ALCOHOL RESEARCH UK

All in the mind?
The effect of beliefs about alcohol on alcohol binges

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Key findings

- Priming participants to believe an initial alcoholic drink would satiate the urge to drink had no effect on ad lib alcohol consumption
- Participants who were told that alcohol consumption would satiate their desire to drink showed greater alcohol-induced impairments in inhibitory control compared to a control group
- The control group showed an association between alcohol-induced impairments in inhibitory control and ad lib beer consumption, the experimental group did not
- A pilot study revealed priming participants task to believe that they had good self control after consuming alcohol (using false feedback on an impulsivity task) resulted in significantly reduced ad lib beer consumption

Research team

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Background

This project investigated whether beliefs about the acute effects of alcohol influence drinking behaviour in the laboratory. We know that an initial priming dose of alcohol causes increased alcohol seeking (the alcohol priming effect), although the mechanisms driving this process are relatively unknown (de Wit, 1996). It has been argued that alcohol induced impairments in inhibitory control mediate the alcohol priming effect, although this has yet to be formally demonstrated (Field et al., 2010). Recently, research into self-control has suggested that beliefs about our own ability to control behaviour are central to behavioural regulation. This suggests that if people expect to have reduced ability to control their drinking after an initial alcoholic drink they will behave accordingly. The following report describes an experiment that investigated how information that changes beliefs about the acute effects of alcohol influenced drinking behaviour in the laboratory.

Method

A single experiment spanning two testing sessions (one involving alcoholic drinks and a second using a non-alcoholic placebo) was conducted. In the first testing session participants completed a battery of

questionnaires assessing demographic variables and drinking habits. Participants were then informed that the purpose of this final experiment was simply to get data on how alcohol affects taste perception and reaction times. Participants were divided into two groups and given a message about "the findings of the research programme to date".

The experimental group was given the following message:

Our research has found that consuming alcohol reduces the body's urge to drink as the body quickly becomes sated once it has received a small dose of alcohol, reducing the biological urge to drink. Furthermore, we have found that consuming large amounts of alcohol as part of an unplanned binge is a cultural phenomenon found in the UK and Ireland. Other European countries involved in our research program have not found that consuming alcohol leads to further alcohol consumption.

The control group was given the following message:

Our research has been investigating the effects of alcohol on thought processes like memory, problem solving and attention. We have so far found that alcohol has a greater effect on some of these processes than others. This final experiment is testing the effects of alcohol on simple reaction times and taste perception.

Participants were told that they would receive an alcoholic drink in both testing sessions. In reality, they received a placebo in one of the sessions. The alcohol prime consisted of 0.4g/kg of vodka, mixed with tonic. The placebo used a vodka mist to simulate the taste and smell of a genuine alcoholic drink.

Each testing session consisted of the message being delivered (session one) or a reminder of this message (session two) following which participants completed a craving questionnaire (desires for alcohol questionnaire; DAQ). They then received a drink (alcohol or placebo) consumed over ten minutes followed by a ten-minute absorption period before completing a second DAQ. Participants then completed a Stop Signal task (SST) to measure inhibitory control. Finally, participants completed a final DAQ and a bogus taste test to measure ad-libitum alcohol consumption.

Pilot

In an additional pilot study, 34 social drinkers took part in two experimental sessions in the bar laboratory. The procedure of the study was identical to that of the main study, but in this version participants were not given an experimental message, instead they were told the SST would assess their ability to exert self-control following alcohol consumption. The SST concluded with the on-screen presentation of bogus feedback. The experimenter visibly noted down this 'self-control index' score and provided further verbal feedback. Those within the high-control condition always received a score of 92.6% and were told that they were very good at controlling their behaviour following alcohol and were in the top 10% of the population. In contrast, those within the average-control condition received a score of 51.2% and were told that they were average at controlling their behaviour following alcohol consumption.

Findings

Craving

The effect of time (baseline, post-drink, end of session), drink (alcohol or placebo) and condition (experimental or control) on craving was assessed using a 2x2x3 mixed ANOVA, with drink and time as within subject factors and condition as a between-subjects factor.

There was an alcohol priming effect with increased subjective craving following alcohol relative to placebo consumption, F(1, 72)= 11.38, p=.001, np2= .14. There was also a significant effect of time with craving increasing following consumption of either priming drink, F (2, 144) = 6.38, p=.004, np2=.096. However, there were no differences in craving between experimental or control conditions, F (1, 72) =.126, p=.72, np2=.002, nor two or three way interactions with the experimental condition (p= >.05).

> Participants given alcohol rather than placebo displayed a priming effect, but this was not affected by the research "message" they received.

Ad lib alcohol consumption

This was assessed using a 2x2 mixed ANOVA, with drink as a within subject factor and condition as a between subject factor. This analysis revealed there to be no significant effect of drink, condition or interaction between the two

> Alcohol consumption increased self-reported craving relative to placebo, however, this did not translate into greater alcohol consumption. Providing information regarding alcohol's effect on alcohol-seeking had no effect on theses indices of alcohol motivation

Inhibitory control

Performance on the SST was assessed using a 2x2 mixed ANOVA with drink (alcohol or placebo) as a within subject factor and condition (experimental or control) as a between subject factor. This revealed there to be no significant effect of drink on stop-signal reaction time (SSRT), F (1, 73), p=.22, np2=.02. However, there was a significant effect of condition, F (1, 73), 5.98, p=.017, np2=.08 with greater SSRT's within the experimental condition (M=221.11, SD=51.19), relative to the control condition (M=193.22, SD=47.47). Furthermore, there was a significant drink x condition interaction, F (1, 73) = 4.49, p=.038, np2=.06. Planned comparisons revealed this interaction to be the result of significantly greater SSRT's within the experimental condition (M=232.61, SD= 68.10) relative to the control condition (M=184.77, SD=61.78) following alcohol consumption, t (75) =3.24, p=.002, d=.75, but not following placebo consumption, t (73) =1.11, p=.27, d=.26.

> Participants told there was no alcohol priming effect showed greater impairment in inhibitory control than those given the control message, but only after they had consumed alcohol (not after they had consumed the placebo).

Pilot Study

Ad lib consumption: A 2x2 mixed ANOVA was used to assess ad lib alcohol consumption with drink (alcohol or placebo) as a within subject factor and condition (average-control group or high-control group) as a between subject factor. A significant effect of drink was found, F (1, 33), 4.24, p=.038, np2=.12 with participants consuming significantly more beer following alcohol consumption (M=230.00, SD=116.96) relative to placebo (M=185.06, SD=117.55). There was also a main effect of condition on ad lib drinking, F (1, 33) = 4.24, p=.048, np2=.12, with those within the high-control group consuming significantly less beer (M=173.19, SD=64.69) than those within the average-control group (M=239.85, SD=113.25).

> Participants who were told that they had good inhibition following an alcohol prime consumed significantly less beer in the ad lib taste test.

Implications

The main study found no differences between participants exposed to the experimental or control message on craving or ad lib alcohol consumption in the laboratory. However, it is the first to demonstrate that beliefs around the acute effects of alcohol can affect inhibitory processes. Participants who were informed that an acute dose of alcohol would make them want to consume less alcohol showed greater impairment in inhibitory control relative to those who had received a control message. Importantly, this difference was only evident when participants had consumed alcohol and not when they had consumed the placebo drink. This suggests that beliefs regarding alcohol's acute effects can contribute to alcohol-induced impairment in inhibitory control. Particularly interesting is the finding that participants displayed evidence of impaired inhibitory control despite being led to believe that an acute dose of alcohol will reduce their urge to drink. This may be due to participants who were exposed to the experimental message exerting less effort on the SST as they may have inferred from the message that their cognitive performance would not be impaired.

Importantly, we found that the experimental message caused a disassociation between alcohol-induced impairments in inhibitory control and alcohol-induced increases in ad lib consumption. Specifically, when the control message was given there was a positive correlation between alcohol-induced impairments in inhibitory control and alcohol-induced increases in beer consumed. This correlation was not evident in the experimental condition. This suggests that the message may have served to uncouple the hypothesised inhibitory control-alcohol use association. Indeed, the control condition findings complement those of Weafer and Fillmore (2008), but the findings from the experimental condition show that explicit beliefs about the acute effects of alcohol can moderate this association.

A follow-up pilot study was conducted to assess the effect of implicit experimental messages (which participants thought was personalised to their task performance) on the alcohol priming effect. Results from this study revealed that participants who were led to believe that they have high levels of self-control following an acute dose of alcohol subsequently consumed less beer than those who were led to believe that they had average self-control (with this effect being evident after both the alcohol and placebo conditions). This study also found a main effect of drink (i.e. alcohol-induced increases in ad lib consumption). Taken together, this suggests that beliefs about the effects of alcohol on self control can reduce ad lib consumption when people believe they have consumed alcohol, but may not specifically ameliorate the priming effect (i.e. general reduction across conditions not just following a moderate prime).

Conclusion

Taken together these findings suggest that manipulating beliefs about the effects of alcohol and one's own ability to control behaviour after a prime can have a significant effect on inhibitory control and ad lib alcohol consumption respectively. This early exploration into beliefs has shown some promise inasmuch as the acute effects of alcohol can be influenced by belief manipulation although considerably more refinement is required in order to identify the extent to which these manipulations can account for alcohol priming, and whether they can be integrated into early intervention programs aimed at reducing binge drinking.

Although the central prediction of the study was not supported, some of the findings in this study and particularly the pilot suggest that more research is needed to fully understand the cognitive underpinnings of the alcohol priming effect. We found that, while not directly affecting drinking, an explicit message about desire to drink alcohol after an initial drink influences processes believed to underpin the priming effect (inhibitory control) and uncouples the link between this process and drinking.

Importantly, the pilot study has shown real promise, with participants showing less alcohol consumed when they were led to believe they had good behavioral control following a prime. We are continuing to collect data on this, and are planning to investigate whether social pressures can also mitigate the alcohol priming effect[1].

Further Information

Dr Paul Christiansen

References

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Weafer, J., & Fillmore, MT. (2008). Psychopharmacology 201, 315-324.

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[1] Mr Graeme Knibb is conducting this research through an internally-funded PhD.