Drinking before going to licensed premises:

An event level analysis of pre-drinking, alcohol consumption and adverse consequences

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Short running head: Event-level Analysis of Pre-Drinking
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Abstract

Background: Research in the US and the UK indicates that drinking before going out (commonly called ‘pre-drinking’) is common among young people and associated with increased harm. Based on Swiss data, this study investigates differences in alcohol consumption and adverse consequences for evenings when persons consumed alcohol before going to a licensed premise (i.e., pre-drinking), drank on-premise only or drank off-premise only.

Methods: Using the recently developed Internet-based Cell phone optimized Assessment Technique (ICAT), alcohol consumption and drinking location were assessed at six time points (5pm to the next morning) on Thursdays, Fridays, and Saturdays over five consecutive weeks by means of participants’ cell phones. Overall, 7,828 assessments provided by 183 young adults (53.0% female, mean age = 23.1 [SD = 3.1]) on 1,441 evenings were analyzed by means of cluster-adjusted means and proportion tests and of multilevel structural equation models including indirect effects.

Results: Higher alcohol consumption occurred on evenings with pre-drinking (7.1 drinks on average) compared to on-premise only (4.2 drinks) and off-premise only (4.3 drinks) evenings. Concurrently, adverse consequences occurred more often on evenings with pre-drinking (23.8%) than on evenings with on-premise drinking only (13.9%) and off-premise drinking only (12.0%). Pre-drinking was indirectly associated with adverse consequences, mediated by larger amounts of alcohol consumed in the evening.

Conclusions: Because of its association with heavier consumption and related consequences, pre-drinking, especially combined with on-premise drinking, represents a major target for prevention. Structural measures, such as reduction of late-night off-sale opening hours, restricting access to already inebriated patrons and staff training in responsible beverage service, are needed to prevent high total consumption and related harm among young people.
Keywords: Pre-drinking, on-premise drinking, drinking consequences, event-level, Internet-based Cell phone optimized Assessment Technique (ICAT)
Introduction

Late-night drinking and drinking in public settings have been found to be linked to harmful consequences such as accidents, injuries, victimization and aggression among young people (Graham et al., 2002; Harford et al., 2003; Nyaronga et al., 2009; Rossow and Hauge, 2004; Wells and Graham, 2003). Recent evidence from North America and the United Kingdom suggests that young people’s heavy drinking occasions in public settings are often preceded by “pre-drinking” (also known as ‘pre-partying’, ‘pre-gaming’, ‘pre-loading’, ‘frontloading’, see Borsari et al., 2007; DeJong et al., 2010; Forsyth, 2010; Pedersen and LaBrie, 2007; Wells et al., 2009; Zamboanga et al., 2011; Zamboanga et al., 2010); that is, alcohol is consumed in a private dwelling (e.g., at home) or in a public place (e.g., public park) before young drinkers go to a party or drinking establishment where more alcohol may or may not be consumed (Forsyth, 2010; Pedersen and LaBrie, 2007). Pre-drinking typically occurs in locations with relatively low-cost alcohol and often involves rapid consumption of large quantities of alcohol (Hughes et al., 2008; Wells et al., 2009).

Previous studies found that between 65% and 75% of US college students pre-drank in the weeks prior to the study (DeJong et al., 2010; Pedersen et al., 2009), and about 60% of UK pub attendees pre-drank on the evening of interview (Hughes et al., 2008). Those who pre-drink reported doing so three to four times per month (Kenney et al., 2010; Pedersen et al., 2009). Studies have shown that, on average, young men reported consuming three to five drinks and women two to four drinks in a pre-drinking session (Hammersley and Ditton, 2005; Kenney et al., 2010; Pedersen and LaBrie, 2008; Pedersen et al., 2009), or eight drinks (men) and six drinks (women) over the entire evening (Pedersen and LaBrie, 2007). Pre-drinking was associated with consuming significantly larger amounts of alcohol over the evening in comparison to people who did not pre-drink (Hughes et al., 2008; Kenney et al., 2010) and to a non pre-drinking night for the same individuals (LaBrie and Pedersen, 2008).
Pre-drinking has also been found to be associated with an increased risk of adverse experiences and harms such as absenteeism at school/work, blackouts, drunk driving, alcohol poisoning and aggressive or violent acts (DeJong et al., 2010; Hughes et al., 2008; LaBrie et al., 2011; LaBrie and Pedersen, 2008; Pedersen and LaBrie, 2007; Pedersen et al., 2009).

Reasons given for pre-drinking include saving money (i.e., lower prices for off- versus on-premise alcohol), getting in the mood for partying (i.e., loss of inhibition), becoming intoxicated, and socializing with friends or facilitating contacts with potential sexual partners (DeJong et al., 2010; Forsyth, 2010; Pedersen et al., 2009; Wells et al., 2009). Although pre-drinking to save money implies substituting pre-drinks for on-premise drinks, a few studies suggest that pre-drinking does not reduce the amount of alcohol consumed on-premise.

Pedersen and LaBrie (Pedersen and LaBrie, 2007) and Read and colleagues (Read et al., 2010) found that US college students drank about one and a half times more on pre-drinking days compared to non pre-drinking days, and that about half of the total amount of alcohol was consumed after pre-drinking. Comparing pre-drinkers with non pre-drinkers among UK pub attendees, Hughes et al. (Hughes et al., 2008, p. 62) concluded that “pre-nightlife drinking does not appear to be a substitute for consumption in nightlife; rather, those drinking before a night out drink similar amounts while out to those who do not”.

Previous studies have been conducted only in the US and the UK and have used retrospective (Borsari et al., 2007; Kenney et al., 2010; LaBrie et al., 2011; LaBrie and Pedersen, 2008; Pedersen and LaBrie, 2007; Pedersen and LaBrie, 2008) or single point assessment methods (Forsyth, 2010; Hammersley and Ditton, 2005; Hughes et al., 2008; Reed et al., 2011) that have important limitations. Retrospective assessments of 30 days and longer are subject to recall bias because people’s ability to recall characteristics of drinking occasions and drinks consumed on these occasions declines considerably after two or three days (Ekholm, 2004; Gmel and Rehm, 2004). Single-point face-to-face interviews conducted
once a night do not assess alcohol consumption and related consequences that occur after the
interview. In addition, neither of these approaches allows for an event-level investigation of
linkages between pre-drinking, alcohol consumption and consequences. Finally, most studies
have compared pre-drinkers to non pre-drinkers rather than pre-drinking versus non pre-
drinking occasions within individuals.

In the present study, we applied the recently developed Internet-based Cell phone-
optimised Assessment Technique (Kuntsche and Labhart, in press) to capture consecutive
snapshots of participants’ alcohol consumption throughout entire evenings. More precisely,
data regarding alcohol consumption and drinking locations were collected at six measurement
points from 5pm until 11am the next morning every Thursday, Friday and Saturday over five
consecutive weeks. Additionally, the last assessment included reporting of adverse
consequences experienced the previous evening. This data collection method was designed to
map the natural drinking history of individuals throughout entire evenings. Thus, instead of
asking participants about their behavior on ‘pre-drinking occasions’ (as defined by
themselves), evenings were divided into sequences of events and pre-drinking occasions –
defined as the consumption of alcohol in a private dwelling or public place before going to
commercial establishments where alcohol is served ‘on-premises’ – were identified a
posteriori.

The aim of the present study is to investigate differences in the number of drinks
consumed and adverse alcohol-related consequences for pre-drinking evenings, on-premise
only evenings (i.e., without pre-drinking) and off-premise only evenings within individuals
over weekend days. Because multiple evenings are recorded for the same individuals, the
study design enables an event-level intra-individual analysis, with participants serving as their
own controls. Two specific hypotheses will be tested:
(1) that higher overall alcohol consumption will occur on pre-drinking evenings than on on-premise only evenings, with no difference in on-premise consumption on pre-drinking versus non pre-drinking evenings;

(2) that more adverse consequences will occur on pre-drinking evenings than on on-premise only and off-premise only evenings, with this relationship mediated by greater alcohol consumption on pre-drinking evenings.

**Methods**

**Study Design and Procedures**

The data collection was conducted using the recently developed Internet-based Cell phone-optimised Assessment Technique (ICAT: Kuntsche and Labhart, in press). This data collection technique consists of a baseline internet questionnaire completed after online registration and a series of web-based questionnaires completed on participants’ personal cell phones. To maximize sample heterogeneity, three institutions with different educational programs in the two main cities in French-speaking Switzerland were selected for recruitment. Students at each institution were sent an invitation by email by the institutions’ administrators, including a hyperlink to the study’s registration webpage. The email and webpage provided the following information: the aim of the study (i.e., to gather data on alcohol use in the evening over five consecutive weekends by means of the participants’ cell phones); a statement explaining that answers were voluntary and would be treated as confidential; that those who returned at least 60% of the cell phone questionnaires would receive a randomly-drawn voucher worth 40 to 80 USD; and contact details. Volunteers had to enter their cell phone number at the bottom of the webpage. Subsequently, they received a unique validation code in a text message (SMS) they had to enter online again to validate their cell phone number. After the code had been confirmed, participants were redirected to the baseline internet questionnaire.
Data collection by cell phone started on the first or second Thursday after registration and continued for five weeks. Every Thursday, Friday and Saturday evening, participants were sent six text messages (SMS) (at 8pm, 9pm, 10pm, 11pm, midnight and the next morning at 11am) containing a hyperlink for completing a brief questionnaire using their cell phone browser. Each questionnaire included questions about the amount of alcohol consumed and location of consumption during the preceding hour (except for the 8pm questionnaire which covered the period from 5pm to 8pm and the next morning questionnaire which referred to events since midnight). To minimise recall bias, responses were only accepted within a 12-hour period following the end of the timeframe to be recorded. Completion of each cell phone questionnaire took less than one minute.

The study was conducted between April and July 2010 and approved by the Research Ethics Board of Lausanne University (Canton de Vaud Protocol No. 223/08).

**Sample**

During the one week recruitment period, 276 participants registered and completed the baseline questionnaire. Of these, 24 (8.7%) were excluded because they did not participate in the cell phone data collection. The remaining 252 participants submitted 10,353 assessments over a total of 2,412 participant-evenings. To ensure sufficient information about drinking over the course of each evening, evenings with more than one missing assessment before midnight were removed. This resulted in the exclusion of 2,286 assessments (22.1%) and 53 participants. In addition, 16 participants (8.0%) who reported no alcohol consumption during the entire cell phone data collection were excluded. The final sample included 183 participants (97 women [53.0%), mean age = 23.1 [SD = 3.1]), who submitted 7,828 assessments over 1,441 evenings. For evenings where only 4 or 5 questionnaires were completed, missing data were imputed by means of chained equations using the Stata ICE procedure (Royston, 2005).
The 69 participants who were excluded were similar to those in the final sample in terms of gender (55.1% female; Chi-square = 0.09; p = .769), and alcohol consumption per usual occasion (mean = 3.5 drinks [SD=2.5] vs. 3.4 [SD = 1.8]; t = 0.49; p = .623), but were slightly younger (mean = 22.1 [SD = 3.3]; t = -2.29; p = .023). For more detailed information, please refer to Kuntsche and Labhart (Kuntsche and Labhart, 2011a).

Measures

Gender and age were recorded in the baseline questionnaire.

Alcohol consumption. Each cell phone assessment asked: “How many of the following alcoholic drinks did you have between…?” (relevant timeframe, i.e., 5-8pm, 8-9pm, 9-10pm, 10-11pm, 11pm-midnight and after midnight): “beer”, “wine and champagne”, “aperitifs and liqueurs”, “spirits”, “cocktails and self-mixed beverages (e.g., whiskey-coke)”, and “premixed alcopops.” Response options were “0”, “1”, “2”, “3”, “4”, and “5 or more” (coded as 5.5). A standard drink was defined as 10 grams of pure ethanol. These were summed to calculate the number of drinks consumed in the given timeframe.

Off-premise only, on-premise only and pre-drinking evenings. For the first five assessments (i.e., until midnight), participants were asked how much time they spent at the following locations: “at a home”, “traveling (bus, car, on foot)”, “outdoors (public park or natural setting)”, “at work, in class”, “in a restaurant, pub or nightclub” or “in a cultural or sporting venue (cinema, stadium, etc.)” within the above-mentioned timeframes. Answer categories were structured in half hour increments (i.e., “0”, “30”, “60”, up to “180” minutes) for the 5-8pm assessment and in quarter hour increments (i.e., “0”, “15”, up to “60” minutes) for the four following one-hour assessments. For the analyses, two categories of evenings were defined according to the locations visited during the entire evening. Evenings were coded as (1) on-premise if the participant attended any on-premise location (i.e., restaurants, pubs or nightclubs and cultural or sporting venues) at least for a short period of time and even
if no alcohol was consumed; (2) off-premise only if the participant did not report any on-premise attendance. In addition, each on-premise evening was coded dichotomously depending on whether or not the participant engaged in pre-drinking, which was defined as the consumption of at least one drink in an off-premise location (e.g., at home, traveling, outdoors) before spending time on-premise. The three types of evenings (i.e., on-premise with pre-drinking, on-premise only, and off-premise only) were used in subsequent comparisons.

Six alcohol-related adverse consequences of the previous night’s drinking were taken from the 11am assessment: hangover, injured self or someone else, black-out (not remember what happened), unplanned use of other substances, unintended or unprotected sexual intercourse, and property damage or vandalism. The score of these consequences was summed to obtain a scale ranging from 0 (no consequence) to 6.

Statistical Analysis

In the bivariate analyses, t-tests and Chi-square tests were used to compare the number of drinks consumed, the number of alcohol-related adverse consequences and the proportion of participants experiencing at least one consequence on evenings involving pre-drinking to evenings where drinking occurred entirely off-premise or entirely on-premise, with participants serving as their own controls. Standard errors of mean and proportion tests were adjusted to account for the design effect of evenings being nested within individuals using the software STATA 11.

To investigate multivariate relationships between pre-drinking, the number of drinks consumed and alcohol-related consequences, a multilevel structural equation model was estimated using the software Mplus 6.1. Gender and age were included at the individual level. Evening-level variables included day of the week (Thursday, Friday, Saturday; reference group = Thursday), pre-drinking and on-premise only attendance. Pre-drinking evenings were distinguished from the on-premise only evenings in order to estimate the effect of both
situations independently (reference group = off-premise only evening). We also assessed indirect effects of pre-drinking and on-premise attendance on alcohol-related consequences via the number of drinks consumed. Reported effect sizes were unstandardized regression coefficients (B) and explained variance ($R^2$).

**Results**

As shown in Figure 1, 689 evenings involved on-premise attendance and 752 involved no on-premise attendance (i.e., coded as “off-premise only”). Alcohol was consumed on 512 evenings (74.3%) involving on-premise attendance and 349 (46.4%) involving no on-premise attendance. Of evenings involving alcohol use and on-premise attendance, 189 involved pre-drinking with alcohol consumed on-premise on 163 evenings (86.2%) following pre-drinking.

A total of 109 participants (59.6% of all participants) reported pre-drinking at least once. As shown in Frames C and D of Figure 1, participants drank about 1 standard drink more and experienced slightly more alcohol-related adverse consequences during on-premise evenings (i.e., with and without pre-drinking) compared to off-premise only evenings, although these differences were not significant (see also Table 1). The number of drinks consumed on evenings with pre-drinking (mean = 7.12 drinks, Frame E) was significantly higher compared to on-premise only evenings (4.22 drinks) and off-premise only evenings (4.31 drinks). Although the amounts consumed before drinking on-premise (i.e., pre-drinking part; 3.60 drinks) and on-premise following pre-drinking (3.53 drinks) were slightly lower than those amounts consumed on off-premise only evenings (4.31 drinks) and on-premise only evenings (4.22 drinks) respectively, these differences were not significant.

As shown in Table 1, respondents experienced significantly more adverse consequences and were significantly more likely to experience adverse consequences on pre-drinking evenings than when drinking was done on-premise only or off-premise only.
Differences in adverse consequences for any on-premise versus off-premise only evenings were not significant.

To investigate the joint impact of different evening characteristics (pre-drinking, on-premise attendance, day of week) and the mediating role of alcohol consumption, a multilevel structural equation model was estimated. As shown in Figure 2, number of drinks consumed was significantly higher on pre-drinking and on-premise evenings without pre-drinking (vs. off-premise evenings), on Friday and Saturday nights (vs. Thursday nights) and among men. Number of consequences was significantly associated with number of drinks consumed. We also found significant direct effects on consequences of Saturday night and male gender. However, we only found significant indirect effects of pre-drinking (increase of 0.19) and on-premise drinking (increase of 0.04) on alcohol-related consequences via an increase in the total number of drinks consumed in the evenings.

--Figure 2 about here--

Discussion

Despite differences in drinking culture, data collection methods and alcohol policy (legal purchase age in Switzerland is 16), this study corroborates previous findings from research in North America and the UK that pre-drinking is a common phenomenon among young people that is associated with heavy drinking. We found a slightly lower proportion of respondents who reported pre-drinking (59.6%) compared to findings from previous research (DeJong et al., 2010; Hughes et al., 2008; Pedersen et al., 2009). However, similar results were found for higher alcohol consumption on pre-drinking versus non pre-drinking evenings (i.e., about 4 drinks without pre-drinking and 7 with pre-drinking) (Hughes et al., 2008; Kenney et al., 2010; LaBrie and Pedersen, 2008; Reed et al., 2011).

By using event-level intra-individual analysis, our study extends previous findings by ensuring that differences are not simply related to the type of people who pre-drink. The
results show that alcohol consumption was almost twice as high on pre-drinking evenings as on either off- or on-premise only evenings. This confirms our first hypothesis and supports previous research indicating that pre-drinking adds to the total amount of alcohol consumed in the evening, rather than substituting for and reducing the amount subsequently consumed on-premise (Hughes et al., 2008; Pedersen and LaBrie, 2007; Read et al., 2010). Thus, while young people may engage in pre-drinking with the goal of saving money, as described by DeJong and colleagues (DeJong et al., 2010), they may end up consuming and spending more than planned while on-premise. Alternatively, if the main motive is heightened intoxication (Reed et al., 2011; Room and Livingston, 2009), pre-drinking may be a cheap way of becoming intoxicated already before going out, but does not preclude further drinking.

The present article also adds new knowledge about the nature of the link between pre-drinking and adverse consequences. Confirming our second hypothesis, results showed that pre-drinking was associated with more adverse consequences but only indirectly, i.e. mediated by greater amounts of alcohol consumed on pre-drinking evenings. However, given that adverse consequences that tend to be particularly associated with on-premise contexts (e.g., DUI, fights) (Graham and Homel, 2008; Rossow, 1996; Stockwell et al., 1993) were not included in the present analyses and that, as we conceived pre-drinking, it involved going on-premise afterwards, these results likely reflect a conservative estimate of the association between pre-drinking and adverse consequences.

Despite its design strengths, this study also had a number of limitations. First, a non-random sample was used which may not be representative of young adults in French-speaking Switzerland; however, to minimize possible selection bias, participants were recruited from three different types of higher education schools and in two different cities. Second, the ICAT data collection approach required that participants connected their cell phones to the internet, which may have prevented some people from participating. However, use of the internet on
cell phones is very common in Switzerland and other European countries and particularly among young adults (Kuntsche and Labhart, 2011b). Third, after a couple of drinks, participants may have had difficulty remembering exactly how many drinks they had consumed during the previous time period. By using short timeframes (i.e., mostly 60 minutes) and multiple assessments, we minimized potential recall bias; however, a potential downside to frequent assessments might be assessment reactivity, in that participants may change their drinking behavior due to the perception that their behavior is being monitored. To minimize potential assessment reactivity, questionnaires were designed to be completed in less than one minute and become part of a daily routine (Kuntsche and Labhart, in press).

Further research is nevertheless needed to assess how such frequent assessments impact sample selection, retention rate and reactivity within a cell-phone based assessment technique.

Among the strengths of the study is the convenience and accuracy of measurement using cell phones, the ability to tease apart effects of pre-drinking and on-premise drinking and the ability to conduct intra-individual analyses. Moreover, based on the information of the participants’ location at a given time, it was possible to identify pre-drinking evenings a posteriori. This approach has the advantage of objectively considering all evenings with off-premise drinking followed by on-premise attendance as pre-drinking rather than just those subjectively defined by participants as intentional ‘pre-drinking’, which may be more likely to involve planned intoxication. Therefore, the present approach likely resulted in conservative estimates of the association of pre-drinking with heavy drinking and adverse consequences.

Further research is needed to better understand the relative effects of “intentional pre-drinking” versus “happening to drink before going out” by comparing self-defined pre-drinking with the present a posteriori coding approach. Additional research is also needed to better understand other forms of pre-drinking, such as drinking in a pub prior to attending a night club or drinking at home prior to attending a party. Thus, although the present results
cannot determine whether pre-drinking led accidentally to heavier consumption or was part of a planned strategy to drink more on particular evenings, the link between pre-drinking and heavy drinking is evident and should represent a major target for prevention.

Overall, by applying a longitudinal methodology (i.e., following the same individuals across multiple evenings) and using an event-level intra-individual analysis, the present study extended previous findings based on retrospective or single-point methods. Our results suggest that across the 1,441 different evenings recorded, pre-drinking combined with on-premise drinking was associated with heavier consumption and consequently greater risk of adverse consequences than other types of evenings. These findings have important implications for addressing drinking and related problems among young adults in Switzerland. In particular, structural measures may be needed to reduce high total consumption and related harm resulting from combining pre-drinking with on-premise drinking. This includes, for example, reduction of late-night off-sale opening hours, restriction of drinking in public places, restriction of access to on-premise establishments once intoxicated and staff training to better detect inebriated patrons before they enter the premises and to ensure responsible beverage service within premises to prevent intoxication among those who have engaged in pre-drinking.

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Table 1: Mean number of drinks and adverse consequences, proportion of people experiencing consequences and adjusted tests between different evening patterns showed in Figure 1.

<table>
<thead>
<tr>
<th>Evening patterns</th>
<th>Number of drinks</th>
<th>Number of adverse consequences</th>
<th>Experienced at least one consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>df</td>
<td>p</td>
</tr>
<tr>
<td>On-premise drinking [C] vs. off-premise drinking [D]</td>
<td>5.29</td>
<td>6.77</td>
<td>.010</td>
</tr>
<tr>
<td>On-premise with pre-drinking [E] vs. on-premise without pre-drinking [F]</td>
<td>7.12</td>
<td>44.53</td>
<td>.000</td>
</tr>
<tr>
<td>On-premise without pre-drinking [F] vs. off-premise drinking [D]</td>
<td>4.22</td>
<td>0.06</td>
<td>.801</td>
</tr>
<tr>
<td>On-premise with pre-drinking [E] vs. off-premise drinking [D]</td>
<td>7.12</td>
<td>32.63</td>
<td>.000</td>
</tr>
<tr>
<td>Pre-drinking [G] vs. off-premise drinking only [D]</td>
<td>3.60</td>
<td>3.76</td>
<td>.055</td>
</tr>
<tr>
<td>On-premise after pre-drinking [H] vs. off-premise without pre-drinking [F]</td>
<td>3.53</td>
<td>1.28</td>
<td>.261</td>
</tr>
</tbody>
</table>

Notes: 1) Adjusted t-test for the design effect of cluster on individuals.
2) Adjusted Chi-square test for the design effect of cluster on individuals.
3) Test performed on the 109 participants who did pre-drinking at least once during the study.
4) ['X'] refer to the letters in the frames in Figure 1.
Figure 1: Classification of evening according to the location, the total alcohol consumption and the alcohol-related consequences.

- **Total evenings**
  - Total evenings: \( N_{\text{evenings}} = 1,441 \)
  - Participants: \( N_{\text{participants}} = 183 \)

- **On-premise attendance**
  - On-premise attendance: \( N_{\text{evenings}} = 689 \)
  - Participants: \( N_{\text{participants}} = 166 \)
  
  - **Without alcohol consumption [A]**
    - Total evenings: \( N_{\text{evenings}} = 177 \)
    - Participants: \( N_{\text{participants}} = 95 \)
    - Mean number of drinks (SD): 5.29 (4.7)
    - Mean n of consequences (SD): 0.25 (0.6)
    - At least 1 consequence: 17.6%

  - **With alcohol consumption [C]**
    - Total evenings: \( N_{\text{evenings}} = 512 \)
    - Participants: \( N_{\text{participants}} = 157 \)
    - Mean number of drinks (SD): 5.72 (4.7)
    - Mean n of consequences (SD): 0.25 (0.6)
    - At least 1 consequence: 17.6%

- **Off-premise only**
  - Off-premise only: \( N_{\text{evenings}} = 752 \)
  - Participants: \( N_{\text{participants}} = 164 \)
  
  - **Without alcohol consumption [B]**
    - Total evenings: \( N_{\text{evenings}} = 403 \)
    - Participants: \( N_{\text{participants}} = 132 \)
    - Mean number of drinks (SD): 5.4 (4.7)
    - Mean n of consequences (SD): 0.25 (0.6)
    - At least 1 consequence: 12.0%

  - **With alcohol consumption [D]**
    - Total evenings: \( N_{\text{evenings}} = 349 \)
    - Participants: \( N_{\text{participants}} = 133 \)
    - Mean number of drinks (SD): 4.21 (4.6)
    - Mean n of consequences (SD): 0.25 (0.5)
    - At least 1 consequence: 12.0%

- **With pre-drinking [E]**
  - Total evenings: \( N_{\text{evenings}} = 189 \)
  - Participants: \( N_{\text{participants}} = 109 \)
  - Mean number of drinks (SD): 7.12 (5.6)
  - Mean n of consequences (SD): 0.34 (0.7)
  - At least 1 consequence: 23.8%

- **Without pre-drinking** (i.e. “on-premise only”) [F]
  - Total evenings: \( N_{\text{evenings}} = 323 \)
  - Participants: \( N_{\text{participants}} = 130 \)
  - Mean number of drinks (SD): 4.22 (3.8)
  - Mean n of consequences (SD): 0.20 (0.5)
  - At least 1 consequence: 13.9%

- **Pre-drinking part** (before going on-premise) [G]
  - Mean number of drinks (SD): 3.60 (3.6)

- **On-premise part** (after pre-drinking) [H]
  - Mean number of drinks (SD): 3.53 (3.7)
Figure 2: Direct and indirect effects of participants’ and evening characteristics on number of drinks and of alcohol-related adverse consequences (B Estimate and level of signification)

Note: * p < .05; ** p < .01; *** p < .001; pre-drinking evenings were distinguished from the on-premise evenings in order to estimate the effect of both situations independently.