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Drinking in social groups. Does 'groupdrink' provide safety in numbers when deciding about risk?

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ABSTRACT

Aims To investigate the impact of alcohol consumption on risk decisions taken both individually and while part of a four- to six-person *ad-hoc* group. **Design** A 2 (alcohol: consuming versus not consuming alcohol) × 2 (decision: individual, group) mixed-model design; decision was a repeated measure. The dependent variable was risk preference, measured using choice dilemmas. **Setting** Opportunity sampling in campus bars and a music event at a campus-based university in the United Kingdom. **Participants** A total of 101 individuals were recruited from groups of four to six people who either were or were not consuming alcohol. **Measurements** Participants privately opted for a level of risk in response to a choice dilemma and then, as a group, responded to a second choice dilemma. The choice dilemmas asked participants the level of accident risk at which they would recommend someone could drive while intoxicated. **Findings** Five three-level multi-level models were specified in the software program HLM 7. Decisions made in groups were less risky than those made individually ($B = -0.73$, $P < 0.001$). Individual alcohol consumers opted for higher risk than non-consumers ($B = 1.27$, $P = 0.025$). A significant alcohol × decision interaction ($B = -2.79$, $P = 0.001$) showed that individual consumers privately opted for higher risk than non-consumers, whereas risk judgements made in groups of either consumers or non-consumers were lower. Decisions made by groups of consumers were less risky than those made by groups of non-consumers ($B = 1.23$, $P < 0.001$). **Conclusions** Moderate alcohol consumption appears to produce a propensity among individuals towards increased risk-taking in deciding to drive while intoxicated, which can be mitigated by group monitoring processes within small (four- to six-person) groups.

Keywords Alcohol, decision making, field study, groups, group processes, multi-level model, risk, social drinking.

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INTRODUCTION

Despite the ubiquity of social drinking, there has been little empirical examination of how drinking as part of a social group may alter the effects of alcohol. A large volume of research has investigated intrapersonal effects and impairments resulting from alcohol consumption, but an emerging body of research suggests that there are distinctive outcomes when people consume alcohol in a group [1–3]. To date, such research has been limited to laboratory-based alcohol administration studies involving groups of strangers. The present study is the first that we are aware of that directly investigates how alcohol consumption and group processes interact to affect risk decisions within the social environment in which participants usually consume alcohol.

There are numerous examples of the disinhibitory effects of alcohol. When intoxicated, people are more likely to use illicit drugs [4], to engage in unprotected sex [5], to be sexually aggressive [6], to engage in violent and other criminal activity [7] and to drive at dangerous speeds [8,9]. These behaviours can be classified broadly as forms of risk-taking [10]. The tendency for alcohol to increase an individual's attraction to risk has been interpreted in terms of Steele & Joseph's [11] attention allocation model. The model focuses on the pharmacological effects of alcohol on cognitive abilities, arguing that alcohol narrows an individual's attentional capacity so that it is only possible to focus on salient internal and external cues, while peripheral cues are processed ineffectively. Fromme, Katz & D'Amico [12] argued that possible positive consequences of risky behaviours have greater associative strength than possible negative consequences due to their greater frequency of occurrence and familiarity. They demonstrated that, following alcohol consumption, the relatively automatic expectation of a positive outcome tends to persist, while the systematic effortful processing that is required to consider possible negative consequences declines, thereby increasing the probability that people will make risky choices.

While it is established that alcohol increases individuals' propensity for risky decisions, there has been relatively little empirical examination of whether comparable effects are found in groups. Such research is crucial, as much drinking occurs in social gatherings and, indeed, many risky decisions behind the major problems linked to alcohol (e.g. drunk driving, violent crime) are often made by groups, rather than an individual acting alone [13]. Therefore, it is important to understand how the direct pharmacological effects of alcohol will combine with group-level processes to affect risk attraction [1]. Research that examines group process is therefore vital in order to reach a more complete understanding of the effects of alcohol intoxication [14].

Sayette and colleagues [13] first investigated how alcohol affects the judgements made by laboratory groups. Mirroring results from traditional alcohol research with isolated individuals, it was found that intoxicated groups were significantly more likely than placebo groups to choose a risky option. Crucially, however, this initial research did not compare attraction to risk within intoxicated groups to that of intoxicated lone individuals. Abrams *et al.* [1] subsequently offered a more comprehensive consideration of the effects of alcohol and group processes on attraction to risk, addressing how a number of group-level processes may moderate the effects of alcohol on group decision-making. After consuming an alcohol dose or a placebo, participants who were alone or in groups of four were asked to decide on the attractiveness of a series of duplex bets. The experiment replicated typical findings that intoxicated individuals were attracted to greater risk than those who received a placebo. However, this effect was eliminated when decisions were made by intoxicated four-person groups; being in a group counteracted the effect of alcohol on attraction to risk.

Abrams *et al.* [1] suggested this effect could be attributed to processes of group monitoring, whereby groups can improve decisions made by members by providing intellectual resources that all members can use. It is argued that such group monitoring may occur in intoxicated groups and may actually be augmented by 'alcohol myopia' [11], as the group becomes the most salient cue and therefore concerns for ensuring the best group outcome can come to the fore [3]. Abrams and colleagues suggested that although moderately intoxicated group members are less self-attentive than non-intoxicated group members, they may still attend to others' opinions, and can remind one another that perspectives other than their own should be taken into consideration. Moreover, they may be called upon to share their own judgements with the group, requiring greater deliberation than they might engage in when alone. These features of group processes are likely to encourage more systematic processing of the risk, thus offsetting members' alcohol-induced tendency to abandon systematic consideration of the more peripheral, negative consequences of the risky option.

Frings and colleagues [2] found further evidence for a group monitoring effect in an investigation of the interactive effects of alcohol and group-level processes on vigilance errors. Alcohol consumption significantly impaired individuals' ability to sustain vigilance, but group performance remained equally accurate regardless of whether members had received an alcohol dose or a placebo. Crucially, social judgement scheme analyses [15] supported the hypothesis that group monitoring processes led the groups to agree on judgements that reflected the highest consensus in the group, rather than simply converging on the mean of members' judgements (which is prone to outlying erroneous individual judgements). Social judgement scheme analysis assigns different weightings to group member judgements according to their distance from the judgements of other group members. This means that group members who make extreme judgements have less influence over the group decision than those whose judgements are more central. This process is obviously not available to individuals, and so they do not have access to a mechanism that can compensate for erroneous judgements.

Research into the way in which groups reach a consensus shows that group members can polarize to a more extreme position than the average of their individual members' positions [16]. The attention allocation model [11] would predict that individuals' decision preferences become riskier after consuming alcohol. Therefore, group polarization effects would lead groups of such individuals to become even more risk-seeking. However, the social judgement scheme modelling by Frings *et al.* [2] indicated that, rather than allowing a group member with an extreme judgement to lead the group to more extreme group judgements, groups actually reduced the influence of extreme members' judgements. One explanation is that when groups are asked to make judgements they approach the problem less as a matter of attitude and more as a task requiring accuracy or objectivity.

Therefore, the norm that groups focus upon is not more extremity, but actually more accuracy. Abrams *et al.* [1] observed that groups that consumed alcohol took longer to reach a decision (relative to individuals and non-consumers), consistent with the interpretation that they may be taking extra time to ensure their accuracy, despite the effects of alcohol consumption.

In summary, laboratory research shows that alcohol has differential effects on individuals and groups. Importantly, the negative effects of alcohol may, in some circumstances, be mitigated by group processes, suggesting that when drinking moderately there may be 'safety in numbers' [1]. The findings are also potentially highly valuable for the promotion of safer drinking behaviour, perhaps by encouraging responsible social drinking rather than lone drinking [1]. However, an important limitation of this conclusion is that research within this emerging field has been limited to laboratory-based alcohol administration studies. In a meta-analysis comparing effect sizes in laboratory studies to field studies, Mitchell [17] found strong correlations between the effects found in the laboratory and those found in the field. However, he also found a substantial number of studies in which the effects observed in the laboratory were reversed in the field. Therefore, it is critically important, especially when studying a topic with policy relevance such as drinking in groups, to test whether effects found in the laboratory are sustained or altered in the field.

The potential lack of external validity accompanying laboratory studies is particularly relevant for alcohol research. For instance, laboratory-based alcohol administration studies have recruited groups of unacquainted strangers. It is rare, however, that people would drink routinely with complete strangers and it is possible that alcohol could have different effects within real social groups, or groups with a history of problem-solving and judgement-making [2]. Moreover, laboratory study participants are likely either to be paid for participation or receiving course credits, either of which could affect the way they behave while being observed by experimenters [18]. Therefore, the first aim of the present research is to extend this potentially important laboratory research by investigating how alcohol and group processes combine to affect propensity for risky decisions within a natural drinking environment.

A field study additionally allows us to exploit other opportunities that are not available within the laboratory. Specifically, for ethical reasons, previous laboratory-based studies in this field have only delivered a relatively low dosage of alcohol—enough to take individuals to the drink drive limits (often these are 0.05% blood alcohol concentration [13]). However, it is known that many of the worst effects of alcohol arise through higher levels of consumption or binge drinking [19]. It is not known whether group monitoring processes would compensate for the effects of alcohol on riskiness at the higher levels of intoxication that might be more typical in real-life drinking contexts. Thus, the present research additionally provides us with a more ecologically valid test of the group monitoring hypothesis, and a methodological springboard from which future studies can determine whether the compensatory effects of group level processes will persist across situations in which participants have a wider range of blood alcohol concentrations.

In sum, the present research is the first, to our knowledge, to investigate how alcohol and group processes interact to affect propensity for risky decisions within the natural environment. Based on previous laboratory evidence, it is expected that individuals who have consumed more alcohol will opt for greater risk than individuals who have consumed less alcohol. However, it is expected that this effect will be significantly attenuated when people make risk judgements in groups, such that intoxicated individuals' propensity for risk is curbed when making the decision as a group. In other words, we predict that when risk decisions are changed from an individual to a group decision, the effect of alcohol consumption will diminish. At the group level it is expected that groups of alcohol consumers and groups of non-consumers will select similar levels of risk.

METHOD

Participants and design

One hundred and one participants were recruited from an opportunity sample at campus bars and an outdoor music event at a campus-based university in the South East of England.[†] Both settings were run by the same university organization and attendants were from the same population. All participants were over 18 years of age (the legal age for drinking alcohol in the United Kingdom). Of these 101 participants, 47 were male, 47 female and seven did not report gender. Mean age was 20.89 years, with a range of 18–30 years. Twenty-two people did not report their age. Procedures were in accordance with the British Psychological Society Code of Conduct, Ethical Principles and Guidelines, with ethical approval gained in advance from the University of Kent's

[†]Participants at the music event had significantly higher BrAC levels (mean = 0.26, SD = 0.14) than those at the bar (mean = 0.10, SD = 0.18) $t_{(200)} = -5.881$, $P < 0.001$. Importantly, however, there is no effect of context (bar versus music) on risk decisions, and the BrAC × decision interaction remains significant (see model 4) once context is entered as a between-group predictor/covariate.

Research Ethics Board. The study had a 2 (alcohol: consuming versus not consuming alcohol) × 2 (decision: individual, group) mixed-model design in which decision was a repeated measure. The dependent variable was risk preference, measured using choice dilemmas [20].

Opportunity sampling was used due to the nature of the study, i.e. groups were needed that either had all been consuming alcohol within an ethically defined upper boundary of 0.052 breath alcohol concentration (BrAC) or all not been consuming alcohol (BrAC = 0) and who gave their permission to participate. Participants were approached by the researchers in their naturally occurring groups with between four and six members. This group size was chosen to be as similar as possible to the group size in the original Abrams *et al*. [1] study and to enable us to test the group monitoring hypothesis, because group monitoring is more viable if the members can observe interactions between others and if more than one judgement preference can potentially be supported by at least two members. In addition, this group size represents typical numbers for social drinking among students [21,22]. To qualify for inclusion in the study the group had to have been in the location for at least 20 minutes prior to being approached. For the alcohol factor, all or none of the members had to have been consuming alcohol.

All participants first recorded a private judgement on a choice dilemma (individual decision) before rejoining their group to discuss a second choice dilemma and arrive at a group consensus (group decision). Data were collected from 49 intoxicated and 52 non-intoxicated participants drawn from 23 groups (11 intoxicated and 12 non-intoxicated). A power analysis conducted using Optimal Design software [23], based on the effect size and sample sizes in Abrams *et al*. [1], showed that 20 groups should be sufficient to capture significant effects in a repeated measures multi-level model design at 80% power.

Procedure

After providing informed consent, participants were asked not to consume any more alcohol or smoke for 20 minutes. After this time, participants' BrAC was measured with a Lion SD400 Alcometer. Participants consuming alcohol had a mean BrAC of 0.29 [standard deviation (SD) = 0.15]; this is equivalent to a blood alcohol of 0.067%, which is well above the drink drive limit in many countries (e.g. Norway and Sweden's 0.02%, and Spain, France, Portugal and Germany's 0.05%). Participants not consuming alcohol all had a BrAC of zero.

Participants first indicated, on a five-point scale, how often (1 = never, to 5 = more than four times per week) they consume alcoholic drinks. Participants then considered two dilemma items based on the Choice Dilemma Questionnaire (CDQ) [20].

The CDQ is a decision-making task that asks people to consider vignettes of risk scenarios in which an individual must decide whether to choose a riskier, although more attractive option or a safer, but less personally desirable option. A pilot study presented the two CDQ items to individuals in counterbalanced order and established that individuals showed no difference in levels of risk preference across the two items regardless of order. This established that the two vignettes were functionally equivalent.[‡] The CDQ vignettes in this study concerned the decision of whether a character should drive or use public transport while intoxicated. Participants were asked to indicate the minimum probability of having an accident that would they would accept in order to advise the individual to pursue the risky course of action (driving while at the legal limit for drink driving in the United Kingdom). Six probability levels were presented on a response scale, anchored 1–6 (1 = five in 10 chance of accident, 2 = three in 10 chance of accident, 3 = one in 10 chance of accident, 4 = 0.5 in 10 chance of accident, 5 = 0.1 in 10 chance of accident, 6 = should not drive). Scores were reverse-coded for analysis, with higher scores indicating a greater propensity for risk. Participants were asked to read the first vignette privately and to provide their response without consultation with other group members (individual decision). Participants were then asked as a group to discuss the second vignette and to reach a consensual group decision (group decision). Groups were allowed as much time as they required to reach a consensus. They were not instructed how to reach this consensus.

Finally, participants provided demographic information and received a debrief card containing a unique identification number and the address of a website containing a full description of the aims of the study and research assistant contact details. Participants were asked to keep the card in case they wished to withdraw their data at a later point if they desired (none did so).

RESULTS

Because this was a naturalistic study and it was not possible to control for individual drinking habits, we first checked whether the groups consuming and not

[‡]We conducted a 2 (CDQ item: 1 versus 2) × 2 (CDQ order: CDQ 1 first versus CDQ 2 first) ANOVA on the choice dilemmas, with repeated measures on CDQ item. The main effect of CDQ item $F_{(1,28)} = 0.01$, $P = 0.91$ and of vignette order $F_{(1,28)} = 1.83$, $P = 0.19$ were non-significant, as was the interaction, $F_{(1,28)} = 0.11$, $P = 0.74$. Respective means and standard deviations: CDQ item 1 first mean = 2.07, SD = 1.79; CDQ item 1 second mean = 2.73, SD = 1.79; CDQ item 2 first mean = 2.80, SD = 1.74; CDQ item 2 second mean = 1.93, SD = 1.71.

consuming alcohol varied in terms of their self-reported alcohol consumption in general. There was no significant difference $t_{(99)} = 1.30$, $P = 0.297$. Non-consumers (mean = 3.83, SD = 0.88) and consumers (mean = 4.04, SD = 0.76) reported typically drinking around two to three times a week, just above the mid-point of the scale.

There was also no significant difference in drinking habits between the two sampling contexts, $t_{(99)} = -0.519$, $P = 0.605$, bar (mean = 3.90, SD = 0.80) and music festival (mean = 4.00, SD = 0.90). This suggests that reasons for consuming and not consuming alcohol were not based on differences in habitual alcohol consumption, or due to differences in sampling context.

We employed a three-level multi-level analysis using HLM version 7 [24] to analyse the data, because risk decisions are nested within people, and people are nested within groups [25]. This analytical strategy accounts for the dependency between individuals' repeated risk decisions. Level 1, the within-participant level, includes observations over *n* points of measurement that are the repeated observations of each person (the first and second risk decisions). At level 2, the between-participant level, each individual is the unit of analysis. At level 3, the between-group level, the group to which the individual belongs is the unit of analysis. In sum, the within-participant model at level 1 accounts for intra-individual differences in the outcome, risk decision. The between-participant model at level 2 accounts for individual differences, such as alcohol consumption, while the between-group model at level 3 accounts for group differences in alcohol consumption (consuming alcohol versus not consuming alcohol), group size and context of data collection (bar versus music festival). The simultaneous consideration of between-group effects as well as between-participant effects allows us to separate and explain effects due to individual differences (in alcohol consumption) and difference due to belonging to a group that is either consuming or not consuming alcohol.

The hypotheses were tested in five sequential models, each model building upon the last. Coefficients for all models are shown in Table 1. The first model tested whether risk decisions differed depending on whether they were made individually or in a group. Decision (individual versus group), a within-participant predictor, was related significantly negatively to risk, showing that decisions were more risky when made by individuals than by groups.

The second model explored the hypothesis that individuals' consumption of alcohol is related to more risky decisions. BrAC, a between-participant predictor, was related significantly positively to risky decision-making, showing that individuals with higher BrAC made riskier decisions.

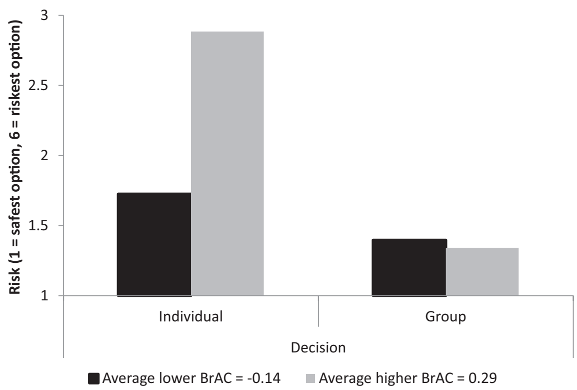

Figure 1 Mean level of risky choice for the individual and group decision as a function of individual breath alcohol concentration (BrAC)

Model 3 tests the cross-level interaction between BrAC and decision. We expected that an effect of BrAC would be larger when risk decisions are made individually, such that higher BrAC would only increase risky decisions made by individuals, but not decisions made in groups. The analysis revealed a significant BrAC × decision cross-level interaction. Effects of BrAC and decision also both remained significant predictors in the model. As predicted by the group monitoring hypothesis, and shown in Fig. 1, when risk decisions were made in groups BrAC levels had no effect on risk decisions. Furthermore, there was no difference between risk decisions made by individuals and groups with lower BrAC, whereas among participants with higher BrAC, groups chose a significantly lower level of risk than individuals.

A fourth model investigated whether the BrAC × decision interaction remained significant once alcohol consumption *per se* (regardless of amount) is accounted for (e.g. an expectancy effect). Thus alcohol (consuming versus not consuming groups), group size and sampling context (bar versus music festival) were entered as between-group predictors. Alcohol was not expected to be a significant predictor of group risk because of group monitoring processes, thus groups consuming and not consuming alcohol should opt for the same levels of risk. This analysis confirmed that there was no effect of alcohol *per se*, showing that groups consuming and not consuming alcohol chose similar levels of risk. There were also no significant effects of group size or sampling context. These variables were therefore dropped from further analyses.

A fifth and final model tested the alcohol × decision cross-level interaction. This checks the possibility that group discussion would polarize in the direction of caution rather than risk (given that groups not consuming alcohol are quite cautious). The analysis revealed a significant alcohol × decision cross-level interaction,

Table 1 Multi-level regression models predicting choice dilemma risk decisions.

	Parameter estimates unstandardized B (standard errors)					
	Intercept only	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Fixed effects						
Intercept	1.74 (0.12)***	1.75 (0.13)***	1.74 (0.12)***	1.75 (0.12)***	1.75 (0.11)***	1.75 (0.12)***
Within-participant						
Decision (individual versus group)		–0.73 (0.16)***	–0.73 (0.16)***	–0.73 (0.15)***	–0.73 (0.15)***	–0.72 (0.15)***
Between-participant						
Breath alcohol concentration (BrAC)			1.28 (0.56)*	1.27 (0.55)*	1.20 (0.81)	1.26 (0.78)
BrAC × decision				–2.79 (0.82)**	–2.79 (0.82)**	
Between-group						
Group size					–0.21 (0.18)	
Context (bar versus music)					–0.03 (0.32)	
Alcohol consuming					–0.06 (0.41)	–0.01 (0.33)
Alcohol consuming × decision						1.23 (0.30)***
Random effects						
Within-participant residual variance (*e*)	1.37 (0.19)	1.22 (0.17)	1.21 (0.17)	1.14 (0.16)	1.14 (0.16)	1.10 (0.16)
Between-participant residual variance (*r*)	0.001 (0.15)	0.001 (0.13)	0.002 (0.13)	0.001 (0.12)	0.003 (0.12)	0.001 (0.12)
Between-group residual variance (*u*)	0.21 (0.11)	0.23 (0.11)	0.17 (0.09)	0.18 (0.09)	0.16 (0.09)	0.18 (0.09)
Degrees of freedom						
Within-participant			77	76	80	79
Between-participant (predictor/interaction)		77	77	77/76	81/80	81/79
Between-group	22	22	22	22	21	22

Significance levels are indicated ***$P < 0.001$; **$P < 0.01$; *$P < 0.05$. The null effect of context is independent of BrAC.

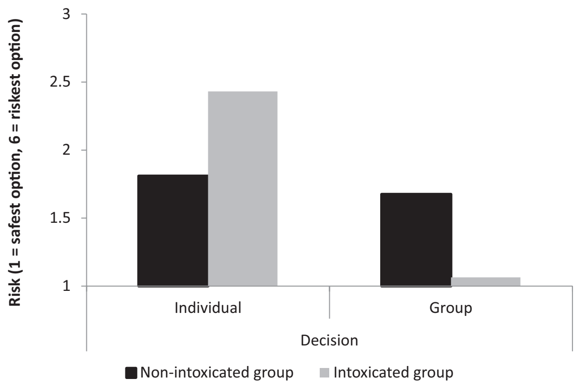

Figure 2 Mean level of risky choice for the individual and group decision as a function of group consuming or not consuming alcohol

shown in Fig. 2. Alcohol consumers made the riskiest decisions when making them alone, and the least risky decisions when deciding as a group. Among non-consumers, individual and group risk decisions do not differ. This analysis controls for individual differences in BrAC.[§]

DISCUSSION

This is the first time, to our knowledge, that the effect of group processes on risk following alcohol consumption has been tested in a social setting with natural social groups. The study provides important evidence that group monitoring effects observed previously only in a laboratory setting, with strangers in *ad hoc* groups, may well translate to typical social drinking situations. By using the natural social setting of the campus bars and a music festival we are able to show that group processes have an impact, even when there are potential effects and error caused by numerous other uncontrolled extraneous variables. Note that both the venue context, and individuals' typical alcohol consumption, did not affect the findings. However, there were also many unmeasured extraneous variables, including noise, reduced formality, the presence of other known and unknown individuals, distractions such as people walking around, bartenders collecting glasses, recent topics of conversation and depth of acquaintance with other group members. It is possible that any of these could affect risk preferences or interact with alcohol consumption to affect judgements and that even more variance could be captured by measuring them.

If the capacity for group processes to mitigate effects of alcohol consumption was fragile or only reproducible under laboratory conditions it would lead to justifiable hesitancy in arguing for the generalizability or practical relevance of those processes. However, despite the presence of multiple contextual features, the findings clearly confirm the pattern predicted on the basis of laboratory evidence for the group-monitoring hypothesis. This, in turn, offers greater confidence that utilizing this process could contribute to the design of interventions designed to promote safer recreational drinking.

First, the data confirmed that individual risk decisions are increased by higher alcohol consumption. The present study therefore replicates previous research showing that individuals who have consumed alcohol are more risk-seeking than those who have not [9]. Importantly, this effect of alcohol consumption was qualified by a significant cross-level interaction showing that group risk decisions did not vary as a function of individuals' level of alcohol consumption. This occurred despite the fact that intoxication levels were quite high. This finding directly matches the pattern observed in the laboratory study by Abrams *et al*. [1]. Furthermore, individuals who had consumed more alcohol were significantly more risky than those same individuals deciding as a group.

Previously it has been argued that, compared with sober individuals, intoxicated individuals are less able to consider negative consequences of risky decisions over positive outcomes [12]. The present research shows that social processes can mitigate such effects. Making risk decisions in a group substantially reduced the high risk-seeking decisions of individuals who had consumed more alcohol. In addition, groups were not more attracted to risk when consuming alcohol than when not consuming alcohol and, indeed, group decisions made by groups of alcohol consumers were actually less risky than those made by groups of non-consumers. This finding suggests an intriguing possibility that group monitoring might even result in overcompensation for alcohol consumption (or caution) in the face of risk, and reinforces the conclusion that group monitoring is capable of mitigating the detrimental effects of alcohol evident in individuals who have consumed these levels of alcohol.

We stress the importance of these findings for two reasons. First, they closely match findings from the laboratory, despite being conducted in relatively less controlled environments. This adds weight to the laboratory study of Abrams *et al*. [1] confirming that, as well as having a high level of experimental control, the findings have external validity. Secondly, the present work provides a strong platform from which to conduct further research in this area and test additional hypotheses.

[§]Due to the shared variance between the BrAC × decision interaction and the alcohol × decision interaction, the BrAC interaction was removed from this model. However, when included, the alcohol × decision interaction remains significant. The BrAC × decision interaction does not.

Procedurally, the study 'worked well'. It was straightforward to implement, was engaging for participants and the tasks seemed to be appropriate and interesting. For example, the present research used a measure of risk preference that is arguably easier for participants to understand and has higher ecological validity than the duplex bets tasks used by Abrams *et al*. [1].

There were limitations with this study; due to the naturalistic nature, the findings were in a limited setting with a limited group size and with one scenario. Based upon previous research these are probably typical of the student population [21,22]; however, future research could extend to other contexts, group sizes and group compositions. For example, group diversity is related to how groups make decisions [26,27]. Future research could test the impact of different group characteristics on group monitoring (e.g. mix of ethnicity, age etc.).

The challenge for future research, in and out of the laboratory, will be to determine which additional situational and psychological processes might facilitate and inhibit group monitoring in groups of social drinkers, thereby providing insights as to potentially beneficial strategies for the safe management of alcohol consumption. The current study was conducted in the relatively benign environs of a university campus bar and music festival. In principle, this procedure seems suitable for use in other naturalistic settings and may increase the viability of testing the impact of other variables that might be hard to manipulate in the laboratory. These might include higher levels of alcohol consumption, and variables that are thought to encourage disruptive or extreme social behaviour.

A relevant area for future research is likely to be to understand the impact of de-individuating factors found in many student bars and nightclubs (e.g. high levels of noise or low levels of light, time of day). De-individuation refers to the process in which group members become less self-conscious and less inhibited than the equivalent individuals [28]. De-individuation can lead to greater levels of antisocial and violent behaviour [29]. Both higher levels of alcohol consumption and certain types of drinking environment can therefore increase the levels of de-individuation. It may be that group monitoring can, to some degree, mitigate these de-individuating variables. It will be important to discover what level of alcohol consumption and what strength of de-individuating cues or their combination are sufficient to diminish or prevent group monitoring and therefore what conditions might cause step changes in group risk by eliminating the protective features of group membership.

Declaration of interests

None.

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