Perfect for a Gin and Tonic: Context effects within a modified bogus taste test

Rebecca L Monk[1]*, Adam W Qureshi[1], Adam McNeill[1], Marianne Erskine-Shaw[1] & Derek Heim[1]

of

[1]Edge Hill University,

St Helens Rd, Ormskirk, UK, L39 4QP

*Corresponding author

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Abstract

Aim:To implement a modified bogus taste test (BTT) and to examine the interactive effects of environmental and social contexts on levels of "alcohol" consumption. Method:One hundred and eighteen University students (Study 1 n = 38, Study 2 n = 80), recruited via opportunity sampling, completed a modified BTT under the pretence of assessing garnish preference for gin and tonic. All participants were tested alone or as part of an existing friendship group. In study 1 participants were in a laboratory setting but were exposed to different contextual cues (alcohol-related or neutral) by way of posters displayed on the walls. In study 2, participants assessed the drinks in either a pub or a library setting. Results:In study 1 participants tested in a group consumed significantly more when exposed to pub-related stimuli in contrast to those who were exposed to library-related stimuli. Participants who were alone and exposed to library-related cues consumed significantly more than those in a group and exposed to these cues. In study 2, as in study 1, participants tested in a group condition consumed significantly more of what they believed to be alcohol when in the pub compared to those who were tested in the library. Higher group consumption was also evident in the library condition, although the size of this difference was not as large as in the pub testing condition. Conclusion:In the absence of any pharmacological effects of alcohol, social and environmental context have an interactive impact on shaping consumption.

Keywords: Bogus taste test, Alcohol, Consumption, Context, Groups, Pharmacology, Placebo

While self-report measures remain important resources in the methodological toolkit available to addiction researchers (Greenfield & Kerr, 2008), these have increasingly begun to be complimented with ways of measuring consumption utilising real-time and experimental methods that are less dependent on retrospective self-report and more sensitive to possible social and environmental contextual influences. The notion that behaviours (alcohol consumption included) are driven by a plethora of contextual factors is not a new one (c.f., Bolles, 1972, primary law of learning). However, the adoption of more 'context aware' methods within alcohol research is beginning to yield greater insights into the complex interactions between the drivers of alcohol consumption. Accordingly, the present study sets out to examine the effect of social and environmental contexts (and context-related cues) on 'alcohol' consumption, using a modified bogus taste test.

Field research indicates that people consume more (pseudo) alcohol in a real bar relative to a laboratory setting (Wigmore & Hinson, 1991), and when in the company of others compared to solitary testing (Kuendig & Kuntsche, 2012). Smartphone technology has also contributed to our developing knowledge about immediate environmental influences on smoking and drinking behaviours (e.g., Alessi & Petry, 2013; Collins, Kashdan, & Gollnisch, 2003; Kuntsche & Labhart, 2014; 2015; Piasecki et al., 2011; Shiffman, et al., 2002). It has also suggested that one's current situational and social context can drive discrepancies between real time and retrospective accounts (Monk, Heim, Qureshi, & Price, 2015; Dulin, Alvarado, Fitterling, & Gonzalez, 2016). Similarly, Smartphone-based assessments of student drinking indicate that drinking as part of larger friendship groups is associated with increases in hourly drinking frequency (Thrul & Kuntsche, 2015). The presence of more same-sex friends has also been shown to predict the real-time acceleration of drinking in the evening (Kuntsche, Otten, & Labhart, 2015). According to myopia theory, such findings may be the result of

contextual-related narrowing of attention, which reduces behavioural monitoring and is associated with increased consumption (Steele & Josephs, 1999).

Laboratory-based manipulations have also contributed to this emerging body of literature, by introducing contextual cues, accounting for participants' interactions with other people, and controlling or removing contact with ethanol. Such research includes the use of bar laboratories (e.g., Albery, Collins, Moss, Frings, & Spada, 2015; Moss et al., 2015) as well as immersive video displays (e.g., Monk & Heim, 2013a). Here, peer groups have been shown to exert an influence on drinking behaviours in a variety of laboratory-based and pseudo-naturalistic studies (e.g., Frings, Hopthrow, Abrams, Gutierrez, & Hulbert, 2008; Hopthrow, Abrams, Frings, & Hulbert, 2007; Larsen et al., 2009; 2012; Lo Monaco et al., 2011; Tomaszewski, Strickler, & Maxwell, 1980). These approaches have also suggested the powerful capacity for relatively subtle contextual factors to impact consumption. For instance, it has been found that the presence of posters designed to promote sensible drinking may in fact increase ad libitum consumption, relative to controls (Moss et al., 2015). This body of work has therefore begun to document the important ways in which alcohol consumption is shaped by the social and environmental contexts in which people drink.

Additionally, research has also begun to investigate the contextual variability of the underlying mechanisms which may shape consumption practices. This approach involves considering the well-established drivers of consumption, such as alcohol-related cognitions and inhibitory control, not as static factors, but as context-dependent variables. In support of this, placing participants in a bar, as opposed to a neutral context, has been shown to increase both negative (Wiers et al., 2003) and positive outcome expectancies in small within (Wall, Mckee, & Hinson, 2001) and between participants investigations (Wall, Hinson, McKee, & Goldstein, 2000). Field research has also suggested that positive beliefs about the likely consequences of consumption (outcome expectancies), and pro-normative beliefs increase,

whilst beliefs in one's ability to refuse alcohol (drink refusal self efficacy) decline in alcohol-related relative to neutral testing environments (Monk & Heim, 2013b). Research by Pedersen, Labrie, and Lac (2008) also indicates that assessments within a group of peers was associated with higher normative estimates of peer consumption, relative to judgements made during individual assessment. Smartphone-based research further suggests that being in a pub, bar or club and in a social group of friends is associated with increases in real-time outcome expectancies *(*Monk & Heim, 2014). Similar patterns have been found in the study of alcohol-related inhibitory control, where alcohol-related visual (e.g., Christiansen, Cole, Goudie & Field, 2012; Murphy & Garavan, 2011; Nederkoorn, Baltus, Guerrieri & Wiers, 2009; Kreusch, Vilenne, & Quertemont, 2013; Petit, Kornreich, Noël, Verbanck, & Campanella, 2012) and auditory cues (Qureshi et al., in press) have been shown to impair inhibitory control, with resultant links to alcohol consumption. Moreover, even the smell of alcohol has been shown to decrease inhibitory control (Monk, Sunley, Qureshi, & Heim, 2016). The sights, sounds and smells associated with alcohol and alcohol-related environments appear therefore to have an important impact on inhibitory control and so, in turn, impact subsequent consumption. Further, it has also been found that the ingestion of alcohol itself (c.f. alcohol priming (Christiansen et al., 2013; De Wit, 1996; de Wit & Chutuape, 1999; Jellinek, 1952; Rose & Grunsell, 2008) can, as a (potential) consequence of the effect of alcohol, effect inhibitory control and alcohol-related cognitions (Field et al., 2010). As such there is a growing body of literature which indicates that contexts may impact consumption both directly and indirectly (c.f., the dual process model for more theorising on this Wiers, Field, & Stacy, 2016).

Another important weapon in the methodological repertoire of alcohol researchers hoping to better understand how consumption impacts behaviour is the bogus taste test (BTT[1]). Nonetheless, use of BTT to measure consumption has yielded inconsistent findings, for example depending on the control groups utilised (c.f., Christensen at al., 2017 for a discussion of controls containing vaporized alcohol and deception versus pure controls, where there is no pretence that the substance consumed is alcoholic). Indeed, concerns have been raised that research using placebo versus alcohol / no alcohol comparisons may underestimate the effects alcohol excerpts on inhibitory processes in real-world settings (Christiansen et al., 2016). Furthermore, results in this area have been inconsistent, with some research pointing to increases in ad libitum consumption following placebo relative to pure control priming (Christiansen et al., 2017). In the recent study by Christiansen and colleagues (2017) there was also no apparent variability in ad libitum consumption across context – such that those in a bar laboratory context did not differ in consumption compared to those in a standard laboratory (ibid).

In sum, there is a need to explore further the interactive effects of social and environmental contextual factors on consumption. Employing a novel modification of the BTT paradigm, the current research therefore aimed to examine largely unexplored interactive effects of environmental and social contextual cues on consumption, in the absence of the pharmacological and olfactory/taste priming effects of alcohol. It was predicted that for both studies, alcohol consumption would be greater for those in group relative to solitary conditions. It was also hypothesised that those in the bar relative to the library contextual (cue) conditions would consume more. As previous research to date has not examined the combined effect of social and environmental context (or cues) on consumption, predictions

[1] The BTT - also referred to as the taste preference test may be used to administer (pseudo) alcohol and asking participants to sample, and then rate, the drinks supplied (e.g Field & Eastwood, 2005; Jones et al.,2011). Comparisons are then made between the levels of alcohol (or placebo alcohol) consumed under different experimental conditions. The validity of this method has been established regardless of any participant awareness of the method's purpose (Jones et al., 2015).

about the nature of any interaction were tentative. However, based on research in the field of alcohol-related cognitions (Monk & Heim, 2013b), it was postulated that there would be additive effects of pub context/cue conditions and social context such that those who were in a group may be expected to drink more than those in the same context but tested alone.

Method

Procedure and materials

This study commenced following ethical approval. All participants gave fully informed written consent. This research complies with the World Medical Association Declaration of Helsinki.

In both studies 1 and 2, participants responded to an advert seeking volunteers to sample a selection of gin and tonic beverages and help determine which garnish should be served as part of a Student Union (SU) summer Gin and Tonic promotion[2]. Participants responded to indicate their interest in attending for group participation (groups of 2-3 existing friends) or solitary testing. Individuals in the solitary condition completed all elements of the research in isolation while those in groups were permitted to communicate throughout the study. A random number generator was then used to allocate volunteering participants into a contextual cue condition for Study 1 or an environmental context for Study 2. Based on their allocation, participants were then emailed with the arrangements for testing, including the time and place to meet the researcher. For Study 1, participants were asked to attend one of two laboratories: one laboratory was set up with 3 posters (297×420mm – portrait orientation) displaying typical bar scenes and the other contained identically sized and

[2] Gin and tonic was selected following pilot testing, which revealed that participants reported that they were less aware/able to taste the gin in a standard measure of gin and tonic, in comparison to other spirits and tonic (including vodka and tonic, which is traditionally used in research where participants are administered a placebo which they are meant to believe is alcohol). This was important because we did not want participants to suspect that the drink did not actually contain alcohol. Post-test manipulation checks indicated that a significant majority of participants believed they were in fact consuming alcohol despite none being present ($p < .05$).

positioned posters containing library-related images. Informed by the approach of Moss et al. (2015), images displayed were taken from existing posters: alcohol images were taken from those displayed on a UK responsible drinking campaign ("Why let good times go bad"[3]) whilst the library images were taken from posters designed to advertise the university's learning and student services. All posters were displayed at eye-level. For Study 2, testing took place in the SU bar on campus, or in a quiet area of the university library.

Testing for both studies took place between the hours of 12 and 6pm. In keeping with the protocols employed during alcohol administration studies, a pre-screening questionnaire was administered. Participants were not permitted to take part in the study if they reported that they were pregnant (or thought they may be), breastfeeding or planning to drive or operate machinery following testing. Participants were also asked if they had consumed any alcohol that day, with those who had being excluded from further testing. (Total excluded: study 1 $n = 0$, study 2 $n = 3$).

Following briefing, participants were given a fisherman's friend mint lozenge (which they were told was to cleanse their palate) in order to further disguise the lack of alcohol (in accordance with similar BTT procedures[4]. e.g., Abrams et al., 2006; Rose & Duka, 2006; Sayette et al., 2012). They were then presented with three different drinks, which they were told were gin and tonic. The drinks were pre-poured to ensure precise measurements (200ml of liquid in each glass) and served in three clear glasses in accordance with other previous work (c.f. Abrams, Hopthrow, Hulbert, & Frings, 2006; Rose & Duka, 2006). In order to maintain the pretence of the study, each of the three drinks was served with a different

[3] http://www.drinksinitiatives.eu/details-dynamic.php?id=313

[4] It is important to note that some research uses an atomiser to spray vodka (for example) into glasses in order to convince people they are receiving alcohol, despite being in a non-alcoholic testing conditions (c.f., Jones et al., 2015). However, it has been noted that even a small priming dose of alcohol can result in increases in consumption (Christiansen et al., 2013; De Wit, 1996; de Wit & Chutuape, 1999; Jellinek, 1952; Rose & Grunsell, 2008). This procedure was therefore not used in the current study and no alcohol was used.

garnish accompaniment - such as those popularly served with gin and tonic (1. a slice of lemon and lime; 2. a slice of apple; 3. a slice of cucumber). Branded gin and tonic bottles were placed in the testing room but only tonic was poured into the glasses[5].

The bogus taste test, as devised by Marlatt and colleagues (1973), was given to all participants at the same time as the drinks were poured. This asked participants to rate each drink (on a Likert scale) on a number of adjectives, e.g., sweet, pleasant, bitter. Questions were also added to assess the participant's preferred garnish to accompany the gin and tonic. These were designed to add credibility to the taste preference test, such that participants would believe we were interested in their evaluation of these characteristics, rather than volume consumed. Participants were given as long as they wished to sample the drinks and complete the BTT ratings, and were instructed to drink as much or as little as they wished in order to answer the questions (testing typically lasted around 20 minutes).

Participants were then asked to complete a demographic and the Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993), which is a 10-item questionnaire concerning domains of alcohol consumption, drinking behaviour and alcohol-related problems and is a simple method of detecting hazardous and harmful alcohol use (good internal consistency on this measure was demonstrated in the current sample: Study 1 Cronbach's $\alpha = .76$, Study 2 $\alpha = .72$). This remained the final component of the study in order to help minimise the impact of any potential demand characteristics (c.f. Davies & Best, 1996 on signal strength). After this, participants were fully debriefed and asked not to share the study aims with others. Consumption measures were taken after the participants departed, by subtracting the amount of liquid remaining away from the initial 600 ml of liquid poured A probed debriefing of participants during pilot testing of this paradigm test revealed that the

[5] It is noteworthy that we were unable control for the possible effects of alcohol anticipation on inhibitory control. This is assessed in further detail in the discussion.

majority of participants believed the cover story and did not detect that the purpose of the study was to measure the amount of alcohol consumed.

Study 1

Method

Participants

38 undergraduate students from a UK University (60% female, 82% White British) of legal drinking age (*M*=23.47, *SD*=2.03) were recruited via opportunity sampling. Mean AUDIT scores (*M* = 11.05, *SD* = 6.71) were above the cut-off for clinical assessment (scores of 8 or above; Babor et al., 2001). Nevertheless, they are comparable with recent research using UK student samples (e.g., Clarke, Field, & Rosa, 2015; Qureshi, Monk, Pennington, Li, & Leatherbarrow, in preparation).

Design

A 2 by 2 between-participants design was used to examine the effect of contextual cue (bar vs library), and social context (solitary vs group testing), on individual levels of consumption in a BTT (out of a total 600ml). Group sizes were as follows: bar cue, solitary = 9; bar cue, group = 8; library cue, solitary = 12; library cue, group = 9.

Results[6]

Preliminary analyses revealed that there were 2 outliers who were subsequently removed from analyses. Post-hoc power analyses suggested that with the smallest significant effect size, the observed power was 0.8. Analyses also revealed that across participant's testing conditions revealed that there were no significant differences in the age, gender or

[6] Individuals group membership (in the group condition) was identified and entered as a random effect in a multi-level model (using STATA 11) in order to account for within-group variance. Results showed the same pattern of results, apart from a main effect of contextual cue. This effect showed greater consumption in the alcohol cue condition compared to the neutral cue condition, the same pattern shown in the ANOVA results albeit with no significant main effect of contextual cue (see Appendix 1).

baseline AUDIT scores of the participants randomly assigned to the four testing conditions ($p > .05$ in all cases). Analyses also confirmed that there were no differences in the gender composition of the groups in the two context conditions (i.e., there were a statistically equivalent number of all male, all female and mixed gender groups). A 2 (Social Context) by 2 (Contextual Cue) between-participants ANOVA was conducted to assess the effect of contextual forces on consumption (total ml consumed, out of a max 600ml). Table 1 displays the means and standard deviations of alcohol consumed (ml) across testing conditions.

INSERT TABLE 1 HERE

Analyses revealed no significant main effect of social context, (F (1, 34) = 0.05, p >.05, η_p^2 =0.00) and no significant main effect of environmental cue (F (1, 34) = 0.86, p >.05, η_p^2 = 0.03), although these effects were qualified by a significant two-way interaction between social context and environmental cue (F (1, 34) = 7.01, p <.05, η_p^2 = 0.17). Simple main effects analyses indicated that participants tested in a group consumed significantly more when being exposed to pub-related stimuli in comparison to those who were exposed to library-related stimuli ($p < .05$, $\eta_p^2 = .05$). Conversely, those who were alone and exposed to library related cues drank significantly more than those who were tested in a group and exposed to these cues ($p < .05$, $\eta_p^2 = .15$).

Discussion

As hypothesised, participants in the group testing conditions drank significantly more when exposed to alcohol-related cues than those exposed to neutral cues. However, participants exposed to neutral cues whilst alone consumed significantly more alcohol than those in the group testing condition.

Study 2

Participants

80 undergraduate students from a UK University (65% female, 83.75% White British) of legal drinking age (M = 20.93, SD = 2.41) were recruited via opportunity sampling. Mean AUDIT scores (M = 12.33, SD = 5.62) were above the cut-off for clinical assessment but comparable with research using similar populations (as in study 1). The decision to increase the sample size from study 1 was a result of the noted discrepancies between the effect sizes detected between lab and field research, and the importance of such effect size when planning a field test (c.f., Mitchell, 2012). This decision was confirmed with a priori power analyses which indicated that with an anticipated large effect size (f = 0.40), a sample of 80 would achieve an observed power of 0.95.

Design

A 2 by 2 between-participants design was used to examine the effect of environmental context (student bar vs library), and social context (solitary vs group testing), on individual levels of (pseudo) alcohol consumption in a BTT (out of a total 600ml). Each group consisted of 20 participants.

Results[7]

Preliminary analyses were carried out as outlined in study 1, with the same results ($p > .05$ in all cases), meaning that any between context differences that were observed could therefore be reasonably attributed to the effect of contextual variations, as opposed to deviations in the demographic makeup of different groups. There were also no outliers.

A 2 (Social Context) by 2 (Environmental Context) between-participants ANOVA was conducted to assess the effect of contextual factors on consumption (total ml consumed,

[7] Again, individuals group membership was entered as a random effect in a multi-level model in order to account for within-group variance. Results showed the same pattern of results (see Appendix 1).

out of a max 600ml). Table 1 displays the means and standard deviations of alcohol consumed (ml) across testing conditions.

INSERT TABLE 2

Analyses revealed a significant main effect of social context (F (1, 76) = 59.79, p <.001, η_p^2= .44) with higher consumption in the group condition, and a significant main effect of the environment (F (1, 76) = 62.79, p < .001, η_p^2 = .45) with higher consumption in the pub setting. These effects were qualified by a significant two-way interaction between environment and social context (F (1, 76) = 18.66, p < .001, η_p^2= .20). Simple main effects analysis revealed that participants tested in the pub whilst in a group consumed higher volumes than in those tested alone in the pub (p < .001, η_p^2 = .48). Similarly, those in tested in the library whilst in a group consumed significantly more alcohol than those tested in the solitary library condition (p < .05, η_p^2 = .08), although size of this difference was not as large as in the pub context.

Discussion

Study 2 findings suggest that both social and environmental contexts impact on (pseudo) alcohol consumption. In other words, being part of a group in a non- alcohol related environment appeared to increase consumption beyond what was observed in those who were alone in this same context. However, being in the pub as a group appeared to have a particularly powerful effect on consumption.

Overall Discussion

In accordance with predictions, the present research appears to demonstrate that in the absence of any pharmacological or priming effects (olfactory /taste) of alcohol, being part of

a group may be sufficient to increase consumption of what participants believe to be alcohol (relative to those alone in this same context). The current research found that this appeared also to be the case in an environment without salient alcohol cues (the library) and that being in a pub setting appears to heighten this effect. Similar effects were observed within laboratory-based testing using alcohol-related cues in the form of posters. Here, participants in the group testing conditions consumed significantly more alcohol when exposed to alcohol-related cues than those exposed to neutral cues. However, participants exposed to neutral cues whilst alone drank significantly more than those in the group testing condition. This was unexpected in light of the facilitative effect that social groups are believed to have on alcohol consumption (Lo Monaco et al., 2010), and it is possible that normative drinking processes may therefore be less influential in artificial drinking settings as used in Study 1. From this perspective, it may be that participants consumed more alcohol alone in order to better position themselves to answer the set questions in the absence of others to consult. The present findings are also somewhat contradictory to of Christiansen et al., (2017) that found no context-related differences in consumption. However, the two studies cannot be directly compared. Christiansen et al. (2017) administered a priming substance (placebo or control) before completing a separate ad libitum taste test to measure beer consumption, whilst the present study had no priming phase. Rather, participants took part in a BTT whilst believing their substance was alcoholic but atomized alcohol was not applied to mimic smell/taste, to avoid any priming. On the whole, the current findings therefore offer more support for the noted importance of groups and normative processes (e.g., Abrams et al., 2006; Hopthrow et al., 2014, Larsen et al., 2012; Kuendig & Kuntsche, 2012) alongside contextual cues (e.g., Monk & Heim, 2013a;Wigmore & Hinson, 1991) on the amount of alcohol consumed. Environmental and social cues in laboratory settings may benefit study designs in which

alcohol and placebo beverages are administered, and further research is recommended to unpick how different contextual cues interact to shape consumption.

The student nature of the present sample must be noted as a potential limitation for those wishing to generalise the current findings to populations where there is a different drinking culture (c.f., Plant & Plant, 2006). It must also be highlighted that although the gender compositions of the groups was balanced, the current sample was predominantly female, possibly due to the increased female presence in further education (Usher & Medow, 2011). This would appear particularly noteworthy in light of recent research which has suggested that males drink more than females during ad libitum taste tests, perhaps due to normative beliefs about what is acceptable (Jones et al., 2015). The present results should therefore be viewed with prerequisite caution.

In contrast to more traditional s of in situ drinking (e.g., Keundig & Kuntsche, 2012), participants in the current study may also have felt obliged to consume the alcohol in order to satisfy the taste test, whereas this may be less likely in a real-life drinking situation (Larsen et al., 2009). During taste rating tasks, perceived restrictions on time may also heighten the volume and pace of consumption when compared to drinking in real-time settings (George, Phillips, & Skinner, 1998). We therefore advocate for continued pursuit of more naturalistic paradigms in this area of research, to remove such possible demand characteristics. In addition, although a probed debrief during pilot testing suggested that participants did not detect the true aims of the study (to measure consumption volume), the inclusion of probed debriefs at all stages of experimental testing would provide further assurance about the veracity of future research.

The current study used pre-existing friendship groups to replicate a natural social environment in which participants would usually consume alcohol with friends. However, in an attempt to control for pre-existing knowledge of normative behaviour within the group

(c.f. Kuendig & Kuntsche, 2012), most experimental group studies use people who are unknown to each other. As such, it is possible that in the existing research findings may not be replicated if carried out with groups who are already familiar with each other, as their existing normative values surrounding alcohol may be a more important determinent of consumption, as opposed to the simple fact of being with others. We therefore strongly advise that future research examine the potential effect of group-member familiarity on consumption, and its interaction with contextual factors. Moreover, in a natural friendship group, participants may consume more (pseudo) alcohol due to modelling others' behaviour (Dallas, Field, Jones, Christiansen, Rose, & Robinson, 2014). On the other hand, consumption may be reduced due to heightened interaction (Kuendig & Kuntshe, 2012). Consequently, future research would benefit from examining these real-life social groups with consideration of pre-existing alcohol-related beliefs/norm, along with closer observation of group interaction during taste test.

Alcohol is often used within the BTT, including within the placebo condition (through the use of atomised vodka onto the rim of the glass, for instance). This paradigm was therefore designed to assess consumption in the absence of the pharmacological effects of alcohol. This is pertinent in light of research which indicates that even small doses of alcohol (e.g., De Wit, 1996; Jellinek, 1952) or just the smell of it (e.g., Monk et al., 2016) can impact inhibition and may be associated with increases in consumption. However, it must be acknowledged that the present paradigm cannot control for the possible effects of alcohol anticipation on inhibitory control, which may also impact the volume of liquid consumed. Indeed, it was intended that participants would believe that they were receiving alcohol, in light of the assertion that this may be a more important determinant of any priming effect than the actual alcoholic content (Marlatt, Demming, & Reid, 1973). With this in mind, the current research design sought to unpick further the respective roles of contextual factors on

consumption in the absence of any pharmacological or priming effects that may occur as a result of the ingestion or even the smell of alcohol.

In conclusion, findings of this research suggest that in the absence of any alcohol-related pharmacological effects, social and environmental context have an interactive influence in determining consumption. Alcohol-related cues appear to have a similar effect on consumption as real-life context effects, although how these cues may interact with social context requires further examination. The methodology employed may also be useful for informing the continued refinement of placebo conditions in alcohol administration research.

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Table 1 ***Means and Standard Deviations of consumption (ml) across Contextual Cue and Social Contexts***

		Contextual Cue		
		Pub	*Library*	
Social Context	*Solitary*	64.78 (63.87)	107.75 (90.73)	**89.33 (81.45)**
	Group	125.11 (94.47)	36.01 (17.25)	**83.18 (81.81)**
		94.94 (84.16)	**79.05 (78.59)**	

Table 2. ***Means and Standard Deviations of consumption (ml) across Environmental and Social Contexts***

		Environmental Context		
		Pub	*Library*	
Social Context	*Solitary*	75.10 (32.80)	35.65 (11.55)	**55.38 (31.44)**
	Group	207.00 (87.63)	73.00 (26.34)	**140.00 (93.19)**
		141.05 (93.42)	**54.33 (27.58)**	