Event-level associations between affect, alcohol intoxication, and acute dependence symptoms: Effects of urgency, self-control, and drinking experience

Jeffrey S. Simons, **Robert D. Dvorak**, **Bryan D. Batien**, and **Tyler B. Wray**
The University of South Dakota

Abstract

This study used experience sampling to examine within-person associations between positive affect, anxiety, sadness, and hostility and two outcomes: alcohol intoxication and acute dependence symptoms. We examined the role of urgency, premeditation, and perseverance in predicting the alcohol outcomes and tested whether the affective associations varied as a function of urgency. Participants completed baseline assessments and 21 days of experience sampling on PDAs. Hypotheses were partially confirmed. Positive affect was positively, and sadness inversely, associated with intoxication. Hostility was associated with intoxication for men but not women. Negative urgency moderated the association between anxiety and intoxication, making it stronger. However, positive urgency did not moderate the effect of positive affect. Heavier drinkers exhibited the greatest number of symptoms, yet the association between intoxication and acute signs of alcohol disorder were attenuated among these individuals. Results support the use of experience sampling to study acute signs and symptoms of high risk drinking and dependence.

Keywords

Ecological Momentary Assessment; Experience Sampling; Self-control; impulsivity; alcohol; affect

Affect regulation is a central component of many theories of alcohol use. Negative reinforcement is a prominent theoretical mechanism underlying the development of substance dependence. Acute alcohol effects include enhanced mood and euphoria and reduction of anxiety. The enhancement of positive affect and alleviation of negative affect are prominent motives for use. Nonetheless, empirical research examining associations between affect and alcohol intoxication has produced mixed findings. The reasons for these discrepancies are many, including differences in outcome variables (e.g., frequency vs. quantity vs. problems), level of analysis (e.g., global association vs. event level),

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

measurement of affect, as well as individual differences and situational factors. The current study seeks to examine associations between specific emotions and acute intoxication and dependence symptoms at the event-level and to examine the potential moderating roles of positive and negative urgency.

Affect and alcohol use

Alcohol is frequently used in celebratory situations. Among young adults, alcohol use is closely tied to socialization, and individuals report drinking because of its positive mood-enhancing effects. At the event-level, young adults consume more alcohol on days when they report higher levels of positive affect (Simons, Gaher, Oliver, Bush, & Palmer, 2005b), and drinking increases during celebratory occasions

In addition to using alcohol for enhancing positive affect, coping with negative affect is an often-cited reason for alcohol use. Consistent with this is research demonstrating positive event-level associations between negative affect and subsequent alcohol consumption. Research examining specific negative emotions has produced mixed results with some suggesting predominant associations between alcohol consumption and nervousness and others indicating predominant associations between alcohol consumption and sadness and hostility. In young adult samples in which alcohol is frequently consumed in convivial settings, inhibiting emotions such as sadness may reduce the likelihood of going out and drinking. Alternatively, sadness could provide a reason for consuming more alcohol in an effort to cope with the negative affect. Consistent with tension reduction models, several studies have reported significant positive associations between stress or anxiety and alcohol use at the event-level. Recent research has highlighted the role of social anxiety in the development of problematic drinking among young adults. Although several studies have linked negative emotion and alcohol use, effects are frequently modest and findings are inconsistent across studies. Associations between affect and alcohol consumption may vary across person.

Impulsivity as a moderator of associations between affect and alcohol consumption

Impulsivity is associated with higher levels of alcohol consumption and associated problems. Several lines of research suggest that poor control over behavior may stem, in part, from an over reliance on affective cues in guiding behavior. The UPPS model derived four facets of impulsivity based on factor analysis of the Five Factor Model of personality (NEO-PI-R) and impulsivity scales: Urgency, premeditation, perseverance, and sensation seeking. Urgency refers to the tendency to act rashly when distressed. Premeditation refers to the tendency to think before acting and to plan ahead. Perseverance refers to the tendency to continue to finish tasks that may prove difficult or tedious. Sensation seeking is the tendency to enjoy activities that are arousing or exciting and to be open to new experiences. Sensation seeking is the least correlated with the other dimensions and may be best considered a construct distinct from impulsivity and self-control. A fifth dimension, positive urgency, refers to a tendency to act rashly when experiencing positive emotion and arousal. Factor analysis of the dimensions indicates that positive and negative urgency load onto a higher-order urgency factor, while (lack of) premeditation and (lack of) perseverance load onto a higher-order factor reflecting deficits in conscientiousness. Urgency and deficits in conscientiousness are, in turn, modestly correlated. Although the model is frequently framed in respect to deficits in conscientiousness, these two higher-order dimensions bear similarity to models of self-control, which posit dimensions such as impulse and constraint (Carver, 2005), poor control and good self-control (Wills et al., 2006), reflexive and reflective systems, automatic and controlled processes, and hot and cool cognition.

Previous research with this model indicates both common and unique associations between the dimensions and a broad range of risk behaviors, including substance use and problems, binge eating, and gambling. Across studies, urgency frequently exhibits unique associations with risk behaviors and especially associated negative consequences above and beyond the shared variance with the other impulsivity traits (for a review, see Cyders & Smith, 2008). In contrast, premeditation and perseverance exhibit less consistent associations with risk behaviors after controlling for the other traits. However, each has exhibited significant associations with alcohol use and problems in previous research. Construct validity for the urgency dimensions has been supported by expected associations with mood-based risk behaviors. For example, negative but not positive urgency exhibits unique associations with engaging in risk behaviors while in a negative mood. In contrast, positive urgency is associated with reported risk behaviors while in a positive mood. In the current study, we test moderating effects of positive and negative urgency on event-level associations between affect and alcohol consumption and acute dependence symptoms. The negative urgency construct is nonspecific in respect to affective stimuli and subsequent rash acts. However, it may be expected to facilitate behaviors closely tied to the emotion. Thus, while negative urgency is broadly associated with higher rates of drinking and associated problems, it may act to potentiate links between specific negative emotions and drinking. The current study aims to examine whether negative urgency potentiates associations between specific negative emotions and subsequent alcohol consumption and dependence symptoms.

Current study

The purpose of this study was to test event-level associations between alcohol intoxication and positive and negative affect, and to examine moderating effects of urgency on the affect-alcohol intoxication associations. This was accomplished via experience sampling with PDAs (see procedure section). Daytime affect (i.e., assessed 10 am to 5 pm) was used to predict the subsequent nighttime alcohol outcomes (i.e., occurring after 5 pm). We hypothesized that daytime positive affect would be positively associated with subsequent alcohol intoxication that night. Daytime anxiety, sadness, and hostility were also hypothesized to be associated with subsequent alcohol intoxication. Positive urgency was hypothesized to potentiate the association between positive affect and intoxication, while negative urgency was hypothesized to potentiate the effects of the negative emotions. Perseverance and premeditation were hypothesized to predict the intercept but were not expected to moderate the association between affect and alcohol intoxication. Finally, we examined whether the affect, urgency, and self-control variables are associated with acute dependence symptoms beyond the effects of intoxication. Previous event-level research has found significant effects of negative affect and impulsivity on acute alcohol problems (Simons et al., 2005). Impulsivity was associated with increased negative consequences and moderated the within-person association between alcohol consumption and associated problems. In the current paper, we extend this to focus specifically on symptoms of dependence and to examine multiple dimensions of impulsivity and self-control. Previous research indicates that associations between affect and alcohol outcomes as well as alcohol consumption and problems may vary as a function of gender (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Hussong, Hcks, Levy, & Curran, 2001; Neal & Fromme, 2007). We thus include gender as a level 2 moderator in the analyses.

Methods

Participants

Participants were 102 college students recruited from a state university. Women made up 52% of the sample. The sample ranged in age from 18–24 years ($M = 20.34$, $SD = 1.50$). Ninetyfive percent of the participants were White, 1% Native American/Alaskan Native, and

4% other. Ninety-six percent were non-Hispanic. Participants were recruited through e-mail and advertisements in the student newspaper for a research project about alcohol use. All enrolled undergraduates who were moderate to heavy drinkers (i.e., ≥ 12 drinks per week for women and ≥ 16 drinks per week for men; Sanchez-Craig et al., 1995) were eligible for recruitment. One previous study includes some of the baseline data reported here (Simons, Maisto, & Wray, 2009).

Measures

Experience sampling measures—*Affect* in the previous 30 minutes was assessed by items from subscales of the PANAS-X and Larsen and Diener s affect circumplex model. Cronbach s alphas were calculated for one signal per person on three days (beginning, middle, and end of the study). We report the mean of the three estimates. Positive affect was assessed by 5 items from the joviality subscale: happy, joyful, excited, energetic, and enthusiastic (α = .91). Negative affect was assessed by three dimensions (sadness, 3 items: sad, blue, downhearted (α = .88)), (anxiety, 3 items: nervous, jittery, anxious (α = .85)), and (hostility, 3 items angry, hostile, irritable (α = .85)). Items were rated on 11-point scales ranging from 1 = not at all to 11 = extremely. Previous research supports the internal consistency and criterion validity of these and comparable affect scales assessed by experience sampling. Daytime affect was the persons mean across signals between 10 a.m. and 5 p.m.

Alcohol intoxication was assessed using two approaches. First, at the random prompts, participants reported the number of drinks they consumed over the past 30 minutes on an 11-point scale (0 10 or more drinks). Second, alcohol use during the previous night was assessed during each morning report. Participants reported the number of standard drinks they consumed and the duration of the drinking episode. These two variables, in conjunction with self-reported indices of weight and gender, were used to estimate BAC (Blood Alcohol Concentration) at the conclusion of the drinking episode (Matthews & Miller, 1979). Participants also reported their subjective level of intoxication during the drinking episode on a 1 (not at all) to 11 (extremely) scale. This combination of in situ assessments (i.e., total number of drinks randomly sampled during the night) and retrospective reports for the previous night (i.e., perceived intoxication and BAC estimate) should enhance reliability of the estimate of level of intoxication. A standardized mean of these three variables was the nighttime intoxication variable (α = .85). This is an estimate of intoxication after 5 p.m. Alpha was calculated as described above for the affect measures.

Dependence symptoms and high risk drinking in the past 30 minutes were assessed by a 7-item checklist. The question asked Have any of the following occurred in the last 30 minutes (check all that apply) and include the following choices: (1) felt sick or vomited, (2) drank when you promised yourself not to, (3) had withdrawal symptoms, (4) tried unsuccessfully to limit your drinking, cut back, or stop, (5) drank more or for a longer time than you intended, (6) drank more than usual to get drunk, and (7) felt alcohol effects less than usual for amount used. The morning assessment also assessed whether the participant; (1) passed out, (2) blacked out, (3) vomited, (4) needed to drink more than usual to get the desired effect, (5) felt less effects than usual for the amount drank the previous night, (6) whether they experience withdrawal symptoms this a.m., and (7) whether they have a hangover. Definitions of blackouts, withdrawal symptoms, and hangovers were provided during the palmtop training. The sum total of items endorsed for the repeated nighttime assessments and the morning assessments was the measure of acute dependence symptoms. This is an assessment of acute dependence symptoms experienced after 5 p.m. Though this runs the risk of a symptom being counted twice (e.g., endorsed vomiting in one of the nighttime assessments and also in the retrospective morning assessment), we expect that it is more

likely to pick up on symptoms missed in the evening (i.e., someone who is quite sick is unlikely to be responding to the assessments). In order to control for potential differences across participant-days in missing assessments, we modeled rates of symptoms (rather than the total) by including an exposure variable equal to the number of completed assessments of dependence symptoms (i.e., random plus the retrospective a.m.) in the statistical model.

The above items reflect a loss of control over drinking and include a wide range of severity in general populations (Saha et al., 2006). Items were derived from the DSM-IV criteria and review of existing measures such as the Alcohol Dependence Scale. Consistent with the Alcohol Dependence Scale, we include both dependence symptoms (e.g., withdrawal) and signs of high risk, uncontrolled, drinking (e.g., vomiting or blackouts). For brevity and consistency with the scales from which they are derived, we refer to these as acute dependence symptoms. Although alcohol dependence is a disorder that develops over time, this reflects the occurrence of repeated events. Commonly used assessments inquire retrospectively as to whether a symptom has occurred repeatedly. For example, the DSM-IV criteria inquire whether alcohol was often taken in larger amounts or over a longer period of time than was intended. Similarly, the Alcohol Dependence Scale assesses whether the person gets physically sick (e.g., vomit, stomach cramps) as a result of drinking, with response options of no, sometimes, or almost every time I drink. Our assessment approach strives to provide an accurate assessment of these specific symptoms at the time that they occur. While we recognize we are not assessing alcohol dependence as a disorder per se, we are assessing the signs and symptoms that may ultimately result in the development of the disorder. We believe examining the occurrence of symptoms over time is a valuable approach to understanding the development of alcohol-related problems.

Baseline measures

Alcohol consumption—The Modified Daily Drinking Questionnaire (DDQ-M; Dimeff, Baer, Kivlahan, & Marlatt, 1999) consisted of a grid representing the seven days of the week. The grid assessed participants' typical daily alcohol consumption and number of hours spent drinking for a typical week during the last six months. Drinking days per week was derived from this measure for screening purposes.

Alcohol dependence—A proxy alcohol dependence diagnosis was derived from items of the Young Adult Alcohol Consequences Questionnaire corresponding to DSM-IV alcohol dependence criteria. For example, the item I have had the shakes after stopping or cutting down drinking& was an indicator of withdrawal symptoms. The item I often drink more than I originally planned was an indicator of DSM-IV criterion 3 the substance is often taken in larger amounts or over a longer period than intended. Participants responses regarding alcohol-related problems occurring in the past 6 months at baseline were used to assign a proxy diagnosis. This diagnosis was used to examine criterion validity of reports of acute dependence symptoms during the experience sampling protocol. While this approach lacks the validity of a semi-structured diagnostic assessment, it provides initial estimates of associations with the experience sampling responses.

UPPS Impulsive Behavior Scale—The 45-item scale has four subscales: negative urgency, premeditation, perseverance, and sensation seeking. Items are rated on 4-point scales, ranging from 1 (*disagree strongly*) to 4 (*agree strongly*). Negative urgency, premeditation, and perseverance were used in the current study. Negative urgency (12 items, $\alpha = .88$) assesses the tendency toward rash action when upset or distressed, sample item When I feel upset, I often act without thinking. High scores indicate more impulsivity. Premeditation (11 items $\alpha = .89$) assesses the tendency to think before acting, sample item, I usually make up my mind through careful reasoning. High scores indicate more self-control.

Perseverance (10 items, α = .84) assesses the tendency to finish a task that may be boring or difficult, sample item I generally like to see things through to the end. High scores indicate greater self-control.

Positive Urgency Measure—The 14-item scale assesses the tendency to act rashly in response to positive mood states (α = .94). Examples of items include, When I am in a great mood, I tend to get into situations that could cause me problems, and Others are shocked or worried about the things I do when I am feeling very excited. Each item is rated on a 4-point scale ranging from 1 (*disagree strongly*) to 4 (*agree strongly*).

Procedure

Participants completed an initial screening survey online that included the baseline measures and then were recruited into the experience sampling study. Participants were instructed in the use of a Palm Tungsten E2 PDA that was running PMAT, modified by Joel Swendsen and CNRS, France. The program was configured to prompt participants to complete brief 1–2 minute assessments at 8 random times within 2-hour blocks from 10:00 a.m. and 2:00 a.m. The random prompts inquired about recent behavior (last 30 minutes), and thus this assessment approach provides random assessment of 25% of time during the assessment period. It strives to adequately sample daily behavior without being overly intrusive. Participants were asked to answer questionnaires during waking hours and could turn the machine off when sleeping or otherwise would be disturbed by it (e.g., taking an exam). In addition, participants were requested to initiate an initial morning assessment shortly after waking and an evening assessment between 5 and 6 p.m. The morning assessment included retrospective reports of drinking and related behaviors the previous night. This was included in order to ensure important low frequency behaviors (e.g., alcohol problems) were not missed and to provide multiple assessments of alcohol consumption (e.g., both random prompts as well as retrospective reports the following day). Participants carried the PDAs for 28 days. In order to allow participants time to adjust to the units and to minimize fatigue effects, we conducted analyses on 21 days of monitoring (i.e., days 3–24). Data collection was scheduled to avoid final exam periods and major holidays (e.g., spring break). Participants received $5–$10 for completing the baseline survey and then received response contingent payments for the ESM study (up to $100).

Analysis plan

We conducted analyses using Stata 10. The continuous outcome was analyzed with XTMIXED and the count outcome with XTNBREG. Multilevel regression analyses examined the within-person associations (Level 1) between daytime affect, nighttime intoxication, and nighttime acute dependence symptoms and the between-person (Level 2) effects of urgency, self-control, and gender on the intercepts and within-person slopes. In addition, for the dependence analysis, we examined whether effects varied as a function of mean intoxication (e.g., heavier vs. lighter drinkers). The analyses included six-orthogonal day-of-week indicators to address daily variation in mood and drinking. Level 1 variables were centered at the person mean and Level 2 variables were centered at the grand mean. Dependence symptoms were a count variable and thus analyzed with a negative binomial model.

Results

Descriptive statistics

Five participants provided 6 days or less of monitoring and were thus excluded from the analysis sample. There were a total of 2037 potential person days (i.e., 97 * 21 days). However, the dataset included 1919 person-days (i.e., there are missing days due to battery

failure and other problems). Participants completed 68% ($N = 10{,}197$) of the random prompts ($N = 14{,}962$). Note that these run 10a.m. to 2a.m. and thus some missing prompts are due to the person sleeping or otherwise unavailable. Participants completed 85% of the self-initiated morning assessments. We had sufficient data to analyze 86% ($N = 1650$) of the person-days for the alcohol intoxication analyses. For the analysis of dependence symptoms, we obtained 1613 person-days (84%) due to missing data on either the random prompts or morning assessment. Participants reported drinking on 36% of the days. They drank an average of 7.16 ($SD = 5.75$) drinks per drinking day and reported an average of one acute alcohol related symptom per drinking day ($M = 0.97$, $SD = 1.73$). There was a moderate association between proxy alcohol dependence diagnosis at baseline and mean acute symptoms reported during the experience sampling protocol $t(37.20) = 2.20$, $p = .034$, Cohen s$d = 0.59$. Table 1 includes descriptive statistics. Table 2 correlations between variables. The person-means of the level 1 variables were utilized for the correlations and thus all correlations represent between-person associations. Table 3 includes descriptive statistics for the acute dependence symptoms.

Intoxication analysis

Nighttime alcohol intoxication was regressed onto daytime joviality, sadness, anxiety, hostility, and six orthogonal day-of-week indicators (see Table 4). The Wooldridge test for serial autocorrelation revealed no autocorrelation in the data, $F(1, 96) = 0.57$, $p = .451$. Only the daytime positive affect (joviality) and sadness slopes had significant variance components, the variance was thus fixed to zero for the other affect slopes. The random intercept was predicted by gender, positive and negative urgency, premeditation, and perseverance. The affective slopes were each predicted by positive and negative urgency and gender.

Daytime positive affect ($B = 0.04$, $p = .021$) was positively, and daytime sadness inversely ($B = -0.05$, $p = .040$), associated with subsequent intoxication. As hypothesized, negative urgency moderated the anxiety association, making it stronger ($B = 0.11$, $p = .009$), see Figure 1. The association between daytime anxiety and nighttime intoxication was $B = 0.09$, $p = .004$ at 1 SD above the mean of negative urgency. In contrast, at 1 SD below the mean of negative urgency, the association between daytime anxiety and nighttime negative urgency was not significant ($B = -0.04$, $p = .239$). Unexpectedly, positive urgency also moderated the association between anxiety and intoxication, attenuating the association ($B = -0.11$, $p = .021$). The association between daytime anxiety and nighttime intoxication was $B = 0.08$, $p = .010$ at 1 SD below the mean of positive urgency. In contrast, at 1 SD above the mean of positive urgency, the association between daytime anxiety and nighttime intoxication was not significant ($B = -0.03$, $p = .376$). The hypothesized moderating effect of positive urgency on the association between positive affect and intoxication was not supported ($B = 0.01$, $p = .827$). There was a significant gender × hostility interaction ($B = 0.12$, $p = .020$). The association between hostility and intoxication was significant for men ($B = 0.10$, $p = .025$) but not women ($B = -0.03$, $p = .398$).

Premeditation was negatively associated with the intoxication intercept ($B = -0.22$, $p = .016$). Contrary to hypothesis, positive urgency exhibited a negative association with mean intoxication ($B = -0.24$, $p = .018$) and the effects of negative urgency and perseverance were not significant. Intoxication was higher on Wednesday Saturday relative to Sunday ($ps < .001$).

Dependence symptoms

We conducted a multilevel negative binomial regression analysis to examine dependence symptoms (see Table 5). The XTNBREG procedure in Stata incorporates a random

dispersion parameter (i.e., random variation in the distributions across individuals). We modeled rates of symptoms by including an exposure variable equal to the number of completed assessments of dependence symptoms (i.e., random plus the retrospective a.m.). Dependence symptoms were regressed onto nighttime intoxication, the daytime affect predictors, and six orthogonal day-of -week indicators. The intercept and the intoxication slope were predicted by gender, positive and negative urgency, perseverance, premeditation, and the subjects mean intoxication. The Level 1 affective slopes were predicted by gender and positive and negative urgency.

As expected, level 1 nighttime intoxication was positively associated with dependence symptoms each night ([Incidence Rate Ratio] *IRR* = 3.09, *p* < .001) and heavier drinkers reported more dependence symptoms (*IRR* = 11.28, *p* < .001). Subject mean intoxication moderated the association between nighttime intoxication and acute dependence symptoms (*IRR* = 0.43, *p* < .001). Lighter drinkers (1 *SD* below the mean) exhibited a stronger association (*IRR* = 4.07, *p* < .001) between intoxication and acute symptoms than heavier drinkers (1 *SD* above the mean, *IRR* = 2.34, *p* < .001). Figure 2 depicts the interaction. As shown, heavier drinkers report more symptoms at lower levels of drinking, while at higher levels of intoxication the lighter drinkers experience more acute symptoms. Finally, men reported fewer symptoms than women (*IRR* = 0.58, *p* = .012) and there was a negative association between daytime hostility and acute symptoms (*IRR* = 0.82, *p* = .041). The remaining effects were not significant at *p* < .05.

Discussion

The purpose of this study was to examine within-person associations between specific emotions, alcohol intoxication, and acute dependence symptoms and to examine between-person effects of impulsivity (i.e., urgency) and self-control (i.e., premeditation and perseverance). The hypothesized associations were partially supported and the results help advance understanding of the urgency construct and alcohol dependence symptoms. Significant associations between affect and subsequent intoxication as well as between intoxication and associated acute dependence symptoms support the validity of the experience sampling protocol.

Affect and urgency associations

At the between-subject level, anxiety, sadness, and hostility had positive bivariate associations with intoxication. Anxiety and sadness were each positively associated with dependence symptoms. Within-person associations, however, were more complex. For some participants, daytime anxiety was positively associated with subsequent alcohol intoxication. This is consistent with negative reinforcement and tension reduction models of alcohol use. However, the association between anxiety and intoxication varied as a function of urgency and was significant only for individuals higher in negative urgency or low in positive urgency. Consistent with hypothesis, negative urgency moderated the association between anxiety and intoxication, making it stronger. For those low in negative urgency, there was not a significant association. This result adds to the growing body of literature examining the role of negative urgency in alcohol use and other risk behaviors. Importantly, this is the first study, to our knowledge, that examines the central hypothesis that negative urgency moderates the within-person association between negative affect and risk behaviors assessed via experience sampling methods. However, the results also indicated that both positive and negative urgency moderated the anxiety-intoxication relationship, making it weaker and stronger, respectively. This is inconsistent with the definition of these constructs, which posit that positive urgency is specific to rash behavior while in positive moods, and negative urgency is specific to rash behavior in response to negative moods. Previous cross-sectional

survey research has supported this specificity. Thus, further research examining this issue via experience sampling and similar methods is warranted.

Sadness was also associated with subsequent intoxication. However, the association was negative. Individuals drank less on days when they reported greater sadness. This is in contrast to the positive between-person association. Previous research examining sad affect has been inconsistent. For example, in a study of children of alcoholics, Hussong and Chassin reported that sadness mediated the associations between stress and alcohol use and that impulsivity increased associations between sadness and alcohol use. Similarly, in an experience sampling study, Hussong and colleagues found significant positive associations between sadness and subsequent drinking in a young adult sample. The Hussong and colleagues study differed from the current study in that affect and drinking were assessed on subsequent days (e.g., weekday affect predicting weekend drinking). In addition, associations varied as a function of social relationships. In contrast to these positive findings, Swendsen and colleagues (2000) found a negative association between being quiet and subsequent drinking within the same day. The effect of sadness in that study was not significant, but was also negative in sign. Further research examining within-person and within-day associations between sadness and alcohol intoxication is warranted. Sadness may inhibit behavior resulting in less activity and less drinking in the short term in this population. However, it may exhibit delayed effects leading to increases in subsequent consumption, though evidence for this is mixed. Negative urgency did not moderate the effect of sadness as hypothesized. If one conceptualizes urgency as potentiating an existing action tendency, the link between sadness and intoxication may not meet this requirement.

At the between-person level, hostility and intoxication were positively associated. However, hostility only exhibited a significant within-person positive association with intoxication for men. Previous research has demonstrated positive associations between hostility on the weekends and subsequent weekday drinking, and there is also evidence that hostility during the week may be associated with a later onset of drinking during the week. Further research delineating within-day associations between hostility and intoxication is warranted. Negative urgency did not moderate the association between hostility and intoxication as hypothesized. Hostility is somewhat different than other negative emotions, such as anxiety and sadness, in that it is associated with both neuroticism and agreeableness. Future research may examine 3-way interactions between gender, hostility, and urgency.

Positive affect was positively associated with subsequent intoxication. This is consistent with previous experience sampling research and the conceptualization of drinking as motivated by appetitive processes seeking to enhance positive affect. However, the hypothesized moderating effect of positive urgency was not supported. Previous survey research indicates that positive urgency is associated with an increase in rash acts while in a positive mood. However, this did not bear out in the current experience sampling study. One difficulty with this type of design is specifying the optimal time lag between the assessed affect and subsequent behavior. In an effort to establish clear temporal ordering, we assessed affect during the day and intoxication during the night. The immediacy of reactions to positive affective arousal (central to the urgency construct) is thus somewhat unclear. Nonetheless, previous research demonstrates that mood earlier in the day is a consistent predictor of mood later in the day.

Neither positive nor negative urgency exhibited expected associations with the intoxication intercept. Although there is some evidence that urgency may be primarily associated with alcohol-related problems, previous research has found significant positive associations between both urgency constructs and alcohol consumption. In the current study, however, negative urgency was not significantly associated with intoxication, and positive urgency

exhibited a negative rather than positive association with the outcome. The current study differed from much of the previous studies on urgency in that it examined level of drinking within a sample of moderate to heavy drinkers. Thus, at least in this sample, level of intoxication did not appear to vary as a function of urgency in expected ways. In contrast, premeditation exhibited a negative association with intoxication as expected. This is consistent with previous research indicating that self-control is associated with decreased involvement in substance use.

Alcohol dependence symptoms and high risk drinking

To our knowledge, this is the first study to assess acute dependence symptoms via experience sampling. This methodology allows for examination of day-to-day variation in symptoms, between-person differences in symptom level, and time-varying predictors of symptoms. Our previous research examining alcohol problems via experience sampling utilized a broad range of symptoms that focused primarily on negative consequences (e.g., interpersonal conflict). Results of that study indicated that impulsivity and negative affect exhibited positive associations with problems. In the current study, we focused on signs and symptoms of alcohol dependence. We note that we have included many signs of excessive use (e.g., vomiting, blackouts, passing out) that are not DSM-IV dependence symptoms, but rather are potential signs of excessive use that may signal a loss of control over alcohol. Although these signs of behavioral excesses are commonly included in well-established scales such as the Alcohol Dependence Scale, they do not necessarily signify the presence of an alcohol use disorder per se. The results revealed great variability in the prevalence of the symptoms ranging from hangovers being endorsed 178 times (~ 11% of days) to blackouts being endorsed 21 times (~1.29% of days).

Validity of the assessments is supported by expected associations with alcohol intoxication at both the within- and between- person level. While heavier drinkers were the most likely to endorse symptoms, the association between daily intoxication and symptoms was attenuated for the heavier drinkers. Lighter drinkers may be the most sensitive to increases from their normative level of intoxication, resulting in adverse consequences such as vomiting, passing out, etc. In contrast, heavier drinkers may be more likely to report symptoms such as withdrawal or violating personal limits when drinking lightly. Neal and Fromme (2007) reported a similar pattern in the prediction of negative consequences, such as sexual coercion, with the association between intoxication and sexual coercion being strongest among lighter drinkers. These results may parallel that finding in potentially demonstrating a higher degree of impairment when lighter drinkers become more intoxicated than they are accustomed. Future research is warranted examining individual symptoms, since different associations with drinking behavior may be expected for symptoms such as passing out vs. violating personal limits or withdrawal. This attenuation of aversive symptoms among heavier drinkers at increased levels of intoxication may foster continued heavy drinking and the eventual development of an alcohol use disorder.

Impulsivity constructs and daily negative affect did not increase the number of symptoms over and above level of intoxication. There was a marginal effect for positive urgency, and anger was inversely associated with reported symptoms. This contrasts with previous research on negative consequences. Poor control over behavior is associated with increased negative consequences. However, when controlling for use level, it may be primarily associated with abuse-type symptoms rather than dependence symptoms.

Limitations and suggestions for future research

Several limitations should be noted. First, while the combination of self-initiated morning assessments and the random prompts provided good sampling coverage, the response rate to

the random prompts was somewhat low. This reduces the confidence that we have optimally sampled daily behavior. However, the pattern of results is largely consistent with previous research and supports the validity of the sampling protocol. Second, the dependence symptom outcome represents a somewhat broad range of symptoms, and future research may benefit from examining individual symptoms or more narrowly defined clusters. Third, the sample was a predominantly White college population and generalization to other populations should be tested.

In summary, the results provide support for both the role of positive affect driven as well as negative affect models of alcohol intoxication. Alcohol intoxication increased on nights when daytime positive affect increased. Sadness, in contrast, was negatively associated with intoxication. This may be a function of inhibiting effects of sad mood on activity levels. The effects of hostility on drinking outcomes were complex and varied as a function of outcome and gender. Support for predictions regarding urgency was mixed. Negative urgency moderated the association between anxiety and intoxication as hypothesized but did not moderate the effects of the other negative emotions as expected. There were significant associations between anxiety and subsequent drinking for individuals high in negative urgency. Positive urgency did not moderate the association between positive affect and intoxication as expected, and it exhibited an unexpected attenuation of the association between anxiety and intoxication. Further research on the construct utilizing experimental and experience sampling type approaches is warranted. Effects of negative urgency may be most likely in modifying a prepotent action tendency. Results support the role of self-control in contributing to reduced alcohol consumption in this population. Heavier drinkers exhibited greater symptoms of alcohol disorder, yet the association between intoxication and symptoms was attenuated. The study supports the use of experience sampling in studying acute signs and symptoms of alcohol dependence and high-risk drinking.

Acknowledgments

References

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association; 2000.

Anestis MD, Selby EA, Joiner TE. The role of urgency in maladaptive behaviors. Behaviour Research and Therapy. 2007; 45(12):3018–3029. [PubMed: 17923108]

Armeli S, Carney MA, Tennen H, Affleck G, O'Neil TP. Stress and alcohol use: a daily process examination of the stressor-vulnerability model. Journal of Personality and Social Psychology. 2000a; 78(5):979–994. [PubMed: 10821203]

Armeli S, Tennen H, Affleck G, Kranzler HR. Does affect mediate the association between daily events and alcohol use? J Stud Alcohol. 2000b; 61(6):862–871. [PubMed: 11188492]

Armeli S, Tennen H, Todd M, Carney MA, Mohr C, Affleck G, et al. A daily process examination of the stress-response dampening effects of alcohol consumption. Psychol Addict Behav. 2003; 17(4): 266–276. [PubMed: 14640822]

Armeli S, Todd M, Conner TS, Tennen H. Drinking to cope with negative moods and the immediacy of drinking within the weekly cycle among college students. J Stud Alcohol Drugs. 2008; 69(2): 313–322. [PubMed: 18299774]

Baker TB, Piper ME, McCarthy DE, Majeskie MR, Fiore MC. Addiction motivation reformulated: an affective processing model of negative reinforcement. Psychological Review. 2004; 111(1):33–51. [PubMed: 14756584]

Cooper ML, Russell M, Skinner JB, Frone MR, Mudar P. Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. Journal of Abnormal Psychology. 1992; 101(1):139–152. [PubMed: 1537960]

Cox WM, Klinger E. A motivational model of alcohol use. J Abnorm Psychol. 1988; 97(2):168–180. [PubMed: 3290306]

Csikszentmihalyi M, Larson R. Validity and reliability of the Experience-Sampling Method. Journal of Nervous and Mental Disease. 1987; 175(9):526–536. [PubMed: 3655778]

Cyders MA, Smith GT. Mood-based rash action and its components: Positive and negative urgency. Personality and Individual Differences. 2007; 43(4):839–850.

Cyders MA, Smith GT. Emotion-based dispositions to rash action: positive and negative urgency. Psychological Bulletin. 2008; 134(6):807–828. [PubMed: 18954158]

Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: development and validation of a measure of positive urgency. Psychol Assess. 2007; 19(1):107–118. [PubMed: 17371126]

Donohew L, Zimmerman R, Cupp PS, Novak S, Colon S, Abell R. Sensation seeking, impulsive decision making, and risky sex: Implications for risk-taking and design of interventions. Personality and Individual Differences. 2000; 28:1079–1091.

Donohue KF, Curtin JJ, Patrick CJ, Lang AR. Intoxication level and emotional response. Emotion. 2007; 7(1):103–112. [PubMed: 17352567]

Fischer S, Anderson KG, Smith GT. Coping With Distress by Eating or Drinking: Role of Trait Urgency and Expectancies. Psychology of Addictive Behaviors. 2004; 18(3):269–274. [PubMed: 15482082]

Fischer S, Smith GT. Binge eating, problem drinking, and pathological gambling: Linking behavior to shared traits and social learning. Personality and Individual Differences. 2008; 44(4):789–800.

Greeley, J.; Oei, T. Alcohol and tension reduction. In: Leonard, KE.; Blane, HT., editors. Psychological theories of drinking and alcoholism (2nd ed.). New York, NY US: Guilford Press; 1999. p. 14-53.

Ham LS, Zamboanga BL, Bacon AK, Garcia TA. Drinking Motives as Mediators of Social Anxiety and Hazardous Drinking Among College Students. Cogn Behav Ther. 2009:1–13.

Hussong AM, Chassin L. The stress-negative affect model of adolescent alcohol use: disaggregating negative affect. J Stud Alcohol. 1994; 55(6):707–718. [PubMed: 7861800]

Hussong AM, Hicks RE, Levy SA, Curran PJ. Specifying the relations between affect and heavy alcohol use among young adults. J Abnorm Psychol. 2001; 110(3):449–461. [PubMed: 11502088]

Larsen, RJ.; Diener, E. Promises and problems with the circumplex model of emotion. In: Clark, MS., editor. Emotion. London: Sage Publications; 1992. p. 25-59.

Lewis MA, Hove MC, Whiteside U, Lee CM, Kirkeby BS, Oster-Aaland L, et al. Fitting in and feeling fine: conformity and coping motives as mediators of the relationship between social anxiety and problematic drinking. Psychol Addict Behav. 2008; 22(1):58–67. [PubMed: 18298231]

Lieberman MD. Social cognitive neuroscience: a review of core processes. Annual Review of Psychology. 2007; 58:259–289.

Little HJ. Alcohol as a stimulant drug. Addiction. 2000; 95(12):1751–1753. [PubMed: 11177488]

Maggs, JL. Alcohol use and binge drinking as goal-directed action during the transition to postsecondary education. In: Schulenberg, J.; Maggs, JL., editors. Health risks and developmental transitions during adolescence. New York, NY, US: Cambridge University Press; 1997. p. 345-371.

Magid V, Colder CR. The UPPS Impulsive Behavior Scale: Factor structure and associations with college drinking. Personality and Individual Differences. 2007; 43(7):1927–1937.

Metcalfe J, Mischel W. A hot/cool-system analysis of delay of gratification: dynamics of willpower. Psychological Review. 1999; 106(1):3–19. [PubMed: 10197361]

Mohr CD, Armeli S, Tennen H, Temple M, Todd M, Clark J, et al. Moving beyond the keg party: a daily process study of college student drinking motivations. Psychol Addict Behav. 2005; 19(4): 392–403. [PubMed: 16366811]

Neal DJ, Carey KB. Association between alcohol intoxication and alcohol-related problems: an event-level analysis. Psychol Addict Behav. 2007; 21(2):194–204. [PubMed: 17563139]

Neal DJ, Fromme K. Event-level covariation of alcohol intoxication and behavioral risks during the first year of college. Journal of Consulting and Clinical Psychology. 2007; 75:294–306. [PubMed: 17469887]

Neal DJ, Sugarman DE, Hustad JT, Caska CM, Carey KB. It's all fun and games…or is it? Collegiate sporting events and celebratory drinking. J Stud Alcohol. 2005; 66(2):291–294. [PubMed: 15957681]

Park CL, Armeli S, Tennen H. The daily stress and coping process and alcohol use among college students. J Stud Alcohol. 2004; 65(1):126–135. [PubMed: 15000512]

Raudenbush, SW.; Bryk, AS. Hierarchical Linear Models : Applications and Data Analysis Methods. London: Sage Publications; 2002.

Read JP, Kahler CW, Strong DR, Colder CR. Development and preliminary validation of the young adult alcohol consequences questionnaire. J Stud Alcohol. 2006; 67(1):169–177. [PubMed: 16536141]

Sanchez-Craig M, Wilkinson DA, Davila R. Empirically based guidelines for moderate drinking: 1-year results from three studies with problem drinkers. American Journal of Public Health. 1995; 85(6):823–828. [PubMed: 7762717]

Sher KJ, Trull TJ. Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. Journal of Abnormal Psychology. 1994; 103(1):92–102. [PubMed: 8040486]

Simons JS, Carey KB, Wills TA. Alcohol abuse and dependence symptoms: A multidimensional model of common and specific etiology. Psychol Addict Behav. 2009; 23(3):415–427. [PubMed: 19769426]

Simons JS, Gaher RM, Correia CJ, Hansen CL, Christopher MS. An Affective-Motivational Model of Marijuana and Alcohol Problems among College Students. Psychology of Addictive Behaviors. 2005a; 19(3):326–334. [PubMed: 16187813]

Simons JS, Gaher RM, Oliver MNI, Bush JA, Palmer MA. An experience sampling study of associations between affect and alcohol use and problems among college students. Journal of Studies on Alcohol. 2005b; 66:459–469. [PubMed: 16240553]

Simons JS, Maisto SA, Wray TB. Sexual risk-taking among young adult dual alcohol and marijuana users. Addictive Behaviors. 2010; 35:533–536. [PubMed: 20071102]

Skinner, HA.; Horn, JL. Alcohol Dependence Scale: User's Guide. Toronto: Addiction Research Foundation; 1984.

Smith GT, Fischer S, Cyders MA, Annus AM, Spillane NS, McCarthy DM. On the validity and utility of discriminating among impulsivity-like traits. Assessment. 2007; 14(2):155–170. [PubMed: 17504888]

StataCorp. Stata Statistical Software: Release 10. College Station, TX: Stata Corporation; 2008.

Swendsen JD, Tennen H, Carney MA, Affleck G, Willard A, Hromi A. Mood and alcohol consumption: an experience sampling test of the self-medication hypothesis. J Abnorm Psychol. 2000; 109(2):198–204. [PubMed: 10895557]

Verdejo-Garcia A, Benbrook A, Funderburk F, David P, Cadet JL, Bolla KI. The differential relationship between cocaine use and marijuana use on decision-making performance over repeat testing with the Iowa Gambling Task. Drug and Alcohol Dependence. 2007; 90(1):2–11. [PubMed: 17367959]

Watson D, Clark LA. On traits and temperament: General and specific factors of emotional experience and their relation to the five-factor model. Journal of Personality. 1992; 60(2):441–476. [PubMed: 1635050]

Watson, D.; Clark, LA. Manual for the Positive and Negative Affect Schedule (Expanded Form). Iowa City, Iowa: University of Iowa; 1994.

Weiss, HM.; Beal, DJ.; Lucy, SL.; MacDermid, SM. Constructing EMA studies with PMAT: The Purdue momentary assessment tool user's manual. 2004. from www.mfri.purdue.edu/pages/PMAT/pmatusermanual.pdf

Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. Personality and Individual Differences. 2001; 30(4):669–689.

Whiteside SP, Lynam DR, Miller JD, Reynolds SK. Validation of the UPPS impulsive behaviour scale: A four-factor model of impulsivity. European Journal of Personality. 2005; 19(7):559–574.

Wiers RW, Bartholow BD, van den Wildenberg E, Thush C, Engels RCME, Sher KJ, et al. Automatic and controlled processes and the development of addictive behaviors in adolescents: A review and a model. Pharmacology, Biochemistry and Behavior. 2007; 86(2):263–283.

Wills TA, Ainette MG, Stoolmiller M, Gibbons FX, Shinar O. Good self-control as a buffering agent for adolescent substance use: An investigation in early adolescence with time-varying covariates. Psychol Addict Behav. 2008; 22(4):459–471. [PubMed: 19071971]

Wills TA, Walker C, Mendoza D, Ainette MG. Behavioral and emotional self-control: relations to substance use in samples of middle and high school students. Psychol Addict Behav. 2006; 20(3):265–278. [PubMed: 16938064]

Figure 1.
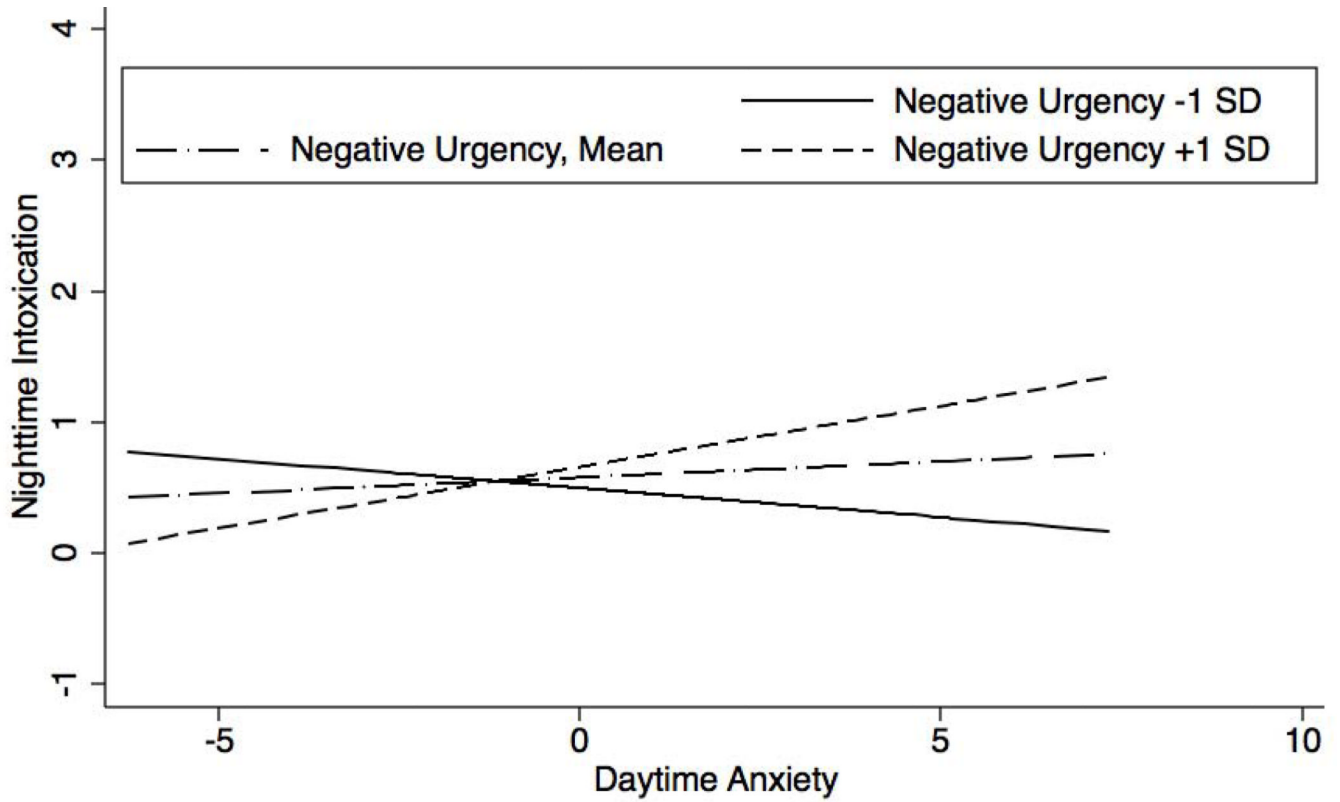Association between daytime anxiety and nighttime intoxication as a function of negative urgency. Anxiety is centered at the subject mean. Negative urgency is centered at the grand mean.
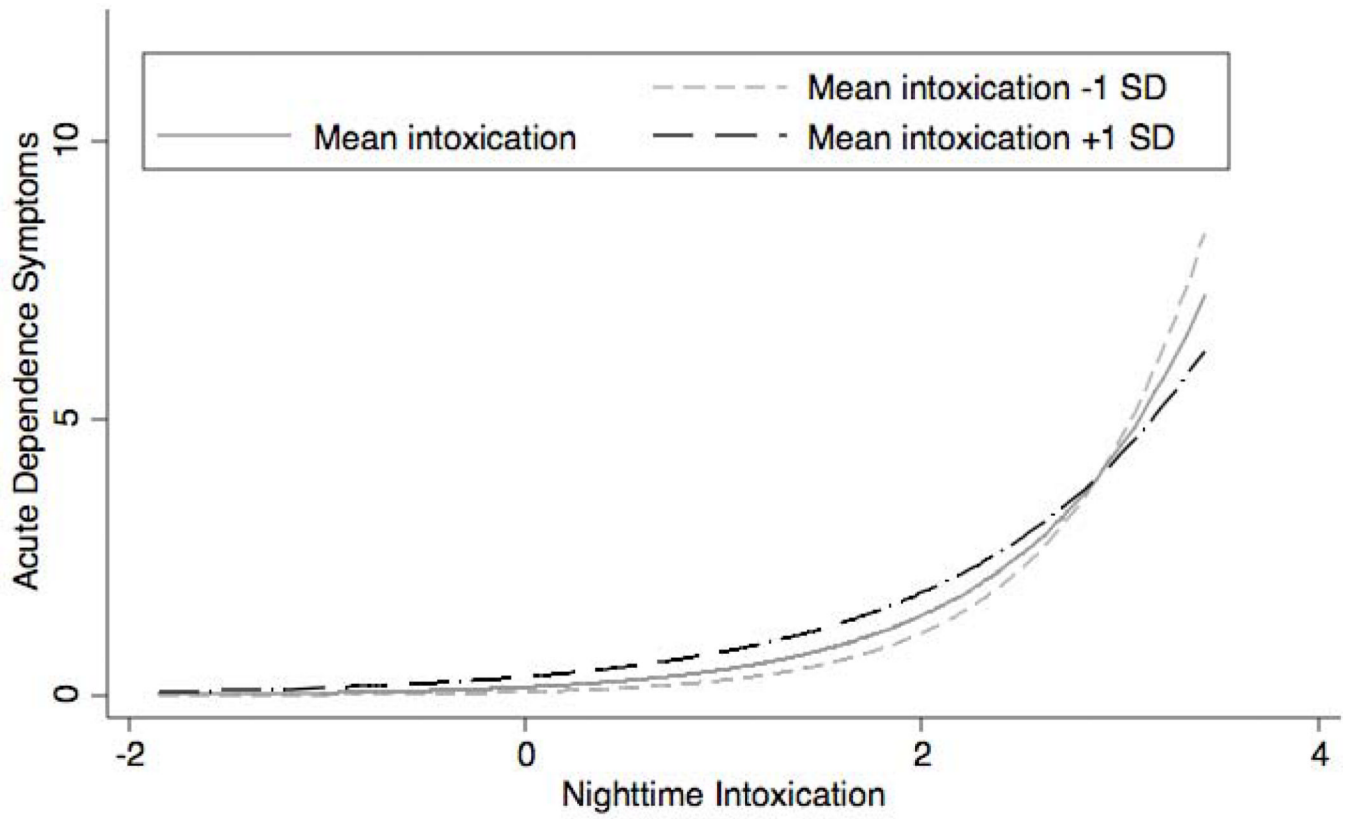
Figure 2.
Association between intoxication and acute dependence symptoms as a function of drinking level. Intoxication is centered at the subject mean. Subject mean intoxication is centered at the grand mean.

Table 1

Descriptive Statistics

	M(SD)	**Range**	**Skew**
1. Positive affect	3.92 (1.90)	1–10.9	0.43
2. Sadness	1.87 (1.56)	1–11	2.81
3. Hostility	1.68 (1.29)	1–10.5	3.17
4. Anxiety	2.06 (1.48)	1–11	2.14
5. Intoxication	0.00 (0.90)	−0.51 3.75	1.85
6. Dependence sxs.	0.39 (1.16)	0 –12	4.61
7. Negative urgency	2.27 (0.55)	1.17 –3.58	0.04
8. Positive urgency	1.75 (0.52)	1 3.25	0.73
9. Premeditation	2.77 (0.50)	1.5−4	−0.17
10. Perseverance	3.04 (0.48)	1.75–3.95	−0.39
11. Gender	-	52W-45M	-

Note. Level 1 N = 1650, except Dependence (N = 1613, due to missing data). Level 2 N = 97. W = women (0), M = Men (1). Sxs = symptoms. Level 1 variables (i.e., positive affect, sadness, hostility, anxiety, intoxication, and dependence symptoms) are the means of the person-days.

Table 2

Between-person correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Positive affect	1.00									
2. Sadness	.04	1.00								
3. Hostility	−.05	.68*	1.00							
4. Anxiety	.09	.74*	.66*	1.00						
5. Intoxication	.03	.20*	.22*	.27*	1.00					
6. Dependence sxs.	−.07	.30*	.16	.34*	.60*	1.00				
7. Negative urgency	−.18	.30*	.28*	.20*	.11	.15	1.00			
8. Positive urgency	−.13	.12	.18	.12	−.08	.09	.61*	1.00		
9. Premeditation	.06	−.15	−.14	−.08	−.20	−.31*	−.41*	−.46*	1.00	
10. Perseverance	.17	−.21*	−.27*	−.13	−.07	−.13	−.51*	−.59*	.57*	1.00
11. Gender	.08	−.36*	−.24*	−.25*	.00	−.23*	−.15	−.06	.17	.08

Note. $N = 97$. W = women (0), M = Men (1).

*
$p < .05$.

Sxs = symptoms. Person-means were used to calculate between-person correlations for the level 1 variables (i.e., positive affect, sadness, hostility, anxiety, intoxication, and dependence symptoms).

Table 3

Acute dependence symptoms

Symptom	Count	% A.M.	% In situ
Used alcohol when promised self not to	26	-	0.44
Unable to stop, limit, or cut back	30	-	0.51
Used alcohol more than intended	43	-	0.72
Blacked out	21	1.29	-
Passed out	94	5.80	-
Hangover	178	10.97	-
Withdrawal symptoms	40	0.99	0.40
Felt alcohol effects less for amount used	59	1.54	0.57
Drank more than usual to get drunk	95	2.47	0.93
Felt sick or vomited	142	1.97	1.85

Note. The first three symptoms were only assessed in the random in situ assessments, the second three were only assessed in the self-initiated morning assessments, and the remainder was assessed in both. Count is the number of positive endorsements. A.M. percentage is percent of morning assessments when symptom was endorsed. In situ percentage reflects percent of assessments endorsed during the night (after 5 pm).

Table 4

Intoxication multilevel regression analyses

Predictors	Alcohol Intoxication		
	B (SE)	*p*	*95% CI*
Intercept Model			
Intercept	−0.30 (0.06)	.000	(−0.42, −0.19)
Gender	0.07 (0.08)	.376	(−0.08, 0.22)
Positive Urgency	−0.24 (0.10)	.018	(−0.43, −0.04)
Negative Urgency	0.14 (0.09)	.108	(−0.03, 0.32)
Perseverance	−0.01 (0.10)	.938	(−0.20, 0.19)
Premeditation	−0.22 (0.09)	.016	(−0.40, −0.04)
Daytime Positive Affect Slope			
Intercept	0.04 (0.02)	.021	(0.01, 0.07)
Gender	−0.09 (0.03)	.006	(−0.16, −0.03)
Positive Urgency	0.01 (0.04)	.827	(−0.07, 0.09)
Negative Urgency	−0.03 (0.04)	.514	(−0.10, 0.05)
Daytime Anxiety Slope			
Intercept	0.02 (0.02)	.232	(−0.02, 0.06)
Gender	0.01 (0.04)	.800	(−0.07, 0.09)
Positive Urgency	−0.11 (0.05)	.021	(−0.20, −0.02)
Negative Urgency	0.11 (0.04)	.009	(0.03, 0.20)
Daytime Hostility Slope			
Intercept	0.03 (0.03)	.261	(−0.02, 0.08)
Gender	0.13 (0.05)	.020	(0.02, 0.23)
Positive Urgency	0.06 (0.06)	.325	(−0.06, 0.17)
Negative Urgency	−0.06 (0.06)	.239	(−0.17, 0.04)
Daytime Sadness Slope			
Intercept	−0.05 (0.03)	.040	(−0.10, −0.002)
Gender	−0.10 (0.05)	.065	(−0.20, 0.01)
Positive Urgency	−0.00 (0.06)	.983	(−0.12, 0.12)
Negative Urgency	0.03 (0.06)	.550	(−0.08, 0.14)

Note. Six orthogonal day-of-week indicators (not shown) were also included in the model. N = 97, 1650 level 1 observations.

Table 5

Dependence symptoms multilevel negative binomial regression analyses

	Dependence Symptoms		
Predictors	*IRR* (SE)	*p*	*95% CI*
Intercept Model			
Gender	0.58 (0.13)	.012	(0.38, 0.89)
Positive Urgency	1.77 (0.53)	.053	(0.99, 3.17)
Negative Urgency	0.78 (0.21)	.343	(0.46, 1.31)
Perseverance	0.81 (0.25)	.503	(0.44, 1.50)
Premeditation	1.01 (0.29)	.703	(0.66, 1.86)
Subject Mean Intoxication	11.28 (3.50)	< .001	(6.14, 20.72)
Nighttime Intoxication Slope			
Intercept	3.09 (0.20)	< .001	(2.71, 3.51)
Gender	1.09 (0.11)	.383	(0.90, 1.33)
Positive Urgency	0.96 (0.14)	.764	(0.72, 1.27)
Negative Urgency	1.07 (0.13)	.613	(0.83, 1.37)
Perseverance	1.07 (0.16)	.629	(0.81, 1.42)
Premeditation	1.09 (0.14)	.526	(0.84, 1.39)
Subject Mean Intoxication	0.43 (0.06)	< .001	(0.33, 0.57)
Daytime Positive Affect Slope			
Intercept	0.99 (0.05)	.876	(0.90, 1.09)
Gender	0.82 (0.08)	.050	(0.68, 1.00)
Positive Urgency	0.88 (0.09)	.184	(0.73, 1.06)
Negative Urgency	0.86 (0.08)	.103	(0.71, 1.03)
Daytime Anxiety Slope			
Intercept	1.02 (0.07)	.736	(0.90, 1.16)
Gender	1.02 (0.12)	.863	(0.81, 1.28)
Positive Urgency	0.97 (0.12)	.817	(0.76, 1.24)
Negative Urgency	1.08 (0.12)	.480	(0.87, 1.35)
Daytime Hostility Slope			
Intercept	0.82 (0.08)	.041	(0.68, 0.99)
Gender	0.77 (0.14)	.143	(0.54, 1.09)
Positive Urgency	1.26 (0.25)	.248	(0.85, 1.85)
Negative Urgency	0.96 (0.17)	.808	(0.67, 1.36)
Daytime Sadness Slope			
Intercept	0.94 (0.08)	.476	(0.80, 1.11)
Gender	0.92 (0.14)	.557	(0.69, 1.22)
Positive Urgency	0.90 (0.14)	.495	(0.66, 1.22)
Negative Urgency	1.08 (0.16)	.588	(0.81, 1.45)

Note. Six orthogonal day-of-week indicators (not shown) were also included in the model. N = 97. Due to missing data, there are 1613 level 1 observations.