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Combining Self-Affirmation and Implementation Intentions to
Reduce Heavy Episodic Drinking in University Students

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Abstract

Studies testing the effects of self-affirmation on alcohol-related cognitions and behaviour in university students have produced equivocal results. As self-affirmation is a motivational technique (i.e., designed to reduce defensive processing) it may need to be supplemented with volitional techniques, such as forming if-then plans, to translate positive intentions into behaviour. Participants ($N = 348$) were randomly assigned to conditions in a 2 (self-affirmation) \times 2 (implementation intention) between-participants factorial design. Participants completed a self-affirmation task (i.e., values essay) or not, read a summary about the health risks of binge drinking (8/6 units for men/women), and then completed an implementation intention task (i.e., forming if-then plans) or not. Participants then completed measures of message derogation, perceived risk and intention as well as alcohol consumption one week later. All main and interaction effects for self-affirmation were non-significant. In contrast, participants who formed implementation intentions (vs. not) reported drinking fewer units of alcohol and engaged in binge drinking less frequently at one-week follow-up. Additional analyses revealed that affirming a social value attenuated the effect of self-affirmation on intention, but augmented the effect of implementation intentions on behaviour. Overall, the findings provide additional evidence for the positive effects of implementation intentions, but question the use of self-affirmation to reduce alcohol consumption in university students.

Keywords: alcohol; binge drinking; college; intervention

Combining Self-Affirmation and Implementation Intentions to Reduce Heavy Episodic Drinking in University Students

Heavy episodic drinking, or “binge drinking” (8/6 or more units of alcohol for men/women in a single session) as it is termed in the UK (NHS, 2014a), is associated with an array of negative health and social consequences including anti-social behaviour, physical violence, unsafe sex, sexual assaults, accidents and injuries (Drinkaware, 2014). It is a common behaviour among young people in the UK (NCSR, 2009; POST, 2014), particularly among university students (Balier et al., 2009; Morton & Tighe, 2011; Norman & Conner, 2006), and is an integral part of the student identity (Carpenter et al., 2008; Colby, Colby, & Raymond, 2009). Interventions are needed to reduce the prevalence of heavy episodic drinking in university students. Unfortunately, messages highlighting the risks of excessive alcohol consumption may have limited impact. Leffingwell, Neuman, Leedy, and Babitzke (2007) found evidence of defensive processing in response to a health-risk message about alcohol, such that alcohol-using students rated the problem as less important and were more critical of the message than non-drinking students. Similar effects have been reported for other health-risk messages (Freeman, Hennessy, & Marzullo, 2001; Lieberman & Chaiken, 1992). Attempts to change health-risk behaviour may therefore fail because people who are at risk may derogate or dismiss the health-risk message (Harris & Epton, 2009).

Self-affirmation theory (Steele, 1988) proposes that messages about future health risks not only threaten people’s physical integrity (e.g., by outlining the future morbidities and heightened risk of premature mortality from continuing risky behaviour) but also their self-integrity (i.e., their sense of being sensible, rational, adaptively and morally adequate people). Thus, people may resist health-risk messages (e.g., by derogating them or counter-arguing) in order to maintain their self-integrity. Self-affirmation – the process of reflecting upon one’s cherished values, actions or attributes in an unrelated domain – is a simple technique for

reducing defensive resistance to a health-risk message (Harris & Epton, 2009). Encouraging people to self-affirm in an unrelated domain – for example by recalling past acts of kindness or writing about their most important value – enables people to feel secure about their self-integrity and removes the need to maintain it by rejecting relevant but unwelcome health-risk information. This allows self-affirmed individuals to engage in a more open-minded and balanced appraisal of the health-risk information and its personal relevance which, in turn, should promote intentions to take action to mitigate the risk and make associated changes in behaviour. A meta-analysis of experimental tests of self-affirmation manipulations reported small, but significant, effects on measures of message acceptance ($d = 0.17$), intentions ($d = 0.14$) and behaviour ($d = 0.32$) (Epton, Harris, Kane, van Koningsbruggen & Sheeran, 2015)

To date, five studies have manipulated self-affirmation to attempt to change alcohol-related cognitions and behaviour in university students. Three studies focused on the effects of health-risk messages linking heavy alcohol consumption to breast cancer in female students. Harris and Napper (2005) found that self-affirmed participants had heightened risk perceptions after reading the message, although the effects of the self-affirmation manipulation on intention and self-reported units of alcohol consumed in the previous week at one-month follow-up were non-significant. Klein, Harris, Ferrer, and Zajac (2011) found that self-affirmed participants had higher feelings of vulnerability (i.e. worry, anxiety), but not perceived risk, and Ferrer, Shmueli, Bergman, Harris, and Klein (2012) found that self-affirmed participants were more likely to generate plans to reduce alcohol consumption. The effect of the self-affirmation manipulation on subsequent alcohol consumption was not examined in these latter two studies. Two studies recruited both males and female students. Scott, Brown, Phair, Westland, and Schüz (2013) found that the self-affirmation manipulation had non-significant effects on measures of message derogation, perceived risk, intention and self-reported number of standard drinks consumed one week later following the presentation

of emotive posters warning of the negative consequences of excessive drinking. Similarly, Meier et al. (2015) reported no significant differences between non-affirmed and affirmed participants on measures of problem importance, perceived risk and self-reported number of weekly drinks and peak quantity consumed at two-weeks follow-up in a sample of heavy drinking students who read a health-risk message about alcohol. Overall, findings for the impact of self-affirmation manipulations on the processing and acceptance of health-risk messages about alcohol in university students are mixed. There is some evidence that self-affirmation can be used to change alcohol-related cognitions when the health-threat is very specific (i.e., breast cancer in females), but less evidence to support the use self-affirmation for more general health-risk messages about alcohol. There is no evidence that self-affirmation impacts on alcohol consumption in university students.

Harris and Epton (2009) have argued that self-affirmation may be best characterised as a motivational intervention that primarily serves to reduce defensive processing and promote positive intentions. However, positive intentions are not always translated into changes in behaviour. Webb and Sheeran (2006) reported that interventions that had a medium-to-large effect on intentions ($d = 0.66$) had only a small-to-medium effect on behaviour ($d = 0.36$). In order to bridge this intention-behaviour gap, additional volitional techniques are required. Gollwitzer (1999) has highlighted the importance of implementation intentions for bridging this gap. Implementation intentions are specific if-then plans that link an appropriate behavioural response to a situational cue. Forming an implementation intention ensures that the critical situation (specified in the “if” part of the plan) is highly accessible (i.e., is swiftly and accurately identified) and that the behavioural response (specified in the “then” part of the plan) is performed relatively automatically (i.e., immediately and efficiently) when the critical situation is encountered (for a review, see Gollwitzer & Sheeran, 2006).

There is good evidence for the use of implementation intentions to help people to translate positive intentions into behaviour. A meta-analysis of 23 studies on health behaviours found that implementation intentions have a medium-to-large effect size on behaviour ($d = 0.59$) (Gollwitzer & Sheeran, 2006). A few studies have used implementation intentions to reduce alcohol consumption in university students. Hagger et al. (2012) found that participants who formed an implementation intention to drink within safe limits reported consuming fewer units of alcohol at one-month follow-up than control participants. Implementation intentions have also been found to reduce the likelihood of choosing a voucher for a free alcoholic drink (versus tea/coffee) following participation in an experiment (Chatzisarantis & Hagger, 2010), the frequency of binge drinking at two-week follow-up (Murgraff, White, & Phillips, 1996), and alcohol consumption on Friday nights at two-month follow-up (Murgraff, Abraham, & McDermot, 2007) in university students.

Combining self-affirmation with implementation intentions offers the exciting prospect of employing a motivational technique (prior to the health-risk message) to reduce defensive processing and promote positive intentions and a volitional technique (following the health-risk message) to translate positive intentions into behaviour. As such, combining both techniques should augment the effectiveness of health-risk messages. To date, only two studies have examined the combined effects of self-affirmation and implementation intentions, with mixed findings. In line with predictions, Harris et al. (2014) found that fruit and vegetable consumption at one-week follow-up was highest among participants who self-affirmed and also formed an implementation intention. In contrast, Jessop, Sparks, Buckland, Harris, and Churchill (2014) found that combining self-affirmation and implementation intentions had a detrimental effect on exercise behaviour. Further tests of the combined effects of self-affirmation and implementation intentions are warranted, given the conflicting

results to date. Moreover, both previous tests have sought to increase health-promoting behaviour rather than reduce health-risk behaviour.

Most tests of the effects of self-affirmation on alcohol-related cognitions and behaviour in university students (Ferrer et al., 2012; Harris & Napper, 2005; Klein et al., 2011, Meier et al., 2015) have used a values essay to manipulate self-affirmation in which participants are instructed to select their most important value and write about why it is important to them (Crocker, Niya & Mischkowski, 2008). Crocker et al. (2008) reported that between 48% (Study 1) and 67% (Study 2) of students chose “social life-relationships” as their most important value to write about. This might have two important consequences that, in part, could account for the non-significant effects of self-affirmation on alcohol-related cognitions and behaviour that have been reported in extant research. First, self-affirmation is proposed to counter the threat to self-integrity posed by risk messages by affirming self-integrity in an unrelated domain (Steele, 1988). However, it is possible that affirming a social value before being exposed to a health-risk message about alcohol does not represent affirming in an unrelated domain. For many students, drinking alcohol serves social goals. Thus, university students have been found to report drinking for social reasons (Norman, Conner & Stride, 2012) and believe that heavy drinking helps them to socialise (Guise & Gill, 2007). Choosing to self-affirm a social value may therefore attenuate the effect of self-affirmation on message processing and subsequent cognitions and behaviour, given that the value is in a related domain. Second, choosing to self-affirm a social value may also prime construct-congruent cognitions and behaviour, especially among those students who perceive a close link between the consumption of alcohol and sociability. For example, Friedman, McCarthy, Pedersen and Hicks (2009) found that following exposure to sociability primes, students who believed that drinking alcohol would enhance sociability consumed more of a

(supposedly) alcoholic drink (see also Sheeran et al., 2005). Thus, choosing to self-affirm a social value could actually increase alcohol consumption.

The present study examined the effects of combining self-affirmation and implementation intentions on students' alcohol-related risk perceptions, intentions and behaviour. It was hypothesised that (i) self-affirmation would reduce message derogation, increase risk perceptions and intention, and reduce alcohol consumption at follow-up, (ii) implementation intentions would reduce alcohol consumption at follow-up and, (iii) implementation intentions would augment the effect of self-affirmation on alcohol consumption. The study also examined whether the impact of the self-affirmation and implementation intention tasks vary according to type of value affirmed.

Method

Design and Procedure

Students at a university in the UK were sent an email inviting them to take part in a study on beliefs about binge drinking, distributed via a central 'volunteers' list and containing a link to the online baseline questionnaire and experimental materials. Potential participants were informed that participation in the research was voluntary, although the offer of a £50 prize draw was used to incentivise participation. Participants were instructed to indicate their consent to participate in the study by clicking on the link in the email. The study employed a 2 (self-affirmation: *yes*, *no*) × 2 (implementation intention: *yes*, *no*) between-participants factorial design. At Time 1, participants completed measures of typical alcohol consumption. Participants were randomly allocated to complete a self-affirmation task (i.e., writing about their most important value) or not before reading a health-risk message about binge drinking. Participants were also randomly allocated to complete the implementation intentions task (i.e., forming if-then plans to avoid binge drinking) or not after reading the health-risk message. All participants then completed measures of message derogation, perceived risk and intention.

Participants provided an email address at Time 1 so that they could be sent a link to a second online questionnaire one week later that assessed alcohol consumption over the previous week.

The study was approved by the Department of Psychology Research Ethics Committee in accordance with the University's Research Ethics Approval Procedure.

Participants

Of the 631 students who clicked on the link to the online questionnaire, 180 were not randomised either because they were non-drinkers ($n = 43$) or they did not complete the pretest measures ($n = 137$). Of the 451 who were randomised to condition, 348 completed all the Time 1 measures. The sample at Time 1 ($N = 348$) comprised 223 females and 123 males (missing data, $n = 1$) and had a mean age of 22.58 ($SD = 6.31$). The majority described their ethnicity as White (88.5%). Two hundred and eighty-three (81.3%) students completed the Time 2 questionnaire. See Figure 1 for a summary of participant flow through the experiment.

Materials

Pretest measures. The pretest questionnaire assessed demographics (i.e., age, gender, ethnicity) and typical drinking behaviour (i.e., *How often do you have a drink containing alcohol? Never, Monthly or less, 2-4 times a month, 2-3 times a week, 4 or more time a week*). Those answering *Never* were excluded from the study. Participants reported what they typically drank on each day of the week, using an adapted version of the timeline follow-back technique (Sobell & Sobell, 1992), to assess baseline alcohol consumption. Such measures have been found to have high agreement with biological measures of alcohol consumption (Babor, Steinberg, Anton, & Del Boca, 2000). Participants were presented with a table containing a space after each day of the week to write the type and amount of each drink they typically consumed on that day (e.g., 1 shot of vodka, 2 large glasses of red wine). The responses were converted into units (i.e., 10 ml) of alcohol using an online alcohol unit calculator (NHS, 2014b). Measures were calculated for the total number of units consumed

and the number of binge drinking sessions (i.e., 8 or more units of alcohol in a single session for men, and 6 or more units for women) in a typical week.

Self-affirmation manipulation. Following Crocker et al. (2008), participants randomly allocated to the self-affirmation condition ranked six values (i.e., *business, art-music-theatre, social life-relationships, science-pursuit of knowledge, religion-morality, government-politics*) for their personal importance. Participants were instructed to choose their most important value and write a short essay describing why it was important to them.¹

Health-risk message. The health-risk message (approximately 750 words) comprised a summary of health-risk information taken from factsheets on the negative effects of high-risk drinking from the Institute of Alcohol Studies (2014). The message began with a definition of binge drinking (i.e., consuming 8 or more units of alcohol in a single session for men and 6 or more units for women) (NHS, 2014a) and a statement of UK advice against engaging in binge drinking. Various negative effects of binge drinking were outlined under two broad headings (i.e., medical problems, other problems) and 16 sub-headings (i.e., brain damage, alcohol poisoning, gastrointestinal tract problems, cardiovascular system, blood pressure, stroke, heart disease, breast cancer, oral cancer, skeletal muscle damage, accidents, violence, unsafe sexual activity, functioning and performance, psychological problems, other drug use). The message finished with a list of 19 supporting references.

Implementation intentions manipulation. In line with Hagger et al. (2012), participants randomly allocated to the implementation intention condition were instructed to form up to three if-then plans to avoid binge drinking in the next week. Participants were presented with an example plan (i.e., *If I am in a bar/club drinking with my friends and I am tempted to engage in binge drinking, then I will opt for a soft drink instead of an alcoholic drink*). They were then presented with a table in which they could make up to three plans that contained open text boxes for the “if” and “then” components of each plan.

Message derogation. Two measures of message derogation were included, based on items used in previous studies (van Koningsbruggen & Das, 2009; Witte, 2014). The first comprised three items assessing participants' affective response to the health-risk message: *The information about binge drinking made me feel... (irritated, angry, annoyed)* followed by 7-point response scales (*not at all-extremely*). Responses were averaged to provide a measure of *message reactance* ($\alpha = .93$). The second included six items assessing participants' evaluation of the message: *The information about binge drinking was... (relevant, exaggerated, helpful, overstated, convincing, alarmist)* followed by 7-point response scales (*not at all-extremely*). Responses were recoded so that high scores related to more positive evaluations and then averaged to provide a measure of *message evaluation* ($\alpha = .67$).

Perceived risk. Six items assessed risk perceptions of the negative effects of binge drinking outlined in the health-risk message: *Binge drinking increases the risk of... (e.g., health problems, accidents, unsafe sex)* followed by 7-point response scales (*very unlikely-very likely*). Responses were averaged to provide a measure of *perceived risk* ($\alpha = .86$).

Intention. Intention to engage in binge drinking in the next week was assessed with two items: e.g., *Do you intend to engage in binge drinking in the next week?* followed by 7-point response scales (*definitely do not- definitely do*). Responses to the two items were averaged to provide a measure of *intention* ($\alpha = .96$).

Follow-up alcohol consumption. Alcohol consumption at one-week follow-up was assessed using a retrospective seven-day recall diary (Gmel & Rehm, 2004) similar to the procedure used to assess baseline alcohol consumption. Participants were asked to indicate what they drank on each day in the previous week by completing a table containing a space after each day for them to write the type and amount of each drink consumed on that day (e.g., 1 shot of vodka, 2 large glasses of red wine). The responses were converted into units (i.e., 10

ml) of alcohol using an online alcohol unit calculator (NHS, 2014b). The total number of units consumed and the number of binge drinking sessions in the past week were calculated.

Results

Randomisation Checks

There were no significant differences between the conditions on baseline demographics (i.e., age, gender, ethnicity) or typical alcohol consumption (i.e., units per week, binge drinking sessions per week).

Attrition Analyses

A significant effect of implementation intention condition was found on attrition between randomisation (at study entry) and completion of the Time 1 measures, $\chi^2(1, N = 451) = 47.64, p < .001$. Attrition was higher among participants randomised to the implementation intention (36.8%) than to the no implementation intention (9.5%) conditions.

Considering attrition between Time 1 and Time 2, those who were lost to follow-up reported drinking more units of alcohol in a typical week at Time 1 ($M = 19.03, SD = 18.88$) than those who remained in the study ($M = 14.40, SD = 14.05$), $t(345) = 2.22, p = .03$. In addition, males (27.6%) were more likely to be lost to follow-up at one-week than females (13.0%), $\chi^2(1, N = 346) = 11.41, p = .001$. There was no evidence of differential attrition by condition, $\chi^2(3, N = 348) = 1.47, p = .69$.

Impact of Self-Affirmation and Implementation Intentions on Message Processing, Perceived Risk and Intention

A series of 2 (self-affirmation: *yes, no*) \times 2 (implementation intention: *yes, no*) between-participants ANOVAs was conducted, with message reactance, message evaluation, perceived risk and intention as the dependent variables (see Table 1).² All of the main effects and interactions were non-significant.

Impact of Self-Affirmation and Implementation Intentions on Alcohol Consumption

Two 2 (self-affirmation: *yes, no*) \times 2 (implementation intention: *yes, no*) between-participants ANCOVAs were conducted, with units of alcohol and binge drinking frequency at follow-up as the dependent variables and corresponding baseline measures entered as covariates (see Table 2).³ All main and interaction effects for self-affirmation condition were non-significant. In contrast, significant main effects of implementation intentions were found on units of alcohol, $F(1, 278) = 6.94, p = .009$, and binge drinking frequency, $F(1, 278) = 6.14, p = .01$, such that participants who formed implementation intentions consumed fewer units of alcohol ($M_{IMP} = 9.65, SE = 0.94; M_{NoIMP} = 12.83, SE = 0.76$) and engaged in binge drinking less frequently ($M_{IMP} = 0.51, SE = 0.06; M_{NoIMP} = 0.71, SE = 0.05$) than those who did not form implementation intentions.

Self-Affirmation Manipulation

Of the 173 participants who completed the self-affirmation task, 99 (57.2%) chose “social-life-relationships” as their most important value. Further analyses examined whether the impact of the self-affirmation and implementation intention tasks varied according to type of value affirmed. The above analyses were repeated with self-affirmation condition recoded as 1 = social value affirmed, 2 = other value affirmed, 3 = non-affirmed. Two significant effects involving self-affirmation were found. First, a significant main effect of self-affirmation was found on intention, $F(2, 342) = 3.14, p = .04$; participants who affirmed a social value had stronger intentions to engage in binge drinking than participants who affirmed another value ($M_{SA} = 3.47, SD = 2.31; M_{OA} = 2.55, SD = 2.05; p = .006$). Second, a significant self-affirmation \times implementation interaction was found on frequency of binge drinking at follow-up, $F(2, 276) = 3.66, p = .03$; the effect of implementation intentions on the frequency of binge drinking at follow-up was significant among participants who affirmed a social value, $F(1, 78) = 6.51, p = .001$ ($M_{IMP} = 0.36, SE = 0.12; M_{NoIMP} = 0.94, SE = 0.10$), but non-significant among participants who affirmed another value, $F(1, 54) = 0.08, p = .78$

($M_{IMP} = 0.43$, $SE = 0.13$; $M_{NoIMP} = 0.47$, $SE = 0.10$), and non-affirmed participants, $F(1, 142) = 0.39$, $p = .53$ ($M_{IMP} = 0.62$, $SE = 0.09$; $M_{NoIMP} = 0.69$, $SE = 0.08$), $F(2, 276) = 3.66$, $p = .03$.

Discussion

The present study examined the effect of combining self-affirmation and implementation intentions on binge drinking cognitions and behaviour in university students. As found in a number of previous, self-affirmation had non-significant effects on measures of message derogation (Scott et al., 2013), perceived risk (Harris & Napper, 2005; Klein et al., 2011) and intention (Harris & Napper, 2005; Scott et al., 2013). Self-affirmation also had non-significant effects on alcohol behaviour at follow-up, in line with null findings reported in previous studies (Harris & Napper, 2005; Meier et al., 2015; Scott et al., 2013). Taken together, these results suggest that self-affirmation has limited effects on alcohol-related message processing, cognitions and behaviour in university students, and concur with Meier et al.'s (2015) conclusion that self-affirmation manipulations should not be employed to reduce alcohol consumption in university students in lieu of more effective strategies.

In contrast, implementation intentions were found to have significant effects on the amount of alcohol consumed and the frequency of binge drinking at follow-up. However, these effects are mitigated by the fact that students allocated to the implementation intentions condition were more likely to drop out of the study after randomisation. Significant effects of forming implementation intentions on alcohol consumption in students have been reported in other studies (Hagger et al., 2012; Murgraff et al., 1996, 2007). Taken together these results indicate that forming an implementation intention is a powerful technique for reducing alcohol consumption that could be easily incorporated into brief interventions (Moyer, Finey, Swearingen & Vergun, 2002).

The hypothesis that there would be a significant interaction between self-affirmation and implementation intentions on alcohol consumption at follow-up was not supported. The

null finding is in contrast to previous studies that have reported both beneficial (Harris et al., 2014) and detrimental (Jessop et al., 2014) effects of combining self-affirmation and implementation intentions. However, more studies are needed before a clear pattern of results can be established. For example, it may be the case that implementation intentions only augment the effect of self-affirmation on behaviour when the main effect of self-affirmation is significant (e.g., Harris et al., 2014).

The study also examined whether the type of value affirmed by participants influences the impact of the self-affirmation and implementation intention tasks. Over half (57%) of participants chose “social life-relationships” as their most important value, in line with percentages reported by Crocker et al. (2008). Additional analyses revealed that participants who affirmed a non-social value had weaker intentions to engage in binge drinking than participants who affirmed a social value. Self-affirmation is proposed to have its effect through a reasoned/conscious route by encouraging more open and balanced processing of health-risk information (Steele, 1988). Given the strong link between alcohol consumption and sociability in students (Guise & Gill, 2007; Norman et al., 2012), affirming a social value may not protect one’s self-integrity from the threat posed by a health-risk message about alcohol and, as a result, may diminish the effect of self-affirmation on the key outcome (i.e., intention) of such a deliberative process. The type of value affirmed also impacted on the effectiveness of the implementation intention task. In contrast to the impact in intention, affirming a social value augmented the effect of implementation intentions on reduced frequency of binge drinking. Behaviour can be automatically triggered by perceptual primes and cues in the environment. Affirming a social value may have primed alcohol-related behaviour (Friedman et al., 2009). However, forming an implementation intention can disrupt goal-priming effects on behaviour (Gollwitzer, Sheeran, Trötschel, & Webb, 2011; Webb, Sheeran, Gollwitzer, & Trötschel, 2012). Students who formed an implementation intention

after affirming a social value may therefore have been equipped with specific strategies to resist environmental cues to engage in binge drinking in response to social goals.

The present study had a number of limitations that should be noted. First, there was attrition between Time 1 and Time 2, with those lost to follow-up more likely to be male and heavier drinkers, which questions the generalizability of the findings. In addition, participants randomly allocated to the implementation intentions condition were more likely to drop out of the study after randomisation. This differential attrition may have led to biases in the sample that might, in part, account for the significant effects of implementation intentions on behaviour, although the present findings are in line with previous tests of implementation intentions on alcohol consumption in students (Hagger et al., 2012; Murgraff et al., 1996, 2007). Second, the one-week follow-up period was relatively short. However, previous tests of implementation intentions have reported significant effects on alcohol consumption over two (Murgraff et al., 1996), four (Hagger et al., 2012) and eight weeks (Murgraff et al., 2007). Third, alcohol consumption was assessed by self-report which may introduce self-presentation biases, although Del Boca and Noll's (2000) review of the validity of self-report measures of alcohol consumption concluded that they can provide accurate estimates of consumption. Fourth, the interpretation of the results relating to impact of affirming a social versus non-social value should be treated with caution given that the social versus non-social self-affirmation groups were the result of self-selection rather than random allocation. The results may therefore reflect differences between individuals rather than the effects of affirming a social versus non-social value. Fifth, the study was conducted in the UK and the results may not generalise to college/university student drinking in other countries. Finally, the results and their interpretation are restricted to university students who reported drinking alcohol.

In conclusion, the present study has a number of important theoretical and practical implications. First, in line with the mixed findings reported in other studies, the findings offer little support for using self-affirmation to reduce alcohol consumption in university students. Second, the findings confirm the efficacy of implementation intentions to produce significant reductions in alcohol consumption. The forming of specific if-then plans is a simple, yet powerful, technique for resisting the social pressures to drink that many students face as part of university life (Lorant, Nicause, Soto, & d'Hoore, 2012). Third, the present study is the first to test a combined self-affirmation and implementation intention intervention to reduce alcohol consumption in university students. Fourth, the finding that impact of the self-affirmation task varied depending on the type of value that participants chose to affirm has important implications for the self-affirmation literature.

Footnotes

1. Participants randomly allocated to complete the self-affirmation task also completed three items from Napper, Harris, and Epton (2009) at the end of the Time 1 questionnaire: *The task about values made me think about... things I don't like about myself [1] – things I like about myself [7]; things I'm bad at [1] – things I'm good at [7]; things I don't value about myself [1] – things I do value about myself [7]* ($\alpha = .88$). Harris et al. (2014) reported that participants who wrote about why their most important value was important to them had a higher score on this measure (i.e., were more self-affirmed) ($M = 4.59, SD = 1.41$) than those who wrote about why their least important value might be important to someone else ($M = 4.14, SD = 1.34$), $F(1, 328) = 8.66, p = .003$. The mean score on this measure ($M = 4.87, SD = 1.21$) for self-affirmed participants in the present study was higher than that reported by Harris et al. (2014), suggesting that participants in the self-affirmation condition had indeed found the task self-affirming.
2. Significant interactions between self-affirmation and risk status have been reported on measures of message derogation, perceived risk and intention in some studies (Harris & Napper, 2005; Scott et al., 2013), with significant effects of self-affirmation only observed among high-risk drinkers. The ANOVAs were therefore repeated with baseline risk status (*binge drinker, non-binge drinker*) as an additional between-participants factor. Two significant interactions with risk status were found. First, a significant self-affirmation \times risk status interaction was found on message reactance, $F(1, 340) = 6.97, p = .01$, such that among non-affirmed participants, binge drinkers had a more negative reaction to the health message than non-binge drinkers, $t(173) = 2.18, p = .03$ ($M_{BD} = 2.25, SD = 1.37; M_{NBD} = 1.83, SD = 1.13$), whereas the difference between binge and non-binge drinkers was non-significant among self-affirmed participants, $t(171) = 1.84, p = .07$ ($M_{BD} = 2.04, SD = 1.28; M_{NBD} = 2.42, SD = 1.26$). This finding is consistent with the idea that self-affirmation can reduce message

reactance among high-risk (i.e., binge) drinkers (Scott et al., 2013). Second, a significant risk status \times self-affirmation \times implementation intention was found on perceived risk, $F(1, 340) = 13.56, p < .001$. Among non-binge drinkers, the self-affirmation \times implementation interaction was significant, $F(1, 166) = 8.45, p = .004$, such that among those who formed implementation intentions, self-affirmed participants ($M = 5.77, SD = 1.25$) had lower risk perceptions than non-affirmed participants ($M = 6.32, SD = 0.55$), $t(66) = 8.45, p = .02$, whereas among those who did not form implementation intentions self-affirmed participants ($M = 6.21, SD = 0.76$) had similar risk perceptions as non-affirmed participants ($M = 6.00, SD = 0.72$), $t(100) = 1.47, p = .14$. Among binge drinkers, the self-affirmation \times implementation intention interaction was also significant, $F(1, 174) = 5.32, p = .02$, although none of the post-hoc comparisons were significant. Thus, the three-way interaction was primarily due to self-affirmed non-binge drinkers who formed an implementation intention having low risk perceptions. This finding is consistent with the argument that forming implementation intention reduces message acceptance in self-affirmed participants (Jessop et al., 2014), albeit only in non-binge (i.e., low risk) drinkers.

3. Further analyses indicated that none of the effects on behaviour were moderated by risk status, in line with previous studies (Harris & Napper, 2005; Scott et al., 2013).

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SELF-AFFIRMATION AND IMPLEMENTATION INTENTIONS

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Table 1

Message Processing and Binge Drinking Cognitions by Condition (N = 348)

	Non-Affirmed		Self-Affirmed		<i>F</i> (η^2_p) Values		
	No implementation intention (<i>n</i> = 105)	Implementation intention (<i>n</i> = 70)	No implementation intention (<i>n</i> = 104)	Implementation intention (<i>n</i> = 69)	SA Condition	II Condition	SA × II
Message reactance	2.05 (1.28)	2.05 (1.29)	2.05 (1.29)	2.27 (1.49)	1.58 (.005)	0.04 (<.001)	0.03 (<.001)
Message evaluation	4.79 (0.98)	4.72 (0.87)	4.84 (0.85)	4.94 (0.93)	1.72 (.005)	0.01 (<.001)	0.70 (.002)
Perceived risk	5.99 (0.80)	5.95 (0.93)	5.97 (0.82)	5.86 (1.01)	0.30 (.001)	0.62 (.002)	0.11 (<.001)
Intention to binge drink	3.25 (2.17)	2.95 (2.11)	3.28 (2.26)	2.78 (2.20)	0.08 (<.001)	0.08 (<.001)	0.17 (<.001)

Note. Means (standard deviations) are reported. II = Implementation intention. SA = Self-Affirmation.

SELF-AFFIRMATION AND IMPLEMENTATION INTENTIONS

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Table 2

Alcohol Consumption at Follow-Up by Condition (N = 283)

	Non-Affirmed		Self-Affirmed		<i>F</i> (η^2_p) Values		
	No implementation intention (<i>n</i> = 87)	Implementation intention (<i>n</i> = 58)	No implementation intention (<i>n</i> = 85)	Implementation intention (<i>n</i> = 53)	SA Condition	II Condition	SA × II
Time 2 units	12.92 (1.06)	10.17 (1.31)	12.74 (1.08)	9.15 (1.37)	0.24 (.001)	6.94** (.024)	0.11 (<.001)
Time 2 binge drinking frequency	0.64 (0.07)	0.57 (0.09)	0.78 (0.08)	0.44 (0.10)	0.002 (<.001)	6.14* (.022)	2.59 (.009)

Note. Adjusted means (standard errors) controlling for baseline scores are reported. II = Implementation intention. SA = Self-Affirmation.

* *p* < .05. ** *p* < .01

Figure 1 *Flow of Participants Through the Experiment*

