# Comparing self-affirmation manipulations to reduce alcohol consumption in university students

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## Introduction

A large proportion of university students consume alcohol with the intention to get drunk; prevalence rates suggest that between 57 to 67% of university students drink alcohol with the intention to get drunk (1,2). Compared to non-university peers, university students have been found to consume significantly more alcohol (3–5). Consumption has been found to be predominantly motivated by social reasons, over-estimating peer consumption and living in uncontrolled environments (6,7). In addition, binge drinking may also represent self-medication as a coping technique for stress and anxiety (8–10).

Excessive alcohol consumption is a significant public health concern, especially for university students (11,12), and is associated with a range of negative health consequences. Alcohol is a contributing factor to both intentional and unintentional disease and injury (11). Strong positive links between binge drinking frequency, alcohol-related health problems and the occurrence of risk behaviours have been found in university students (13,14). Alcohol can compromise the immune system, increasing susceptibility to infections (11,15), increase individuals' risk of gastrointestinal illness, and increase the likelihood of developing cancer (16–18). Additional consequences include increased chances of assaults or violence, engaging in unwanted or unsafe sexual activity, unplanned pregnancies, injuries, drug use and damage to goods (13,14). It can also lead to psychiatric disorders, such as alcohol dependence, depression and anxiety (11,19–22). Binge drinking can further cause deficits in executive function, such as attention, memory or problem-solving (23–25) and, as a result, has been linked to poor academic achievement (26).

It is therefore apparent that binge drinking among university students is hazardous, highlighting the need for intervention. However, interventions to reduce heavy drinking will not be successful if students dismiss health-risk information presented in interventions (27). Heavy drinking students, and thus those most at risk, have been found the most likely to dismiss risk information and to give little weight to the significance of their behaviour. Dismissing this information constitutes defensive processing (28,29) and is likely to undermine the effectiveness of health-risk

messages in interventions. To be effective, interventions may need to address and reduce defensive processing.

Self-affirmation is one technique that may help to reduce the defensive processing of health-risk messages according to self-affirmation theory (SAT) (27,30–33). SAT poses that when individuals are presented with health-risk information, they experience a threat to both their physical integrity (including their current or future health) and their self-integrity (i.e. their view of themselves as a 'good' and moral person). In order to protect their self-integrity, individuals may react defensively to the threat by displaying defensive processing, such as dismissing or derogating the health-risk information (30–32). So therefore, a person's defensive processing must be reduced prior to being presented with this health-risk information, to prevent dismissal. In order to achieve this, SAT proposes that individuals should self-affirm in an unrelated domain to the one being threatened by the health-risk message in order to negate the threat to their self-integrity, allow non-defensive processing of the message and increase message acceptance. For example, if the health-risk message concerns the risks of binge drinking, individuals could self-affirm in unrelated domains, such as values, 'central beliefs' or 'relationships' (30,31). When self-affirming, it is vital that a domain is chosen that is important to the person and not related to the focus/content of the health-risk message (31).

SAT has previously been used to address hazardous drinking behaviour (27,34–36). A meta-analysis reported significant, but small, effects of self-affirmation manipulations (SAMs) on the acceptance of health-risk messages (d=0.17), behavioural intention (d=0.14) and changes in behaviour (d=0.32) (33). However, evidence specific to the effectiveness of SAMs to reduce alcohol consumption is mixed: while some studies have found significant reductions in alcohol consumption following intervention (34,36–38), others have not (27,35,39). The effect of SAMs on other variables, such as message acceptance, threat perception, behavioural intention and self-efficacy are equally mixed: while some studies have found no direct effect of SAMs on these variables (27,34,37,38), one study found a significant effect on plans to reduce alcohol consumption (40) and another study found a significant effect on perceived vulnerability but not on perceived risk (41).

Some significant effects have only been obtained when considering participants' risk status (i.e. among 'high-risk' drinkers). One study found that students who engaged in binge drinking at baseline, displayed greater behavioural intentions to reduce alcohol consumption than those who did not engage in binge drinking at baseline, following a self-affirmation manipulation (29). Another study, using female undergraduates, found that a message linking binge drinking with breast cancer also only produced significant effects in message acceptance, affect (i.e. feelings of fear while processing health risk information) and intentions to reduce alcohol consumption for high-risk drinkers; however, consumption at follow-up was not significantly reduced (42). However, non-significant findings have also been reported regarding the impact of risk status. For example, Knight and Norman (2016) found that risk status did not moderate the effect of the self-affirmation manipulation on message processing, perceived risk, intentions or subsequent alcohol consumption (27). Similarly, Meier et al. (2015) also found no significant effects of their SAM on perceived personal risk, message scrutiny and follow-up consumption in their sample of high-risk drinkers compared to their control group (39). The role of risk status within self-affirmation research therefore requires further attention given that high-risk drinkers are 'typically the least persuaded' (42), yet the most vulnerable to the consequences of excessive drinking.

SAT proposes that people may self-affirm in various ways, but achieve the same cognitive and behavioural effects (30). Four different SAMs have been used in the majority of studies investigating alcohol consumption at university. First is the values essay (VE) (44), which is most commonly used SAM in studies investigating students' alcohol consumption (27,29,39,40,42,45–47). In this SAM, participants are asked to select a value from a list and write about its personal meaning (45,46). However, previous studies have reported that it has not led to successful reductions in alcohol consumption (27,29,39), increases in message processing or acceptance in university students (27,35,36). Second is the attributes questionnaire, in which participants are asked 32 questions about their personality characteristics (48). This measure has been used by two studies on alcohol consumption in students (27,36). Only one study found a significant effect for message derogation and intentions for high-risk drinkers (>6-8 units a week) (27,36), and both studies found non-significant effects on alcohol consumption at follow-up. Third is the Kindness Questionnaire

(KQ) (49), a 10-item questionnaire assessing participants' past acts of kindness; which has only been used once with students in relation to alcohol consumption (27). No significant effects were found on any of the variables (message acceptance, message evaluations and consumption at follow-up). However, this SAM has been found to lead to significant reductions in alcohol consumption in a sample of retail workers (38). Fourth is the "Self-Affirming Implementation Intentions" manipulation (SA-II), a SAM (37,38) that instructs participants to make plans by linking future situations that may present a threat to them with 'appropriate', desirable behaviours by making if-then plans (50). It has been found to lead to significant reductions in alcohol consumption at follow-up in a sample of adolescents (51) and in a sample consisting of both university students and staff (37); however, to date, it has not been used to address alcohol consumption exclusively in students.

Studies that have sought to compare the effectiveness of different SAMs, have failed to produce conclusive findings. Knight and Norman (2016), for example, compared the KQ, VE and attributes questionnaire in the context of students' alcohol consumption and found that none of the SAMs had significant effects on any of the outcome variables (27). Armitage et al. (2011), although not with a student sample, on the other hand, found that both the KQ and the SA-II produced significant reductions in alcohol consumption and were equally as effective (52). Other studies have only used one SAM and compared results with control conditions (36,40,43).

In addition to the debate as to which is the most effective SAM, there is also a debate about which mechanisms underlie the effects of SAMs. While some have suggested that the effects of self-affirmation (decreased defensive processing, increased message acceptance and behavioural changes) are due to increases in participants' self-esteem, others have argued that it is due to increases in participants' interpersonal feelings (48,52–54). For example, self-affirmation manipulations may increase participants' feelings of self-esteem or interpersonal feelings, thereby bolstering their sense of self-worth and allowing them to engage in more open processing of a health-risk message. In order to investigate this, Armitage and Rowe (2011) tested adolescent girls' self-esteem and interpersonal feelings after taking part in the KQ or a control condition (51). Self-esteem was not raised, whereas interpersonal feelings were by the KQ. In a second experiment, participants were exposed to either the VE, kindness essay or KQ and assessed on

self-esteem and interpersonal feelings. The SAMs had non-significant effects on self-esteem, but interpersonal feelings were comparably increased across the experimental manipulations. However, the study is limited as it did not test the effect of the manipulations on behaviour.

Crocker et al. (2008) also reported raised interpersonal feelings in participants after completing the VE compared to control participants. Moreover, increased feelings of 'lovingness' and 'connectedness' fully accounted for smokers' message acceptance following exposure to the VE (54). Other studies (55) have found self-esteem to be raised as a result of SAM (Kindness essay), but only in those with low self-esteem at baseline. This may be because individuals with higher self-esteem may already feel good about themselves, and do not need to be 'manipulated' by self-affirmation task. Alternatively, it could simply reflect a ceiling effect for those who already have high levels of self-esteem.

The fact that the VE SAM increased interpersonal feelings could result from participants choosing to write about the importance of 'social relationships', which could prime for social feelings (35,54). Considering the social aspect of binge drinking (2,6), using a SAM that primes for social goals may not be suitable as students may choose to write positively about their past social events that involved alcohol. This could have adverse consequences, including message dismissal, as alcohol may be viewed as an important part of their self. This potential process may explain the inability of the VE SAM to reduce university students' alcohol consumption (27,39). It can further be suggested that it might be counter-productive to ask students to take part in a SAM known to increase interpersonal feelings if the goal is alcohol reduction. Similar processes may also occur when participants complete the KQ, which might explain its non-significant effect on student's alcohol consumption in Knight and Norman's (2016) study (27). SA-II, on the other hand, has only been tested in regards to self-esteem, and not interpersonal feelings; adolescent girls' self-esteem was raised following the SA-II SAM (38). Due to a lack of direct priming of sociability-related factors, SA-II could reduce defensive processing via increases in self-esteem rather than interpersonal feelings and thus lead to behavioural changes. In particular, by giving participants a strategy for not feeling threatened by the health-risk message, the SA-II SAM may serve to protect participants' self-esteem compared to non-affirmed participants.

The current study sought to compare the effects of two SAMs – the Self-affirmation Implementation Intentions (SA-II) and the Kindness questionnaire (KQ) – against a control group. Their effects on alcohol-related cognitions (e.g. perceptions of message quality or health-risks), interpersonal feelings, self-esteem, intentions as well as plans to drink within recommended limits and alcohol consumption at 1-week follow-up will be compared. The SA-II was chosen as it had not been used with a student-only sample in the context of alcohol consumption, but has led to significant reductions in an adolescent sample, who are an age group similarly at risk (56,57). The KQ was chosen to see if similar non-significant results would be achieved as in Knight and Norman's (2016) study; and secondly, to partly replicate the study conducted Armitage and Rowe (2011) investigating interpersonal feelings, self-esteem in the context of different means of self-affirmation (52).

## Method

*Ethical approval.* Ethical approval was granted by The University of Sheffield, Department of Psychology Ethics Committee.

*Design*. A between-participants design was employed in this study in which participants were randomly assigned to one of three experimental conditions; Self-affirmation intention implementation, Kindness Questionnaire or a control condition. The primary outcomes were units of alcohol consumed and frequency of binge drinking. The secondary outcomes included measures of message processing, message acceptance, self-esteem and interpersonal feelings.

*Participants*. Participants were university students who volunteered to take part in the research. Sample size calculations were conducted based on the meta-analysis by Epton et al. (33) which reported an average effect of SAMs on behaviour of d=0.32, which equates to an effect size of f=0.16 for a three group design. An *a priori* power analysis indicated that 381 participants would be needed for an effect size of f=0.16 at 80% power with alpha = 0.05 (58).

Procedure. Participants were recruited via an email send to student members of a university 'volunteers' list. The email included a link to an online survey hosted on Qualitrics that first displayed information and consent pages. After consenting, participants answered questions regarding demographics and their typical alcohol

consumption. Participants were then randomly allocated to one of the three conditions using the block randomisation function on Qualtrics: (i) Self-Affirmation Implementation Intention (SA-II), (ii) Kindness Questionnaire (KQ) (49), and (iii) a control condition (49). Participants' interpersonal feelings and self-esteem were assessed immediately after. All participants were then presented with the WHO graphic, graphic published by the WHO (2015) detailing negative health outcomes of binge drinking. This information was then followed by questions concerning participants' perceptions of the information as well as their plans and intentions to drink within recommended limits over the next week (35,38). Participants then gave an email address, in order to receive the time 2 questionnaire one week later. The time 2 questionnaire assessed alcohol consumption over the intervening week.

## Materials

### Pre-test/baseline measures

The baseline measures assessed age, gender, nationality and ethnicity. A screening question was included that assessed the frequency of participants' drinking behaviour. If 'Never' was chosen, participants were excluded from further participation. To assess baseline alcohol consumption, a timeline format was used (27,59,60). Participants were presented with a table containing the weekday names in rows on the left, and space on the right to list what and how much alcohol they consumed on each day in a typical week, e.g. '4 pints of beer, 1 glass of wine'. These free text responses were subsequently converted into units using the Alcohol Units Converter published by Public Health England (nd.), as part of their Alcohol Outcomes Record, and the 'Drinkaware Unit & Calorie Calculator'. Typical alcohol consumption at baseline was calculated as the sum of alcohol units consumed during each of the seven days. In addition, the frequency of binge drinking was calculated (i.e. how often females/makes drank more than 6/8 units in a session during a typical week).

### Self-affirmation manipulations

Participants were either randomised to the SA-II manipulation (Armitage et al., 2014), the Kindness Questionnaire or its Control version (49).

*Self-affirmation implementation intention (SA-II)*

Participants in this condition were presented with the sentence "If I feel threatened, then I will…" and given four options to finish the sentence with, such as "I will think about the things I stand for" (34) (Armitage et al., 2014; Harris, Napper, Griffin, Schuez & Stride, 2011). Participants were asked to type their answer.

*Kindness questionnaire (KQ).*

The Kindness questionnaire is a 10-item questionnaire directly prompting participants to reflect and elaborate on past acts of kindness (e.g. "Have you ever forgiven another person when they have hurt you?") (49).

*Control questionnaire.*

The control version of the KQ was used for the control condition; it is also called the Personal Opinion Survey. It consists of ten neutral questions and gives participants chance to elaborate on these (e.g. "I think the colour blue looks great on most people") (49).

*Post-manipulation tests*

*Interpersonal feelings*. Interpersonal feelings were measured with previously used items (52,54). Participants were asked to indicate how kind, loving, joyful, giving and connected they felt after partaking in a SAM. They were asked to answer using a 5-point response scale (Not at all – Extremely). The mean of the questions was then calculated, and a measure of 'interpersonal feelings' was obtained, with high scores indicating high interpersonal feelings. The internal reliability of the scale was acceptable ($\alpha$ = .78).

*Self-esteem.* Self-esteem was assessed by asking participants to rate how much the sentence "I have high self-esteem" is true of them by choosing from a 5-point response scale (Not very true of me – very true of me) (61). This measure was previously used to investigate the role of self-esteem following SAMs (52); high scores indicated high self-esteem.

*Health risk message*

Participants were presented with a graphic published by the World Health Organisation detailing 14 effects of 'high-risk drinking', such as premature aging,

alcohol dependence, aggressive-irritable behaviour and weakness of heart muscle. The same graphic was also used by Armitage et al. (2011) (38). A short message detailing current NHS alcohol guidelines was also added. A timer automatically recorded how much time participants spent reading the health-risk message.

*Post-message health-risk measures*

*Negative reactions.* Negative reactions to the health-risk message were investigated with three questions used in previous studies (e.g. 35,62) (e.g. "The information about binge drinking made me feel… irritated") and answered on 7-point response scales (Not at all – Extremely). Participants' mean scores were then calculated, with high scores indicating high negative reactions. The internal reliability of the scale was high ($\alpha$ = .91).

*Message quality.* Perceived message quality was assessed by six items used in previous studies (35,63) (e.g. "The information on the effects of high-risk drinking was...Relevant"). Participants answered on 7-point response scales (Not at all – Extremely). The mean score of the six items was calculated for each participant to achieve an overall measure of (perceived) 'message quality'. High scores indicated better perceptions of message quality. The internal reliability of the scale was acceptable ($\alpha$ = .70).

*Health risk*. Participants' perceptions of the health risks of binge drinking were assessed with five items used in a previous study (35) (e.g. "Excessive alcohol consumption increases the risk of… health problems"). Participants answered on a 7-point response scale (very unlikely – very likely). The mean score of the five items was calculated with high scores indicating that the health risks were perceived as likely. The internal reliability of the scale was high ($\alpha$ = .87).

*Intention*. Intention to drink within recommended guidelines over the following week was assessed using two questions (e.g. "Do you intend to drink within recommended alcohol guidelines in the next week?") as previously used by Norman and Wrona-Clarke (35). The questions were answered on a 7-point response scale (Definitely do – Definitely do not). After reverse coding one question, the mean of the two items was calculated to measure participants' intention. High scores indicated higher intentions. The internal reliability of the scale was high ($\alpha$ = .97).

*Plans.* Plans to drink within recommended guidelines were measured using two questions (e.g. “I have a clear plan of how to drink within recommended alcohol guidelines in the next week.”). The questions were answered on a 7-point scale (Definitely do – Definitely do not). After reverse coding one question, the mean of the two items was calculated to measure participants’ plans. High scores indicated higher plans to drink within recommended limits. The internal reliability of the scale was high ($\alpha$ = .98).

*Follow-up measures*

*Follow-up alcohol consumption*. Participants’ alcohol consumption at one-week follow-up was assessed via a retrospective recall timeline (59). Participants were asked to report what they had drank on each day of the previous week using the same format as used to assess alcohol consumption at baseline.

Analysis

Data was exported from Qualtrics and imported into SPSSv26 for Mac for analysis. The sample was summarised descriptively. The extent of any imbalance due to randomisation across groups in baseline variables was assessed, with variables considered to be potentially influential on the outcomes showing substantive imbalances carried forward for inclusion and assessment in the count regression models. Possible attrition biases were assessed through comparisons of values of non-missing data between those who did and did not complete post-manipulation measures, and between those who did and did not complete the post-intervention follow-up, using analysis of variance and chi-squared tests.

Data distributions of primary outcome variables (i.e. units of alcohol consumed and frequency of binge drinking at time 2) were assessed for right-skewness, overdispersion and zero inflation. These effects were anticipated for both measures and may determine the most suitable modelling distributions for the data. Candidate modelling distribution considered for both variables included the Poisson distribution, the zero-inflated Poisson distribution, the negative binomial distribution and the zero-inflated negative binomial distribution. For each variable, the best fitting distributions were determined for models including indicator variables used to model the condition variable (i.e. modelling whether an individual was assigned to the Kindness, SA-II or

control (reference) groups) and baseline alcohol consumption variables (units of alcohol consumed and frequency of binge drinking at time 1) using AIC (Akaike Information Criterion) statistics. The variable corresponding to frequency of binge drinking frequency at baseline was considered to determine whether a zero case was a 'certain zero' or a count of zero in the zero-inflated variants of the models considered. The effect of the SAMs (condition) on the secondary outcomes was tested using analyses of variance.

Additional analyses tested whether risk status moderated the effects of the SAMs on the primary and secondary outcomes. For the primary outcomes, interaction terms were created between the number of units of alcohol typically consumed at baseline and the two indicator variables used to model the condition variable. These were then included in the regression models predicting units of alcohol consumed and frequency of binge drinking at time 2. For the secondary outcomes, interactions between risk status (i.e. whether or not paricipants typically consumed more than 14 units of alcohol per week at baseline) and condition were tested for each secondary using analyses of variance.

## Results

**Participants.** The time 1 questionnaire link was accessed by 576 participants. Of these, 122 were not randomised as they did not drink alcohol ($n$ = 57) or terminated the questionnaire pre-manipulation ($n$ = 65). Therefore, 454 participants were randomised to one of three conditions. Of these, 386 completed some or all questions in their experimental condition (SA-II questionnaire: $n$ = 137, Kindness-Q: $n$ = 102, control: $n$ = 137). Of the 369 participants who provided email addresses, 303 responded to the time 2 questionnaire.

**Descriptive and exploratory analysis.** The baseline sample of 454 participants consisted of 176 males, 273 females and 5 people with other or missing gender identities. Participant mean age was 22.6 years (SD = 5.24 years). The majority of participants were UK nationals (351; 77.8%) from White ethnic backgrounds (390; 86.3%) studying at undergraduate level (291; 64.4%).

The baseline sample of 454 participants is summarised in Table 1, by allocation and as a full cohort. Group balance at baseline was assessed from

inspection of Table 1. No substantive imbalances were detected between most variables. While some differences in the baseline alcohol variables across groups were observed, these differences were broadly within expectations of the consequences of the randomisation procedure. Nonetheless, as these variables were considered to be of potential importance to the primary outcome variables they were consequently carried forward for inclusion as controlling covariates in the inferential analyses. Inspection of means and standard deviations (Table 1) and frequency distributions for the variables corresponding to alcohol consumption and episodes of binge drinking at time 2 (post intervention) (see Supplementary Figures 1 and 2) suggested right-skewed data distributions, possibly over-dispersed data with zero inflation; justifying consideration of the selected modelling distributions. No substantive differences in data distributions between groups were apparent.

Attrition analyses indicated that participants who completed the post-message measures drank significantly more ($F(1, 563) = 74.30$, $p < .001$) and had a higher frequency of binge drinking ($F(1,573) = 34.06$, $p < .001$) at baseline than those who didn't complete these measures. All other comparisons were non-significant. Similarly, participants who completed the time 2 questionnaire drank significantly more alcohol ($F(1, 563) = 66.96$, $p < .001$) and had a higher frequency of binge drinking ($F(1, 573) = 21.49$, $p < .001$) at baseline than those who were lost to follow-up. In addition, participants identifying as “White” were more likely to complete the time 2 questionnaire than those identifying as “Non-white” ($X^2(1, N=561) = 18.35$, $p < .001$). All other comparisons were non-significant.

**Analysis of primary outcomes: Alcohol consumption and frequency of binge drinking.** A comparison of model goodness-of-fit using AIC statistics on all candidate modelling distributions for both primary outcomes revealed that the zero-inflated negative binomial distribution was the best-fitting modelling distribution for the alcohol consumption variable, fitting the data substantially better than other distributions. The zero-inflated Poisson distribution was the best modelling distribution for the binge drinking variable, with little substantive difference in goodness-of-fit of all four candidate modelling distributions for this variable (Table 2). The best fitting modelling distributions in each case were carried forward to use as the basis for regression models to assess the effects of the SAMs on units of alcohol consumed and frequency of binge drinking at time 2.

Model and inflation parameters for the zero-inflated negative binomial regression model of units of alcohol consumed at time 2 are summarised in Table 3. Neither SAM was a significant predictor of units of alcohol consumed at time 2 ($p$ = .522 for Condition = *Kindness*; $p$ = .562 for Condition = *SA-II*). Units of alcohol consumed at time 1 did not significantly predict alcohol consumption at time 2 ($p$ = .129), whereas frequency of binge drinking at time 1 did ($p$ < .001). Binge drinking at time 1 did not significantly predict the probability of an individual being a 'certain zero', with respect to level of alcohol consumption post-intervention (i.e. certain to have consumed no alcohol during that week) (p = .079). Additional analyses indicated that neither of the interactions between condition and baseline alcohol consumption was a significant predictor of alcohol consumption at time 2 ($p$ = .597 for Condition = *Kindness*; $p$ = .120 for Condition = *SA-II*).

Model and inflation parameters for the zero-inflated Poisson regression model of time 2 binge drinking episodes are summarised in Table 4. Neither SAM was a significant predictor of frequency of binge drinking at time 2 ($p$ = .337 for Condition = Kindness; p = .720 for Condition = SA-II). Units of alcohol consumed ($p$ = .475) and frequency of binge drinking ($p$ = .067) at time 1 also were not significant predictors of the response variable. Binge drinking at time 1 also did not significantly predict the probability of an individual being a 'certain zero', with respect to episodes of binge drinking at time 2 ($p$ = .082). Additional analyses indicated that neither of the interactions between condition and baseline alcohol consumption was a significant predictor of frequency of binge drinking at time 2 ($p$ = .455 for Condition = *Kindness*; $p$ = .115 for Condition = *SA-II*).

**Analysis of secondary outcomes: Post-manipulation and post-message measures.** A series of between-participants ANOVAs was conducted to investigate whether condition (independent variable) had an effect on the secondary dependent variables of interpersonal feelings, self-esteem, time spent reading the risk message, negative reactions, perceived message quality, perceived health risks, plans and intentions. As shown in Table 5, all ANOVAs revealed no evidence for significant effects of condition on the secondary outcomes. Moreover, the effect sizes were very small. Additional analyses indicated that risk status did not moderate the effect of condition on the secondary outcomes; non-significant condition x risk status interactions were found for time spent reading the message (p = .50), negative

reactions (p = .56), perceived message quality (p = .29), perceived health risks (p = .95), intention (p = .74) and plans (p = .87).

## Discussion

The present study sought to compare the effects of the SAMs (Self-affirmation Intention Implementations, Kindness Questionnaire versus Control Questionnaire) on message processing (time spent reading a health-risk message about the consequences of binge drinking, negative reactions, and perceived message quality), acceptance of the message (perceived health risks, behavioural intentions, and plans to drink within recommended limits) and alcohol consumption (units consumed and frequency of binge drinking) at 1-week follow-up. The effects of the SAMs on interpersonal feelings and self-esteem were also investigated.

No significant effects of the manipulations were found on message processing, message acceptance, and alcohol consumption at 1-week follow-up. In regards to alcohol consumption and university students, non-significant results have previously also been reported in studies investigating message acceptance (27,29), perceived risk (27,39,42,47), intentions (27,36,37,42) and plans to drink within recommended limits over the time of follow-up (27). Effects of SAMs on alcohol consumption at follow-up have also previously been found to be non-significant (27,35,36,42,43). Additional analyses revealed that risk status (typical alcohol consumption at baseline) did not moderate the effect of the SAM on any of the outcome variables, which has also previously been found (27,43). Together, these results suggest that interventions targeting excessive alcohol consumption in university students, based on SAT, are not effective.

Furthermore, no significant effects were found on reports of interpersonal feelings and self-esteem following SAM, which are the mechanisms thought to underlie SAT (52–54). Contrary to previous research (52), participants in the KQ did not report increases in interpersonal feelings and SA-II participants did not report increased feelings in self-esteem or interpersonal feelings. An explanation for these non-significant findings could be that the SAMs (KQ, SA-II) did not work in the sample; that is, they were not perceived as affirming by the students who completed them. The current study, unlike others (27,48), did not include a question

investigating whether participants found the manipulations affirming; which may have yielded important insight into the success of the manipulations. However, past studies with university student samples suggest that participants find SAMs, such as the kindness questionnaire or values essay, self-affirming. Moreover, Knight and Norman (2016), for example, still found no significant effects on participants' cognitions and behaviour at follow-up, despite participants indicating they felt self-affirmed.

Previous studies with non-student samples have found significant effects for SAMs on alcohol consumption (37,38,51); however, the current study did not. A potential explanation is offered by Meier et al. (2015), who found that pre-existent perceptions about the importance of a problem, such as the consequences of binge drinking, had a greater influence on subsequent alcohol consumption than self-affirming in an experimental manipulation (43). Thus, it is likely that university students have stronger beliefs about alcohol that are a key part of their student identity (1,63–67) and, as a result, more resistant to change. The SAMs typically tested might not be strong enough to overcome the threat posed by challenging these beliefs.

The present study had a number of limitations that should be noted. First, a number of attrition biases were found. In particular, participants with higher baseline alcohol consumption and who engaged in binge drinking more frequently were less likely to drop out of the study. One explanation of this finding could be that participants who needed the intervention most, realised their drinking behaviour was harmful, and therefore stayed in the study. In contrast, people who drank less frequently may have decided this did not apply to them and they did not need to engage further with the study. Non-white participants were also more likely to drop out, again perhaps because they felt that it was less relevant to them. However, this explanation needs further investigation.

Second, the WHO graphic used outlined general risk factors, such as premature ageing, liver damage or impaired sexual performance, and not age-specific ones such as physical assaults and negative academic impacts. As a result, the students may have felt that the consequences were irrelevant and, as a result, did not find the message threatening. The same graphic was used previously with

retail workers, who self-affirmed using SA-II or KQ, and subsequently displayed greater message processing, perceived threat, message acceptance and a reduction in alcohol consumption at follow-up (38). This effect may partly be due to the higher perceived relevance of the health-risk message in this participant group.

Thirdly, although it is possible to question the accuracy of self-report measures of alcohol consumption as used in the current study, using self-report measure for alcohol consumption has largely been found to correlate to biomarkers (69,70), suggesting participants generally give accurate self-reports of their drinking. Nonetheless, future research could utilise electronic developments, such as apps that aid the recording of drinking behaviour. The current study also had a number of strengths including the use of manipulations and measures that have been used in previous research investigating SAT.

## Conclusion

In conclusion, the present study demonstrated that two different self-affirmation techniques had non-significant effects on alcohol-related cognitions and alcohol consumption at follow-up in a university student sample. It can also be concluded that the mechanisms underlying self-affirmation remain unclear and require further research as the current study found neither self-esteem nor interpersonal feelings to be raised following the SAMs. The most important implication of this research, however, is that interventions aiming to reduce alcohol consumption in university students should be not be informed by self-affirmation theory as the majority of studies have found no beneficial effect of SAMs.

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## Supplementary documents

1. Ethics Approval

Downloaded: 21/08/2016 Approved: 19/02/2016
Katharina Vogt
Registration number: 150130002 Psychology
Programme: Research Project
PROJECT TITLE: Self-affirmation and alcohol consumption in university students
APPLICATION: Reference Number 007598
On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 19/02/2016 the above-named project was approved on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:
University research ethics application form 007598 (dated 19/02/2016). Participant information sheet 1015097 version 2 (17/02/2016). Participant consent form 1015098 version 1 (02/02/2016).
If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.
Yours sincerely
Thomas Webb
Ethics Administrator Psychology

2. Volunteers email

Study investigating alcohol consumption in students – Chance to win a £50 Amazon-voucher!

We are looking for participants to take part in a study investigating alcohol consumption at university: participation would entail completing two surveys.

The first one will take no longer than fifteen minutes. A week later, the second questionnaire will be emailed to you, which will only take about 2 minutes to complete.

Once you have completed both, you can enter yourself into a price draw for a £50 Amazon-voucher.

If you want to take part in the study, please click on this link XX.

Should you have any questions, do not hesitate to contact me on ksvogt1@sheffield.ac.uk

Many thanks for your participation,

Kathy Vogt
Department of Psychology

3. Time-1 Survey

Binge-drinking and self-affirmation

Q1 Thank you for your interest in participating in this research on alcohol consumption in university students Participation in this study involves filling out two questionnaires: this first one, which should take no longer than 10 minutes, and a follow-up questionnaire in 7 days, which should take no longer than 1-2 minutes to complete. In order to be able to send you the second questionnaire, you will be asked to provide an email address. This email address will only be used for the purpose of contacting you again and matching both your responses; it will then be deleted, so that all data collected will be anonymised. This first questionnaire will ask you some personal questions, such as your age and study level, your personal alcohol consumption and your beliefs about alcohol consumption. You will also be presented with some information about alcohol consumption. Once you have completed both questionnaires, you will have the chance to enter yourself into a prize draw for a £50 Amazon voucher. Participation in this research is entirely voluntary and confidential. All email addresses will be deleted once data collection has been completed. The anonymised data will be stored electronically on a password-protected computer. Should you have any questions, do not hesitate to contact me on ksvogt1@sheffield.ac.uk Many thanks for your participation, Kathy Vogt Department of Psychology Please answer the following question to indicate that you consent to take part in the study. Do you consent to take part in this study?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Q39 A few questions about you...

Q2 1. What is your gender?

- Male (1)
- Female (2)
- Other (3) _____

Q3 2. How old are you?

- 16 (1)
- 17 (2)
- 18 (3)
- 19 (4)
- 20 (5)
- 21 (6)
- 22 (7)
- 23 (8)
- 24 (9)
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- 74 (59)
- 75 (60)
- 76 (61)
- 77 (62)
- 78 (63)
- 79 (64)

□ 80 (65)

Q4 3. Which level of study are you currently undertaking?
□ Undergraduate Degree (Bsc, BA, BmedSci, ...) (1)
□ Postgraduate Taught Degree (MA, PgCert, PgDip, MSc, ...) (2)
□ Doctorate Degree (PhD, DClinPsy, ...) (3)
□ Other (4)

Q5 4. Which ethnic background describes you best?
□ White British (1)
□ White Other (2)
□ Black British (3)
□ Black Other (4)
□ British Asian (5)
□ Asian Other (6)
□ Other (7)
□ Prefer not to say (8)

Q95 5. What is your nationality?
□ UK (1)
□ Other (2) _____

Q7 Your drinking habits...

Q8 How often do you have a drink containing alcohol?
□ Never (1)
□ Monthly or less (2)
□ 2-4 times a month (3)
□ 2-3 times a week (4)
□ 4 or more times a week (5)
If Never Is Selected, Then Skip To End of Survey

Q87 Your drinking habits...

Q10 Think of a typical week and what you would have to drink on each day of the week. Please write down what, if anything, you would typically drink on each day of the week. Please enter both the type and the amount you would drink - e.g. 2 pints of Stella, 1 large glass of red wine, 1 shot of vodka. If you do not typically drink anything on a certain day of the week please write down “0” or "nothing". How much do you typically drink on a...
Monday (1)
Tuesday (2)
Wednesday (3)
Thursday (4)
Friday (5)
Saturday (6)
Sunday (7)

Q80 About you.... Please read the following statements and answer yes or no. If your answer to any of the statements is 'yes', please provide a brief example or reason (i.e. a few words) for your answer. Please be as honest and accurate as possible.

Q12 1. I think the colour blue looks great on most people.
- Yes (1)
- No (2)

Q100 If yes, please provide a brief example or reason for your answer.

Q13 2. I think that chocolate is the best flavour of ice cream.
- Yes (1)
- No (2)

Q101 If yes, please provide a brief example or reason for your answer.

Q14 3. I think that winter is the most satisfying season of the year.
- Yes (1)
- No (2)

Q102 If yes, please provide a brief example or reason for your answer.

Q15 4. I think that the most aromatic trees in the world are pine trees.
- Yes (1)
- No (2)

Q103 If yes, please provide a brief example or reason for your answer.

Q16 5. I think that cooking is an important skill to possess.
- Yes (1)
- No (2)

Q104 If yes, please provide a brief example or reason for your answer.

Q17 6. I think that houseplants help to brighten the home.
- Yes (1)
- No (2)

Q106 If yes, please provide a brief example or reason for your answer.

Q18 7. I think that sewing is an important skill to possess.
- Yes (1)
- No (2)

Q109 If yes, please provide a brief example or reason for your answer.

Q19 8. I think that the beach is a great place to go on holiday.
- Yes (1)
- No (2)

Q107 If yes, please provide a brief example or reason for your answer.

Q20 9. I think that the underground is the best form of public transport.
- Yes (1)
- No (2)

Q110 If yes, please provide a brief example or reason for your answer.

Q21 10. I think that fruit makes the best dessert.
- Yes (1)
- No (2)

Q111 If yes, please provide a brief example or reason for your answer.

Q81 About you.... Please read the following statements and answer yes or no. If your answer to any of the statements is 'yes', please provide a brief example (i.e. a few words) of a time in your life when you have done what the statement describes. Please be as honest and accurate as possible.

Q55 1. Have you ever forgiven another person when they have hurt you?
- Yes (1)
- No (2)

Q68 If yes, please provide a brief example of a time when you have forgiven another person.

Q56 2. Have you ever been considerate of another person's feelings?
- Yes (1)
- No (2)

Q68 If yes, please provide a brief example of a time when you have been considerate of another person's feelings.

Q57 3. Have you ever been concerned with the happiness of another person?
- Yes (1)
- No (2)

Q69 If yes, please provide a brief example of a time when you have been concerned with the happiness of another person.

Q58 4. Have you ever put another person's interests before your own?
- Yes (1)
- No (2)

Q70 If yes, please provide a brief example of a time when you have put another person's interests before your own.

Q59 5. Have you ever been generous and selfless to another person?

 Yes (1)
 No (2)

Q71 If yes, please provide a brief example of a time when you have been generous and selfless to another person.

Q60 6. Have you ever attended to the needs of another person?
 Yes (1)
 No (2)

Q72 If yes, please provide a brief example of a time when you have attended to the needs of another person.

Q62 7. Have you ever tried not to hurt the feelings of another person?
 Yes (1)
 No (2)

Q73 If yes, please provide a brief example of a time when you have tried not to hurt the feelings of another person.

Q63 8. Have you ever felt satisfied when you have helped another person?
 Yes (1)
 No (2)

Q74 If yes, please provide a brief example of a time when you have felt satisfied when you have helped another person.

Q66 9. Have you ever gone out of your way to help a friend at the expense of your own happiness?
 Yes (1)
 No (2)

Q75 If yes, please provide a brief example of a time when you have gone out of your way to help a friend at the expense of your own happiness.

Q67 10. Have you ever found ways to help another person who was less fortunate than yourself?
 Yes (1)
 No (2)

Q76 If yes, please provide a brief example of a time when you have found ways to help another person less fortunate than yourself.

Q11 About you....

Q77 The beginning to a sentence appears below. Below it are 4 different ways of completing the sentence. In the text boxes below, please write out the beginning of the sentence and then complete it with 1 of the 4 options we have given you. If I feel threatened or anxious, then I will... … think

about the things I value about myself. … remember the things that I have succeeded in. … think about what I stand for. … think about the things that are important to me.

Q97 If...
- If I feel threatened or anxious... (1)

Q99 then...
- then I will think about things I value about myself (1)
- then I will remember the things I have succeeded in (2)
- then I will think about what I stand for (3)
- then I will think about the things that are important to me (4)

Q37 A few questions about how you feel right now...

Q83

| | Not at all (1) | (2) | (3) | (4) | Extremely (5) |
|---|---|---|---|---|---|
| How kind do you feel? (1) | | | | | |
| How loving do you feel? (2) | | | | | |
| How joyful do you feel? (3) | | | | | |
| How giving do you feel? (4) | | | | | |
| How connected do you feel? (5) | | | | | |

Q112 I have high self-esteem...
- Not very true of me (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- Very true of me (7)

Q28 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Q89 The Effects of High-Risk Drinking Presented below is a diagram, published by the World Health Organisation (WHO), about the dangers of high-risk drinking.

Please read all the information on the diagram about the effects of alcohol on your health.

Q22

Q86 The NHS recommends that to reduce the risk of harming your health: men and women should not drink more than 14 units a week spread your drinking over three days or more if you drink as much as 14 units a week (14 units is equivalent to 6 pints of average strength beer or 10 small glasses of low strength wine). During a single drinking session, you should try to: limit how much you drink drink more slowly, drink with food, and alternate with water or non-alcoholic drinks

Q33 A few questions about the information... Here are some questions about your views on the information you just read. Please indicate the extent to which you agree with each of the following statements by marking the appropriate number on each scale.

Q34 1. The information on the effects of high-risk drinking made me feel...

| | Not at all (1) | (2) | (3) | (4) | (5) | (6) | Extremely (7) |
|---|---|---|---|---|---|---|---|
| Irritated (1) | □ | □ | □ | □ | □ | □ | □ |
| Annoyed (2) | □ | □ | □ | □ | □ | □ | □ |
| Angry (3) | □ | □ | □ | □ | □ | □ | □ |

Q35 What did you think about the information you read? 2. The information on the effects of high-risk drinking was...

| | Not at all (1) | (2) | (3) | (4) | (5) | (6) | Extremely (7) |
|---|---|---|---|---|---|---|---|
| Relevant (1) | □ | □ | □ | □ | □ | □ | □ |
| Exaggerated (2) | □ | □ | □ | □ | □ | □ | □ |
| Helpful (3) | □ | □ | □ | □ | □ | □ | □ |
| Overstated (4) | □ | □ | □ | □ | □ | □ | □ |
| Convincing (5) | □ | □ | □ | □ | □ | □ | □ |
| Alarmist (6) | □ | □ | □ | □ | □ | □ | □ |

Q26 Your beliefs... Please indicate the extent to which you agree with each statement. 1. Excessive alcohol consumption increases the risk of...

| Very unlikely (1) | (2) | (3) | (4) | (5) | (6) | Very likely (7) |
|---|---|---|---|---|---|---|

Health problems (1) □ □ □ □ □ □ □

Psychological problems (e.g. anxiety, depression) (2) □ □ □ □ □ □ □

Reduced cognitive function (e.g. poor memory) (3) □ □ □ □ □ □ □

Aggressive behaviour (4) □ □ □ □ □ □ □

Accidents (5) □ □ □ □ □ □ □

Q29 2. I intend to drink within recommended alcohol guidelines in the next week.

□ Definitely do not (1)
□ (2)
□ (3)
□ (4)
□ (5)
□ (6)
□ Definitely do (7)

Q31 3. Do you intend to drink within recommended alcohol guidelines in the next week?

□ Definitely do not (1)
□ (2)
□ (3)
□ (4)
□ (5)
□ (6)
□ Definitely do (7)

Q32 4. I have a clear plan of how to drink within recommended alcohol guidelines in the next week.

□ Not at all true (1)
□ (2)
□ (3)
□ (4)
□ (5)
□ (6)
□ Very true (7)

Q53 5. To what extent do you have a clear plan of how to drink within recommended alcohol guidelines in the next week?

□ Definitely do not (1)
□ (2)
□ (3)
□ (4)
□ (5)
□ (6)
□ Definitely do (7)

Q36 Finally... Please provide us with a valid email address so that we can email you a follow-up questionnaire in one week's time. The questionnaire will not take longer than 2 minutes to complete. By providing us with your email address, you will also be entered into a prize draw to reward you for taking part in this study. We will not use your email address for any other purpose. Thank you for your help. Please enter a valid email-address here:

Q41 Thank you for taking part in this research project. We will send you a second questionnaire to complete in one week's time.

4. Time-2/Follow-up Survey & Debrief

Q1 Alcohol Survey Follow-up Thank you for agreeing to take part in the second part of this study. In this questionnaire, we would like to ask you about your drinking behaviour over the past 7 days. This won't take longer than 2 minutes to complete.

Q3 Your drinking behaviour over the last 7 days... 1. Think of the past 7 days and what you had to drink on each day of the week. Please write down what you had to drink on each day of the week. Please enter both the type of drink and the exact amount you drank - e.g. 2 pints of Stella, 1 glass of wine, 1 shot of vodka. If you did not drink anything on a certain day, please write '0' or 'nothing'.
Monday (1)
Tuesday (2)
Wednesday (3)
Thursday (4)
Friday (5)
Saturday (6)
Sunday (7)

Q5 Thank you for your response! As you have completed both questionnaires, you can enter yourself into a prize draw for a £50 Amazon gift voucher.Please indicate whether or not you want to be entered into the prize draw...
- Yes (1)
- No (2)

Q8 Thank you for taking part in this study. Please click the button (>>) and take time to read some background information.

Q6 Debrief: Defensive Processing of Risk Information about Alcohol Thank you for taking part in this study, which sought to investigate how individuals' responses to risk information about alcohol, including their intentions and behaviour, are affected by reflecting on personal values. If you have any further questions or queries about the study, please do not hesitate to contact me: Kathy Vogt <ksvogt1@sheffield.ac.uk> My supervisor's contact details are: Professor Paul Norman <p.norman@sheffield.ac.uk> For further information on alcohol use,

please see these links:
http://www.nhs.uk/LiveWell/Alcohol/Pages/Alcoholhome.aspx http://well-connected.group.shef.ac.uk/advice/food-and-mood/drinking-well/alcohol https://www.drinkaware.co.uk http://www.alcoholconcern.org.uk If you feel that the topics within this study have raised any issues for you, you may find the following useful: http://www.shef.ac.uk/union/advice/support-services/nightline.php http://www.talktofrank.com/contact-frank http://www.alcoholconcern.org.uk/concerned-about-alcohol

Q7 Please click the button (>>) to exit the questionnaire. Thank you.

**Tables**

**Table 1: Descriptive summary of sample**

| Variable | Condition = Control | Condition = *Kindness* | Condition = *SA-II* | All |
|---|---|---|---|---|
| **Age (years)** | 22.8 (5.41) (*n*=150) | 22.1 (4.45) (*n*=150) | 22.9 (5.76) (*n*=151) | 22.6 (5.24) (*n*=451) |
| **Gender** | (*n*=151) | (*n*=151) | (*n*=151) | (*n*=453) |
| **Male** | 55 (36.4%) | 64 (42.4%) | 57 (37.7%) | 176 (38.9%) |
| **Female** | 95 (62.9%) | 86 (57.0%) | 92 (60.9%) | 273 (60.3%) |
| **Other/not known** | 1 (0.7%) | 1 (0.7%) | 2 (1.3%) | 4 (0.9%) |
| **Nationality** | (*n*=151) | (*n*=150) | (*n*=150) | (*n*=451) |
| **UK** | 117 (77.5%) | 119 (79.3%) | 115 (76.7%) | 351 (77.8%) |
| **Other** | 34 (22.5%) | 31 (20.7%) | 35 (23.3%) | 100 (22.2%) |
| **Ethnicity** | (*n*=151) | (*n*=150) | (*n*=151) | (*n*=452) |
| **White** | 134 (88.8%) | 124 (82.7%) | 132 (87.4%) | 390 (86.3%) |
| **Other** | 17 (11.2%) | 26 (17.3%) | 19 (12.6%) | 62 (13.4%) |
| **Level of study** | (*n*=151) | (*n*=150) | (*n*=151) | (*n*=452) |
| **Undergraduate** | 102 (67.5%) | 104 (69.3%) | 85 (56.3%) | 291 (64.4%) |
| **Postgraduate taught** | 23 (15.2%) | 21 (14.0%) | 35 (23.2%) | 79 (17.5%) |
| **Postgraduate research** | 25 (16.6%) | 24 (16.0%) | 27 (17.9%) | 76 (16.8%) |
| **Other** | 1 (0.7%) | 1 (0.7%) | 4 (2.6%) | 6 (1.3%) |
| **Alcohol consumption at baseline** | 12.3 (12.1) (*n*=149) | 12.7(11.6) (*n*=150) | 14.0 (15.5) (*n*=148) | 13.0 (13.1) (*n*=447) |

| | | | | |
|---|---|---|---|---|
| **Binge-drinking at baseline** | 0.723 (1.05) (*n*=151) | 0.702 (0.929) (*n*=151) | 0.656 (0.952) (*n*=151) | 0.695 (0.975) (*n*=453) |
| **Alcohol consumption post-intervention**[1] | 8.80 (12.1) (*n*=131) | 7.82 (11.3) (*n*=96) | 8.75 (11.3) (*n*=136) | 8.52 (11.6) (*n*=363) |
| **Binge-drinking episodes post-intervention** | 0.496 (0.831) (*n*=133) | 0.433 (0.789) (*n*=97) | 0.482 (0.789) (*n*=141) | 0.474 (0.802) (*n*=371) |

[1] Alcohol consumption was significantly reduced across all three conditions post-intervention at Time 2, at the p=.05 significance level; as assessed by repeated measures t-tests
Control: t (129) = 3.14, p=.002
Kindness: t (95) = 4.63, p <.001
SA-II: t (132) = 4.12, p <.001

**Table 2: Goodness-of-fit statistics for candidate modelling distributions**

| Modeling distribution | AIC statistics | |
|---|---|---|
| | Outcome = Week 2 Alcohol consumption | Outcome = Week 2 Binge drinking frequency |
| **Poisson** | 5057.6 | 642.1 |
| **Zero-inflated Poisson** | 2632.5 | 631.3 |
| **Negative binomial** | 2069.9 | 635.0 |
| **Zero-inflated negative binomial** | 1952.3 | 632.6 |

**Table 3: Model parameters for the Week 2 (post-intervention) alcohol consumption (zero-inflated negative binomial regression model)**

| Model parameters | | | |
|---|---|---|---|
| **Variable** | **Parameter coefficient** | **95% CI** | ***p*-value** |
| **Condition = Kindness** | -0.0800 | (-0.325, 0.165) | 0.522 |
| **Condition = SA-II** | -0.0635 | (-0.278, 0.151) | 0.562 |
| **Units of alcohol consumed (Week 1)** | 0.0375 | (0.0238, 0.0513) | 0.129 |
| **Frequency of binge-drinking episodes (Week 1)** | 0.119 | (-0.0346, 0.273) | <0.001 |
| **Constant** | 1.876 | (1.66, 2.09) | <0.001 |
| **Inflation parameters** | | | |
| **Frequency of binge-drinking episodes (Week 1)** | -0.210 | (-0.445, 0.0245) | 0.079 |

| | | | |
|---|---|---|---|
| **Constant** | -0.361 | (1.66, 2.09) | <0.001 |

**Table 4: Model parameters for the Week 2 (post-intervention) binge drinking episodes (zero-inflated Poisson regression model)**

| **Model parameters** | | | |
|---|---|---|---|
| **Variable** | **Parameter coefficient** | **95% CI** | ***p*** |
| **Condition = Kindness** | -0.0202 | (-0.614, 0.210) | 0.337 |
| **Condition = SA-II** | -0.0662 | (-0.429, 0.296) | 0.720 |
| **Units of alcohol consumed (Week 1)** | 0.0520 | (-0.00907, 0.0194) | 0.475 |
| **Frequency of binge-drinking episodes (Week 1)** | 0.205 | (-0.0144, 0.424) | 0.067 |
| **Constant** | -0.590 | (-1.05, -0.132) | 0.012 |
| **Inflation parameters** | | | |
| **Frequency of binge-drinking episodes (Week 1)** | -2.32 | (-4.94, 0.295) | 0.082 |
| **Constant** | 0.176 | (-0.576, 0.928) | 0.646 |

Table 5: *Summary of ANOVAs testing the effects of self-affirmation condition on the dependent variables.*

| Variable | SAII | Kindness-Q | Control | F | *p* | Eta-squared |
|---|---|---|---|---|---|---|
| | Mean (SD) | Mean (SD) | Mean (SD) | | | |
| **Time spent reading message** | 38.71 (36.92) | 43.98 (79.96) | 48.0 (72.63) | .832 | .44 | $4.3 \times 10^{-3}$ |
| **Interpersonal feelings** | 3.48 (.64) | 3.45 (.73) | 3.52 (0.63) | .29 | .75 | $1.53 \times 10^{-3}$ |
| **Self-esteem** | 4.40 (1.74) | 4.07 (1.75) | 4.18 (1.75) | 1.19 | .30 | $6.2 \times 10^{-3}$ |
| **Negative reactions** | 1.89 (1.22) | 1.96 (1.35) | 1.86 (1.28) | .15 | .86 | $7.9 \times 10^{-4}$ |
| **Perceived message quality** | 4.63 (1.03) | 4.83 (1.05) | 4.78 (0.91) | 1.14 | .32 | $6.0 \times 10^{-3}$ |
| **Perceived health risks** | 4.86 (.65) | 4.88 (.84) | 4.88 (0.71) | .02 | .98 | $9.1 \times 10^{-3}$ |
| **Intentions** | 4.88 (2.10) | 5.01 (2.08) | 5.08 (2.08) | .31 | .73 | $1.8 \times 10^{-3}$ |
| **Plans** | 4.35 (2.13) | 4.32 (2.31) | 4.24 (2.13) | .72 | .49 | $3.9 \times 10^{-3}$ |

*Note.* SA-II *n* varies from 143 – 146, Kindness Questionnaire *n* varies from 97 – 102, Control Questionnaire n varies from 135 – 140.