Do preparatory behaviours predict alcohol consumption among UK university students?

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**Data availability:**

The data that support the findings of this study are available on reasonable request from the corresponding author, BG.

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**Abstract**

**Objective:**This study explored whether the frequency and habitual nature of engagement in three behaviours that may serve as preparation for alcohol consumption on a night out with friends – i.e., contacting friends to arrange a night out, buying alcohol, drinking alone at home before going out – predicted consumption on such nights.

**Design:** Prospective correlational design.

**Methods:**120 UK university students (68 female, 50 male, 2 non-binary, mean age = 20.78y, SD = 1.52) completed a survey comprising intentions, habits, and frequency and habit for the three preparatory behaviours. One week later, a second survey measured the number of nights out with friends on which alcohol was drunk (i.e., drinking frequency) and the number on which four or more alcoholic drinks were consumed (i.e, excessive drinking). Regression models were run to predict drinking frequency and excessive drinking.

**Results:**Drinking frequency was predicted only by frequency of contacting friends (B = 0.28, SE = 0.12, p = .02), and habitually drinking alone before going out (B = 0.20, SE = 0.09, p = .03). Excessive drinking was only predicted by alcohol consumption habit (B = 0.67, SE = 0.23, p = .003).

**Conclusions:**Preceding actions may influence the frequency of alcohol consumption on nights out, independently of intentions and habits relating to alcohol consumption. While interventions to reduce consumption quantity in a single session might focus on disrupting the habits that sustain drinking episodes, efforts to reduce alcohol consumption frequency on nights out might focus on disrupting behaviours that precede alcohol consumption.

**Keywords**: Drinking frequency; excessive drinking; preparatory behaviours; habit; alcohol intentions

**Statement of contribution:**

*What is already known on this subject?*

* Attempts to understand university students’ alcohol consumption have tended to focus on cognitions towards alcohol consumption, such as intentions and habits
* Some behaviours may reliably precede evening alcohol consumption
* Accounting for these behaviours has the potential to enhance predictive models of alcohol consumption

*What does this study add?*

* The frequency with which students drink alcohol on nights out with friends may be reduced by disrupting performance of behaviours that serve as reliable precursors to alcohol consumption
* Attempts to reduce excessive drinking, however, might seek to disrupt the habitual way alcohol is drunk within consumption episodes

**Introduction**

More than 88,000 people die from alcohol-related causes in the USA annually (Centres for Disease Control and Prevention, 2018). Frequent drinking increases the risk of developing negative health conditions, such as cancer, coronary heart disease, and liver cirrhosis (World Health Organization, 2018). Additionally, excessive drinking (i.e., women drinking 4 or more glasses, or men drinking 5 or more glasses, during a single episode; NIAAA, 2004) has been linked to short-term negative outcomes, like blackouts, drink driving, unsafe sex and vomiting (Department of Health, 2016). University students drink more frequently and excessively than their peers (Davoren et al., 2016). UK university students engage more in excessive drinking than do students from other European countries (Cooke et al., 2019).

Developing effective interventions to reduce university students’ alcohol consumption requires identification of reliable predictors of consumption patterns. Existing interventions have typically followed the Reasoned Action Approach, which portrays individuals’ consumption as the outcome of deliberative decision-making (Cameron et al., 2015; Epton et al., 2014; Norman et al., 2018, 2019). Several models used to predict alcohol consumption adopt a Reasoned Action Approach (Ajzen, 1991; Cox & Klinger, 1988; Oei & Moraskwa, 2004). For example, Ajzen’s (1991) Theory of Planned Behaviour (TPB) proposes that intentions to act are the proximal determinant of behaviour. Intentions result from weighing the pros and cons of drinking (attitudes), perceptions of social approval for drinking (subjective norms) and perceptions of behavioural control over drinking (PBC). Evidence supports the claim that intentions predict consumption prospectively (Barratt & Cooke, 2018; Cooke et al., 2007; Norman et al., 2012; Norman & Conner, 2006) and a recent meta-analysis noted a large-sized correlation between intentions and prospective consumption (Cooke, Dahdah, Norman & French, 2016).

The Reasoned Action Approach neglects the potential for behaviour to proceed automatically (Bargh, 1994). Dual process models propose that action can arise from two information processing systems (e.g. (Strack & Deutsch, 2004). The reflective system is deliberative and akin to the Reasoned Action Approach: upon encountering a context demanding action, we reflect on the utility of available options and contextual demands and forms an intention to act. Cognitive effort is required to translate intentions into action. The impulsive system, however, generates action non-consciously: encountering contexts activates non-conscious associations, which in turn trigger impulses to act, without deliberation. Unless inhibited by stronger, competing impulses, these impulses trigger action rapidly, efficiently, and automatically, potentially without awareness, control, or intention. The impulsive system is constantly active, so is the default system for behaviour regulation; people only engage the deliberative system where they possess the required cognitive resources. For example, when people are stressed, distracted, or lack willpower, they are more likely to act in line with associations than conscious intentions (Neal et al., 2013).

The predictive utility of the Reasoned Action Approach can be enhanced by considering impulsive processes, like habit, as additional determinants of consumption (Gardner, de Bruijn, et al., 2012; Murray & Mullan, 2019; Norman, 2011). Habit is a process whereby encountering a context automatically activates impulses to act, based on learned context-action associations (Gardner, 2015). Habit forms through repeatedly performing an action in a given setting (Lally et al., 2010), such as drinking alcohol with friends in the same bar or pub on multiple occasions. Performance reinforces context-action associations, such that the associated action becomes more mentally accessible in memory (Danner et al., 2008; Neal et al., 2013), and context cues acquire the potential to automatically instigate associated actions (Bargh, 1994; Gardner et al., 2016; Neal et al., 2012). Although they typically form through repetition of intended actions, habits can continue to direct behaviour even where conscious intentions shift (Gardner, Lally & Rebar, 2020; Landis et al., 1978). For example, a student who forms habits supporting an initially desired goal of excessive drinking may continue to drink to excess even when their conscious motivation erodes.

Systems-based approaches argue that all behaviours are located within a complex network of behaviours, such that enactment of one behaviour may activate enactment of another (Michie et al., 2014). From this perspective, Reasoned Action Approach models can be developed beyond augmentation with habit by additionally considering behaviours that precede alcohol consumption, like contacting friends about going out later, buying alcohol, or drinking at home before going out. For example, individuals who more frequently contact friends prior to a drinking night might be expected to drink more frequently, because contacting friends provides support for consumption by identifying others who share the same goal. Buying alcohol in advance of a night out can also promote consumption: Groefsema et al. (2019) found that drinkers who start drinking earlier (i.e., pre-drinking, Caudwell & Hagger, 2014) increase their drinking rate compared to drinkers who start drinking later. In sum, greater frequency of engaging in preparatory actions may act as a precursor to greater frequency and quantity of alcohol consumption. If correct, alcohol reduction might be achieved by targeting the behaviours that precede consumption, rather than targeting consumption behaviour directly (Michie et al, 2014). This makes it important to establish whether preparatory behaviour performance frequency adds to prediction of consumption over and above Reasoned Action Approach and habitual variables.

Beyond the frequency of performance of preparatory behaviours, it is also possible that such behaviours can become habitual themselves. With university students living together in shared accommodation it is easy to imagine how such habits could develop; for example, students may contact their friends in advance of nights out in consistent settings, so developing associations between settings and behaviours that give rise to habit formation (Lally et al, 2010). Habit has been found to predict future behaviour when controlling for past behaviour frequency, suggesting that the habitual nature of a behaviour can influence future performance independently of prior frequency (Allom et al., 2013, Study 2). Whereas behaviour frequency assesses *whether* an action is undertaken, habit captures *the manner in which* it is initiated, which may enhance prediction. For example, people who habitually opt to drink alcohol may perhaps find it harder to halt a drinking session, such that stronger alcohol consumption habit may contribute to excessive drinking. Likewise, people who habitually initiate preparatory actions may engage in those actions in a way that enhances the likelihood or quantity of later alcohol consumption. People who unthinkingly drink at home prior to a night out, for example, may be more likely than non-habitual drinkers to consume more alcohol in preparation for the night, which in turn can enhance the likelihood both of going on a night out, and of drinking excessively during the night (Pedersen & LaBrie, 2007).

The Present Study

Understanding the determinants of behaviour can aid the development of behaviour change initiatives, and interventions focusing on actions that reliably precede a target behaviour have the potential to bring about change in target behaviours (Kaushal, Rhodes, Spence & Meldrum, 2017; see too Gardner, Rebar & Lally, 2019). The present study was undertaken to investigate whether preparatory behaviours, and habit for performing such behaviours, augment prediction of drinking frequency and excessive drinking on nights out, over and above the impact of alcohol consumption intentions and habit. Past literature supports two opposing predictions. Proponents of the Reasoned Action Approach would argue that cognitions towards a target action should encapsulate any impact of preparatory actions (Ajzen, 2002); if a person engages in a preparatory behaviour observed to consistently precede alcohol consumption, this action should make alcohol consumption more desirable or favourable in some way, so influencing attitudinal, normative or control beliefs towards consumption. Alcohol intentions should therefore mediate effects of preparatory actions on alcohol consumption, such that frequency and habit for preparatory actions should have no influence above and beyond alcohol intentions. Conversely, because people do not always fully consider the features of available options when forming intentions (Bagozzi et al., 1989; Sheeran & Conner, 2019), a model augmented with measures of cognitions towards related behaviours might have greater predictive utility (Gardner & Abraham, 2010). Assessing engagement in and habit for preparatory behaviours might therefore be expected to enhance explanation of alcohol consumption when controlling for alcohol intentions and habits.

**Method**

Elicitation study

Preparatory behaviours were selected on the basis of an elicitation study with a sample of 15 students aged 18-25y who did not complete the main study. They were asked to identify specific actions they reliably carry out before going drinking on a night out with friends, that serve as preparation for going out. Three distinct behaviours were identified: contacting friends to arrange a night out; buying alcohol to drink at home before going out; and drinking alcohol alone at home before going out.

Main study

Participants, design and procedure

Ethical approval was granted by the host university (MRSU-19/20-14776). A prospective design was used. UK university students were invited to complete two online questionnaires. At baseline, measures were taken of demographics, alcohol consumption intentions and habit, and frequency and habit for each of the three presumed preparatory behaviours (contacting friends; buying alcohol; drinking alcohol alone at home). One week later, measures were taken of two alcohol consumption indices: the number of nights out with friends on which any alcohol was drunk (hereafter ‘drinking frequency’), and the number of such nights on which four or more alcoholic drinks were consumed (hereafter ‘excessive drinking’).

Participant eligibility criteria were (1) drink alcohol at least occasionally, (2) aged 18-25y and (3) UK university student. Participants were recruited by disseminating the study URL on social media (Facebook, Instagram), flyers posted around host university sites, and via an internal advertisement emailed to students at the host university. Participants provided their email address at baseline, allowing us to invite them to complete follow-up measures. Those who completed both questionnaires were entered into a prize draw to win one of two £25 (~$31) gift vouchers. Data were collected between November 2019 and February 2020. We paused recruitment between 16th December 2019 and 17th January 2020 to ensure that data collection did not fall over the holiday period, when alcohol consumption patterns may be higher than normal (Tremblay et al., 2010).

One hundred and sixty-two UK university students completed the baseline questionnaire. After removing six participants reportedly older than 25y, our baseline sample comprised 156 participants (87 female, 66 male, 3 non-binary, mean age = 20.79, SD = 1.61). Thirty-six participants (23%) were lost to follow-up. Our final sample comprised 120 participants (68 female, 50 male, 2 non-binary; mean age = 20.78y, SD = 1.52, range 18-24y). Almost half (48%, N = 58) were in their third year of study (1st year N = 22; 2nd year N = 18; 4th year N = 22). Study completers did not differ to those lost to follow-up on any variable (all p’s >= .21).

The final sample met power requirements: a priori power analysis using GPower 3.1, assuming a medium effect size for regression, with eight predictor variables, alpha set to 0.05 and power set to 0.8, indicated that 109 participants were needed.

Measures

All measures were self-reported. Alcohol consumption and preparatory behaviour frequency variables were reported numerically using free response. All other variables were measured using 1-7 Likert scales, with reverse scoring where necessary.

*Alcohol consumption.* Participants answered three questions related to socialising and drinking alcohol on nights out: “In the last two weeks, on how many nights did you go out with your friends?”, “Of those nights that you went out with your friends in the last two weeks, on how many did you drink alcohol?” (*drinking frequency*), “Out of the nights that you went out with your friends and drank alcohol in the last two weeks, on how many did you have four or more drinks?” (*excessive drinking*)[[1]](#footnote-1).

*Alcohol consumption intentions* were assessed using three items (“[I will / I intend to / I plan to] drink alcohol every time I go out on a night out with my friends in the next two weeks”[[2]](#footnote-2); Definitely False-Definitely True) that were internally consistent (McDonald’s omega = 0.83)[[3]](#footnote-3).

*Habit w*as measured using the 4-item Self-Reported Behavioural Automaticity Index (SRBAI) (Gardner et al 2012; Verplanken & Orbell, 2003). Participants were given a stem to assess habitual instigation of alcohol consumptionand each preparatory behaviour (Gardner et al., 2016): “Deciding to [drink alcohol on a night out with friends / contact my friends to arrange to go on a night out / buy alcohol to drink at home before going on a night out with friends / drink on my own at home before going on a night out with friends ] is something I do…” (“automatically”, “without being consciously aware”, “without thinking”, “before I realise I have done it”; Strongly Disagree - Strongly Agree). Reliable composite four-item measures were computed for each habit index (McDonald’s omega range: 0.69-0.78).

*Preparatory behaviour frequency*. For each preparatory behaviour, participants completed a single item: “Of those nights that you went out with your friends, in the last two weeks, on how many did you [contact your friends/buy alcohol/drink alcohol at home on your own] before going out?”

Data analysis

Descriptive statistics and intercorrelations were computed in JASP 0.12.2. Bivariate correlations (rs) of .10, .30, and .50 were interpreted as small, medium, and large effects, respectively (Cohen, 1992).

Stepwise multivariate regression analyses were run to model variation in drinking frequency and excessive drinking respectively, using eight predictors (alcohol consumption intentions and habit, and respective frequency and habit of each of contacting friends, buying alcohol, and drinking alcohol alone at home). For drinking frequency, which ranged from zero to five nights, we ran a hierarchical linear regression. For excessive drinking, which ranged from zero to three nights, we created a dummy variable (with zero representing zero episodes and one representing all other values) and ran a hierarchical logistic regression. For both models, predictors were entered in the following four steps: (1) alcohol intentions; (2) alcohol consumption habit; (3) preparatory behaviour (contacting friends, buying alcohol, drinking alone) frequency; (4) preparatory behaviour (contacting friends, buying alcohol, drinking alone) habit. Regression analyses were computed in SPSS 25.

**Results**

Frequencies for behavioural and habit measures

At both timepoints, the modal response for nights out was two. One night was the most common drinking frequency at baseline, while at follow-up, zero nights was the most frequent response. Zero was the most frequent response for excessive drinking at both timepoints. Most participants reported going out at both baseline (84.17%) and follow-up (75.00%), and drinking frequency was reported on at least one occasion for most participants at baseline (81.67%) and follow-up (66.67%). Also, most participants reported excessive drinking at least once at baseline (60%) and follow-up (53.33%). Our sample thus mainly comprised individuals who drank fairly infrequently during the study period.

At baseline, modal responses for preparatory behaviours were one for contacting friends, and zero for buying alcohol and drinking alone: 72.50% of participants reported contacting friends at least once; 51.67% buying alcohol at least once; 25.67% of participants reported drinking alone before going out. At follow-up, the modal response for all three variables was zero though most participants (53.33%) reported contacting friends at least once. Preparatory behaviour performance appeared to decline over the two timepoints and contacting friends was more common than buying alcohol, which was more common than drinking alone before going out. Comprehensive behavioural frequency data is available in a Supplementary Table.

Descriptive statistics and intercorrelations

On average, participants reported 1.20 drinking nights, and 0.83 excessive drinking episodes (Table 1). Average alcohol consumption habit scores were near the scale mid-point (M = 3.93). Scores for contacting friends habit (M = 3.32) appeared higher than those for buying alcohol habit (M = 3.06), which in turn, were higher than drinking alone habit (M = 2.28). Alcohol intentions were above-midpoint (M = 4.15) suggesting participants intended to drink alcohol in the study period.

INSERT TABLE 1 HERE

Drinking frequency had medium-sized correlations with alcohol intentions (r = .35), alcohol consumption habit (r = .34) and frequency of contacting friends (r = .30), while excessive drinking had medium-sized relationships with alcohol consumption habit (r = .42), alcohol intentions (r = .36), and buying alcohol habit (r = .32). Most correlations were however small, indicating no obvious multi-collinearity.

Predicting drinking frequency

Alcohol intentions accounted for 12% of the variance in drinking frequency at step 1 (F = 16.27, p < .001; Table 2). Entry of alcohol consumption habit at step 2 did not increase explained variance (R2 change = 0.03, F Change = 3.75, p = 0.06) and the model fit the data less well (F = 10.20, p < .001). Entry of contacting friends and buying alcohol frequency measures at step 3 did not improve the model fit (R2 change = 0.04; F change = 2.10; p = .10). Entering the preparatory behaviour habit indices at step 4 did not improve model fit (R2 change = 0.04; F change = 1.92; p = .13). In this model, around a quarter of variance in drinking frequency was accounted for (R2 = .23, p < .001), with frequency of contacting friends (B = 0.28, SE = .12, p = .02) and drinking alone habit (B = 0.20, SE = .09, p = .03) the only significant predictors. In sum, higher drinking frequency was predicted by greater frequency of contacting friends and higher scores on the drinking alone habit.

INSERT TABLES 2 & 3 HERE

Predicting excessive drinking

The model at step 1, consisting of alcohol intentions alone, was significantly predictive (Chi-Square = 12.85, p = .001; Table 3). Entering alcohol consumption habit at step 2 improved the previous model (Chi-Square = 20.31, p < .001), with alcohol consumption habit the only predictor (B = 0.77, SE = .20, p < .001). Neither entry of preparatory behaviour frequency at step 3 (Chi-Square = 2.75, p = .43), nor preparatory behaviour habit at step 4 (Chi-Square = 1.10, p = .78), improved the model. In both models, alcohol consumption habit was the only significant predictor (step 3: B = 0.76, SE = .20, p < .001; step 4: B = 0.67, SE = .23, p = .003). Overall, excessive drinking was predicted by higher alcohol consumption habit scores.

**Discussion**

The present study tested whether frequent or habitual engagement in three behaviours that serve as preparation for subsequent alcohol consumption—contacting friends to arrange a night out, buying alcohol, and drinking alcohol at home before a night out—boosted prediction of UK university students’ alcohol consumption on nights out. The frequency with which any alcohol was drunk on nights out with friends (i.e. drinking frequency) was predicted by the frequency with which participants contacted friends prior to a night out, and the habit of drinking alone before going out. The number of such nights on which four or more drinks were consumed (i.e., excessive drinking), however, was only predicted by alcohol consumption habits. While preparatory behaviours contributed to prediction of only one of the two modelled outcomes, and explained only 8% additional variance in that outcome, our findings suggest that targeting preparatory behaviours has the potential to enhance alcohol consumption reduction interventions.

Drinking frequency

Previous studies applying the Reasoned Action Approach have shown that alcohol intentions consistently predict UK university students’ alcohol consumption (Barratt & Cooke, 2018; Cooke et al., 2007; Norman & Conner, 2006; Norman et al., 2012), and that these effects remain even when accounting for the effects of alcohol consumption habit (Gardner et al., 2012; Norman, 2011). However, these studies did not include measures of preparatory behaviour frequency and habits as alternative determinants of consumption. Such studies have assumed, as proposed by Ajzen (1991, 2002), that preparatory behaviours, like other variables not part of the TPB, influence consumption only indirectly by rendering a target behaviour more or less attractive, more or less likely to gain social approval, or more easy or difficult to perform, so influencing attitudes, subjective norms or PBC affecting intentions. Results from the present study cast doubt on this assumption by showing that frequency of contacting friends to arrange a night out, and habitually drinking alone at home before going out, had direct effects on drinking frequency, while alcohol intentions and alcohol consumption habits did not.

It is possible that our participants overlooked information relating to preparatory behaviours when formulating their intentions. People often make decisions regarding familiar actions based only on subsets of available information (Verplanken et al., 1997). This would explain not only that intentions did not mediate the relationship between preparatory behaviours and drinking frequency, but also that intentions did not predict alcohol consumption; intentions based on more extensive appraisals of available information more strongly predict later behaviour (Sheeran & Conner, 2019). Nonetheless, our findings point to the potential importance of accounting for cognitions towards and engagement in preparatory behaviours when modelling alcohol consumption frequency.

Correlations point to possible mechanisms by which preparatory behaviours co-occur to increase drinking frequency. Participants who contacted friends to arrange a night out were more likely to buy alcohol, and while there was no correlation between contacting friends and drinking alone before a night out, buying alcohol correlated positively with drinking alone. Taken together, these observations profile some participants as social drinkers (i.e., those who enjoy drinking alcohol, but also possess high drinking refusal self-efficacy; Morawska & Oei, 2005), for whom drinking alcohol is part of a broader episode characterized by approaching friends, buying alcohol and subsequently going out with friends. For this type of drinker, contacting friends likely triggers a subsequent sequence of socializing behaviours, in which alcohol plays a significant role. Drinking alone is often portrayed as a sign of a more problematic drinker, differentiated from social drinkers by enjoying drinking but also reporting low drinking refusal self-efficacy (Moraskwa & Oei, 2005). Habit for drinking alone before going out directly predicted drinking frequency, suggesting that individuals for whom find drinking alone in preparation for a night out is automatic drink frequently. These findings point to the profile of the lone drinker, for whom preparing for a night out involves buying and consuming alcohol alone as opposed to social drinkers who buy alcohol before joining a drinking group. Alternatively, lone drinkers may perhaps be more likely to decide to go on a night out after consuming alcohol.

The habitual nature of such sequences among our participants is cause for concern. Habitual actions proceed automatically, potentially outside of conscious awareness or control, and so alcohol consumption driven by habit may be harder to disrupt than consumption driven by social motives. Further research is needed to identify the interplay between preparatory behaviours, and whether and to what extent such interplay may vary across different profiles of student drinkers.

Excessive drinking

Alcohol consumption habit was the only variable to predict the number of nights out during which students drank excessively. This result, which echoes previous studies showing habit to play a core role in binge drinking (Gardner, de Bruijn & Lally, 2012; Murray & Mullan, 2019; Norman, 2011), suggests that people who drink to excess do so because they are driven by habits that sustain consumption of alcohol drinks within a drinking episode. Commentators have discerned two manifestations of habit in behaviour (Gardner et al., 2016; Phillips & Gardner, 2016). ‘Habitual instigation’ refers to the habitual *selection* of action from available alternatives; for example, habitually opting to contact friends about a night out, rather than watch TV. The observed effect of alcohol consumption habit on excessive drinking frequency is however more likely to capture ‘habitual execution’, which pertains to *performance*, with habit aiding progression through the ‘smaller’ acts that together comprise a higher-order action. While we sought to measure the habitual instigation of alcohol consumption and preparatory actions, the wording of our measures (e.g., ‘deciding to drink alcohol on a night out with friends’) may potentially have captured habitual execution. Our findings may therefore reflect that, among our participants, finishing one drink acted as a trigger to habitually seek and consume further drinks, so increasing the alcohol consumption involved in the higher-order act of ‘going on a night out’. Impulses generated by habit are by definition difficult to inhibit, often being activated outside of awareness and control, and possibly without or despite intentions (Bargh, 1994; Triandis, 1977). Inhibiting impulses to continue drinking requires willpower and self-control (Muraven et al., 2002; Neal et al., 2013; Quinn et al., 2010). Alcohol consumption facilitates automatic action (Vogel-Sprott et al., 2001), and so, ironically, it may become harder to resist alcohol consumption habits as more alcohol is consumed. Interventions to reduce excessive alcohol consumption might therefore focus on interrupting the habitual ‘flow’ of excessive drinking episodes.

Implications and future directions

Our findings have both theoretical and practical implications. From a theoretical standpoint, findings suggest that, while drinking frequency and excessive drinking were strongly positively correlated, they can be predicted by different psychological variables. This echoes previous research; for example, Baldwin, Oei and Young (1993) showed that while drinking *frequency* was predicted by drinking refusal self-efficacy, drinking *quantity* was predicted by alcohol expectancies. Excessive drinking appears to be a function of alcohol consumption habits that develop over time, whereas drinking frequency is seemingly determined by multiple routes that involve drinking alone or with others before a night out. More research on the influence of preparatory behaviours is needed to confirm our findings.

From a practical standpoint, our results offer recommendations for intervention strategies to reduce alcohol consumption. Interventions that seek to encourage people to consider alternative courses of action should be placed at or immediately prior to the point at which the key decision regarding such actions is made (Lewis & Eves, 2012). While the role of ‘pre-drinking’ prior to attending a subsequent alcohol consumption event is well-established (Pedersen & LaBrie, 2007), we identified specific actions, such as contacting friends to arrange a night out or drinking alone at home, that are performed in preparation for later consumption. The observed impact of preparatory behaviours on alcohol consumption in our data was modest; three presumed preparatory behaviours were considered, and each was measured with respect to performance frequency and habit, yet only two measures predicted consumption frequency, and none predicted excessive drinking. Nonetheless, interventions to reduce student drinking frequency might fruitfully target such preparatory actions. This is not to say that interventions must seek to prevent people from engaging in preparatory behaviours such as contacting friends. Rather, such behaviours may represent pivotal moments around which interventions might be built. Digital interventions might seek to target opportune moments, such as at times of day when students are likely to be forming decisions to engage in preparatory actions, or in locations associated with such actions. For instance, public health campaigns might be run on social media, which many students use to make contact with friends (Vorderer, Krömer & Schneider, 2016).

Interventions to reduce excessive drinking might focus on disrupting momentary habits that sustain and extend drinking episodes. Habit theory offers three distinct strategies for ‘breaking’ such ‘bad’ habits, which all require identification of cues to such responses (Gardner et al, 2020). Students might be encouraged to: avoid cues conducive to prolonged consumption; monitor cues and inhibit the translation of habit impulses into behaviour upon encountering such cues (via, e.g., reminding oneself not to act in triggering contexts; Quinn et al, 2010); or seek to consistently perform competing actions (e.g. consuming non-alcoholic drinks) in response to such cues, so as to form a new, stronger habit to displace habitual alcohol consumption. Further research is needed to identify the most effective of these strategies to disrupt habitually executed alcohol consumption episodes.

Limitations

Limitations must be acknowledged. Follow-up data was collected one week after baseline, so our results may not reflect patterns of prediction over longer timeframes. Our reliance on self-report data more broadly is problematic, because people often both strive for consistency in their reported behaviour and cognitions (Paulhus & Vazire, 2007), and under-report true alcohol consumption (Stockwell et al, 2004). Further work might test the robustness of findings using less subjective behavioural assessments. Our alcohol consumption intention and habit measures, which related only to drinking frequency, lacked compatibility with the outcome variable when modelled as determinants of excessive drinking (Ajzen & Fishbein, 1977). This may explain the discrepancy between our results, whereby alcohol consumption intentions had no impact on excessive drinking when controlling for habit, and previous research, using compatible measures, which found both intentions and habit to influence excessive drinking (Gardner, de Bruijn et al, 2012; Murray & Mullan, 2019; Norman, 2011). Replication using compatible measures is warranted. Our study focused on only three potential preparatory behaviours, identified via a elicitation exercise among just 15 students. Yet, which behaviours are most important in preparing for later alcohol consumption is likely to differ between individuals. Future research might identify a broader range of common preparatory behaviours, and the common sequences in which these occur, to inform optimally effective population-level interventions.

Conclusion

The frequency and habitual nature of engagement in behaviours that precede alcohol consumption on nights out with friends may improve prediction of the number of occasions on which alcohol is consumed. Our findings endorse a systems-approach to understanding and changing alcohol consumption, based on identifying and targeting behaviours that increase the likelihood of later alcohol consumption. Future work should identify common preparatory behaviours that most reliably predict alcohol consumption, and the mechanisms via which they influence consumption.

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Table 1. Descriptive statistics and intercorrelations between study variables (N = 120).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | Mean | SD |
| 1. Drinking frequency
 | .86\*\*\* | .35\*\*\* | .34\*\*\* | .30\*\*\* | .20\* | .08 | .25\*\* | .25\*\* | .26\*\* | 1.20 | 1.12 |
| 1. Excessive drinking
 |  | .36\*\*\* | .42\*\*\* | .22\* | .26\*\* | .14 | .27\*\* | .32\*\*\* | .25\*\* | 0.83 | 0.93 |
| 1. Alcohol Intentions
 |  |  | .62\*\*\* | .41\*\*\* | .37\*\*\* | -.01 | .26\*\* | .37\*\*\* | .13 | 4.15 | 1.77 |
| 1. Alcohol consumption habit
 |  |  |  | .17 | .23 | .08 | .33\*\*\* | .66\*\*\* | .36\*\*\* | 3.93 | 1.60 |
| 1. Contacting friends frequency
 |  |  |  |  | .47\*\*\* | .03 | .23\* | .08 | -.04 | 1.17 | 0.92 |
| 1. Buying alcohol frequency
 |  |  |  |  |  | .34\*\*\* | .32\*\*\* | .33\*\*\* | .16 | 0.73 | 0.91 |
| 1. Drinking alone frequency
 |  |  |  |  |  |  | .16 | .15 | .27\*\* | 0.30 | 0.54 |
| 1. Contacting friends habit
 |  |  |  |  |  |  |  | .49\*\*\* | .16 | 3.32 | 1.39 |
| 1. Buying alcohol habit
 |  |  |  |  |  |  |  |  | .53\*\*\* | 3.06 | 1.55 |
| 1. Drinking alone habit
 |  |  |  |  |  |  |  |  | - | 2.28 | 1.22 |

\* *p* < .05; \*\* *p* < .01; \*\*\* *p* < 0.001

Table 2. Prediction of drinking frequency: Hierarchical linear regression analysis (unstandardized regression coefficients) (*N* = 120)

Step Variable entered Step 1 Step 2 Step 3 Step 4

1 Alcohol Intentions .22(.06)\*\*\* .14(.07) .08(.07) .09(.07)

2 Alcohol Consumption habit .15(.08) .17(.08)\* .12(.09)

3 Contacting friends frequency .29(.12)\* .29(.12)\*

 Buying alcohol frequency -.07(.13) -.08(.13)

 Drinking alone frequency .16(.19) .05(.19)

4 Contacting friends habit .10(.08)

 Buying alcohol habit -.06(.10)

 Drinking alone habit .20(.09)\*

*R*2 .12 .15 .19 .23

$∆$*R*2 .03 .04 .04

Model *F* 16.27\*\*\* 10.20\*\*\* 5.45\*\*\* 4.21\*\*\*

$∆$Model *F* 3.75 2.10 1.92

Note. Standard errors are reported in parentheses. \* p < .05; \*\* p < .01; \*\*\* *p* < 0.001

Table 3. Prediction of excessive drinking: Hierarchical logistic regression analysis (unstandardized regression coefficients) (*N* = 120)

 Beta

Step Variable entered Step 1 Step 2 Step 3 Step 4

1 Alcohol Intentions .39(.12)\*\* .04(.16) .04(.17) .06(.18)

2 Alcohol consumption habit .77(.20)\*\*\* .76(.20)\*\*\* .67(.23)\*\*

3 Contacting friends frequency -.05(.29) -.05(.30)

 Buying alcohol frequency .20(.32) .12(.33)

 Drinking alone frequency .49(.43) .42(.44)

4 Contacting friends habit .09(.18)

 Buying alcohol habit .04(.23)

 Drinking Alone habit .13(.23)

Standard errors are reported in parentheses. \*\* *p* < .01; \*\*\* *p* < 0.001. All other p’s>.05

1. A fourth alcohol consumption measure (“When you went on nights out with your friends and drank alcohol in the last two weeks, what was the average amount of drinks you consumed each night?”) was administered but not analysed. [↑](#footnote-ref-1)
2. Due to human error, our intention items focused on the following two weeks, whereas behaviour was measured one week later, and so intention items violated the principle of compatibility (Ajzen & Fishbein, 1980). We do not however view this as problematic, because there is no reason to expect intentions relating to the coming two weeks to differ from those relating to the coming one week. [↑](#footnote-ref-2)
3. Following Ajzen (1991), participants also completed measures of attitudes, subjective norms and PBC. Because attitudes and subjective norms are not proposed to directly predict behaviour, and PBC has been shown to have inconsistent effects on consumption, we only report intentions here. [↑](#footnote-ref-3)