to-use self-affirmation manipulations that can be used in public health campaigns. First steps in this direction are being made, with economic implementation-intentions-based self-affirmation manipulations (Armitage et al., 2011), but to date there are no interventions that could be used in stand-alone mass media campaigns.

Our research shows that particularly younger adults who are both at increased risk for alcohol-related injury (Hingson
et al., 2009) and at developing drinking habits that could develop into later-life alcohol problems (Wennberg et al., 2000) can profit from combining health messages with self-affirmation.

REFERENCES


