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Impact of brief self-affirmation manipulations on university students'
reactions to risk information about binge drinking

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Abstract

Objectives. Binge drinking is associated with an array of negative health consequences and is particularly prevalent in university students. Health-risk messages about alcohol may fail to change such behaviour because they are dismissed or derogated. The present study sought to compare the effect of three brief self-affirmation manipulations on message processing, message acceptance and subsequent alcohol-related behaviour in university students. *Design.* Participants ($N = 307$) were randomly allocated to condition (kindness questionnaire, values essay, attributes questionnaire, control questionnaire) before reading a health-risk message about binge drinking. *Methods.* After reading the message, participants completed measures of message processing (message reactance, message evaluation, counter-arguing) and message acceptance (perceived risk, intention, plans) as well as a manipulation check. Alcohol consumption was assessed one week later. *Results.* Participants in all three self-affirmation conditions scored significantly higher than participants in the control condition on the manipulation check measure. All other self-affirmation effects were non-significant. *Conclusions.* While the three self-affirmation manipulations were found to be self-affirming, they failed to impact on measures of message processing, message acceptance or subsequent behaviour. The findings concur with previous research that questions the use of self-affirmation to reduce alcohol consumption in university students. Current self-affirmation manipulations may not be strong enough to overcome defensive processing of health-risk messages about alcohol in students and/or prime social goals that are related to the domain under threat (i.e., alcohol consumption) and thereby nullifying any positive self-affirmation effects.

Key words. Alcohol; Self-affirmation; Intervention; College

Introduction

Binge drinking, defined as drinking twice the recommended daily limit of alcohol in a single session (Drinkaware, 2014), is a common behaviour among young people in the UK (NCSR, 2009; POST, 2014). Binge drinking is particularly prevalent in university students (Balier et al., 2009; Morton & Tighe, 2011) where it is seen to be a core part of the student identity (Carpenter et al., 2008; Colby, Colby, & Raymond, 2009). Norman, Conner and Stride (2011) reported that 66.3% of their sample of undergraduate students had engaged in binge drinking at least once in the previous week. Similar figures have been reported in other studies (Cooke, Sniehotta, & Schüz, 2007; Jamison & Myers, 2008; Norman, 2011). Binge drinking is associated with an array of negative short- and long-term social and health consequences. For example, binge drinking is associated with anti-social behaviour, physical violence, sexual assaults, accidents and injuries (Miller, Plant, & Plant, 2005; The Cabinet Office, 2004). In addition, continued heavy drinking increases the risk of long term-health complications including cirrhosis of the liver, heart disease and cancer (NHS, 2014a). Interventions to reduce the prevalence of binge drinking in university students are an important part of an alcohol harm-reduction strategy (The Cabinet Office, 2004). However, interventions may fail if students dismiss or derogate information on the negative health effects of binge drinking. Leffingwell, Neuman, Leedy, and Babitzke (2007) found that students who drank alcohol were more likely to engage in defensive processing of risk information about alcohol, such that they were more critical of the information presented and rated the problem as less important, than students who were non-drinkers. Moreover, these effects were more pronounced among students who engaged in binge drinking.

According to self-affirmation theory (Steele, 1988), information outlining the health risks of binge drinking (or any other behaviour) not only threatens a person's physical integrity, by outlining future risks to their health, but also their self-integrity (i.e., their sense

of being a sensible, rational, adaptively and morally adequate individual). As a result, individuals may derogate or dismiss such information as a means of protecting their self-integrity. However, the process of self-affirming – i.e., reflecting on a cherished value, attribute or characteristic in an unrelated domain – may protect an individual's self-integrity and therefore lead to more open and unbiased processing of the health-risk information. This, in turn, should lead to greater message acceptance, more positive intentions and associated changes in behaviour. As argued by Cohen and Sherman (2014), even relatively brief self-affirmation manipulations can be a catalyst for change as they help to momentarily overcome a barrier (i.e., the threat to one's self-integrity) that may impede the processing and acceptance of health-risk messages. Accordingly, a recent meta-analysis reported that self-affirmation manipulations produced, on average, small but significant effects on measures of message acceptance ($d = 0.17$), intention ($d = 0.14$) and behaviour ($d = 0.32$) (Epton, Harris, Kane, van Koningsbruggen & Sheeran, 2015).

To date, only a few studies have tested the effect of experimental (i.e., brief) manipulations of self-affirmation on the alcohol-related cognitions and behaviour of university students, with mixed findings. Harris and Napper (2005) examined whether self-affirmation enhanced the effectiveness of a message linking alcohol consumption with breast cancer in a sample of female university students. Significant effects were found on perceived risk and intention, although the latter effect was only significant among high-risk drinkers. The effect of self-affirmation on subsequent alcohol consumption was non-significant. In similar studies, Klein, Harris, Ferrer and Zajac (2011) found that self-affirmation had a significant effect on perceived vulnerability (worry, anxiety) but not perceived risk, and Ferrer, Shmueli, Bergman, Harris and Klein (2012) found that self-affirmation had a significant effect on the clarity of plans to reduce alcohol consumption. However, neither of these studies assessed subsequent alcohol consumption. Scott, Brown, Phair, and Schüz

(2013) recruited both male and female university students and found that self-affirmation only had a significant effect on message derogation and intention in high-risk drinkers. The effect of self-affirmation on subsequent alcohol consumption was non-significant. Finally, Meier et al. (2015) found that self-affirmation had non-significant effects on perceived risk, problem importance and message scrutiny, as well as follow-up behaviour, in a sample of heavy drinkers.

Self-affirmation theory (Steele, 1988) proposes that there are multiple ways in which individuals can self-affirm and, as a result, different self-affirmation manipulations should have similar effects on measures of message processing, message acceptance and subsequent behaviour. However, in their meta-analysis, Epton et al. (2015) reported that studies that employed a values essay in which participants are instructed to choose their most important value and write a short essay on why it is important to them (Crocker, Niya & Mischkowski, 2008), had larger effects on behaviour than those that used other self-affirmation manipulations. Most studies that have focused on university students' alcohol consumption have employed a values essay (Ferrer et al., 2012; Harris & Napper, 2005; Klein et al., 2011; Meier et al., 2015) to experimentally manipulate self-affirmation. In contrast to Epton et al. (2015), these studies have reported null effects on behaviour (Harris & Napper, 2005; Meier et al., 2015). Scott et al. (2013) used an attributes questionnaire (Napper, Harris & Epton, 2009) in which participants are instructed to rate the extent to which a number of positive values or characteristics apply to themselves, but also reported non-significant effects on alcohol consumption. In contrast, Armitage, Harris and Arden (2011) found that participants who were affirmed using a kindness questionnaire (Reed & Aspinwall, 1998), which asked about 10 past acts of kindness, engaged in less defensive processing of a health message about alcohol, had elevated threat perceptions, and consumed fewer units of alcohol at follow-up than non-affirmed participants. However, it is not clear whether these positive effects were

due to the specific self-affirmation manipulation used and/or to the non-student sample where excessive consumption of alcohol may be less normative. As a result, there is a need for research to compare the relative impact of different self-affirmation manipulations on alcohol-related message processing, cognitions and behaviour in university students.

Few studies have directly compared different self-affirmation manipulations (McQueen & Klein, 2006). Armitage and Rowe (2011) reported that participants who completed a kindness questionnaire, a values essay or a kindness essay (in which they wrote about the value of kindness) all had higher scores on a measure of interpersonal feelings (e.g., love, connectedness) than participants in the control condition, although no significant effects were found on measures of self-esteem and self-feelings. Jessop, Simmonds and Sparks (2009) reported that participants (female sunbathers) who completed a kindness questionnaire, values essay, or an attributes questionnaire, before reading a leaflet about sun safety, all had higher scores on measures of self-feelings, attitudes, response efficacy and self-efficacy than participants in the control condition, although no significant effects were found on measures of mood, defensive processing, message derogation and intention. Participants in the attributes questionnaire condition though, were more likely to take a free sample of sunscreen than those in the control condition. To date, no studies have directly compared different self-affirmation manipulations on the alcohol-related cognitions and behaviour of university students.

The present study sought to extend previous research by directly comparing the effects of three brief self-affirmation manipulations, i.e., the kindness questionnaire, a values essay and an attributes questionnaire, on alcohol-related cognitions and behaviour in university students. Previous studies have employed a values essay (Ferrer et al., 2012; Harris & Napper, 2005; Klein et al., 2011; Meier et al., 2015) or an attributes questionnaire (Scott et al., 2013) to affirm participants, with mixed effects on alcohol-related cognitions and null

effects on behaviour. There is some evidence that the kindness questionnaire may be used in conjunction with a health-risk message to reduce alcohol consumption (Armitage et al., 2011) although, to date, it hasn't been tested with university students. In addition, given that there is some evidence that self-affirmation manipulations may be more effective for those most at-risk (e.g., heavy drinkers) (Harris & Napper, 2005; Scott et al., 2013), the present study also examined whether risk status (i.e., binge drinking status at baseline) moderates self-affirmation effects.

Method

Design and Procedure

An email inviting students to participate in the study was sent to the 'volunteers list' of a UK university. The email contained information about the study and a link to the online baseline questionnaire. Participation was voluntary but was incentivised through the offer of a £50 prize draw. Participants were informed that completion of the online questionnaire would be taken as an indication that they consented to participate, although they were also informed that they could withdraw their data at any time by emailing the lead researcher. The study was approved by the Department of Psychology Research Ethics Committee in accordance with the University's Research Ethics Procedures.

The study employed a between-participants design in which participants were randomly allocated to one of four conditions (i.e., kindness questionnaire, values essay, attributes questionnaire, control questionnaire) after completing pre-test measures of demographics and alcohol consumption. Participants were then instructed to read a short health-risk message outlining the negative effects of engaging in binge drinking. Participants then completed measures of message processing, perceived risk, intentions and plans as well as a manipulation check. Participants were then asked to provide an email address for the one-week follow-up. One week later, participants were sent an email with a link to the follow-up

questionnaire that contained a measure of alcohol consumption over the previous week.

Participants

As detailed in Figure 1, 462 students clicked on the link contained in the email inviting them to participate in the study. Of these, 31 were excluded because they indicated that they were non-drinkers and a further 41 did not complete the pre-test measures. Of the 390 participants who were randomised to condition, 311 completed the post-message measures. Attrition analyses indicated no significant differences between those participants who did ($n = 311$) and did not ($n = 79$) complete the post-message measures on any of the pre-test measures (i.e., age, gender, study level, nationality, ethnicity, baseline alcohol consumption, baseline binge drinking frequency). However, condition was found to have a significant effect on attrition between randomisation and completion of the post-message measures, $\chi^2(3, N = 390) = 42.56, p < .001$. Attrition was higher among participants randomised to the kindness questionnaire (42.9%) than to the values essay (15.6%), attributes questionnaire (9.4%) and control (13.0%) conditions.

Of the 311 participants who completed the post-message measures, 4 were subsequently excluded due to extreme scores on the baseline measure of alcohol consumption (i.e., > 3 SDs above mean baseline consumption). The final sample size was therefore 307, of whom 56 were randomly allocated to complete the kindness questionnaire, 81 to the values essay, 86 to the attributes questionnaire and 84 to the control questionnaire. The baseline sample comprised of 224 females and 83 males with a mean age of 21.93 ($SD = 4.45$). The majority of the participants were undergraduates (73.6%), British (87.9%) and described their ethnicity as "White" (89.3%).

Two hundred and fifty-four participants (82.7%) completed the one-week follow-up questionnaire, comprising 47 allocated to complete the kindness questionnaire, 70 to the values essay, 72 to the attributes questionnaire and 65 to the control questionnaire. Further

attrition analyses were conducted to compare those who did ($n = 254$) and did not ($n = 53$) complete the follow-up questionnaire. No significant differences were found on the pre-test measures, including baseline alcohol consumption and frequency of binge drinking. However, considering the post-message measures, those who were lost to follow-up had lower risk perceptions ($M = 5.24$, $SD = 1.00$ vs. $M = 5.99$, $SD = 0.95$), $t(305) = 2.37$, $p = .02$, stronger intentions to engage in binge drinking ($M = 4.51$, $SD = 2.07$ vs. $M = 3.54$, $SD = 2.13$), $t(305) = 3.05$, $p = .002$, and weaker plans to avoid binge drinking ($M = 3.37$, $SD = 1.64$ vs. $M = 4.18$, $SD = 2.11$), $t(305) = 2.63$, $p = .01$, than those who remained in the study. There was no evidence of differential attrition by condition, $\chi^2(3, N = 307) = 2.57$, $p = .46$.

Pre-test measures

Demographics. Participants completed a range of pre-test measures assessing demographic variables (i.e., age, gender, level of study, nationality, ethnicity).

Screening question. Participants were also asked: *Do you drink alcohol? (Yes, No)*. Those answering *No* were excluded from the study and directed to a thank you page.

Baseline alcohol consumption. Participants remaining in the study were asked to think of a typical week and to write down what they drank on each day of the week, using an adapted version of the timeline follow-back technique (Sobell & Sobell, 1992). Spaces were provided for each day of the week for participants to enter the type and amount of each drink consumed (e.g., 2 pints of cider, 1 large glass of wine). These entries were then converted into units (i.e., 10ml) of alcohol using an online converter (NHS, 2014b) in order to calculate the total number of units consumed and the frequency of binge drinking (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 manipulations

Kindness questionnaire. The kindness questionnaire (Reed & Aspinwall, 1998) comprised 10 items that asked about past acts of kindness: e.g., *Have you ever put another*

person's interests before your own? (Yes, No). For items that were answered in the affirmative, participants were asked to provide an example of a time when this had happened.

Values essay. In line with Cohen, Aronson and Steele (2000) participants were instructed to rank 11 values in terms of their personal importance (e.g., *relations with friends/family, spontaneity, physical attractiveness, creativity*). Participants were then asked to write a few sentences to describe (i) why their highest ranked value was important to them and (ii) a time when the value was particularly important to them.

Attributes questionnaire. This questionnaire, as developed by Napper, Harris and Epton (2009), asked participants to answer 32 statements about a trait, characteristic or quality: e.g., *I love to learn new things*. Responses were made on five-point response scales (*Very much like me – Very much unlike me*).

Control questionnaire. The Personal Opinions Survey (Reed & Aspinwall, 1998) was used as the control questionnaire. It has been commonly used as the control condition in studies using the kindness questionnaire as a self-affirmation manipulation. The questionnaire comprised 10 items that asked about benign topics: e.g., *I think that houseplants help to brighten the home (Yes, No)*.

Health-risk message

The health-risk message (\approx 1,000 words) summarised information on the risks associated with binge drinking taken from the Drinkaware alcohol campaign website (Drinkaware, 2014). The message started with a definition of binge drinking and then outlined the negative effects of binge drinking under six headings: (i) short-term (physical and mental health) effects – e.g., anxiety, memory loss, sickness, bad skin, weight gain, (ii) long-term (health) effects – e.g., liver disease, cancer, stroke, (iii) aggression – e.g., physical and sexual assaults, (iv) risk-taking – e.g., accidents, anti-social behaviour, (v) unsafe sex – e.g., sexual transmitted diseases, unwanted pregnancies and (vi) crime – e.g., street crime, burglaries.

Post-test measures

Negative reactance. Two items were used to assess participants' affective reactions to the message: *The information about binge drinking made me feel... irritated, angry.*

Responses were made on seven-point response scales ranging from *Not at all* (1) to *Extremely* (7). Scores were averaged so that high scores indicated a strong negative reaction to the message ($\alpha = .85$).

Negative message evaluation. Six items assessed participants' evaluation of the quality of the message: *The information about binge drinking was... relevant, helpful, distorted, exaggerated, believable, convincing.* Responses were made on seven-point response scales ranging from *Not at all* (1) to *Extremely* (7). Scores were coded and averaged so that high scores indicated a strong negative evaluation of the message ($\alpha = .78$).

Counter-arguing. Three items assessed the extent to which participants developed counter-arguments when reading the message: *I was thinking of points that went against the information's arguments, I was feeling sceptical of the information's arguments, I was criticising the information.* Responses were made on seven-point response scales ranging from *Strong disagree* (1) to *Strongly agree* (7). Scores were averaged so that high scores indicated greater counter-arguing ($\alpha = .86$).

Perceived risk. Participants' perceptions of the risks associated with binge drinking covered in the message were assessed with five items: *Binge drinking increases the likelihood of... experiencing short-term negative health outcomes (e.g., bad skin, weight gain, memory loss), engaging in risky behaviour (e.g., unsafe sex, criminal offences), experiencing negative mental health outcomes (e.g., anxiety, depression), short-term negative social outcomes (e.g., anti-social behaviour, assaults), experiencing long-term negative health outcomes (e.g., heart disease, liver disease, cancer).* Responses were made on seven-point response scales ranging from *Very unlikely* (1) to *Very likely* (7). Scores were averaged so that high scores indicated

greater perceived risk ($\alpha = .82$).

Intention to binge drink. Three items assessed participants' intentions to engage in binge drinking in the following week: *Do you intend to engage in binge drinking in the next week? (Definitely do – Definitely do not)*, *How likely is it that you will engage in binge drinking in the next week? (Very unlikely – Very likely)*, *I intend to engage in binge drinking in the next week (Definitely do – Definitely do not)*. Responses were made on seven-point response scales (1 to 7), coded and averaged so that high scores indicated stronger intentions to engage in binge drinking ($\alpha = .97$).

Plans to avoid binge drinking. Participants' plans to avoid binge drinking were assessed with two items: *To what extent do you have a clear plan of how to avoid binge drinking?*, *I have a clear plan of how to avoid binge drinking*. Responses were made on seven-point response scales ranging from *Definitely don't* (1) to *Definitely do* (7) that were averaged so that high scores indicated clearer plans to avoid engaging in binge drinking ($\alpha = .97$).

Self-affirmation manipulation check. The manipulation check measure comprised five items from Napper et al. (2009) that asked the extent to which the task made participants *Think about positive aspects of myself*, *Think about things that are personally important to me*, *Think about my values*, *Focus my attention on who I am* and *Aware of things that I value about myself*. Responses were made on five-point response scales ranging from *Strongly disagree* (1) to *Strongly agree* (5). Scores were averaged to provide a manipulation check so that high scores indicated that the task made participants focus on their values ($\alpha = .86$).

Follow-up alcohol consumption. A retrospective seven-day recall diary (Gmel & Rehm, 2004) was used to assess alcohol consumption at one-week. Participants were instructed to write down what they drank on each day of the previous week. Spaces were provided for each day of week for participants to enter the type and amount of each drink

consumed (e.g., 2 pints of cider, 1 large glass of wine). These entries were then converted into units (i.e., 10ml) of alcohol using an online converter (NHS, 2014b) in order to calculate the total number of units consumed and the frequency of binge drinking (i.e., 8 or more units of alcohol in a single session for men, and 6 or more units for women) in the previous week.

Results

Randomisation checks

There were no significant differences between the four conditions at baseline in terms of age, $F(3, 294) = 0.49, p = .69$, gender, $\chi^2 = (3, N = 307) = 0.60, p = .90$, level of study, $\chi^2 = (3, N = 307) = 0.62, p = .89$, nationality, $\chi^2 = (3, N = 307) = 5.43, p = .14$, or ethnicity, $\chi^2 = (3, N = 307) = 4.62, p = .20$. There was a marginally significant difference between conditions in terms of typical weekly alcohol consumption, $F(3, 303) = 2.45, p = .06$, and a significant difference in terms of frequency of binge drinking in a typical week, $F(3, 294) = 3.61, p = .01$. Post-hoc analyses indicated that participants randomly allocated to the values essay condition ($M = 1.17, SD = 1.03$) engaged in binge drinking more frequently than those allocated to the kindness questionnaire ($M = 0.77, SD = 0.95$) ($p = .02$) and attributes questionnaire ($M = 0.70, SD = 0.92$) ($p = .002$) conditions. As a result, baseline binge drinking frequency was entered as a covariate in subsequent analyses.

Self-affirmation manipulation check

An ANCOVA was conducted with condition (kindness questionnaire, values essay, attributes questionnaire, control questionnaire) as the between-participants independent variable and the manipulation check measure as the dependent variable, with baseline binge drinking frequency entered as a covariate. Condition was found to have a significant effect on the self self-affirmation manipulation check measure, with post-hoc analyses indicating that participants in all three self-affirmation manipulation conditions scored higher than participants in the control condition ($ps < .001$) (see Table 1).

Effect of the self-affirmation manipulations on message processing, perceived risk, intention and plans

A series of ANCOVAs was conducted with condition (kindness questionnaire, values essay, attributes questionnaire, control questionnaire) as the between-participants independent variable and measures of message processing, perceived risk, intention and plans as the dependent variables, with baseline binge drinking frequency entered as a covariate. The effect of condition was found to be non-significant in each analysis (see Table 1). Thus, no significant differences were found between the conditions on these measures.

The analyses were repeated with risk status (baseline binge drinker vs. non binge drinker) entered as an additional between-participants factors. All condition \times risk status interactions were non-significant, indicating that risk status did not moderate the effect of the self-affirmation manipulations on the measures of message processing, perceived risk, intentions and plans.

Effect of the self-affirmation manipulations on alcohol-related behaviour at follow-up

Two ANCOVAs were conducted with condition (kindness questionnaire, values essay, attributes questionnaire, control questionnaire) as the between-participants independent variable and units of alcohol consumed and frequency of binge drinking at follow-up as the dependent variables, with corresponding baseline measures entered as covariates. The effect of condition was found to be non-significant in both analyses (see Table 2).

The analyses were repeated with risk status (baseline binge drinker vs. non binge drinker) entered as an additional between-participants factors. Both condition \times risk status interactions were non-significant, indicating that risk status did not moderate the effect of the self-affirmation manipulations on alcohol-related behaviour at follow-up.

Discussion

The present study sought to compare the effect of three brief self-affirmation

manipulations (kindness questionnaire, values essay, attributes questionnaire) on the processing and acceptance of a health-risk message on the dangers of binge drinking in university students. A manipulation check indicated that participants found all three self-affirmation manipulations affirming, compared to the control condition, but that there was no significant differences between the self-affirmation manipulations. The results are in line with those reported by Armitage and Rowe (2011) who found that a kindness questionnaire, a values essay and a kindness values essay all led to more positive interpersonal feelings, compared to control, although there were no significant differences between the self-affirmation manipulations. Taken together, these results are consistent with Steele's (1988) proposition that there are multiple ways that individuals can self-affirm.

Despite being self-affirming, the self-affirmation manipulations had no significant effects on measures of message processing, message acceptance or behaviour at follow-up. Non-significant self-affirmation effects have also been reported on measures of message derogation (Scott et al., 2013), perceived risk (Harris & Napper, 2005; Klein et al., 2011; Meier et al., 2015), intention (Harris & Napper, 2005; Scott et al., 2013) and subsequent behaviour (Harris & Napper, 2005; Meier et al., 2015; Scott et al., 2013) in previous studies on alcohol consumption in students. Moreover, in contrast to some studies (Harris & Napper, 2005; Scott et al., 2013), there was no evidence that the self-affirmation manipulations were more effective among those most at risk (i.e., binge drinkers at baseline). The present, and previous, findings therefore question the use of self-affirmation as a technique to help to reduce alcohol consumption in university students.

A key question for future research is why self-affirmation does not enhance the effectiveness of messages about risks of excessive alcohol consumption in students, when significant self-affirmation effects have been reported for a range of other health risks (Epton et al., 2015). First, it is possible that the self-affirmation manipulations assessed in the present

study are not strong enough to overcome students' resistance to messages about the risks of binge drinking. Although significant, the differences between the means of the self-affirmation and control conditions were small in absolute terms (i.e., 0.49 - 0.59) and the means were only just above the mid-point of the five-point scale (i.e., 3.72 - 3.82). While these means and differences are in line with those reported in other studies that have found subsequent self-affirmation effects on measures of message processing and acceptance (Harris et al., 2014; Napper et al., 2009), they do suggest that current self-affirmation manipulations represent a minimal self-affirmation intervention. Further research is needed to develop and test stronger and/or more intensive self-affirmation interventions to overcome defensive processing of health-risk messages about excessive alcohol consumption in students.

A second possibility is that, for many students, self-affirmation manipulations may prime social goals that are associated with alcohol consumption. For example, Armitage and Rowe (2011) reported that the three self-affirmation manipulations they tested all led to more positive interpersonal feelings than the control condition, but had no effect on global self-feelings or self-esteem. Similarly, Crocker et al. (2008) reported that the values essay produced more positive other-directed feelings than a control condition. Many university students report that they engage in binge drinking for social reasons (Norman et al., 2012) and believe that it helps them to socialise (Guise & Gill, 2007). As a result, if self-affirmation manipulations lead participants to reflect on the importance of social and interpersonal values, they may inadvertently prime the very cognitions and behaviour that they seek to reduce. It is possible that this interpretation may also generalise to other health-risk behaviours performed by young people that have an important social component (e.g., smoking, substance abuse). Although not formally tested in the Epton et al. (2015) meta-analysis, inspection of the forest plots reveals that most self-affirmation effects on health-risk behaviours (i.e., alcohol, smoking, substance abuse) were non-significant (i.e., 95% CIs crossed zero). Future studies

therefore need to identify and test ways to self-affirm that are less likely to lead to participants reflecting on social and interpersonal values when targeting health-risk behaviours, such as binge drinking, that have an important social component.

The study had a number of limitations that should be noted. First, there was evidence of attrition between randomisation and completion of the post-message measures, with participants randomly allocated to the kindness questionnaire more likely to drop out before completing the post-message measures. This differential attrition may simply reflect the greater length of the questionnaire, as participants could potentially have to write about 10 previous acts of kindness. The differential attrition may caution against the use of the kindness questionnaire as a self-affirmation manipulation. Second, there was also some evidence of attrition bias between Time 1 and Time 2 which may limit the generalisability of the findings. Those lost to follow-up had stronger intentions to engage in, and weaker plans to avoid, binge drinking. They also were more likely to downplay the risks of binge drinking. Third, the one-week follow-up period was relatively short, although this should increase the likelihood of significant self-affirmation effects on behaviour. Previous self-affirmation studies with students have either not assessed alcohol consumption at follow-up (Ferrer et al., 2012; Klein et al., 2011) or assessed it at one-week (Scott et al., 2013), two-week (Meier et al., 2015) or one-month (Harris & Napper, 2005) follow-up. However, self-affirmation has not been found to reduce student alcohol consumption in any of these studies, regardless of the length of follow-up. Fourth, alcohol consumption was assessed using a self-report measure which, although in line with previous studies, may introduce self-presentation biases. Nonetheless, Del Boca and Noll's (2000) review of the validity of self-report measures of alcohol consumption concluded that they are able to provide accurate estimates of consumption.

In conclusion, the present findings indicate that there may be multiple ways to encourage individuals to self-affirm. As a result, each of the manipulations tested in the present study can be used to test self-affirmation effects on message processing and acceptance, although the differential attrition observed for the kindness questionnaire may caution against its use. Despite being self-affirming, the self-affirmation manipulations had no significant effects on message processing, message acceptance or subsequent behaviour, in line with the mixed findings reported in previous studies. It is possible that self-affirmation manipulations may prime social and interpersonal values and goals that are related to alcohol use in students (and thereby nullify any self-affirmation effects). Overall, the present findings 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, unless other (effective) self-affirmation interventions are identified and tested.

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Table 1

Manipulation Check, Message Processing and Binge Drinking Cognition Scores by Condition (N = 307)

	Condition				Condition <i>F</i> (η^2_p) Value
	Kindness Questionnaire (<i>n</i> = 56)	Values Essay (<i>n</i> = 81)	Attributes Questionnaire (<i>n</i> = 86)	Control Questionnaire (<i>n</i> = 84)	
Manipulation check	3.82a (0.09)	3.72a (0.08)	3.74a (0.07)	3.23b (0.08)	11.79* (.110)
Negative reactance	2.40 (0.18)	2.28 (0.15)	2.32 (0.15)	2.08 (0.15)	0.78 (.008)
Negative message evaluation	2.83 (0.13)	2.98 (0.11)	2.92 (0.10)	2.90 (0.10)	0.29 (.003)
Counter-arguing	3.00 (0.18)	2.98 (0.15)	3.10 (0.14)	2.93 (0.14)	0.26 (.003)
Perceived risk	5.63 (0.13)	5.47 (0.11)	5.49 (0.10)	5.55 (0.11)	0.36 (.004)
Intention to binge drink	3.73 (0.24)	3.67 (0.20)	3.56 (0.20)	3.87 (0.20)	0.42 (.004)
Plans to avoid binge drinking	4.34 (0.26)	3.97 (0.22)	4.03 (0.21)	3.91 (0.21)	0.59 (.006)

Note. Data are adjusted means (standard errors) controlling for baseline binge drinking frequency.

Means with different subscript are significantly different. * $p < .001$.

Table 2

Alcohol Consumption and Binge Drinking Frequency at Follow-up by Condition (N = 254)

	Condition				Condition <i>F</i> (η^2_p) Value
	Kindness Questionnaire (<i>n</i> = 47)	Values Essay (<i>n</i> = 70)	Attributes Questionnaire (<i>n</i> = 72)	Control Questionnaire (<i>n</i> = 65)	
Consumption (units)	12.29 (1.52)	11.96 (1.25)	14.61 (1.23)	11.88 (1.29)	1.08 (.013)
Binge drinking frequency	0.65 (0.26)	0.64 (0.22)	0.88 (0.21)	0.79 (0.21)	1.26 (.015)

Note. Data are adjusted means (standard errors) controlling for corresponding baseline scores.

Figure 1. Participant Flow Through the Experiment

