Affect and Alcohol Consumption: An Ecological Momentary Assessment study during national lockdown

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The design, methodology, hypotheses and analyses of this study were pre-registered on the Open Science Framework on the 2nd June 2020, after the commencement of data collection (https://osf.io/rphn4, Tovmasyan et al., 2020). Materials, data, and analysis code used in the study could also be found on the Open Science Framework (https://osf.io/dhk6j, Tovmasyan et al., 2021).

Abstract

COVID-19-related lockdown provided an opportunity to examine the relationship between affect and alcohol consumption in a historically unique context. To shed light on mixed findings regarding the interplay between affective states and alcohol consumption, the present study examined how affective states and affect fluctuations impact drinking during confinement of people to their homes. It also examined the extent to which the social context moderated the affect-consumption relationship. Having pre-registered study protocols, methods, and hypotheses, 87 UK participants (34% male, Mage = 29.33) used their smartphones to respond to thrice-daily prompts, recording their affective states, alcohol consumption, and social context over one week. Multilevel modelling suggested that being with someone (versus alone) were associated with increased alcohol consumption. Increased drinking on the previous day was associated with increased next day negative affect, and the number of household occupants was associated with decreased negative affect. Pre-consumption affect was not associated with subsequent drinking. These findings point to a complex relationship between alcohol consumption, social context, and negative affect. The opportunity to interact with others during lockdown was generally associated with decreased negative affect in the moment. However, the presence of others was associated with increased consumption which, in turn, predicted increased next-day negative affect.

**Keywords:** alcohol consumption, affective states, social context, COVID-19

**Public significance statement:**
During lockdown, greater opportunity to interact with household members is associated with decreased negative mood in the moment, while being with someone is associated with increased alcohol consumption, which in turn is associated increased next-day negative mood. This suggests that alcohol may attenuate the positive impact others may exert.
Introduction

Alcohol has played a ubiquitous part of human life since the beginning of recorded history (Hanson, 1995) and is one of the most used recreational drugs despite well documented adverse social, economic and health impacts (Rehm et al., 2009). While, in many Western nations, alcohol intake has been declining among younger people (Kraus et al., 2020; Room et al., 2020; Vashishtha et al., 2020), heavy alcohol consumption in other demographics may be on the increase, with manifold adverse effects (e.g., Milton et al., 2019) and consumption patterns appear to be shifting to less well-regulated spheres (Foster & Ferguson, 2012; Reynolds & Wilkinson, 2020). By now a large body of work has established that an apparent reason for alcohol’s continued popularity is its ability to profoundly shape people’s affective states (Cox & Klinger, 1988; Cronce et al., 2020; Gilman et al., 2008; Gorka et al., 2017; Kuntsche & Bruno, 2015; Monk et al., 2020; Peacock et al., 2015). Theoretical accounts, in this way, are suggestive of a ‘circle’ of reinforcement whereby mood and alcohol consumption dialectically influence each other, although empirical findings are inconsistent, highlighting a need for research able to better untangle the interplay between mood and alcohol in the actual contexts in which people drink.

According to the positive reinforcement theory of alcohol use, people drink when they are in a good mood to further enhance positive emotions (de Wit & Phan, 2010), although there have been varied findings regarding the extent to which positive affect impacts consumption, with studies finding elevated drinking (Cyders et al., 2010; Dinc & Cooper, 2015; Dvorak & Simons, 2014; Peacock et al., 2015; Russell et al., 2020), decreased drinking (Emery & Simons, 2020; Simons et al., 2014), or no impact (Duif et al., 2019; Richardson et al., 2020; Stamates et al., 2019; VanderVeen et al., 2016). A potential reason for these discrepant findings may be that some studies focused on state positive affect (i.e., within participant variability in affect), whereas others have examined trait positive affect (i.e., differences in affect between participants; Colder et al., 2010). Findings regarding positive affect as a state found elevated consumption following increases in affect (Duif et al., 2019; Dvorak & Simons, 2014; Emery & Simons, 2020; Peacock et al., 2015; Russell et al., 2020; Simons et al., 2014), whereas those focusing on trait positive affect found no association (Duif et al., 2019; Rankin & Maggs, 2006) or an inverse relationship (Emery & Simons, 2020; Simons et al., 2014), indicating that
momentary changes in positive affect may be a better predictor of consumption than being predisposed towards increased positive affect (Colder et al., 2010).

Other theories have a more explicit focus on people drinking alcohol in the hope of ameliorating negative affect. According to the self-medication hypothesis (Khantzian, 1997) and negative reinforcement model (Baker et al., 2004), alcohol consumption can be motivated by attempts to alter negative affect (Tice et al., 2001). These accounts are supported by research highlighting associations between poor mental wellbeing and alcohol consumption (Appleton et al., 2018) and by work indicating a high degree of co-morbidity between alcohol use disorders, anxiety, and depression (Brière et al., 2014; Burns & Teesson, 2002). However, research guided by such theories has also produced inconsistent findings across studies of both state and trait negative affect. Some research utilising measures of state negative affect point to a direct relationship between increased negative affect and elevated consumption (Austin et al., 2020; McHugh & McBride, 2020; Mohr et al., 2005; Monk et al., 2020; O’Hara et al., 2014; Richardson et al., 2020; Simons et al., 2005, 2014) while others have found an inverse association (i.e., increased negative affect being associated with reduced consumption; Bresin & Fairbairn, 2019; de Leon et al., 2020; Dvorak et al., 2018; Rohsenow, 1982; Simons et al., 2010), or that there was no association (Duif et al., 2019; Dvorak & Simons, 2014). Likewise, while some studies of trait negative affect indicate that there is a positive relationship with consumption (Simons et al., 2014) others have found failed to find an association (Duif et al., 2019; Emery & Simons, 2020).

A possible reason for such inconsistent findings - and a potentially fruitful avenue for further research - relates to affect variability. Specifically, in contrast to efforts that largely focussed on mean levels of negative affect (Bresin & Fairbairn, 2019; Cyders et al., 2010; Dinc & Cooper, 2015), there is emerging evidence indicating that negative affect fluctuation may play a significant role in shaping alcohol consumption. This is illustrated by findings suggesting that people who experience negative mood fluctuations during the day may be more prone to drinking compared to those whose mood is consistently low (Gottfredson & Hussong, 2013; Mohr et al., 2015; Waddell et al., 2021). A similar tendency has also been found with regards to fluctuations in positive affect, such that positive affect variability appears to be a stronger and independent predictor of consumption than mean levels of affect (Mohr et al., 2015). On the other hand, a study that gauged people’s agreement with a series of adjectives (e.g., happy), and treated affect as a continuum, found no evidence that affect variability is associated with alcohol
consumption (Peacock et al., 2015), although this study’s divergent findings may be a result of treating affective state as a unidimensional continuous variable. The studies that treated positive and negative affect as separate entities (Gottfredson & Hussong, 2013; Mohr et al., 2015), in this way, found that both positive and negative affect fluctuation could lead to increased consumption.

In addition to the potential variability introduced by differences in affect measurement/conceptualisation, and the extent to which affect fluctuations are accounted for in previous work, a further layer of complexity that warrants consideration relates to the social contexts in which research in this area is typically conducted (Curtin & Lang, 2007). Social context has an independent effect on mood (Neumann & Strack, 2000; Parkinson & Simons, 2009) and on alcohol consumption, with social consumption and mood impacting quantity consumed (Monk et al., 2020). Further research suggests that people who have had positive interpersonal experiences drink more in a group, while people with negative experiences drink more alone (Mohr et al., 2001). It has also been found that negative affect variability is associated with increased alcohol consumption independently of social context (Mohr et al., 2015), while another study showed that peer support moderated this relationship such that those with more supportive friends were less likely to engage in alcohol consumption (Shadur et al., 2015). In short, this body of work illustrates that consideration of contextual factors is potentially important when examining the alcohol mood nexus.

Contextual factors may have an ability to moderate the relationship between affect and consumption beyond individual drinking occasions. While socially induced excessive consumption (Kuendig & Kuntsche, 2012; Monk et al., 2020; O’Donnell et al., 2019; Thrul et al., 2017; Thrul & Kuntsche, 2016) would typically be expected to result in lowered affect because of hangover experiences (see Alford et al., 2020; Griffin et al., 2018; Karadayian et al., 2013), research also documents what might be termed ‘positive affective hangover’ as a function of drinking in social settings. In this vein, a recent study by Cronce et al. (2020) found that while alcohol consumption was associated with lower next-day levels of positive affect, drinking in social settings was also independently associated with decreased negative affect on the day following the drinking occasion. Yet, to our knowledge, whether social context on the day following consumption may help ameliorate adverse effects of consumption on mood has not previously been examined.
While ecological momentary assessment (EMA) has been particularly useful in helping elucidate in real time and real-world settings the relationship between affect and alcohol consumption (e.g., Duif et al., 2019; Dvorak & Simons, 2014; Gautreau et al., 2015; Gottfredson & Hussong, 2013; Holzhauer et al., 2020; Mohr et al., 2013, 2015), a potential drawback of such methods relates to their inability to control for, or assess, the relative impact of participants’ changing environmental contexts (Monk et al., 2015). In considering the socio-contextual complexities of affect and consumption, the COVID-19 pandemic presented researchers with a historically unique social context (i.e., lockdown during a global pandemic) in which to examine this relationship, while controlling for other factors. Specifically, the national lockdown removed much of the contextual variability, with licensed premises being shut and mixing between households banned. The pandemic therefore provided a distinctive opportunity to investigate the relationship between affective states and alcohol consumption in relatively uniform (i.e., home) settings. Indeed, a growing research has provided a varied picture of self-reported alcohol consumption during the pandemic (e.g., Jackson et al., 2021; Vandenbergh et al., 2021; Vanderbruggen et al., 2020; Winstock et al., 2020). For example, while some people reported increased alcohol consumption in various populations following the COVID-19 onset (Lechner et al., 2020; Silczuk, 2020; Tran et al., 2020), others reported decreased consumption during the pandemic (Winstock et al., 2020). Research utilizing real-time assessments of consumption and with a focus on affective state fluctuations may therefore provide greater insights into the predictors of drinking during a pandemic.

The Current Study

The current study focused on examining the factors that could potentially be associated with the development of problematic consumption in non-clinical populations, including affective states and social context. By building on previous studies into affective states and alcohol consumption which have paid insufficient attention to affect fluctuations, the current study used EMA to assess the relationship between affective states and alcohol consumption during a period of lockdown in the UK.

The aims were as follows: (1) to examine how daily affective states influence intra-day consumption; (2) to assess how consumption of alcohol influences next-day affective states; (3) to explore how the social context in which people consume alcohol moderates the impact of
alcohol consumption on next-day affective states. Based on the findings of previous research (Cronce et al., 2020; Gottfredson & Hussong, 2013; Mohr et al., 2015), the following hypotheses were pre-registered for a study in a non-clinical population given the focus on possible affective precursors to problematic alcohol consumption: (i) affective state fluctuations during the day would be associated with elevated alcohol consumption; (ii) decreased positive affect and increased negative affect would be expected on days where there was previous day alcohol consumption (in comparison with days on which there was alcohol consumed the day prior); (iii) the relationship between affective states and previous day consumption would be moderated by participants' social context, such that those in a larger household would be expected to experience more positive affect and less negative affect than those in smaller households.

Method

Transparency and Openness

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. The design, methodology, hypotheses, and analyses of this study were pre-registered on the Open Science Framework on the 2nd June 2020, after the commencement of data collection (https://osf.io/rphn4, Tovmasyan et al., 2020). Materials, data, and analysis code used in the study could also be found on the Open Science Framework (https://osf.io/dhk6j/, Tovmasyan et al., 2021).

Participants

Advertisement on social media recruited participants who consume alcohol regularly. If potential participants expressed interest, they were re-directed to eligibility questionnaire. Participants were deemed eligible to take part in the research if they consumed alcohol on at least four occasions in the month prior to registering to take part in the study (following Gautreau et al., 2015, to help ensure that participants would drink during the 7-day sampling period) and were aged 18+ years (making them legally permitted to drink in the UK). Having a mood disorder or alcohol use disorder and/or using illicit drugs within the last three months were exclusion criteria (as our focus was on non-clinical populations). The final sample consisted of 87 people1 (19-64 years old, $M = 29.33, SD = 9.93$, 34 % male) from an original sample of 91

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1 The sample size was equivalent to one used in similar studies (Emery & Simons, 2020; Hussong et al., 2008; Monk et al., 2020; Monk & Heim, 2014; Monk et al., 2015; O'Donnell et al., 2019)
participants who signed up for the study (the remaining four did not supply any data for analyses following their initial expression of interest). All participants were reimbursed with £27 for their time. Respondents were regular drinkers (Alcohol Use Disorder Identification Test [AUDIT, Babor et al., 2001] scores ranged from 3 to 26, $M = 10.38, SD = 4.54$). At baseline, the mean level of depression (measured by Center for Epidemiologic Studies Depression Scale [CES-D; Radloff, 1977]) was $19.82, SD = 5.27, range = 8-37$. 20% of participants reported drinking alcohol four or more times per week, 52% of participants reported drinking alcohol 2 – 3 times per week, and 28% reported drinking alcohol 2 – 4 times per month. 13% of participants reported drinking 10 or more units of alcohol per drinking occasion, 15% reported drinking 7 – 9 units, 15% reported drinking 5 – 6 units, 33% reported drinking 3 – 4 units, and 24% reported drinking 1 – 2 units.

**Procedure**

All participants were treated in accordance with American Psychological Association ethical guidelines for research (Sales & Folkman, 2000) and the World Medical Association Declaration of Helsinki (WMA, 2013). The institutional review board approved this study prior to recruitment. Recruitment via social media advertisements took place between 28th May 2020 and 27th June 2020, - that is, the study commenced two months after the beginning of lockdown in the UK (March 23rd, 2020). During that period, people in the UK were legally required to maintain social distancing by isolating themselves in their households. Essential journeys (e.g., for medical appointments or food shopping) and one-hour exercise per day were allowed. Prior to completing the baseline assessment, participants had to demonstrate eligibility to take part in the study by completing a screening questionnaire and to provide informed consent.

Participants received thrice-daily prompts via text messages to complete their assessments of affect and alcohol use over a seven-day period. Prompts were sent at random points within two-hour intervals: 10:00 A.M. – 12 noon, 3:00 P.M. – 5:00 P.M, and 8:00 P.M. – 10:00 P.M., following similar sampling protocols (Monk & Heim, 2014; Muraven et al., 2005a, 2005b, 2005c; Simons et al., 2010). Each text message prompt contained a link to the questionnaire (hosted on the online questionnaire platform, Qualtrics) and participants were asked to complete the assessment within 30 minutes after receiving an SMS text. All assessments were date- and time-stamped. The average completion time for an individual assessment was
three minutes. At the end of the study, participants were fully debriefed. Study compliance was 90%.

**Design and Measures**

A within-participants EMA design was used to examine the relationship between affective states (mean levels of positive and negative affect, positive and negative affect fluctuations), social context (alone or with someone, number of people in the household), and alcohol consumption (whether drinking occurred, total number of drinks).

**Baseline measures**

Baseline assessments obtained measures of age, gender, participants’ household members (e.g., partner, children, parent), number of household occupants, and relationship quality in the household (on a 5-point scale, 1 – “extremely poor” to 5 – “extremely well”). Number of household occupants was included in the study as a measure of social context because the study was conducted during COVID-19 related lockdown, and it was assumed that participants were staying at home and would therefore only be drinking in the presence of members of their households. Participants' phone numbers were also recorded to facilitate SMS text message prompting.

**The CES-D Scale** (Radloff, 1977): a 20-item self-report screening tool for depression, where respondents have to indicate on a 4-point scale (1 - "rarely or none of the time" to 4 - "most or all of the time") how often over the past week the described statement was true for them (e.g., "I felt fearful", "My sleep was restless", "I enjoyed life"). While often used to assess clinical depression, CES-D is frequently employed as a measure of the prevalence of depressive symptoms in general population and it is noteworthy that the measure tends to be positively skewed in non-clinical samples (Teale Sapach et al., 2017). For the current sample, scale reliability was high, $\omega = .87$, 95% CI [.83, .91].

**AUDIT** (Babor et al., 2001): this measure contains 10 multiple choice questions examining three distinct domains, – alcohol consumption, alcohol dependence and alcohol-related problems. To obtain the overall score, the scores for responses on each domain were summed. For the current sample, scale reliability was high, $\omega = .74$, 95% CI [.63, .80].

**EMA measures**

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2 Participants’ household members and relationship quality were the variables initially included in the analyses but were removed to simplify the models as the results with and without them were identical.
**Positive and Negative Affect Schedule (PANAS) questionnaire** (Watson et al., 1988): this questionnaire is widely used in studies looking at affective states (e.g., Cronce et al., 2020; Duif et al., 2019; Moeller et al., 2020; Stevenson et al., 2019) and has been shown to have high reliability and validity (Crawford & Henry, 2004). For the current sample, $\omega$ (positive) = .91, 95% CI [.90, .92], $\omega$ (negative) = .86, 95% CI [.85, .87]. Participants were asked to report the extent to which they experienced 10 positive (e.g., “interested”, “attentive”, “active”) and 10 negative emotions (e.g., “distressed”, “hostile”, “irritable”) since the last assessment, on a five-point Likert scale (from 0, not at all, to 4, extremely).

**Alcohol consumption:** participants were asked whether, since the last assessments, they had been drinking or not. Participants were also asked to provide a number of drinks they consumed since the last assessment (one drink defined as 1/2 pint of beer/cider, 1 pint of beer/cider, small bottle of beer/cider, large bottle of beer/cider, small glass of wine, large glass of wine, small spirit and mixer, large spirit and mixer, 1 shot of spirit; following Monk et al., 2020) by manually entering a number of drinks (free-response measure).

**Social context:** at every assessment point, participants were asked whether they were alone or with others.

**Analytic Strategy**

**Data Management**

Eighty-seven eligible participants responded three times a day over a seven-day period, yielding a total of 1653 completed response periods (from a maximum of 1827). This culminated in a total of 36326 data points for analyses (from a maximum of 40194). Data was analysed in Mplus Version 8 (Muthén & Muthén, 2017). For all models, participant number was chosen as a cluster variable to group each individual’s data (as there were 21 rows of responses for each participant). The current study contains 87 clusters (participants), with an optimal number of data occasions being 21, with the data being collected over a period of one week. The number of clusters is above the minimum, which is usually cited as between 20 – 30 (Snijders & Bosker, 2012; Hox, 1998), and the number of data occasions ($n = 21$) is an added strength of the data.
Mean daily negative and positive affect were calculated by averaging each participant's daily responses (three per day). Positive and negative affect fluctuations were derived from the standard deviations of these daily responses, following the approach of Mohr et al. (2015). If a participant completed only one assessment during the day, that data was imputed as missing. Daily number of drinks is a variable representing the sum of drinks consumed during the day, whereas momentary number of drinks is the number of drinks consumed since the previous assessment. Previous day consumption was computed by combining the total number of drinks reportedly consumed on the previous day. For models 1 and 2, an overdispersion Negative Binomial Regression Model was used to adjust for the preponderance of zeros in the data (non-drinking occasions). The negative binomial model assumes a gamma distribution in relation to the residuals, and this unobserved heterogeneity is accounted for by a non-symmetric distribution. For each model, intercepts were allowed to vary randomly. For models 1, 2, 3, and 5, no model slopes had random variance components, and thus were fixed to zero. Positive and negative affect variables were group-mean centered, as group-mean centering allows examining a moment-to-moment deviation from a person's average level, as well as allowing a person to serve as their own control and accounts for individual differences in mean affect.

Alcohol consumption (Models 1 and 2)

For Model 1, a two-level regression analysis was conducted. This model aimed to examine the relationship between daily affect and total daily alcohol consumption. The dependent variable was the total number of drinks consumed during the day. The independent within-person variables were mean positive affect (group mean centred), mean negative affect (group mean centred), positive and negative affect variability (i.e., standard deviation of positive and negative affect), and day of the week (weekday was used as reference category). ‘Time’ (a count variable from 1 to 21), which indicates the assessment period, was added to this (and to each subsequent model) as a within-participant variable to account for repeated measures within the data. The independent between-person variables were age, gender, number of people in the household, and AUDIT score. There were 1530 observations for 10 independent variables.

For Model 2 (exploratory analysis), a two-level regression model was used to explore the momentary (within-day) relationship between affect and daily consumption. For this model, each data point was analysed individually (rather than being collapsed into daily aggregated levels). The dependent variable was the number of drinks consumed since the previous assessment. The
independent within-person variables were positive affect (group mean centred), negative affect (group mean centred), social context (being alone or not), time of day (evening being used as reference category), and day of the week (weekday used as reference category). ‘Time’ was added to a model as a repeated measure variable. The independent between-person variables were age, gender, number of people in the household, and AUDIT score. There were 1584 observations for 11 independent variables.

_Affective states (Models 3 - 6)_

Model 3 considered daily predictors of negative affect. The within-person dependent variables were mean levels of positive affect (group mean centred), number of drinks consumed on the previous day, and social context (alone or with someone). ‘Time’ was added as a repeated measures variable. The between-person predictors were number of people in the household and CES-D score. There were 1373 observations for 6 independent variables.

Model 4 aimed to examine the moderating role of number of people in the household on the relationship between number of drinks consumed on the previous day and negative affect. To perform this cross-level interaction, a slope was calculated from the within-person part of the model and treated as a predictor at the between-person section of the model. ‘Time’ was added as a repeated measures variable. There were 1550 observations for 3 independent variables.

Model 5 examined daily predictors of positive affect. The within-person predictors were mean levels of negative affect (group mean centred), number of drinks consumed on the previous day, social context (alone or with someone). ‘Time’ was added as a repeated measures variable. The between-person predictors were number of people in the household and CES-D score. There were 1373 observations for 6 independent variables.

Model 6 aimed to examine the moderating role of number of the people in the household on the relationship between number of drinks consumed on the previous day and positive affect. The procedure for running the model mirrored that of Model 4, whereby the model slope was taken from the within-person part of the model and treated as a predictor on the between-person level. ‘Time’ was added as a repeated measures variable. There were 1560 observations for 3 independent variables.
Results

Descriptive statistics are summarised in Table 1 (Appendix A). Participants reported being alone during 532 out of 1827 assessments. See Table 2 (Appendix B) for correlations between the variables and Tables 3 - 5 (Appendix C) for summary of all models.

At the daily level, neither affective state fluctuations nor number of people in the household were associated with number of drinks consumed. None of the included variables significantly predicted number of drinks consumed. At the momentary level, being with someone (relative to being alone) and higher levels of AUDIT were associated with increased consumption, while time of the day (morning and afternoon) was associated with decreased consumption.

For negative affect, higher number of drinks on the previous day and higher CES-D levels were associated with higher levels of negative affect. Higher levels of positive affect and greater numbers of people in the household were associated with decreased negative affect. Number of people in the household did not interact with number of drinks on previous day to predict levels of negative affect.

Positive affect had a significant inverse relationship with negative affect. None of the other variables were significantly associated with positive affect. Number of people in the household did not interact with number of drinks consumed on previous day to predict consumption.

In summary, higher levels of AUDIT scores and being with someone were the factors associated with increased alcohol consumption. Morning and afternoon were associated with lower levels of alcohol consumption. Previous day drinking and higher CES-D levels were associated with increased negative affect, while increased number of people in the household was associated with decreased negative affect. Increased positive affect was associated with decreased negative affect.

Discussion

The current EMA study assessed the relationship between alcohol consumption and affective states during COVID-19 lockdown. It was hypothesized that (i) affect fluctuations would be associated with increased alcohol consumption; (ii) participants would experience

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3 When social context was assessed as whether someone was alone or not, it also did not interact with number of drinks consumed on previous day to predict consumption.
more negative affect and less positive affect on days following alcohol consumption; and (iii) respondents’ social context (i.e., household size) would moderate the relationship between previous day alcohol consumption and affective states. Only hypothesis two was partially supported.

Contrary to our first hypotheses, affect fluctuations (positive and negative) were not significantly associated with consumption. When we operationalized affect fluctuation in an alternative way (as the deviations of each momentary rating from the person-mean, following Waddell et al., 2021, see supplementary materials), the results were identical. While inconsistent with previous findings suggesting that fluctuations in affect predict consumption patterns among adolescents (Gottfredson & Hussong, 2013) and moderate to heavy drinkers (Mohr et al., 2015), this does accord with research from Peacock et al. (2015), whose study (akin to ours) was conducted using a general population of adult drinkers. Furthermore, the context in which the current research was carried out may shed more light on this result. Completed during UK lockdown owing to COVID-19, it is possible that this difficult period muted fluctuations in affect (Procentese et al., 2021), also considering research that indicates that people perceive the time to pass slower during lockdown (Droit-Volet et al., 2020; Martinelli et al., 2021). As the UK emerges out of periods of strict social distancing restrictions, further studies would nevertheless be recommended to test this assertion.

In partial support for hypothesis two, while previous day alcohol consumption was not associated with positive affect, it was related to higher levels of negative affect. Coupled with the finding that negative and positive affect were found to be strongly and inversely related, the current findings may offer indirect support for results of research by Cronce and colleagues (Cronce et al., 2020), who found that drinking on a previous night was associated with lower levels of positive mood. Potentially owing to the pharmacological effects of alcohol (e.g., hangover; Lantman et al., 2017), it therefore appears that having consumed increased amount of alcohol the previous day may be associated with higher levels of negative affect.

Our third prediction, that household size would moderate the relationship between previous day consumption and affect, was not supported. Nevertheless, household size was a significant predictor of negative affect, but not of same day consumption. On the other hand, social context more generally (being alone versus in a group) did not predict affect but did predict consumption, in line with previous research (Monk et al., 2020). These findings may
suggest that different facets of one’s social environment may exert varying influences on both mood and drinking. As such, while the current findings illustrate that social context may shape alcohol behaviors, they do not evidence patterns found elsewhere in the literature, where drinking is greater as a function of groups size (Cullum et al., 2012; Reed et al., 2013). This unexpected finding may, however, afford novel insights into how social contexts excerpt influences on alcohol consumption behaviours. Specifically, in previous EMA research (e.g., Duif et al., 2019; Gautreau et al., 2015; Mohr et al., 2015), contextual influences on consumption could vary throughout drinking episodes (e.g., in terms of group composition), while this was not the case in the context of a national lockdown, where interaction was restricted to people’s household. In short, the current findings may therefore indicate that social settings per se are less important predictors of mood and, rather, it is having the opportunity to interact with greater numbers of social others (i.e., knowing that you have someone in the household to talk to) that impacts affect.

It is also noteworthy that, in the current study, participants could report drinking in the presence of others, regardless of whether they were also drinking. This makes the current study distinct from previous EMA research which has tended to index participants’ drinking when with other people who are also drinking (e.g., Mohr et al., 2015; O’Donnell et al., 2019). As such, the present findings may provide an early indication that, in home settings, being with someone regardless of drinking status may increase consumption in the same way that being with individuals who drinks might. The social dynamics of co-occurring alcohol consumption and related behaviors (e.g., drinking reciprocity) may therefore warrant closer inspection in future EMA research. As well as offering insights into consumption patterns during times with heightened stress and challenges to mental wellbeing (Bai et al., 2004; Brooks et al., 2020; Cava et al., 2005; Desclaux et al., 2017; Hawryluck et al., 2004), our findings therefore contribute to the understanding of the nuanced social influences on alcohol consumption in an under-researched setting. The current EMA focus on alcohol consumption in people’s homes may therefore lay useful groundwork for research into more problematic forms of home drinking (Creswell, 2020; Skrzynski & Creswell, 2020) and examine how this is shaped by the presence of others (e.g., spouses or offspring).

Finally, the results of three further findings derived from exploratory analyses are noteworthy. First, an inverse dynamic between the average levels of positive and negative affect
was found in support of the notion that assessing affective state as a continuum (akin to measures used in de Castro, 1990; Monk et al., 2020; VanderVeen et al., 2016; Wardell et al., 2012) holds promise. However, this association may, in part, be explained by the current sample. Indeed, even though this was drawn from a non-clinical population and having a mood disorder was an exclusion criterion, the mean levels of CES-D for the current sample were above the threshold for clinical depression. This may have been a result of collecting data during the pandemic as previous work documents its adverse impacts on wellbeing (Lima et al., 2020; Sønderskov et al., 2020; Xiang et al., 2020), with elevated levels of depression and anxiety symptoms in the general population (Smith et al., 2020; Shevlin et al., 2020). Previous studies also indicate that higher depressive symptomology predicts the bipolarity of positive and negative affect, which may not be the case in individuals without signs of poor mental health (Dejonckheere et al., 2018; Lamers et al., 2018). Similarly, there is evidence that bipolarity between positive and negative affect is elevated during emotional times (Diener & Emmons, 1984). Moreover, it could be the case that people experienced a more diverse array of emotions than would be typical on other settings. Further research with more varied samples is therefore required in future research in this area.

Second, time of the day significantly predicted drinking, in accordance with previous research (Kuntsche & Labhart, 2012). While not unexpected, this observation is noteworthy as it suggests that, even in the lockdown-related relative absence of social routines that may obstruct drinking (e.g., going to work), there was an apparent preference for maintaining more routine drinking practices such as during evenings. However, contrary to previous research (Del Boca et al., 2004; Gmel & Daeppen, 2007), we did not find that whether it was the weekend (Friday and Saturday) or a weekday made a significant difference in predicting drinking behavior. This indicates that alcohol consumption patterns may have changed during lockdown so that people were equally likely to drink on any given night, regardless of the weekday.

Third, while overall AUDIT scores were found to predict momentary level consumption, our analyses suggests that this finding was driven by questions relating to drinking frequency/quantity (known as the AUDIT-C), as opposed to items pertaining to problem drinking (known as the AUDIT-P). The current results may therefore suggest that one’s typical consumption practices predict in the moment decisions to drink, while any past behaviours associated with problem drinking behaviours do not exert a significant influence.
While, unlike previous research (e.g., Dvorak et al., 2016, 2018; Emery & Simons, 2020) we found no significant association between positive affect and alcohol consumption, these results should be viewed in light of a number of considerations. First, the current results pertain to state positive affect, and not trait affect, which has been a focus of other previous research (Duif et al., 2019; Dvorak & Simons, 2014; Emery & Simons, 2020; Peacock et al., 2015; Russell et al., 2020; Simons et al., 2014), Second, it has been suggested that PANAS may not necessarily capture all the positive emotions that might be associated with increased consumption (e.g., happiness; Emery & Simons, 2020; Simons et al., 2014). Finally, the original PANAS positive subscale includes items such as attentive and interested, which, when used in studies about alcohol can, at times, yield null results (e.g., Park & Grant, 2005; Weiss et al., 2019). Further studies using other emotion measurement tools may be usefully deployed in the further exploration of potential links between affect and consumption.

Several limitations should be born in mind when considering the current findings. First, number of drinks, as opposed to drink size was assessed, meaning that variability in self-reported drinking volumes cannot be ruled out (Kerr et al., 2005). Further, as we did not record participants’ height and weight, we were not able to estimate their blood alcohol concentration, and this is an important avenue for future research. Second, as participants were asked to report their feelings and consumption levels after the previous assessment, between day analyses were unable to fully discount the possibility that reports from a previous assessment interval impacted these. For example, consumption captured in the morning of day four could feasibly have taken place on the evening of day three, after the last assessment interval. Third, as participants were asked how much they had consumed since their last response but not if they were drinking at the moment of their response, it is possible that contemporaneous alcohol use may have confounded affect measurements (i.e., drinking at the time of assessment may have impacted affect). However, as both between- and within-day models demonstrated no significant association between affect prior to consumption and subsequent consumption, we would expect any effects of current intoxication on mood to be relatively modest. Future research is nevertheless recommended to further test this assertion and to explore any intoxication effects in more detail. Fourth, while the use of standard deviation to measure affect fluctuation has been used in previous studies (Gottfredson & Hussong, 2013; Mohr et al., 2015), it has been argued that this approach is reductive in that, as standard deviations are not fully time-sensitive, they may not
fully capture moment to moment change in affect (Trull et al., 2015), although when alternative measure was used (see supplementary materials), the results were identical. Further studies may benefit from looking at rates of affect change (akin to measures used by Russell et al., 2020) as a measure of affect fluctuation. Fifth, since assessments were only taken three times a day, it may not have adequately captured mood variability.

While the current EMA study overcomes some of the limitations of traditional self-report questionnaires, it nevertheless relies on affective self-reports which assume that people are able to accurately self-introspect, which cannot always be guaranteed (Robins et al., 2009). Participants were not asked to report whether they have used other drugs (such as nicotine, caffeine, marihuana, or cocaine) that could interact with alcohol to affect mood (Sher & Grekin, 2007). As such, although self-reported illicit drug consumption within the three months prior to participation was an exclusion criterion, the current findings cannot exclude the possibility that participant responses were affected by polydrug use. Furthermore, we did not take measures of participants’ socioeconomic status, which could potentially contribute to people’s drinking behavior. As more research emerges about the possible links between, for example, having more children at home and increased alcohol consumption during the pandemic (Vanderbruggen et al., 2020), more studies are required to assess how socio-contextual subtleties may interact with mood and drive varying patterns of drinking. Additionally, caution should be taken when seeking to generalize the findings beyond the COVID-19 pandemic context, which could have substantially impacted people’s affective states (Smith et al., 2020; Shevlin et al., 2020). Furthermore, our study only focused on non-clinical samples, and therefore the findings may not apply to clinical populations. Finally, while the study is well powered to detect within-participant (respondents and time) variation, an increase in the number of participants would have a beneficial effect on the between-participants part of the model (Bolger & Laurenceau, 2013).

In conclusion, the current study took advantage of the COVID-19 lockdown to examine affect and alcohol consumption in a de facto natural experiment in which environmental and social contexts were controlled / homogeneous and limited to home settings. Findings point towards a complex relationship between affect, social context, and consumption, such that social context (being with someone versus alone) predicted increased consumption levels, which, in turn, predicted increased levels of negative affect on the next day. Household size but not social context per se was associated with decreased levels of negative affect. In this way, current
findings may contribute to our understanding of the nuanced social influences on mood and alcohol consumption in an under-researched setting.
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