The role of context and timeframe in moderating relationships within the theory of planned behaviour

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Abstract

The present study examined the moderating effect of context and timeframe on the predictive ability of Theory of Planned Behaviour (TPB) constructs. Three hundred and eighty-three students completed TPB measures either in a campus bar or a library and were randomly allocated to one of three timeframe conditions: tonight, tomorrow, or next week. There was a three-way interaction such that the subjective norms of participants in a bar were more predictive of their intentions to binge drink that night, whereas the subjective norms of participants in a library were less predictive of intentions to binge drink that night. The present research provides empirical evidence that ignoring context may result in underestimation of the importance of normative factors in binge drinking. It also suggests that other research utilizing the TPB needs to take greater account of the impact of context of data collection, which has been neglected to date.

Key words: context, timeframe, TPB, subjective norms, intention, binge-drinking

The role of context and timeframe in moderating relationships within the theory of planned behaviour

The Theory of Planned Behaviour (TPB: Ajzen, 1991) is one of the most frequently used models of human behaviour employed in health psychology research (see Ogden, 2003; Johnston, French, Bonetti & Johnston, 2004), being used in hundreds of published studies concerning health-related behaviours (Conner & Sparks, 2005). The TPB states that a person's plan or intention to act is the most important predictor of subsequent behaviour. In addition, the TPB suggests that a person's perceived behavioural control (PBC), which reflects their perceptions of their control over behavioural performance, can also predict behaviour to the extent that perceptions reflect actual control over behaviour. Intentions are, in turn, predicted by three variables: attitudes (which reflect a person's evaluation of behaviour performance), subjective norms (which reflect a person's perceptions of important others' approval for behaviour performance) and PBC.

Meta-analytic reviews of the TPB support the model in that all these variables are predicted as specified (Armitage & Conner, 2001; Conner & Sparks, 2005). For example, Armitage and Conner (2001) found, across studies, that intentions and PBC accounted for 27% of the variance in behaviour and that attitudes, subjective norms and PBC accounted for 39% of the variance in intention.

In line with other attitudinal research, however, the TPB has been criticized for ignoring the social context of attitudes (e.g., Eagly & Chaiken, 1993; Sutton, 1996). There is a dearth of research applying the TPB that has examined the possibility that social context moderates relationships within the TPB. The present study tests this possibility.

Context could affect TPB relationships by altering participants' questionnaire responses. It is assumed that where participants complete measures does not affect the responses generated to measures of TPB constructs. For example, university students' responses to a TPB questionnaire about exercise are assumed to be equivalent in the non-behavioural contexts they typically complete these measures (e.g., laboratories, lecture theatres, libraries), and behavioural contexts, (e.g., gyms, football pitches) where they exercise. However, Smith and Semin (2004) argue that the context in which research is conducted cannot be ignored:

'If human behaviour is sensitive to social situations and contexts, it follows that the situation cannot be ignored when social behaviour is being studied. Sometimes the social psychological laboratory is regarded as a sterile, virtually context-free setting for studying behaviour, and thus superior to other more specific and limiting contexts…In our view this is a mistake. The laboratory is a social situation and thus many aspects of it (such as the communicative relationship between experimenters and participants) affect participants' responses, just as they do in any social situation.' (p88)

If Smith and Semin's arguments are correct, then where participants complete TPB questionnaires could affect the responses generated, and TPB relationships as a result. Currently, there is little evidence either way; the main aim of this paper is to test the moderating influence of context on TPB relationships with regard to binge-drinking behaviour. Binge-drinking is a pattern of alcohol consumption characterised by heavy drinking over a short period of time.

TPB research conducted into binge-drinking behaviour has ignored the impact of contextual factors, with research being exclusively conducted in non-drinking contexts, such as laboratories, lecture theatres and libraries. These studies typically find the attitude-intention relationship is larger than the subjective norm-intention relationship, and the relationship between

PBC and intentions is inconsistent (Armitage, Norman, & Conner, 2002; Collins & Carey, 2007; Cooke, Sniehotta, Schüz, 2007; Hagger, Anderson, Kryiakaki, & Darkings, 2007; Johnston & White, 2003; Norman, Armitage, & Quigley, 2007; Norman & Conner, 2006; Rivis, Sheeran, & Armitage, 2006). Given that subjective norms are supposed to assess social approval for behaviour, and binge-drinking is a behaviour sometimes performed to gain social approval (Guise & Gill, 2007; Johnston & White, 2003; Young, Morales, McCabe, Boyd & D'Arcy, 2004), it is notable that the TPB research into binge-drinking shows only a moderate relationship between subjective norms and intentions (for an exception see Huchting, Lac & LaBrie, 2008).

One way to account for these results is to suggest that context affects the results reported in TPB studies; it could be that attitudes are more predictive than norms *when questionnaires are completed in a non-drinking context.* As participants often complete questionnaires on their own, they may downplay or underestimate the impact of others' behaviour, reducing the subjective norm-intention relationship. In contrast, in a drinking context there are cues to binge-drinking, including the cue of other people drinking. These cues may make participants focus more on the importance of social approval in intentions to binge-drink, leading to stronger subjective norm-intention relationships. Support for this position comes from a recent study (French & Cooke, in press), where participants completed measures of TPB constructs regarding drinking that evening in a drinking context (i.e. a bar). In this study, intentions were predicted by subjective norms as strongly as by attitudes (β=0.42 for both constructs)

An alternative explanation for the small correlations found between subjective norms and intention in binge-drinking studies is the *timeframe* used to measure TPB constructs in previous studies. TPB binge drinking studies typically measure TPB cognitions relating to binge drinking over the next week (e.g., Norman et al., 2007) or the next two weeks (e.g., Johnston & White,

2003. According to Construal Level Theory (CLT: Trope & Liberman, 2000, 2003) using these timeframes may enhance the attitude-intention relationship. For example, Trope and Liberman (2003) state: '…general preexisting attitudes are likely to be better predictors of distant-future than near-future behavioural intentions.' (p415).

Therefore, previous TPB studies may overestimate the size of the attitude-intention relationship, relative to the subjective norm-intention relationship, because they measure intentions that are distant to behaviour performance. This is problematic because Trope and Liberman (2000) claim that contextual factors are more predictive of near future intentions compared with attitudes, meaning that variables that are more sensitive to context, such as subjective norms, will be better predictors of intention for near future as opposed to distant future events. Thus, subjective norms may be more predictive of binge-drinking intentions when participants are asked to consider their intentions in the near future (e.g., tonight, tomorrow) as opposed to the distant future (e.g., next week, fortnight) where contextual factors are less salient. Support for this position again comes from the French and Cooke (in press) study, where participants were asked about their intentions to drink that evening, and subjective norm was as strong a predictor of intentions as was attitude.

The present study was conducted to disentangle the relative impact of context and timeframe on relationships within the TPB. The aim of the present study was to provide an assessment of the prediction afforded by the TPB depending on context and timeframe. A quasi-experiment was conducted with student participants approached in either a bar or library. Individuals who agreed to participate were randomly allocated to receive one of three questionnaires. All questionnaires measured TPB constructs regarding binge-drinking, but the timeframe in the items was manipulated, with participants asked about their binge-drinking in

one of the following timeframes = tonight, tomorrow night or next week. The following predictions were made:

H1. Subjective norms will be better predictors of intentions when measured in a drinking context compared to a non-drinking context.

H2: Subjective norms will be better predictors of intentions when timeframe is near compared to distant.

H3: Attitudes will be better predictors of intention when timeframe is distant compared to near

H4: Context and timeframe will interact to affect prediction of intentions by subjective norms.

Evidence for the first hypothesis supports the explanation derived from Smith and Semin (2004) and Sutton (1996) that context affects TPB relationships, while evidence for the second and third hypotheses supports the explanation derived from CLT that timeframe affects TPB relationships. Evidence for the fourth hypothesis supports both explanations.

Method

Design

A 3 (timeframe: tonight, tomorrow night, next week) by 2 (context of data collection: campus bar vs. library) between participants design was used. Participants were randomly allocated to timeframe but not context of data collection. Six questionnaires were produced, to account for differences in timeframe and gender.

Participants

Three hundred and eight-three participants (190 males, 193 females) completed the study. Participants were approached in either the campus bar (N = 195, 97 male, 98 female), or in the library (N = 188, 93 males, 95 females) of a large English university. Another 67 people were approached but refused to participate in the study, giving a response rate of 85%.

Procedure

Participants who were approached were given an information sheet detailing the study. Questionnaires were randomly ordered in terms of timeframe prior to administration, with researchers blind to timeframe. In the bar, participants were approached by at least two researchers once they were sitting down, and usually had purchased a drink but were not drinking already. In the library, participants were approached as they walked past the entrance/exit. Questionnaires were administered only on Monday, Tuesdays, and Wednesdays to ensure that weekend drinking was not taken into account in the "tomorrow" condition.

Measures

At the start of the questionnaire participants were provided with a definition of binge-drinking for two reasons. First, several definitions of binge-drinking exist (see Murgraff, Parrott, & Bennett, 1999). Second, research shows that students are unsure how many units constitute binge-drinking (see Cooke, French & Sniehotta, 2010). Binge-drinking was defined for women as consuming 7 or more alcoholic units and for men as consuming 10.5 or more alcoholic units in line with previous research (Murgraff et al., 1999). Below the definition, information was provided outlining how many units there are in various alcoholic drinks; 1 unit is 8g of alcohol (Department of Health, Home Office, Department for Education & Skills, Office for Culture, Media & Sports, 2007). After reading these definitions, participants were asked to report how many pints of lager, shots of spirits, and glasses of wine they consumed the last time they went out drinking, before completing TPB items. All TPB measures had 7-point response scales. *Intentions* were measured using three items, 'I plan/intend/will try to drink at least 7/10.5 units of alcohol tomorrow night'. *Attitudes* were measured using five items, all items used the same stem 'For me to drink 7/10.5 units of alcohol tomorrow night is…' with these endpoints (good/bad,

beneficial/harmful, enjoyable/unenjoyable, pleasant/unpleasant, sensible/not sensible). *Subjective norms* were measured using two items, 'Most people who are important to me think that I should/Should not drink at least 7/10.5 units of alcohol tomorrow night' and 'It is expected of me to drink at least 7/10.5 units of alcohol tomorrow night' (Extremely likely to Extremely unlikely). *PBC* was measured using two items, 'For me to drink 7/10.5 units of alcohol tomorrow night would be possible/impossible' and 'If I wanted to I could drink at least 7/10.5 units of alcohol tomorrow night' (Definitely true to Definitely false).

Cronbach's alpha coefficients were calculated separately for bar/library samples and tonight/tomorrow/next week samples. The results were similar for each of these samples: Attitudes, PBC and intentions were always internally consistent (alphas ranged from 0.76 to 0.97), while subjective norms varied in internal consistency (bar alpha = 0.53, library alpha = 0.68; tonight alpha = 0.56, tomorrow alpha = 0.63, next week alpha = 0.60). Therefore, attitudes, PBC and intentions were combined into composite measures, whereas subjective norm items were kept separate in all analyses.

Data Analysis

Data analysis proceeded by first, checking randomisation to timeframe condition. Chi-square analysis was conducted to assess gender differences for conditions and a series of one-way ANOVAS were conducted to see if past alcohol consumption among participants varied by condition. Second, we compare mean scores on TPB variables by experimental condition. A series of two factor between-participants ANOVAs were performed to investigate whether respondents' scores on TPB variables differed by context or timeframe condition.

Third, we compare prediction of intentions for participants in the bar and library contexts. Moderated regression was used to test the prediction that context moderates TPB relationships,

following the recommendations of Aiken & West (1991). The predictor variable (e.g. subjective norm) was entered on the first step followed by the moderator (context) on the second step and the interaction between predictor and moderator on the final step. Moderation is present if the interaction term is significant.

Fourth, we examine the prediction of intentions for participants asked about their intentions regarding either tonight, tomorrow or next week. Moderated regressions were conducted to see if TPB relationships were moderated by timeframe. Because there were three conditions it was necessary to create two dummy coded variables, Night 1 (where "tonight" is coded as 1, and the other two nights as 0) and Night 2 (where "tomorrow" is coded as 1, and the other two nights as 0).

Finally, we tested the interaction between context and timeframe, to see if this affected TPB relationships. In these analyses, interactions between context and the two timeframe variables (Night 1, Night 2) with TPB predictors were calculated to assess the possibility that context and timeframe interact to affect TPB relationships.

Results

Randomisation to timeframe condition

Chi-square analysis showed that there were no gender differences between the three timeframe conditions χ^2 (2, N = 383) = 0.00, p = .997. There were also no differences between the timeframe conditions in terms of self-reports of the amount of alcohol consumed the last time they went out drinking, collected prior to completing TPB measures.

Mean Scores on TPB variables, according to Context and Timeframe

The mean scores for TPB variables according to condition are shown in Table 1. Intentions to binge-drink were significantly higher for participants who answered questions in the

bar (M = 9.59) compared to the library (M = 8.51), and for next week (M = 11.57) compared to tomorrow (M = 8.88) and tonight (M = 6.90). Attitudes were significantly more positive in the bar (M = 19.79) compared to the library (M = 18.15), and for next week (M =19.75) compared to tomorrow (M = 19.19) and tonight (M = 18.06). PBC was higher for participants in the bar (M = 11.70) compared to the library (M = 10.98). Subjective norm scores were significantly higher for next week (SN1M = 3.63, SN2M = 3.24) and tomorrow (SN1M = 3.58, SN2M = 3.24) relative to tonight (SN1M = 3.07, SN2M = 2.67).

Does context affect the prediction of intentions by TPB variables?

All TPB variables showed significant, positive, correlations with intentions in both contexts (see Table 2). In both contexts, attitudes (r_{Bar} = .52, $r_{Library}$ = .62) and subjective norm 2 (r_{Bar} = .69, $r_{Library}$ = .61) had large-sized correlations with intentions The proportion of variance in intentions accounted for by TPB variables was similar in analyses for samples recruited in the bar (R^2 = .54; F(4, 184) = 54.43, p < .001) and in the library (R^2 = .51 ; F(4, 180) = 47.08, p < .001; see Table 3). Considering TPB constructs, subjective norm 2 was a stronger predictor of intentions in the bar ($beta_{Bar}$ = .57 vs. $beta_{Library}$ = .37; both p's <.001), whereas attitudes were a stronger predictor of intentions in the library (beta $_{Bar}$ = .22, p<.01 vs. $beta_{Library}$ = .39; p<.001). Moderated regression analyses was conducted to test the idea that context moderated the size of attitude-intention, subjective norm 2-intention and PBC-intention relationships (see Table 4). Context moderated the subjective norm 2-intention relationship, with a significant interaction between subjective norm 2 and context (beta = -.29, p < .05). The negative beta value means that prediction of intention by subjective norm 2 was better for the bar sample compared with the library sample. Context did not moderate the attitude-intention relationship; the interaction between attitude and context was not significant (beta = .08, p = .68). Context also did not

moderate the PBC-intention relationship; interaction between PBC and context was not significant (beta = -.03, p = .88).

Does timeframe affect the prediction of intentions by TPB variables?

Table 3 outlines regression results for timeframe conditions. There are two notable results from these analyses. First, there are differences in TPB relationships for the three conditions. Subjective norm 2 appears a stronger predictor of intentions for tonight (beta = .53, $p < .001$) and tomorrow (beta = .54, $p < .001$) compared to next week (beta = .33, $p < .001$). Attitudes have a stronger predictive relationship with intentions for next week (beta = .35, $p < .001$) compared to tonight (beta = .23, $p < .01$) and tomorrow (beta = .31, $p < .01$). PBC was only a significant predictor for next week (beta = .22 $p < .001$). Second, the regression for next week explained more variance in intentions ($R^2 = .62$; $F(4, 114) = 45.89$, $p < .001$) than regressions for tomorrow ($R^2 = .51$; $F(4, 125) = 30.86$, $p < .001$) or tonight ($R^2 = .49$; $F(4, 124) = 29.79$, $p < .001$).

On the basis of the moderated regression analyses (see Table 5) there was no evidence that timeframe moderated the relationship between subjective norm 2 and intentions, however, timeframe did moderate the attitude-intention relationship. The interaction between Night 1 and attitude was significant (beta = -.47, $p < .01$), whereas the interaction between Night 2 and attitude was not significant (beta = .03, p = .84). The results for PBC were similar, with a significant interaction between Night 1 and PBC (beta = -.45, $p < .01$) and a non-significant interaction between Night 2 and PBC (beta = -.02, p = .89). These results show that attitudes and PBC have significantly weaker relationships with intention when participants are asked to consider binge-drinking that night as opposed to tomorrow or next week.

Do Context and Timeframe interact to affect TPB relationships?

Three additional moderated regression analyses investigated the possible three-way interaction between TPB predictors of intention, context and timeframe (summarized in Table 6). There were significant three-way interactions between subjective norm 2, context and Night 1 (beta = -.12, $p<.05$) and also between subjective norm 2, context and Night 2 (beta = -.11, $p<.05$). The interaction terms were decomposed using simple slope analysis (Aiken & West, 1991).

For next week (see Figure 1), there was little difference in the subjective norm 2-intention relationship due to context, particularly when subjective norms were high. For participants asked about tonight, (and to a lesser extent, about tomorrow) there was a clear difference due to context in the subjective norm 2-intention relationship. Subjective norms did not predict intentions when participants completed measures in the library. In contrast, subjective norms were a much better predictor of intentions when participants were recruited in the bar. Thus the subjective norm-intention relationship is stronger in the bar than in the library when participants are asked about specific proximal nights, but equally strong in both contexts when participants were asked about the next week. For attitudes and PBC there were no three-way interaction terms, meaning context does not interact with timeframe to affect the size of attitude-intention or PBC-intention relationships.

Discussion

The present study provides the first direct evidence of which we are aware that the predictive ability of TPB constructs are moderated by both context of questionnaire completion and timeframe. There was evidence for these differences in both relationships within the TPB and the amount of variance in intention accounted for by the TPB. Hypothesis 1 was supported as subjective norms were a better predictor of intentions in a drinking context compared to a non-drinking context. Hypothesis 2 was not supported because the subjective norm-intention

relationship did not vary by timeframe, however hypothesis 3 was supported because attitudes better predicted intentions for distant compared to near events. Hypothesis 4 was supported because context and timeframe interacted to affect the subjective norm-intention relationship.

We have produced evidence for the importance of context and timeframe for TPB relationships. The present study demonstrated that context affects the size of subjective norm-intention consistency, with greater consistency found in a drinking context compared to a non-drinking context. In addition, the study also illustrates the impact of timeframe on attitude-intention and PBC-intention relationships; Attitudes and PBC had stronger relationships with intentions when participants were asked to consider their intentions for the next week, compared to intentions for tomorrow or tonight. In addition, there was an interaction between context and timeframe that affected the subjective norm-intention relationship. The subjective norm-intention relationship is stronger in the bar than in the library when participants are asked about specific nights, but equally strong in both contexts when participants were asked about the next week.

Ajzen and Fishbein (1980) suggest prediction will be maximised when TPB research is conducted in line with the TACT (Target, Action, Context, Time) principle, which emphasises the importance of matching context and timeframe (of questionnaire items of cognition and behaviour). However, the TACT principle does not say anything about the context of *data collection* nor does it say which (matched) timeframe should yield the best *prediction*. Hence, we have drawn on the work of Smith and Semin (2004) and Sutton (1996) and CLT (Trope & Liberman, 2000; 2003) to develop predictions, given a lack of previous empirical TPB work.

The present study offers an explanation of differences in results from French & Cooke (in press), who found subjective norms predicted binge-drinking intentions as well as attitudes, and other studies (e.g., Hagger et al., 2007; Norman et al., 2007; Norman & Conner, 2006) that found

attitudes were a better predictor of intentions compared with subjective norms. Similar to French and Cooke, the present study found that participants who complete TPB measures in a drinking context, report subjective norms that had a large and significant relationship with their binge-drinking intentions. Similar to Norman and Conner (2006) we found that when subjective norms were elicited in a non-drinking context, they had a smaller relationship with binge-drinking intentions, possibly because this context reduces perceptions of social approval for binge-drinking. Thus, context moderates the subjective norm-intention relationship for binge-drinking, with subjective norms a much better predictor of intentions when measured in a drinking context compared to a non-drinking context.

Why should context affect the relationship between subjective norms and intentions? One potential reason is that context may affect the salience of subjective norms. Social approval is likely to be a more salient reason for intending to binge-drink in drinking contexts, as significant others are present in drinking contexts and binge-drinking is a behaviour that some individuals engage in to gain social approval (e.g., Guise & Gill, 2007; Young et al., 2004). So, greater saliency of social approval for binge-drinking in drinking contexts could explain the increased subjective norm-intention consistency. However, data from Table 1 show that there was no difference between overall levels of subjective norms in the two contexts. This result stems from participants who completed the questionnaire in a bar, and were asked about drinking tonight; this group had the lowest subjective norm scores in any condition. Although a surprising finding, we should not confuse low scores with low prediction. It may be that lower approval was perceived because data was collected on Mondays, Tuesdays and Wednesdays, and undergraduates may perceive little approval for binge-drinking. Research is needed to examine how drinking varies over the different days of the week. Alternatively, context may affect the

accuracy of subjective norms: completing measures in a drinking context may better reflect actual social pressure (or absence of such pressure) to binge-drink than measures completed in non-drinking contexts. This greater accuracy could explain the improved prediction of intention.

The present study also provided one of the first manipulations of timeframe in TPB research, with participants asked to consider tonight, tomorrow or next week when outlining their responses. The fact that responses differ according to timeframe is consistent with the TACT principle that measurement of cognitions is affected by the timeframe participants are asked to consider (cf. Ajzen & Fishbein, 1980). Timeframe moderated attitude-intention and PBC-intention relationships such that both attitudes and PBC were stronger predictors of intention for next week compared to tomorrow and tonight. These findings are consistent with the predictions of CLT (Trope & Liberman, 2000, 2003), that distant future events prompt more abstract construals compared to near future events. Future TPB studies are needed to see if this effect generalises across other behaviours.

Why should timeframe affect the strength of TPB relationships? One possibility is that a timeframe of one week allows participants seven evenings where they have the opportunity to binge-drink, and consequently the impact of context will be much less – there are up to seven different contexts, and if people like drinking, it is likely that at least one context will be supportive of this behaviour, and hence the behaviour will be attitudinally driven. Similarly, within these seven opportunities individuals who lack control over binge-drinking are likely to be able to identify one context that facilitates their behaviour. Alternatively, these effects for attitudes and PBC may reflect greater abstraction about next week as opposed to tonight and tomorrow. Trope and Liberman (2003) convincingly show that variation in desirability of behaviour is more influential in guiding distant future decisions, so when researchers ask

participants about TPB constructs relating to the next week, responses better reflect what people desire rather than cognitions relating to the nearer future.

This study also highlights the interaction between context and timeframe for the subjective norm-intention relationship. Figure 1 shows that responses in a drinking context are sensitive to variation in timeframe, with responses in the bar x next week condition highly similar to responses in the library x next week condition. This suggests context matters if researchers ask about drinking now, and does not matter if researchers ask about drinking in the next week. This is consistent with Trope and Liberman's (2000) claim that contextual factors are more important in considering intentions for near future events and less important for distant future intentions.

Implications for TPB

The moderating effect of context on the subjective norm-intention relationship found in this study provides empirical support for the position of Smith and Semin (2004) and Sutton (1996) that context affects the results of studies investigating social behaviour. Further, it suggests that TPB research in general may underestimate the impact of subjective norms on intention because most studies collect data in contexts where the behaviour is not performed. This means that the smaller effect sizes reported for the subjective norm-intention relationship in reviews of the TPB (e.g., Armitage & Conner, 2001), compared to attitude-intention or PBC-intention relationships, may be underestimates at least partly because subjective norm measures are more sensitive to the measurement context in which the behaviour is performed. As our results show, subjective norm-intention consistency was affected by the context in which participants complete their measures. In contrast, context did not moderate attitude-intention or PBC-intention consistency.

We have provided evidence that researchers should pay more attention to the role of context, as it moderates the subjective norm-intention relationship. Further research is needed for other behaviours to investigate the impact of context on TPB relationships, to assess the generalizability of the findings reported here.

Varying the timeframe altered the proportion of variance in intention explained by the TPB. One explanation for this difference is the impact of PBC on predicting intention; inspection of Table 4 shows that while PBC is a significant predictor of intention to binge-drink next week, it does not predict intention to binge-drink for tomorrow or tonight. Thus, research is needed to investigate why PBC does not predict intention to binge-drink on a specific occasion.

A key implication of this paper is that the TPB could do better at predicting behaviour because factors that influence behaviour, e.g., other people's behaviour, environmental cues to action, are not present in non-behavioural contexts, or not salient when asked about the week ahead, undermining the validity of the data collected. We suggest that one way to improve behavioural prediction is to conduct research in more ecologically valid settings, such as bars, and see if the structure of the TPB and other social cognitive models is as useful in these settings as it appears to be in non-behaviour settings. This approach may lead to a revision of the theory to incorporate variables that are more strongly tied to behaviour performance.

In practical terms, if TPB research is going to inform interventions to encourage health-promoting behaviours and discourage health-risk behaviours, we need to be sure that variables which appear important when measured in non-behavioural contexts are also important when measured in behavioural contexts. Previous binge-drinking research would suggest that targeting attitudes is the key to changing intentions. This paper would suggest that subjective norms are the most important variable when it comes to predicting intentions to binge-drink in a drinking

context. Thus, to affect binge-drinking in bars, we should target subjective norm; to affect binge-drinking outside of bars, we should target attitudes. Experimental work is needed to see if targeting normative beliefs can reduce binge-drinking intentions, in particular intentions to binge-drink for the night ahead in a drinking context.

Limitations

There are several limitations with the present research. The subjective norm items were not internally consistent. Although alpha value (α=0.68 for the library sample almost reached the accepted alpha criterion of 0.7, the bar sample alpha was low (α=0.53). Future research should examine conditions under which alphas vary by context. In addition, participants were not randomly assigned to study location, meaning that the sample in the bar may be systematically different from the library sample. However, there were no differences in gender or alcohol consumption between participants assigned to different timeframe questionnaires, suggesting this randomisation was successful. Conversely, by collecting data from individuals in a drinking context we were more likely to access people who actually binge-drink. It could be the case that TPB relationships are inflated in non-drinking contexts because of the inclusion of participants who do not consume alcohol, and who possess no intention to binge-drink. Finally, the study collected data on all TPB cognitions at the same timepoint, so we cannot be sure about the direction of causality for the relationships reported. Future studies should use experimental designs, and collect data longitudinally, to address this.

The present paper has a number of strengths. It is the first to examine the moderating impact of context and timeframe on TPB relationships, and the use of a quasi-experimental design allows some inference of cause. Although this design is not as strong as a fully

randomised experiment in terms of internal validity, it is stronger in terms of external validity, by looking at assessment of cognitions in situ.

In conclusion, the present paper demonstrates the impact of context and timeframe on TPB relationships. Simply put, where participants complete measures, and what timeframe participants are asked about, has a significant impact on TPB relationships. Ignoring context appears to have biased previous TPB research, while timeframe needs to be more fully considered and justified when designing TPB studies. More generally, this paper questions the accuracy of information generated using existing TPB data collection procedures and suggests a reappraisal of the importance of context and timeframe in research that utilizes the TPB.

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Table 1

Sample characteristics and descriptives

Sample	Males	Females	Attitude	SN 1	SN 2	PBC	Intention
Bar	99	98	19.79_{a} (5.84)	3.53 (3.08)	3.08 (1.90)	11.70_{a} (3.68)	9.59_{a} (6.20)
Library	93	96	18.15_{b} (5.84)	3.31 (1.53)	3.01 (1.99)	10.98_{b} (3.51)	8.51_{b} (5.66)
Tonight	66	67	18.06_{b} (6.19)	3.08_{b} (1.44)	2.67_{b} (1.80)	10.90 (3.49)	6.90_{c} (4.71)
Tomorrow	64	64	19.19_{ab} (5.74)	3.58_{a} (1.51)	3.24_{a} (2.05)	11.74 (3.25)	8.88_{b} (6.21)
Next Week	62	63	19.75_{a} (5.61)	3.63_{a} (1.36)	3.24_{a} (1.93)	11.42 (3.23)	11.57_{a} (5.96)
bar (tonight)	30	34	19.52 (6.22)	3.28 (1.47)	2.59 (1.67)	11.30 (3.19)	7.54 (5.28)
bar (tomorrow)	37	34	19.54 (6.12)	3.59 (1.48)	3.25 (2.12)	11.92 (3.30)	9.18 (6.60)
bar (next week)	32	30	20.37 (5.07)	3.73 (1.12)	3.40 (1.79)	11.85 (2.90)	12.22 (5.73)
library (tonight)	36	33	16.74 (5.90)	2.88 (1.39)	2.75 (1.92)	10.53 (3.74)	6.31 (4.07)
library (tomorrow)	27	30	18.75 (5.24)	3.57 (1.57)	3.23 (1.99)	11.51 (3.20)	8.51 (5.74)
library (next week)	30	33	19.16 (6.07)	3.54 (1.56)	3.10 (2.05)	11.00 (3.50)	10.94 (6.15)

Note. Standard Deviations are in brackets. Means with different subscripts in each column differ by at least $p<.05$.

Table 2

Intercorrelations for TPB variables in Bar (N = 195) and Library (N = 188) samples.

Variables	1	2	3	4	5
1. Intention	1.00	.52***	.34***	.69***	.40***
2. Attitude	.62***	1.00	.49***	.47***	.52***
3. Subjective Norm 1	.48***	.53***	1.00	.38***	.44***
4. Subjective Norm 2	.61***	.49***	.53***	1.00	.30***
5. PBC	.48***	.69***	.46***	.43***	1.00

Note. * $p < .05$; ** $p < .01$; *** $p < .001$. Correlations above the diagonal are for the bar sample, correlations below the diagonal are for the library sample.

Table 3

Prediction of Intentions using TPB variables in Bar (N = 195) and Library (N =188) contexts and Tonight (N = 128), Tomorrow (N = 125) and Next Week (N =118) conditions

	Bar	Library	Tonight	Tomorrow	Next Week
Variable	Beta	Beta	Beta	Beta	Beta
Attitude	.22**	.39***	.23**	.31**	.35***
Subjective Norm 1	-.06	.09	.01	-.10	.05
Subjective Norm 2	.57***	.37***	.54***	.53***	.33***
PBC	.16*	.00	.08	.06	.22**
R^2	.54	.51	.49	.51	.62
Model *F*	54.43***	47.08***	29.79***	30.86***	45.89***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4

Moderated regressions testing the impact of context on attitude-intention and subjective norm-intention relationships

		Beta						
Step	Variable Entered	Step 1	Step 2	Step 3	R^2	Model F	ΔR^2	ΔF
1.	Attitude	.57***	.57***	.52***	.33	181.93***		
2.	Context		-.01	-.07	.33	90.79***	.00	0.09
3.	Attitude X Context			.08	.33	60.45***	.00	0.17
1.	Subjective Norm	.65***	.64***	.89***	.42	269.81***		
2.	Context		-.08	.05	.42	137.09***	.00	3.95
3.	Subjective Norm X Context			-.29*	.43	94.25***	.01	4.40*
1.	PBC	.44***	.44***	.46**	.20	91.54***		
2.	Context		-.04	-.02	.20	46.21***	.00	0.90
3.	PBC X Context			-.03	.20	30.74***	.010	0.25

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 5

Moderated regressions testing impact of timeframe on attitude-intention, subjective norm-intention and PBC-intention relationships

		Beta						
Step	Variable Entered	Step 1	Step 2	Step 3	R^2	Model F	ΔR^2	ΔF
1.	Attitude	.57***	.55***	.66***	.33	181.93***		
2.	Night1[a]		-.20***	.25	.37	107.36***	.04	22.37***
3.	Attitude X Night1			-.47**	.39	77.83***	.02	12.26**
1.	Subjective Norm 2	.65***	.62***	.65***	.42	269.81***		
2.	Night1[a]		-.17***	-.10	.45	151.57***	.03	19.87***
3.	Subjective Norm 2 X Night1			-.09	.45	101.63***	.00	1.41
1.	PBC	.44***	.42***	.52***	.20	91.54***		
2.	Night1[a]		-.22***	.21	.24	60.77***	.04	24.36***
3.	PBC X Night1			-.45**	.26	44.22***	.02	8.66**

Note. * $p < .05$; ** $p < .01$; *** $p < .001$. [a]Night 1 is a dummy-coded variable: Tonight is coded as 1, Tomorrow and Next Week coded as 0.

Table 6

Testing three-way interaction between TPB variables, Context and Timeframe (N=375)

	SN2	Attitude	PBC
Variable	Beta	Beta	Beta
TPB variable	.64***	.71***	.64***
Context	-.05	-.04*	-.03
Night 1	-.28***	-.30***	-.35***
Night 2	-.22***	-.18***	-.23***
Context X TPB	.06	.03	-.01
Context X Night1	-.07	.02	-.03
Context X Night2	.01	.01	.00
TPB X Night1	-.03	-.22**	-.25***
TPB X Night2	-.01	-.08	-.12
TPB X Context X Night1	-.12*	.00	.03
TPB X Context X Night2	-.11*	-.04	-.03
R^2	.50	.41	.31
Model *F*	33.96***	23.34***	15.28***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Figure 1: Interaction between Subjective Norm, context and timeframe