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Dyads experience over confidence in hand-eye coordination skills after placebo alcohol.

Daniel Frings, Ian P. Albery, Kimberly Rolph, Anna Leczfalvy, Stefan Smaczny & Antony Moss.

Division of Psychology, London South Bank University

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All correspondence should be addressed to the first author care of: Division of Psychology, London South Bank University, London, SE1 0AA. Phone: +442078155888, email fringsd@lsbu.ac.uk

**Abstract**

An experiment tested the effects of dyad membership and the prospect of completing a motor-skills task on alcohol placebo consumption and task confidence. Participants (*n* =115) completed a taste preference task whilst alone or in dyads. Half the individuals and half the dyads expected to subsequently complete a motor-skills task and rated task confidence pre and post-consumption. Individuals expecting the task consumed less than those in the non-task condition and felt less confident in their abilities post-consumption. Amongst those expecting the task, dyad members’ consumption did not reduce and their post-consumption confidence was higher than individuals’. Findings suggest dyad membership can lead to overconfidence. Attempts to reduce alcohol related harms must balance the protective properties of dyads with risks of overconfidence.

Keywords: Alcohol, groups, dyads, confidence, polarization, motor skills

**Dyads experience over confidence in hand-eye coordination skills after placebo alcohol.**

Alcohol is related to numerous accidents every year, many of which involve people attempting complex tasks whilst intoxicated (Health and Social Care Information Centre, Table 4.3, 2013). The extant literature suggests that alcohol may affect decisions making (in particular risk taking) through processes such as alcohol myopia (an increased impact on factors impelling behaviour than inhibiting it, see below). However, little work has examined the effect of alcohol myopia on cognitive constructs associated with decision making, such as confidence. Moreover, little work has attempted to understand how drinkers mitigate their drinking behaviour when faced with the prospect of undertaking such tasks. Nor has the role of social others (i.e. present group or dyad members) on drinking decisions or confidence been examined. The current study addresses these three issues by examining how both the prospect of undertaking a complex task and being in a dyad may alter both ratings of confidence and in-the-moment drinking behaviours.

**Alcohol myopia and risk tolerance**

One important mechanism through which alcohol may affect cognition and behaviour is alcohol myopia (Steele, et al., 1985; Steele & Josephs, 1990; Steele & Southwick, 1985). Alcohol myopia theory argues that, when a response conflict is present, alcohol consumption increases one’s focus on salient aspects of the environment at the expense of peripheral features. If impelling cues (e.g. the prospect of enjoying a drink) are salient, they may guide judgments and behaviour to a greater extent than inhibiting peripheral cues (e.g. possible injury incurred after failing a future complex task). This may therefore lead to more extreme judgements and behaviours in the direction (impelling vs. inhibiting) of the most salient aspects of the situation. Alcohol consumption has been shown to lead to increased preparedness to engage in unprotected sex (MacDonald et al., 2000), decreases in individuals’ perceived risk of sexual aggression from others and reported intentions to resist sexual advances (Testa, et al., 2006) . Myopic effects of alcohol are also reflected in attention processes. For instance, intoxicated participants focus more on central features of a visual scene than placebo participants. (Harvey et al., 2013). Similarly, both lab and field based research shows that consumption of alcohol to levels similar to the UK drink drive limit (8 milligrams of alcohol per 100 millitres of blood, at time of writing) led to individuals behaving more riskily in a betting task (Abrams, et al., 2006; Hopthrow, et al., 2014). From a myopia perspective, the impelling nature of the reward appeared to outweigh the inhibiting nature of the risk amongst these participants.

Myopia effects are not restricted to situations where alcohol has been consumed. For instance, the expectancy that one is about to consume an alcohol containing drink (vs. a non-alcoholic one) is a strong predictor of actual levels of subsequent consumption, regardless of the actual presence of alcohol (e.g. Marlatt, Demming & Reid, 1973). Both alcohol expectancy theories (LaBrie, et al., 2011) and dual process models of alcohol consumption (e.g. Moss & Albery, 2009) suggest that believing that one has consumed alcohol, or even one’s thoughts about imminent alcohol consumption (being ‘pre-consumptive’), can lead to cognitive and behavioural effects. These can be akin to those seen after actual alcohol consumption. For instance, the belief that alcohol has been consumed can lead to impairment in a simple motor task amongst both alcohol and placebo groups (Fillmore & Vogel-Sprott, 1995) and can slow down information processing speed (Fillmore, et al., 1998). The current study examines the effect of the belief one has consumed alcohol on a particular risk related cognition - judgements of confidence.

**Confidence, risk taking and alcohol.**

Confidence predicts behaviour and risk taking (e.g. Schwarzer, 2008).Whilst it is evident that alcohol (and alcohol related expectancies) can affect processes such as risk assessment, attention and motor skills, little work has addressed directly alcohol’s effect on confidence. Drinkers may experience increased confidence due to a focus on goal related actions at the expense of non-goal related ones. This effect could also occur due to a decreased focus on the steps required for goal achievement. Sevincer and Oettingen (2013) observed that alcohol consumption led individuals to focus more on the desirability of goals than on their feasibility. Other work suggests increased goal commitment even when expectations of achieving such goals are lowered (Sevincer et al., 2012). Thus, another aim of the present study was to expand this body of research by exploring how alcohol can affect confidence. It also aimed to test how such effects interact with group membership during drinking.

**Group membership, drinking behaviours and confidence**

Alcohol is frequently used to enhance social interactions and is often consumed in groups. For instance, university students identify sociability as the major benefit of drinking alcohol (Crundall, 1995) and expect that binge drinking will improve social interactions and increase relaxation and arousal (Turrisi, 1999). Sayette et al., (2012) suggest that moderate doses of alcohol led social drinkers to spend more time talking to one other and decreased the frequency of facially expressed negative emotions. This finding seems to be concurrent with Quigley & Collins’ (1999) observation that group members’ levels of consumption are affected by others around them. Social camaraderie has been observed to be one of the strongest influencing factors in the tendency to binge drink amongst heavy drinking males (Kuntsche, et al., 2004). In Larsen et al., (2009), dyads (consisting of a confederate and a participant) were given the opportunity to consume an alcoholic or non alcoholic beverage during a break in a testing session. When the confederate chose an alcoholic drink, a greater proportion of participants did also. When the confederate drank greater quantities (two or three glasses as opposed to one) mean participant consumption increased by a similar amount. In addition, when both group members drank alcohol the rates of sipping between the confederate and the participant became synchronized. Whilst this study shows that group members match their drinking behaviour to heavier drinkers little research to date has directly explored whether, in the absence of a heavier drinking confederate, group membership leads to increased alcohol intake. Drinkers also often intend to drink heavily to enhance social interactions (e.g. Sayette et al., 2012). In addition, drinkers match their drinking behaviour to heavier drinking confederates (see meta analysis, Collins and Quigley, 1999) when drinking with strangers (Larsen, et al, 2009; Larsen, Engels, Wiers, Granic & Spijkerman, 2012) , actors on screen (Koordemann, Anschutz, van Baaren & Engels, 2011) and acquaintances (Dallas et al., 2014). More directly, Koordeman, Anschutz and Engels (2012) show a high intra-class correlation between drinkers in non-confederate dyads, suggesting some form of matching is occurring. These effects are likely to be reciprocal such that perception of increased consumption on the part of one dyad member likely to be matched the other. This will then lead to the other dyad member increasing in kind, such that a reciprocal process may occur. Given drinkers typically overestimate the volumes of alcohol normatively consumed by other drinkers (e.g. Baer et al., 1991) and the other dyad member may indeed be drinking more in actuality (as they are in a social situation) such initial perceptions (and associate responses) are likely. Thus, it can be expected that even when a confederate is not used, groups should spontaneously increase their alcohol consumption relative to individuals. Thus our *matching hypothesis* argues that group members should match drinking behaviours, and that mean volumes of drink consumed will be higher amongst groups than amongst individuals.

**Group membership and confidence**

**Group monitoring**. Alongside drinking levels, groups and dyad membership may also affect performance. To date, research exploring groups and alcohol has focused upon performance outcomes but has neglected to test group members’ confidence in their abilities prior to and post alcohol consumption. This is important as levels of confidence may predict preparedness to undertake complex, potentially dangerous, behaviours. In terms of performance, the group monitoring hypothesis (e.g. Abrams, et al., 2006; Frings 2012a) suggests that group membership may offset some of the detrimental cognitive effects of alcohol ingestion. ‘Group monitoring’ is thought to occur through both motivational (a desire not to let other group members down) and informational (the ability to pool, compare and discuss) processes. As outlined above, Abrams, et al (2006) showed that individuals who had consumed alcohol took more risks in a betting task than controls. However, a further finding of this research was that when different participants undertook this study as part of four person groups, alcohol did not alter their risk taking at all (see also Hopthrow et al., 2014 for a replication). In addition, Frings, et al., (2008) showed that alcohol consumption reduced judgement accuracy during an auditory vigilance task amongst individuals but to a lesser extent in group members. Moreover, groups’ consensual judgements were unaffected by alcohol. It is argued that group monitoring offsets impairments in performance due to motivation gains (an increase effort directed at a task or more cognitive elaboration over a judgement) and process gains (the effects of sharing information and judgements amongst group members). As it is predicted that both motivational and informational processes could still take place in dyadic contexts, one possibility is that the effects of drinking (or the belief one is drinking) on individuals will be minimised amongst dyads. Specifically, while individuals may remain (or become more) confident of their motor skill abilities after drinking (or given the belief that alcohol has been consumed), dyads should show decreased confidence.

**Group polarisation and alcohol.** Not all research suggests that group membership is beneficial when drinking. One process which can affect groups (both intoxicated or not) is *group polarization* (see Isenberg, 1986)*.*  Group polarization is said to occur when an initial tendency of a group (such as a tendency to tolerate risk or, alternatively, to behave cautiously) is magnified, with the eventual outcome being more extreme than the mean individual opinions. Amongst sober participants, being part of group (and, in particular, engaging in group discussion) leads to effects such as more extreme opinions and gambling behaviour (e.g. Myers & Bishop, 1970; Blascovich & Ginsburg, 1974) and more lenient or harsh sentencing, (e.g. Bray & Noble, 1978). In contrast to the proposed effects of group monitoring, group polarization accounts propose that the myopic effects of alcohol may be exacerbated. For instance, alcohol myopia may lead to considerable attentional and cognitive focus being placed on a salient feature of a situation (i.e. belief in one’s ability to perform a subsequent task). The effect of group polarization on this already attended to feature may be to further amplify beliefs about one’s ability (either positively or negatively). Such polarization has been observed experimentally amongst intoxicated groups. Hopthrow, et al., (2007) showed that levels of co-operation between groups decreased during a social dilemma task when group members were intoxicated (relative to changes in individuals). Hopthrow et al., (2007) argued that during a social dilemma the immediacy of external potential rewards (or negative outcomes) act as an impelling cue. Simultaneously, less immediate and more abstract inhibiting cues (such as co-operation or maintaining ideals of fairness) become more peripheral. As a result, behaviours to achieve the reward (or avoid negative outcomes) become more likely. This appeared to be magnified amongst groups relative to individuals. Thus, in contrast to a hypothesis regarding group monitoring, the *group polarization hypothesis* predicts that the effects of alcohol (or a placebo) observed amongst individuals will be magnified amongst groups. This is likely to extend to confidence in one’s own abilities. Minson and Mueller (2012) report that, despite being less accurate, dyads had increased confidence in their decisions, and disregarded others’ informational input, relative to individuals. Sniezek and Henry (1990) show that some methods of reaching a group consensus increased confidence in judgements, despite little change in pre and post discussion estimates. Chang, et al., (2012) showed a similar effect behaviourally – the implicit activation of ‘friendship concepts’ led to greater levels of risk during a long shot paradigm and also the Balloon Analogue Risk Test.

Both the group monitoring and polarization alcohol related literatures have a number of key limitations. Firstly, both are typically investigated with small groups (around 4 people) and have not tested dyads. This is important as both group monitoring and polarization effects are based in part on information exchange (see Frings et al., 2008; Isenberg, 1986) which may vary according to group size. Moreover, the study of dyads rather than larger groups allows for social influence between group members to be examined more directly with reasonable sample sizes, as the influence of one group member upon another does not interact with the influence of others (e.g. majority/minority effects etc). Furthermore, the majority of research takes place in traditional laboratories or field settings. Whilst in many cases such environments are appropriate and the findings valid, they can also present challengers for researchers. For instance, drinking cues in an environment (in particular between bar and lab settings) can change the expectancies associated with alcohol usage (Monk & Heim, 2013a, Monk & Heim, 2013b) and subsequent behaviour (Moss et al., 2015). Cognitive changes in laboratory-based experiments may thus not reflect changes observed in the real world. In contrast, when research is taken into the field, numerous other factors beyond the experimenter’s control (including lighting, music, the present or absence of others, advertising materials, etc.,) are present. These add a significant amount of error variance increasing the likelihood of valid effects being missed (i.e. Type II error). It may also lead to systematic variance changes increasing the risk of a Type I error. To address this, the current study utilized a bar-laboratory which simulates a bar or public house. In addition to the pub décor, the bar-laboratory features a bar complete with beer taps, stools, a fruit machine, optics etc. By conducting research in this environment, the current study provides a realistic simulation of drinking environments (complete with all relevant contextual cues) whilst maintaining vigorous experimental control.

The present experiment tested the effects of being in a dyad on volume of alcohol substitute consumed and also on drinkers’ confidence in future performance. Participants consumed drinks they believed to be alcoholic whilst either alone or as part of a dyad. Before this drinking episode some participants were led to expect that they would subsequently be asked to complete successfully a complex hand eye co-ordination task for a reward. In line with previous research, the *matching hypothesis* predicted that group members would match their drink intake and consume more alcohol substitute than individual drinkers. Research from an alcohol myopia perspective suggests that after consumption, tendencies towards higher (or lower) levels of confidence should also be observed. We also tested two competing hypotheses regarding the effects of consumption on confidence. To date, there is considerable empirical evidence allowing for the formulation of a hypothesis that dyad membership will decrease confidence post consumption (*group monitoring hypothesis*). However, these findings are contra-indicated by others which suggest the reverse pattern (*group polarization hypothesis*). Thus, planned comparisons between groups and individuals were formulated. Specifically, the volume of consumption of dyads was compared to that of individuals under conditions of expecting to complete a hand-eye co-ordination task or not. In addition, where a task was expected, the pre and post consumption confidence of dyads and individuals was compared. As no directional hypothesis is made, a more conservative statistical criteria for rejecting the null hypothesis (e.g. *p* < .025) is adopted for these contrasts.

**Method**

**Participants**

One hundred and fifteen participants (30 males, 85 females) were recruited from the psychology undergraduate course of a modern London university. Recruitment materials comprised posters placed around campus, an electronic bulletin board and word-of-mouth. These communications advertised an opportunity to take part in a study in which alcohol may be consumed. Participant ages ranged from 18 to 56 years (*M* = 25.06, *SD* = 8.03). AUDIT scores (which represent a combined measure of both drinking frequency and alcohol related harms, see AUDIT, below) of the sample ranged from 1 to 21 (*M* = 6.84, *SD* = 4.43). This suggests a sample including both light and heavy drinkers. ANOVA on AUDIT scores according to condition revealed no main effects of interactions (*p*s > .32). Participants were allocated randomly to condition prior to scheduling. Where dyads were expected to participate but only one participant attended, they were assigned to an individual condition. Dyads were single sex[[1]](#footnote-1), and participants did not know their dyad partner prior to the study. Participants were part of a research participation scheme [RPS][[2]](#footnote-2) and were offered credits for taking part in the study. Fifty one participants took part as individuals (20 in the Task condition), and 64 took part as dyad members (34 in the Task condition).

**Design**

A 2 (Group: Individual vs. Dyad) x 2 (Performance: Task vs. No Task) between participants design was implemented. In the individual conditions participants completed the experiment alone. In group conditions they completed it as part of a dyad. In the task conditions participants expected to be required to complete a complex hand-eye co-ordination task. In the no-task conditions they were not. For participants in the task conditions the design contained an additional within participant factor (Phase: Pre-drinking, Post drinking). Dependent variables consisted of the amount of alcohol placebo consumed during a taste preference task and, for Task condition participants, confidence in completing the task. Levels of regular alcohol use were measured as a covariate.

**Procedure.** Testing took place during afternoon sessions scheduled between 2 pm and 4 pm. After giving informed consent, participants entered the bar and sat on bar-stool(s). A glass of red and a glass of white wine (total 300ml per participant, in reality a 0% alcohol wine substitute) had previously been poured (to 150ml per glass) into wine glasses and placed on the bar. Participants in the task conditions were at this point shown a wire loop game (which requires that they pass a metal bar with a loop on the end from one end of a curvy wire to another without the two touching). The task was chosen as it requires concentration and motor skills, both attributes people generally expect to be impaired by alcohol (see Fillmore & Vogel-Sprott, 1995). Participants in the individual condition were verbally informed that ‘after you have finished the tasting task, you will have a go at the game. If you are successful, you will be rewarded one additional RPS credit’. In the group / task condition, the same instructions were modified such that participants were told ‘... after you have finished the tasting task, one of you will…’. At this point, these participants rated how confident they were that they could succeed (pre-drinking phase rating). The experimenter then left all participants while they completed the drinking phase which comprised a taste preference task. This involves participants consuming as much or little of the wines as they like and subsequently answering questions on taste, quality, price and preference. Participants were given ten minutes for this phase (but could end it earlier by alerting the experimenter). This placebo paradigm has been used in several previous studies produced by multiple research groups (e.g. Albery, at al. 2015; Morrison, Noel & Ogle, 2012; Moss et al., 2015; Frings, Melichar & Albery, 2016). It has been shown to have a good level of believability and also to be sensitive to changes in a variety of factors such as context, motivation etc. After the taste preference task, the experimenter re-joined the participant(s). Those in the task conditions were again asked to rate their confidence (post-drinking phase rating). Finally, the AUDIT was administered to all participants and they were thanked and debriefed. All participants were awarded an extra credit. The volume of fluid remaining in each participant’s glass was recorded to measure their intake. After the study was completed, funnel debriefing was undertaken to probe if participants had any understanding of the true purpose of the study (‘what do you think the study was about?’), or the nature of methodology, including the use of an alcohol substitute (‘did you notice anything strange about the study or have any suspicions?’). As a result of this six participants (five dyad members and one in individual condition, all in no-task conditions) were excluded from the study[[3]](#footnote-3) leading to a final sample of 109 participants (comprising 30 individuals in each Task condition, 12 Task condition dyads and 17 No Task condition dyads).

**Materials**

**Confidence.** Both before and after the drinking phaseconfidence was measured using four items on a four point scale anchored at 1 (*Very confident*) and 4 (*Not confident at all*). The items were ‘I am going to complete this task without any problems (e.g. setting off the buzzer), ‘I am good at hand-eye co-ordination tasks’, ‘I am better than most at this task’ and ‘The alcohol I consume(d) will not affect my ability to complete this task in any way’. Scale reliability was acceptable (Pre-phase ratings, Cronbach’s α = .57, post-phase ratings, Cronbach’s α = .76). For ease of interpretation confidence means were reversed such that higher scores indicate *higher* levels of confidence.

**Alcohol use (AUDIT).**The Alcohol Use Disorders Identification Test (AUDIT, Saunders, et al., 1993) test was used to evaluate drinking behaviours. The AUDIT is a self-administrated structured questionnaire test comprising ten questions around quantity of alcohol consumption, frequency of alcohol consumption, drinking behaviour and alcohol-related problems such as harmful alcohol use. Higher scores indicate higher levels of alcohol consumption and increased risk of alcohol related harms.

**Results**

For the following analyses, as cell sizes were relatively unequal and estimated marginal means including covariate effects were used to calculate planned comparisons (unadjusted means are reported for clarity). To account for shared variance between dyad members, a multi-level approach to analysis was undertaken.

**Volume consumed.**

A 2 (Group condition: Individual vs. Dyad) X 2 (Performance: Task vs. No task) multilevel model fit was undertaken on the volume of alcohol substitute consumed as the dependent variable and AUDIT score as a covariate. The nesting variable was the participants’ dyad number (with each participant in a dyad assigned a unique dyad number). A maximum likelihood estimation model was employed. The analysis was undertaken using SPSS v21 MIXED command. The model BIC was 1265.22. Type III fixed effects revealed a significant effect of the covariate, *F*(1, 90.49) = 19.22, *p* < .001. There was a marginal main effect of group condition, *F*(1, 75.48) = 3.16, *p* = .080. Dyads consumed more drink (*M* = 138.17ml, *SD* = 74.69) than individuals (*M* = 111.00, *SD* = 70.28). There was also a marginal effect of task condition, *F*(1, 76.13) = 3.65, *p* = .060. When expecting to complete a hand eye co-ordination task, participants consumed less (*M* = 106.57, *SD* = 65.18) than when they did not (*M* = 133.67, SD = 77.21). The interaction between these two factors was not significant, *F*(1, 75.48) = 2.62, *p* = .110. However, as a-priori predictions were made, simple effects were undertaken, with a conservative α of 0.025 being used to test for significance. As can be seen in Table 1, there was a simple effect of Task condition in the individual condition, *F*(1,92) = 7.31, *p* = .008, but not in the dyad condition, *F*(1, 63.74) = .039, *p* = .843. Individuals and dyads did not differ in the no task condition, *F*(1,73.60) = .01, *p* = .911, ηp2 <.01, but did in the task condition, *F*(1, 77.35) = 5.74, *p* = .019. In summary, individuals decreased the amount they consumed when faced with a motor-task, whilst dyads did not.

At an individual drinker level, a correlation[[4]](#footnote-4) was observed between the amount of alcohol each group member consumed and the amount their partner consumed**,** *r* = .73, *df* = 29, *p* < .001.This correlation remained when variance associated with pre-task confidence was partialed out, *pr* = .78 *df* = 14, *p* <.001, when AUDIT scores were partialed out, *pr* = .70, *df* = 26, *p* <.001, and when both these factors were partialed out simultaneously, *pr* = .78, *df* = 13, *p* < .001.

**Confidence.**

Zero order correlational analysis was carried to test for relationships between volume consumed, audit scores and pre / post drinking confidence (see Table 2). This analysis was carried out at both and individual and dyadic level (by creating mean scores from each dyad members scores, and then treating the dyad as a single unit for analysis). Higher AUDIT scores were related to greater volumes consumed, and decreased confidence in task ability both before and after the drinking phase. Higher confidence in the pre-drinking phase was correlated with higher post drinking phase confidence, and volume consumed was unrelated to pre or post drinking confidence.

A 2 (Group condition: Individual vs. Dyad) X 2 (Phase: Pre-drink, Post- drink) mixed level model fit was undertaken with confidence as the dependent variable and AUDIT score and amount of fluid consumed as covariates (the latter was included as dyads drank more than individuals). The nesting variables for this analysis were the participants’ participation number and their dyad number. The Model BIC was 178.64. Amongst the covariates, there was no effect of the amount of fluid consumed, *F*(1, 54) = 1.14, *p* = .29. There was a significant effect of AUDIT score, *F*(1, 54) = 6.23, *p* = .016. There was a main effect of Group condition, *F*(1, 54) = 4.98, *p* =.030. Individuals were less confident (*M* = 2.13, *SD* = .55) than dyads (*M* = 2.50, SD = .44). There was no effect of Phase, *F*(1, 54) = 0.50 , *p* = .483. The interaction between Phase and Group was significant, *F*(1, 54) = 5.10, *p* = .028. Mean confidence for these conditions can be seen in Figure 1. Simple effects analysis revealed that overall confidence did not differ between individuals and dyads in pre-drinking phase, *F*(1, 75) = 1.23, *p* = .272, but did in the post drink phase, *F*(1 , 75) = 8.78, *p* = .004. Individuals’ confidence did not decrease with between the pre and post drink phases, *F*(1, 54) = 0.96, *p* = .22. In contrast, the confidence of dyads increased significantly between pre and post drink phases, *F*(1, 54) = 5.93, *p* = .018.

**Discussion**

To date, the vast majority of work on the effects of alcohol consumption on cognition and behaviour has tended to focus on individuals. How the myopic effects of alcohol vary when drinking alone or in the company of others is poorly understood. Previous findings and predictions based on the *matching hypothesis* suggest that group members consume more alcohol than lone drinkers. In terms of the effects of the belief alcohol had been consumed on confidence two competing predictions were tested. The *group monitoring hypothesis* predicts that while this belief may increase individuals’ confidence at completing a hand-eye co-ordination task, group members will be unaffected or be less confident. In contrast, *group polarization* accounts suggests that group members may become more confident when they think they have consumed alcohol.

**Matching hypothesis.**

Participants who scored higher on the AUDIT consumed more alcohol substitute than those who scored lower. This buttresses confidence that the alcohol substitute effectively simulated real alcohol – to the extent that differences in placebo consumption between light and heavy drinkers mirrored differences observed in actual consumption between these groups. Across conditions, members of dyads consumed more on average than individuals. This effect has been observed in prior research amongst participants interacting with confederates (Larsen et al., 2009). The current experiment adds to this knowledge base in a number of ways. Specifically, it allowed dyad members to interact freely (instead of using a confederate design) and the alcohol consumption of both dyadic members was measured. In addition, the task took part in a bar-laboratory which approximated closely a real life drinking environment in a controlled way. Another novel contribution of the current study is an insight into the processes underpinning this effect. First of all, the current study suggests that the amount drinkers consume is related to the amount consumed by group members. Secondly, it appears that greater levels of drinking amongst groups may in part be due to a failure to moderate drinking when it would be appropriate to (as shown by similar levels of consumption amongst dyads where task demands were present or absent). Given that the majority of drinking happens in situations where multiple people are present, this suggests that research into the effects of public health campaigns highlighting these risks may generate new ways of reducing alcohol related harm.

**Group monitoring and polarization**

A second aim of the study was to test the effects of the belief alcohol had been consumed on confidence and the moderating effects of group membership. Amongst individuals, less volume was consumed when participants believed they would subsequently have to undertake a complex motor task. Higher levels of regular drinking behaviour (measured via the AUDIT) was linked to lower confidence in completing the task successfully both before and after the drinking phase. These findings suggest that individuals adjust their drinking in response to anticipation of future task demands. Individual drinkers became (slightly) less confident in their ability to complete a hand-eye co-ordination task after they believed they had consumed alcohol. Alcohol myopia theory may explain this in terms of inhibiting cues related to desirable outcome (i.e. the difficulty of the task and the impairing effects of alcohol on hand-eye co-ordination and awareness of pre-existing expectancies of impairment) being focused upon to a greater extent than more impelling cues linked to the immediate aspects of the situation (i.e. the potential pleasant affects associated with higher levels of consumption).

Amongst dyads a different pattern emerged. As noted above, the prospect of completing a task did not reduce drinking behaviour. Also, group confidence (which at baseline was slightly above the scale mid-point) increased significantly between the pre/post drinking phases. Similarly, there was no difference in confidence between groups and individuals in the pre-drinking phase, but dyads’ confidence was higher than that of individuals in the post drinking phase. These results suggest that group polarization took place. How may this have occurred? One mechanism thought to underpin group polarization is an exchange of information between members leading to a shift in attitudes/beliefs, with reciprocal exchanges leading to a magnification of initial group tendencies. A second explanation suggests that group members estimate an (extreme) group norm and attempt to emulate it. It is unknown which of these processes led to increased confidence in the present task. Anecdotally, observations by the researchers that dyads discussed the apparent difficulty of the task and reinforced one another’s viewpoints (an opportunity unavailable to individuals) suggests the former mechanism may be in operation, but systematic recording and analysis of such comments would be required before firmer conclusions can be drawn. Another difference between dyads and individuals was that greater prior drinking experience (measured via AUDIT) predicted lower pre-consumption confidence amongst dyads. Amongst individuals this correlation failed to reach significance.

Previous work (e.g. Dallas et al., 2014; Larsen et al., 2009; Larsen et al.,2012; Koordemann et al., 2011 ) suggest group / dyad members match drinking levels to that of fellow members. The majority of this work (cf. Koordemann et al., 2012) is survey based or relies on confederate designs where one half of the dyad drinks to a pre-defined level, regardless of others’ behaviour. The current study did not employ a confederate design, but allowed both dyad members to drink freely. This is important as interactions between dyads and groups may well be reciprocal. The actual or perceived behaviour of one member influences the behaviour of another, which leads to adjustments in that of the first. So, for instance, how one member (observer) perceives another’s (observee) drinking may influence their own. The observee then uses the observer’s new behaviour to anchor their own, and so on. In a confederate design, the initial conditions of such behaviours is set, and the reciprocity between individuals reduced. This allows a clear demonstration of modelling, but not a demonstration that such effects will emerge spontaneously. As such, confederate designs do not wholly test the effects of dyad membership on drinking rates. Thus, the current study builds upon existing work (showing modelling takes place) by demonstrating that such effects will appear spontaneously (with no confederate present).

These novel findings extend our understanding of alcohol expectancies amongst group members in several ways. While previous research has addressed actual performance (e.g. vigilance or problem solving analysis) or risk perception, none has examined confidence judgements. It appears that not only does alcohol consumption make tasks more difficult, associated expectancies also increases dyad members’ confidence in avoiding negative outcomes (or achieving positive ones). This, in turn, is likely to lead to lowered risk perception and higher risk tolerance (see Frings, 2012b).

One question raised by the current research is why group monitoring was not observed. Two possibilities arise. First, previous work on group monitoring focuses upon small groups (typically four members). This allows multiple views to be exchanged and pooled and also makes group members accountable for multiple others. Dyads have fewer members so levels of information pooling and normative influence may be lower. A second difference between this study and others on group monitoring is the use of an alcohol substitute. One possibility is that if ethanol had been administered group monitoring may have occurred. However, it would be surprising if contra-indicators to the current findings would be observed in an ethanol-based study for two reasons. First of all, previous research suggests that alcohol expectancies (including the belief that one is going to consume alcohol in the future) can lead to cognitive effects similar in nature to actual consumption (see Moss & Albery, 2009). Secondly, the time frame in which the study took place would have allowed only a low dosage of ethanol to be absorbed. However, it would be useful to replicate this study with an ethanol administration design to untangle whether it is the expectancies of impairment or actual impairment which drive effects. The current findings also suggest an important caveat to the group monitoring literature. Although previous research has shown that group membership can offset the negative cognitive effects of alcohol, being around others may also increase the amount of alcohol consumed, thus increasing such effects. Understanding how this balance of risk factors operates has important implications for the reduction of alcohol related harms (for instance, traffic accidents and injuries sustained whilst intoxicated) and should be investigated further.

One unresolved issue is whether the way tasks are presented may alter the effects of the dyad membership. In the current study, both members of the dyad believed that they may be required to undertake the task. Alternative presentations could require both members undertake the task, with an interdependent outcome, or both undertake it with independent outcomes . In the design phase of the study the authors felt the former may encourage diffusion of responsibility (which may have subsequent effects on confidence) and the latter a general reduction in the size of dyadic effects. Given the relatively exploratory nature of this work, the authors were keen to avoid either of these outcomes and the associated Type II error risk. Future research could address this question by directly comparing contexts of interdependence vs. no interdependence. A second unresolved issue is that, similar to other TPT based tasks, and indeed all measures taken explicitly, participants behaviour may have been influenced by a number of demand characteristics. The combined use of a drinking task and an (expected) motor skills task may have increased this possibility. Our probe suggested the participants were unaware of the nature of the study purpose (so would not be altering their behaviour to fit in line with our specific hypotheses). However, it is of course possible that the probe failed to detect such effects, or that participants were behaving in ways which differ from natural responses due to being in a research setting. The use of a realistic bar-setting may well have reduced the possibility of the latter, to the extent that participants were in an environment highly similar to the one in which the relevant behaviours occur naturally. Finally, we posited that increased drinking in this study may be due to reciprocal influences occurring in group members, driven by initial mutual misperceptions of intake. Whilst this process mirrors well documented reciprocal processes (such as group polarisation), the current study does not provide the opportunity to directly test this process, so it remains conjecture.

Alongside the theoretical implications, this study provides support for the use of placebo alcohol as a dependent variable in experimental studies. It is one of few to do so - the others the authors are aware of are Bernstein, Wood and Colby (2016) and Morrison et al., (2012). These methods are easier to administer, less intrusive to participants and can be employed in populations which include underage drinkers. The current study has a similar feature to Bernstein, et al., in that it included a second drinker. In Bernstein et al., this second drinker was a confederate who gave scripted responses which served to increase belief that the placebo was in fact alcohol. Together, these studies support the idea that creating a shared social belief with another person that placebo alcohol is real may be a powerful tool, which may increase confidence in the use of placebos as a measurement method.

**Conclusions**

The current research suggests that drinkers match their level of consumption to those they drink with spontaneously. It also suggests that group membership may affect how drinkers react to the prospect of completing complex tasks. In particular, it shows that the expectancy for the successful completion of a complex hand-eye co-ordination task led to lower consumption only amongst individuals. Dyads did not reduce their behaviour on this basis. Furthermore, whilst individuals who believed they had consumed alcohol were less confident in their abilities, dyads actually became more confident.

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Table 1:

*Mean volumes consumed according to task and dyad conditions*

|  |  |  |
| --- | --- | --- |
|  | No Task | Task |
| Individual | 130.33 (78.67)a | 82.00 (42.62)ab |
| Dyad | 142.00 (76.14) | 135.47 (75.89)b |

*Note: Standard Deviations in parenthesises. Means with a superscript differ from those labelled with the same subscript, p <.05 .*

Table 2:

*Pearson’s zero order correlations between Audit scores, volume consumed and pre / post drinking confidence.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Audit | Volume consumed | Individual pre-drink confidence | Individual post-drink confidence | Group pre-drink confidence a | Group post-drink confidence a |
| Audit | --- |  |  |  |  |  |
| Volume consumed | .28\* | --- |  |  |  |  |
| Individual Pre-drink confidence | -.27† | .18 | --- |  |  |  |
| Individual Post-drink confidence | -.24† | .12 | .68\*\*\* | --- |  |  |
| Group Pre-drink confidence a | -.34\* | .08 | .87\*\* | .48† | --- |  |
| Group Post-drink confidence a | -.26† | .03 | .72\*\* | .87\*\* | .81\*\* | --- |

*Note: † = p < .10, \* =* p *<. 05, \*\* =* p *< .01,\*\*\** p *= <.001. Individual level data included in this analysis except where a indicates dyad level data included.*

FIGURE CAPTIONS

*Figure 1:* Mean confidence of individuals and dyads pre and post drinking phase.

FIGURE 1:

Phase

*M* = 2.08a†

*SD* = 0.62

*M* = 2.60ab

*SD* = 0.45

*M* = 2.41b

*SD* = 0.44

*M* = 2.18†

*SD* = 0.48

*Note: means sharing a subscript differ, a, b = p < .025, † = p < .10.*

1. Frequency analysis conducted between conditions showed that male and female dyads were distributed randomly across task conditions, *x*2(1) = .74, *p* = .38. Males and females were also distributed randomly across task conditions in the individual conditions, *x*2(1) = .80, *p* = .37. [↑](#footnote-ref-1)
2. Students at the research site are required to accumulate a number of Research Participation Scheme [RPS] credits in order to access the recruitment pool for their final year dissertation project work. [↑](#footnote-ref-2)
3. The detection rate (of 5.2%) is lower than that often observed in placebo studies of this sort (10%-20%) both in our own laboratory group’s work and that of others. We can speculate that this lower detection rate may be simply due to chance, or be a result of the context the study took place in, the pre-testing of various wines by the research team to identify a substitute, and / or the dyadic interactions which took place. [↑](#footnote-ref-3)
4. An alternative approach would be to use intra-class correlations. The same relationship is observed: ICC(1,1) = .59, *F*(28,29) = 2.83, *p* <.001. [↑](#footnote-ref-4)