

Alcohol Consumption and Group Decision Making

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In 2017, it was estimated that over 29 million people in the UK drank alcohol (Office for National Statistics, 2019). Although the number of drinkers has slightly decreased for the past decade, alcohol consumption is still commonplace. Moreover, the number of alcohol-related incidents (e.g., hospital admissions and deaths) has changed little. The National Health Service reported more than 300,000 hospital admissions and 5,000 deaths due to alcohol consumption (NHS, 2018). Thus, alcohol consumption continues to pose substantial risks to individuals' health and society

Social and health psychologists have endeavored to address the issues around drinking, and our specific interest is in social drinking. Drinking in groups is ubiquitous, but national data collection exercises have not provided a clear quantification of factors such as group size or frequency, and nor is there clear evidence about whether social processes themselves are altered when people drink in groups, other than the prevalence of heavy episodic drinking that is assumed in many cases to be in groups.

Psychological research on alcohol intoxication was given particular impetus by the seminal work by Steele and Josephs (1988, 1990), who proposed the alcohol myopia model. This model holds that the influence of alcohol consumption on behavior results in part from the narrowed focus of information processing that follows alcohol intoxication, i.e., the alcohol myopia. Specifically, they argued that intoxication rendered individuals less attentive to cues that normally act as inhibitory controls on behavior (Monahan & Lannutti, 2000; Steele & Josephs, 1990). The alcohol myopia model was further supported and elaborated by Fromme et al. (1997) demonstrating that intoxicated individuals tended to base their judgement on an automatic expectation of positive outcomes, ignoring potential negative consequences. The theory has subsequently gained empirical support from a number of studies (Bayless & Harvey, 2017; Fromme et al., 1997; Giancola et al., 2010, 2011). Overall, the model established a cognitive mechanism arising from the pharmacological effects of alcohol consumption.

Risk taking behavior has been one of the most studied effects of alcohol intoxication. Previous studies looked at numerous forms of risk taking such as drunk-driving (Burian et al., 2002, 2003; Guppy, 1994; Harrison & Fillmore, 2011; McMillen & Wells-Parker, 1987; Taylor et al., 2010; Van Dyke & Fillmore, 2015, 2017), violence and aggression (Permanen, 1991), sexual risk taking¹ (Davis, 2010; Rehm et al., 2012; Scott-Sheldon et al., 2016; Stall et al., 1986), and gambling² (Bidwell et al., 2013; Lane & Cherek, 2000). Overall, these studies

¹ Supporting the alcohol myopia model, when cues highlighting potential risks were present, individuals were less susceptible to the risk-enhancing effect of alcohol intoxication (MacDonald et al., 2000).

² We would like to note that while laboratory experiments consistently demonstrated that alcohol consumption was associated with an increased risk-taking gambling, a field experiment revealed the positive effect of intoxication on risk-seeking behavior among male

have consistently demonstrated that alcohol consumption increases various forms of risk-taking behavior.

Alcohol consumption and group decision making

Past research on alcohol predominantly focused on individual decision making following sole drinking and has consistently demonstrated that intoxicated individuals make significantly different decisions in various domains from those who are sober. However, people often consume alcohol during various social occasions (Ally et al., 2016). Previous studies, in fact, have documented that alcohol consumption has been a social activity (Aitken, 1985; Gordon et al., 2012) as well as a part of rituals (Dietler, 2006). Indeed, despite the negative impacts of alcohol intoxication on various behaviors, it has a positive role in building interpersonal relationships (Brown et al., 1980; de Visser et al., 2013; Fairbairn et al., 2015; Freed, 1978; Gordon et al., 2012; Hull, 1981; Monahan & Lannutti, 2000), which is reflected by the prevalence of alcoholic beverages at diverse social events. Furthermore, it was also suggested that individuals tended to drink more in the presence of others (Eisenberg et al., 2014; Thombs et al., 1997), implying drinking behavior itself would be different between sole and social drinking. This prior evidence all suggests that research should address both the incidence and the effects of social and group drinking.

In fact, social psychological work has robustly demonstrated that such group decision making, wherein a group of individuals together make a sole decision, involves several group processes that can potentially alter the way alcohol affects individual decision making. Therefore, it is important to ponder whether alcohol affects individual decision making in the same manner as it would group decision making. In addition, understanding how alcohol shapes group decision making also helps us to understand and tackle societal issues caused by alcohol consumption.

Sayette et al. (2004) first shed light on how alcohol could affect risk taking behavior of a group of people in a laboratory³. They formed groups of four unacquainted individuals who consumed either alcoholic beverages (100-proof vodka: cranberry juice = 1: 3.5) or placebo drinks (flattened tonic water instead of vodka). Participants were asked to consume these in three doses 0.82 g/kg dose of alcohol, each over a 10 minute period, with the second and third doses starting at 10 and 20 minutes, respectively. They then engaged in an ice-breaker activity during a 20-min alcohol absorption time. Finally, they were presented with two options as to and additional questionnaires they would be asked to complete. As a group, they could decide to complete a further 30-min survey or they could toss a coin to determine that

and young participants (Proestakis et al., 2013). However, it remains unclear whether this should be attributed to the low ecological validity of lab experiments or the fact that intoxicated individuals in the field experiment simply did not fully understand the nature of gambling they engaged with.

³ Prior research such as Connors and Sobell (1986), attempted to investigate the role of alcohol in group contexts, by controlling the presence of others. However, Connors and Sobell (1986) had one research confederate as an observing other, and it is unsure whether the mere presence of a person whose behavior was strictly scripted would have any implications for the relationship between alcohol intoxication and group processes.

they would either have to complete a 60-min survey or no survey. Participants were given 150 seconds to make this decision, which was used as a measure of their risk taking behavior.

Consistent with previous studies on individual decision making, intoxicated groups were more likely to make the risk taking decision than placebo groups. However, it must be noted that there was no comparison condition in which participants made these decisions as separate individuals.

Sayette and colleagues' findings seemed to suggest that the alcohol myopia process that affects individuals would also apply to group decision making. However, without direct comparison to individual decision making, this conclusion was premature, and also there was no alternative mechanism proposed to account for the effect of alcohol consumption on group decision making. To address this, drawing upon social psychological work (Abrams et al., 1997), Abrams et al. (2006) proposed that three different psychological mechanisms could affect the way that alcohol intoxication would affect group decision making, particularly in the risky behavior domain: (1) group polarization, (2) deindividuation, and (3) group monitoring.

Group Polarization

First, group polarization is defined as a phenomenon where deliberation tends to move groups towards a more extreme point in the direction indicated by their own pre-deliberation judgements (Kerr et al., 1975; Sunstein, 2002; Zuber et al., 1992). This tendency has been consistently documented in various types of decision making, including risk taking behavior (Zuber et al., 1992). Steele and Josephs' (1990) alcohol myopia model posited that intoxicated individuals had increased attraction towards the risk compared to sober ones. Fromme et al. (1997) also suggested those who had consumed alcohol tended to focus on a restricted range of positive outcomes, ignoring potential negative events. Combined with group polarization, these findings implied that risk attraction might emerge more strongly in group decision making than individual decision making, as the inclination towards risk would tend to be more extreme in groups. Consequently, according to the group polarization account, it was expected that group decision making after the consumption of alcohol should be riskier than individual decision making.

Deindividuation

Second, deindividuation refers to a state where people lose self-consciousness, and this occurs especially when members of a group do not feel their behavior could be singled out by others (Festinger et al., 1952). Previous studies found that under deindividuation, people tended to act in a less inhibited manner, resulting in increased non-normative behaviors (Diener et al., 1980; Mullen, 1986). In addition, meta-analytic evidence also supported the reduction in self-attention and regulation in a group (Mullen, 1986). Drawing upon this past research, Abrams and colleagues reasonably assumed that deindividuation and alcohol might together affect group decision making in a way that additively increases risk taking tendencies. In other words, this perspective predicted that group decision making would yield riskier behavior than individual decision making, given the tendency for alcohol consumption generally to disinhibit risk taking behavior. Unlike the group polarization perspective, deindividuation predicts that the risk-enhancing effect of alcohol intoxication would hold both among individuals and groups, regardless of the initial tendency of the group. Sayette et

al.'s (2004) study revealed that groups were more likely to make risky decisions when intoxicated, consistent with the possibility that deindividuation processes occurred. However, as the study did not have individual decision making conditions, there is no way to know whether being in the groups *per se* resulted in any disinhibition and so it is not feasible to imply whether deindividuation was actually occurring.

Group monitoring

The third process proposed by Abrams et al. (2006) is group monitoring. The idea of group monitoring stems from seminal work on motivational accounts for individual performance in a group: social loafing and facilitation (for a review, see Karau & Williams, 1993). Studies on social loafing and social facilitation suggest that the presence of co-actors, particularly when behavior is visible and hence accountable, may motivate greater effort and better performance. When these factors are absent, in contrast, social loafing can take place, meaning that individuals are less likely to invest themselves in tasks. Thus, these theories suggest that face-to-face small group discussion would generally have a positive effect in performance of the group. More directly, moreover, Abrams et al. (2006) postulated that the process of making a group decision exposed each group members' thinking and reasoning, thereby enabling members to observe and monitor one another's inputs, and making it more likely that flawed or faulty reasoning would be rejected. Thus, although individuals may find it harder to self-regulate because they feel disinhibited, their attention to external cues that are focal in the situation (other group members) may compensate for effects such as alcohol myopia. These three theories provided different routes (i.e., motivational influences on individual performance in a group) that could explain how and why groups would make decisions differently from individuals when intoxicated. However, the group monitoring hypothesis was the only one that allowed for the possibility that groups might be less rather than more susceptible to the effects of alcohol myopia than individuals.

The group monitoring perspective built on research in the group decision making literature identifying that groups allow members to exchange intellectual resources and that this can result in improved decisions compared to those made by lone individuals (Abrams et al., 2006). Hoptrow and Hulbert (2005), for instance, demonstrated that groups could reach an optimal solution in social dilemmas through discussion. Several studies have provided support for the positive effect of group processes (Meleady et al., 2013a, 2013b). Based upon these findings, Abrams et al. (2006) argued that unless tasks were extremely complex, group monitoring would allow members to confer and avoid making a non-optimal (i.e., risky) decision. Therefore, they hypothesized that group decision making process would mitigate the risk-enhancing influence of alcohol consumption.

Given the three possible mechanisms by which alcohol consumption could affect risk taking behavior of groups, Abrams et al. (2006) conducted a comprehensive study in order to further understand risk taking behavior among intoxicated groups and individuals. They, thus, directly examined how alcohol intoxication affected risk attraction among individuals and groups of four persons. They recruited 120 undergraduate students mostly by means of a staffed desk soliciting volunteers. They were randomly assigned to group decision or individual decision making conditions, and groups of four unacquainted individuals were formed for the former. Participants were told that they might consume a moderate amount of alcohol during the testing. In addition, they were asked to drink no alcoholic beverages for 18

hours eat no food for 3 hours prior to the study. Furthermore, before experimental sessions, participants were screened out by a revised version of the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) such that only those who usually drank low to moderate amount of alcohol were eligible. Because of the potentially risky nature of the research, they carefully explained the format of the experiment and participants signed a medical consent form on a voluntary basis. Although they were free to discontinue their participation at any time during the testing, they were explicitly instructed that they could not leave the lab and their time in the laboratory was monitored in order to ensure their safety.

Regardless of the experimental condition, participants received a very strong tasting lozenge to disguise the taste of drink prior to drink administration. In the alcohol condition, they were asked to drink a mixture of vodka (1.13g/kg) orange juice, and tonic water within 6 min. In the placebo condition, participants were given a mixture of orange juice and tonic water with 2 ml of vodka floating on the surface, to disguise the smell. (This amount was not sufficient to register in a BAC test device they used). It was followed by a 40-min alcohol absorption phase, where they watched a comedy show. This alcohol administration procedure resulted in participants in the alcohol condition being intoxicated at the .074% BAC (breath alcohol concentration) on average. Importantly, unlike Sayette et al. (2004), those who were in the individual condition and group condition completed the whole procedure, from alcohol induction, with nobody (in the individual condition) or with three other group members (in the group condition), respectively. In other words, individual decision making followed sole drinking and group decision making followed group drinking.

The risk attraction task employed 16 duplex bets (Slovic & Lichtenstein, 1968), which was more elaborate than the task used in Sayette et al. (2004). These bets varied in the amount of money they could win or lose as well as the probability of winning and losing. They were presented in the same manner to participants in both conditions, but those in the group condition could confer with group members to reach consensus and make group decisions. For each bet, they were asked to rate their commitment to gamble using a 10-point scale. To make sure that they believed that the decisions involved real monetary incentives, they were instructed that a random set of bets rated most favorably would be played with their own money. However, in actuality, no money was gambled.

The findings clearly supported the group monitoring hypothesis. There was a significant interaction between alcohol consumption and decision making such that the risk-enhancing effect of alcohol consumption was present among individuals but absent among groups. In other words, it was revealed that group decisions were less susceptible to the deleterious effect of intoxication. Abrams et al. (2006) also recorded decision making time and found that intoxicated groups took significantly longer to complete the risk attraction task, but this pattern was not observed among individuals. This suggested that group members were more-self-attentive and spent time conferring with other members the finding also supported the group monitoring hypothesis. Overall, Abrams et al. (2006) offered the first experimental evidence on the influence of moderate levels of alcohol on group decision making in comparison to individual decision making and showed a risk-suppressing effect of group contexts arguably through group monitoring.

Frings and colleagues provided further support for the group monitoring hypothesis with different behavior and contexts; Frings et al. (2008), for example, found that while

intoxicated individuals performed significantly worse at a vigilance task (i.e., a task requiring sustained attention) than sober individuals, intoxicated groups did not show such reduced performance. Moreover, they used mathematical modelling to further test the group monitoring hypothesis, based on Davis' Social Judgement Scheme (SJS: Davis, 1996). The SJS model assumed that group members would seek the highest degree of consensus in the group such that individual decisions that were close to the consensus were given more weight than outliers in the model. The model represented the process supposed to operate in the group monitoring hypothesis which assumes that group members would attend to cues in order to reach an accurate group consensus, rather than being distracted by extreme or erroneous individual recommendations from group members. Frings et al. (2008) established that the SJS model predicted group consensus well and better than other mathematical models predicting the group decision simply with central tendencies of the group e.g Mean or Median, suggesting that group members discarded erroneous outliers and trusted the areas of consensus when making group decisions. Therefore, consistent with Abrams et al. (2006), Frings et al. (2008) showed evidence that group monitoring ameliorated the negative effect of alcohol consumption on vigilance typically observed among individuals in previous studies (e.g., Clifasefi et al., 2006; Koelega, 1995; Koelega, 1998; Mongrain & Standing, 1989; Moskowitz & Depry, 1968; Rohrbaugh et al., 1988; Schulte et al., 2001). Specifically, they were able to show through mathematical modelling that groups were able to reduce the influence of members who made extreme judgments and thus ameliorate the potentially deleterious effects of alcohol consumption on the group's decision making.

Further support for the group monitoring hypothesis comes from the literature on fatigue. Fatigue is a physical and/or mental state that often leads to impaired decision quality (Gander et al., 2008; Landrigan et al., 2004) and, therefore, can provide a domain that enables further testing of the group monitoring effects. In a sample of military personnel, Frings (2011) found that group monitoring could also alleviate the negative effect of fatigue on cognitive performance. Drawing on the preceding studies on group monitoring, they tested whether group decision making would also help individuals overcome fatigue-related impairment in decision quality. In line with the hypothesis, they demonstrated that while fatigued individuals performed worse in cognitive tasks than alert individuals, teams of fatigued individuals did not exhibit such impaired performance due to fatigue. Thus, overall, the group monitoring hypothesis has earned empirical support from several studies.

In a stark contrast to the findings in favor of the group monitoring hypothesis, Sayette et al. (2012) conducted further research that found no support for group monitoring in risky behavior in groups. Specifically, as well as the individual and group decision conditions employed by Abrams et al. (2006), Sayette et al. (2012) added a non-alcohol condition in which participants knew they were drinking a non-alcoholic beverage. This allowed them to account for potential differences between pharmacological effects and dosage-set effect (i.e., the influence of the belief that they were drinking alcohol). Nonetheless, other methodological differences were present. Unlike Abrams et al. (2006), all participants consumed their drinks as a group, and then those in the individual decision making condition were taken away to make their decision privately. Thus, individual decision making followed group drinking. Using the coin toss decision from Sayette et al. (2004) as a measurement of risky behavior it emerged that the intoxicated and placebo groups were both more likely to choose the risky option compared to groups in the non-alcohol condition (47%, 44%, and

20%, respectively). By contrast, individual decision making was not affected by the drinking conditions at all (27%, 27%, 30%, respectively). Sayette et al.'s (2012) results suggested that alcohol intoxication did not have a risk-enhancing effect on individuals but that groups were rather susceptible to the effect of alcohol. Parenthetically, Sayette et al. (2012) also examined the effect of the gender composition of groups because it has been found that gender composition significantly affects group decisions (Dufwenberg & Muren, 2006; Hannagan & Larimer, 2010; Lamiraud & Vranceanu, 2018). However, they did not find a significant influence of gender.

Following the counterevidence from Sayette et al. (2012), Hothrow et al. (2014) conducted a further test of the group monitoring hypothesis. They were aware that results from lab experiments did not always correspond to those from field experiments (Mitchell, 2012), and they aimed to test the external validity of group monitoring effect using naturalistic drinking contexts. They recruited groups and individuals who had consumed or not consumed alcohol from bars and music events. This allowed them not only to potentially generalize the group monitoring hypothesis but also to have participants with a relatively high dosage of alcohol. Participants consuming alcohol, on average, had a mean BAC of 0.29, which is above the drink-drive limit in different countries (e.g., limits for private motorists: 0.08% in England, 0.05% in Scotland).

Hothrow et al. (2014) asked all participants, regardless of whether they were groups or individuals, to individually answer two questions measuring individual risk behavior that were created based on the Choice Dilemma Questionnaire (Kogan & Wallach, 1964). For those who had consumed alcohol as a group, they first privately made individual decisions and then discussed the dilemma as a group to reach a group decision. Each question consisted of a short vignette where a protagonist was about to drink and drive, and participants were asked to indicate the lowest probability of having an accident resulting from drinking and driving. For example, one of them read, "You have been drinking in the pub with friends for the afternoon. You receive a phone call from your girlfriend/boyfriend who is at the airport having returned from holiday. S/he is not feeling well and doesn't have money for the taxi home. You are very excited about seeing your girlfriend/boyfriend again, but you are at the legal limit for drinking and driving. The chances that you would have an accident are increased by your alcohol consumption. However, to catch the train to the airport would cost a lot more money and would mean that your girlfriend/boyfriend would have to wait at the airport for twice as long." Participants were then presented a six-point scale to indicate the lowest probability of having an accident they would accept to pick up their partner. The item was scaled in the following manner: 1 = five in 10 chances, 2 = three in 10 chances, 3 = one in 10 chances, 4 = 0.5 in 10 chances, 5 = 0.1 in 10 chances, and 6 = should not drive.

Using multi-level analyses, Hothrow et al. (2014) accounted for the multiple risk decisions participants made and the fact that individuals are members of a group. They first revealed that decisions were riskier when made by individuals than by groups. Moreover, participants who had consumed more alcohol were more likely to make riskier decisions. In addition to these main effects of decision making setting and alcohol consumption, there was a significant interaction such that intoxication levels affected individual but not group decisions. Moreover, individual and group decision making did not differ under lower BAC levels, but individuals indicated more attraction towards risk taking behavior under higher intoxication levels. These findings supported the group monitoring hypothesis that groups

should be less susceptible to the risk-enhancing effect of alcohol consumption (see Fig. 1). Their findings provided a pivotal extension to the literature, replicating the group monitoring effect in naturally-occurring drinking contexts with a high dosage of alcohol.

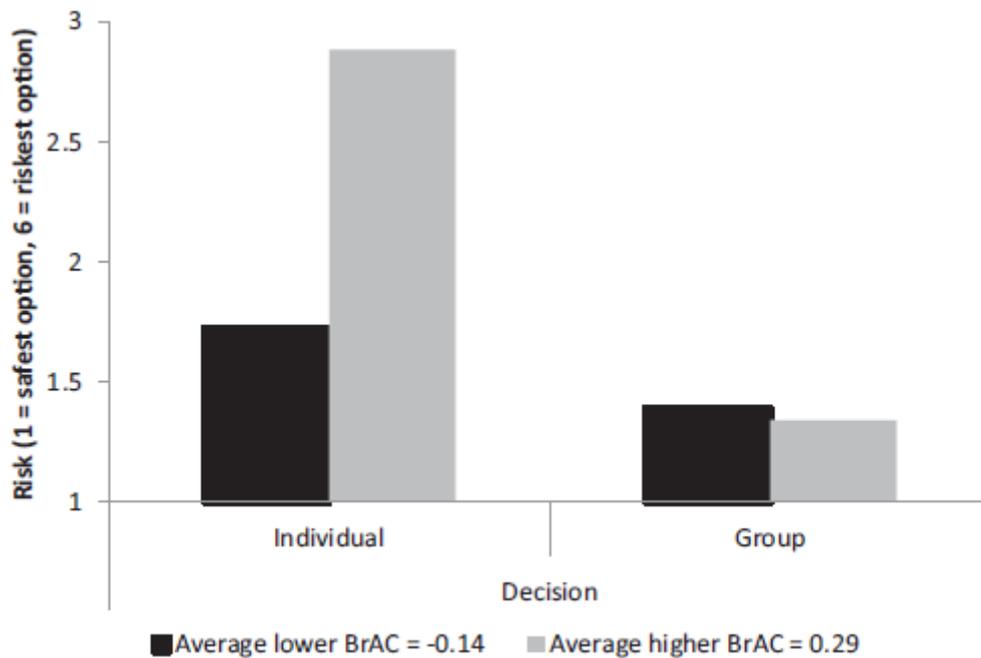


Fig. 1 from Hothrow et al. (2014).

The literature on alcohol and group decision making has generated mixed results, specifically as to whether groups could mitigate the negative effect of alcohol consumption. On the one hand, Abrams, Hothrow, Frings, and colleagues have demonstrated in a number of experiments that while individuals tended to be easily influenced by alcohol, group monitoring reduced the extent to which their decision was affected by intoxication. On the other hand, Sayette and colleagues demonstrated that groups were, in general, more susceptible to the disinhibitory effect of alcohol. Overall, there remain some key questions to be addressed empirically. Why has past research yielded conflicting results? When are groups more vulnerable to the negative influence of alcohol consumption? What happens during group monitoring – how is it manifested during group interactions?

Task Type

Previous studies employed various measurements for risk behavior: tossing a coin to avoid a time-consuming task (Sayette et al., 2004, 2012), a duplex bet task (Abrams et al., 2006), and questions, and risk-taking scenario measurement based on the CDQ (Hothrow et al., 2014). However, no attempts have been made so far to comprehensively examine the potential influence of task type on results. We shall discuss how different measurements might have contributed to generating conflicting findings.

One possibility is that the coin toss task used by Sayette et al. (2008, 2012) failed to capture risk seeking tendency. Given that people are motivated to affiliate, it seems reasonable to suppose that, once a group has formed, the prospect of spending more time together (i.e., in this case taking a longer survey with members) might be normative, attractive and even rewarding (Bernabé et al., 2016; Haslam et al., 2006; Stevens et al.,

2020). Bernabé et al. (2016), for example, showed that identification with the group significantly increased the willingness to engage in group activities. Therefore, it is ambiguous whether participants viewed the coin-toss task as a prospective opportunity or as a risk. Other types of risk-taking measurements, such as the duplex bets used by Abrams et al. (2006), seem to present a clearer index of risk attraction. These considerations suggest that the interaction between alcohol consumption and decision making setting may depend on the type and contingencies of risk-taking. It is therefore plausible that group monitoring effects might work differently depending on which aspects of the task people are attending to (e.g., social versus material outcomes). At this point, we can simply note that the previous studies supporting the hypothesis suggest that group monitoring successfully suppress risk-seeking behavior inflated by alcohol consumption when risk-taking behavior involves financial and physical risks (Abrams et al., 2006; Hothrow et al., 2014).

Another feature of the coin task is that it is less complex than those used in studies that supported the group monitoring hypothesis. Group monitoring improves the quality of group decisions by allowing members to exchange resources, but it should only make a difference if group members have insufficient capacity to process the information fully on their own. Thus, when a task is so simple that it does not leave much room for discussion or that a simple vote could be taken, group monitoring is unlikely to be as effective as when the task is more complex and requires reasoning and discussion. Consistent with this account, Frings et al. (2008) demonstrated that group monitoring buffered against the influence of alcohol on performance on tasks requiring sustained attention, suggesting that the group monitoring exerted its positive influence on cognitively tough tasks. Thus, it seems that task complexity may be another important factor to consider in future studies.

In general, past research on alcohol consumption, regardless of whether the focus was on individual or group decision making, has not yet endeavored to systematize the effect of different risk measurements. Therefore, further research around the issue will help us elucidate boundary conditions for group monitoring to work as well as when alcohol intoxication increases individual risk-pursuit.

Social drinking vs. sole drinking

Alcohol administration methods might be another factor that has affected the results of the previous studies. In Abrams et al. (2006) and Hothrow et al. (2014), participants who would make an individual risk decision consumed alcoholic (or placebo) beverage alone. By contrast, Sayette et al. (2012) had their participants drink as a group, regardless of whether they were in the group or individual decision making conditions. In other words, individual decision making followed social drinking. We argue this group setting might have primed the presence of others and subsequently influenced individual decision making by increasing self-monitoring. It may be this that resulted in the atypical finding that individual decision making was unaffected by alcohol intoxication. In fact, a recent study investigated how social drinking influences subsequent individual and group decision making and revealed that social drinking did not enhance the tendency for individuals to make risky decisions (Erskine-Shaw et al., 2017). The finding suggests that the previously documented risk-enhancing effect of intoxication might be limited to when individuals solely consumed alcohol. In other words, sole and group drinking posed significantly different influences on following individual risk taking behavior. This suggests that it is important to consider the relationship between

drinking conditions and the effect of alcohol. However, to our knowledge, there has not been any research directly addressing how sole and social drinking affect subsequent individual decision making. Therefore, future research should explore a potential interaction between drinking and decision making situations, which may clarify some of the inconsistencies in the literature.

This would have practical implications for dealing with alcohol-related issues in society. In the UK, for instance, pre-loading (drinking before attending nightlife) is commonplace (Hadfield & Newton, 2010). In such a circumstance, it is likely that when people gather to drink together, some of them have already consumed alcohol from sole drinking. Hughes et al. (2008) found that such pre-loaders were more likely to be involved in drink-related incidents, and it would be of great importance to understand the potential interaction between drinking style (sole vs. group) and decision making condition (individual or group).

Dosage-set vs. pharmacological effect

It is important to distinguish pharmacological effects from dosage-set effects. Previous studies on alcohol consumption have predominantly relied on a placebo condition as a comparison with an intoxicated group. In Abrams et al. (2006), participants in the placebo condition had significantly lower expectancy as to how much they had consumed alcohol compared to those in the alcohol condition. Therefore, the risk-enhancing effect of alcohol on individual decision making was due to both alcohol intake and the higher level of expectation about intoxication. Accordingly, it remains unclear whether the group monitoring effect worked against pharmacological and/or expectancy effects.

Sayette et al. (2014) showed that groups in the placebo and alcohol conditions did not vary in risky behavior, but found that they made riskier decisions compared to groups who knew they were drinking a non-alcoholic beverage, i.e., those without any expectation that they had consumed alcohol. This suggested that group monitoring might not reduce the effect of expectancy in decision making, but it was effective in reducing the pharmacological effect of intoxication. To date, the group monitoring hypothesis earned supports from studies comparing the placebo to the alcohol group. However, as past research on individual decision making revealed the importance of distinguishing expectancy from pharmacological effect (Burian et al., 2003; Proestakis et al., 2013), future studies should incorporate it into group decision studies. This would be an interesting direction to address the range of influence of group contexts in buffering against the risk-enhancing effect of alcohol.

Time pressure

Finally, there is another methodological issue concerning the debate: time pressure. Sayette and colleagues explicitly instructed groups to make a decision in 150 seconds (Sayette et al., 2004, 2012), while studies in favor of the group monitoring hypothesis did not impose any time limit on participants. Given that in Abrams et al. (2006), groups in the placebo and alcohol condition took, on average, 312 and 516 seconds to complete 16 decisions, the time pressure does not seem restricting. However, time pressure, rather than time constraint, has been found to substantially affect both individual and group decision making (Ibanez et al., 2008), and the mere presence of a time limit might have significantly affected decision making processes in previous studies.

According to the alcohol myopia model (Fromme et al., 1997; Steele & Josephs, 1988, 1990), intoxicated individuals can only attend to the most salient cue. In line with this, Hothrow et al. (2007) demonstrated that intoxicated groups were less likely to act cooperatively than sober groups, reasoning that the group context became the most salient context which resulted in intoxicated groups failing to reach an optimal (i.e., cooperative) decision. Based on these findings, it can be reasonably assumed that the time pressure might be the most salient cue in the situation, and groups in Sayette et al. (2012) failed to successfully engage in the group monitoring process. Furthermore, it can be speculated that time pressure prevented groups from initiating monitoring processes, consistent with past research showing that groups spent significantly more time in making decisions than individuals (Abrams et al., 2006). As no empirical evidence is available to support or refute these assumptions, it remains an open question whether time pressure may play an influential role in intoxicated decision making processes in groups.

Summary

Overall, Abrams, Hothrow, and colleagues have found that group decision making is less susceptible to the risk-enhancing effect of alcohol intoxication (Abrams et al., 2006; Frings et al., 2008; Hothrow et al., 2014), while Sayette and colleagues have argued that intoxicated groups are more likely to pursue risks (Sayette et al., 2004, 2012). However, due to several significant differences in methods, these different views are not necessarily contradictory and they point to various directions to test the group monitoring hypothesis. Future studies should systematically address how we should interpret previous findings, reflecting the methodological differences. It will be important for identifying how and when group monitoring can prevent intoxicated groups from engaging in risky behavior, as this has direct implications for dealing with societal issues and accidents resulting from alcohol consumption.

Future directions

We reviewed the previous studies on the role of alcohol intoxication in group decision making and discussed the group monitoring hypothesis. We identified possible directions for future studies that will help to disentangle the contrasting findings. We now explore directions for future work that will be needed to provide a fuller account of behaviors in typical social drinking situations.

Alcohol x group decision making in different domains

Firstly, although an ample number of studies have addressed how alcohol intoxication affects individual behavior in various domains (e.g., risk-seeking behavior and aggression), only a few types of intoxicated group behavior have been studied. To date, the main body of the research has predominantly focused on risk-seeking behavior, with the exception of Hothrow et al. (2007). They investigated cooperative behavior and found that alcohol consumption promoted intergroup competition among groups, although it did not change individual preference for intergroup cooperation. More research is needed to understand how this fits with the robust finding that drinking exacerbates discriminatory behavior and prejudice (Hunt & Laidler, 2001; Levine et al., 2012; Loersch et al., 2015; Mitchell et al., 2015; Zhou et al., 2018), but the reason they did not observe the competitive tendency among intoxicated individuals could be simply because Hothrow et al. (2007) did not explicitly

frame other groups as out-groups, suggesting that intergroup contexts were only mildly induced, or it may be the moderate amounts of alcohol that participants consumed. Regardless, they provided valuable additional evidence on intoxicated group behavior. Given that whether individual and group decision making are affected by alcohol consumption in the same manner depends on particular tasks or behaviors, future research should address how alcohol intoxication impacts other forms of group behavior.

Environmental factors

Secondly, as noted in Hoptrow et al. (2014), participants in previous studies took risk-taking assessment in quiet labs, which is not similar to naturally occurring situations where intoxicated groups have to make decisions, e.g., clubs, pubs, and parties. These contexts are relatively crowded, and noise levels tend to be high, which is likely to trigger the deindividuation process where individuals lose self-consciousness. Therefore, the group monitoring hypothesis may be supported in some contexts, but deindividuation in others. Contrary to group monitoring, deindividuation should increase the negative effects of alcohol intoxication (e.g., further enhanced risk-seeking tendency) among groups. Furthermore, Monk and Heim (2014) demonstrated that individuals' expectation about consequences of drinking significantly depended on drinking contexts (e.g., where and who they consumed alcohol). Although they did not elaborate on factors underpinning to the influence of such contexts, their finding alluded to the importance of considering the influence of environmental factors. Thus, the potential influence of actual decision making situations will surely be a relevant area for future research.

Social factors

Another factor in real drinking contexts is the constitution of the groups. Members of a group at a drinking occasion may vary in intoxication levels, so that some individuals may be completely sober. Previous studies looked at homogenous groups where all members had consumed the same amount of alcohol with a small variation in measured intoxication levels mostly resulted from differences in weight. Previous findings and theoretical backgrounds do not provide any predictions as to whether group monitoring occurs, for instance, in groups composed of both drunk and sober individuals.

It is also important to consider other social factors such as asymmetry in power and status among group members. Past research has consistently shown that individuals often base various types of judgment and behavior on these factors (Sturm & Antonakis, 2015), and power plays a relatively strong role in directing others towards a consensus (Hays & Goldstein, 2015). Given that social drinking is sometimes introduced to formal occasions (e.g., business meetings and academic conferences) where status and power tend to be salient, research accounting for processes in heterogeneous groups will further provide practical implications for the interaction between drinking and group decision making in real life.

Another interesting question is whether the closeness of relationships among social drinkers (e.g., friends, a partner, and family members) matters for subsequent risk-taking tendencies. With notable exceptions of Hoptrow et al. (2014) and Frings (2011), previous empirical work predominantly focused on groups of strangers (Abrams et al., 2006; Sayette et al., 2004, 2012), where groups norms specific to drinking had not formed yet. The former recruited groups of friends and the latter had army officer cadets working in the same branch.

Together with other studies that used groups of random strangers, the group monitoring hypotheses apparently holds in different types of groups, but it remains unclear whether the effect would be moderated by the nature of groups or the closeness of the relationships, *per se*.

Group Monitoring and the night time economy

Sociologists, criminologists, and psychologists have in recent years studied the night time economy, a concept that describes the transformation of towns and cities into places of drinking and other related past times once the traditional shops and businesses have closed after day time trading (Hadfield & Newton, 2010; Hayward & Hobbs, 2007; Liempt et al., n.d.; Roberts, 2005). Past research has shed light on the role of night time economy on aggressive behavior and related social issues (Chatterton, 2002; Copes et al., 2013; J. Taylor et al., 2015; Townsley & Grimshaw, 2013; Wilkinson et al., 2016).

Increasingly since the UK 2003 Licensing Act, town centre drinking establishments have been remodeled to provide more space and excitement for large groups of drinkers (Hayward & Hobbs, 2007) that may lead to increasing issues of problematic behavior and further separation between groups of people that are looking to drink heavily and those that are not or are family groups. This separation could lead to a divergence of social norms that enforce responsible behavior and place more pressure on public and private agencies.

There is evidence to suggest that norms of responsible behavior can be reinforced. For example, since the recession in 2008, there have been increasing numbers of empty retail spaces in town centers. Hubbard (2019) highlights a new phenomenon, namely small pop-up craft beer establishments. These focus on high value and often high strength beer, but also on community-mindedness and meaningful social relationships between landlord and customers. This approach to social drinking is likely to result in more socially responsible behavior and may in a mixed night time economy help set more socially responsible behavioral norms reinforced by group monitoring.

One key problem, though, is the limited appeal of these outlets to diverse groups in the night time economy. The principle of being able to encourage socially responsible behavioral norms in a social drinking environment is important. Indeed, our research on the group monitoring effect would suggest that groups are capable of using self-monitoring processes to moderate their behavior and this capability should be mobilized where possible.

Further research should look at the ability to harness group monitoring in the night time economy to facilitate the co-location of different groups and the reinforcing of socially responsible norms.

Summary

On the whole, previous studies have relied upon laboratory experiments, and may not have captured potentially influential elements of social drinking. Although they have produced insights into the safe management of alcohol consumption, it seems that their practical implications might be limited, leaving multiple pathways through which future researchers would extend the understanding of the effect of intoxication in group decision making. We acknowledge that it is a challenge that investigation goes beyond lab experiments to account for factors in natural settings, but it is particularly important for this field to ensure findings

are ecologically valid. Thus, we hope that researchers will expand and develop this key area of research.

Conclusion

Social and health psychologists have long investigated how alcohol intoxication influences various domains of behavior, since the proposition of the alcohol myopia model (Steele & Josephs, 1988, 1990). They have collated a number of studies on the role of alcohol consumption in shaping risk taking behavior, as major alcohol-related issues in society (e.g., drink driving and acute alcoholism) are relevant to risk taking tendencies. Past research consistently demonstrated that alcohol intoxication makes individuals attracted to risky choices and, thus, take risky actions.

Despite that alcohol consumption often takes place in social occasions (e.g., bar, festival, etc.), it was only until the early 2000s that researchers embarked on the empirical investigation of the potential role of group contexts. Abrams et al. (2006) was the first to provide evidence that the alcohol intoxication poses different effects on individual and group decision making; namely, they found support for the group monitoring hypothesis that group decision making is less susceptible to the risk-enhancing effect of alcohol compared to individual decision making. Several subsequent research further replicated and extended the finding (Frings, 2011; Frings et al., 2008; Hoptthrow et al., 2014).

However, there are studies showing that group contexts do not suppress the negative effect of alcohol intoxication on risk taking behavior (Sayette et al., 2004, 2012). Interestingly, they also found that intoxicated individuals did not display risk seeking behavior, contrary to past research on individual decision making and alcohol consumption.

Overall, the previous literature on the role of alcohol intoxication on group decision making has obtained mixed results, as to whether groups can be a buffer against the risk-enhancing effect of alcohol. As we have reviewed, preceding studies employed different research design and measurements of risk taking behavior, and it would be premature to draw any conclusions. However, they consistently suggested that alcohol consumption exerts different influences on individuals and groups, and, more importantly, the effects are very sensitive to various factors (e.g., methodology and contextual factors). Therefore, we hope that future research will systematically account for potential moderators and ecological factors and better elucidate the relationship between alcohol consumption and decision making processes, which in turn aid us ways to protect individuals and society from the harmful effect of alcohol intoxication.

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