

Unplanned Heavy Episodic and High-Intensity Drinking: Daily-Level Associations With Mood, Context, and Negative Consequences

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ABSTRACT. Objective: Underestimating how much one will drink has been associated with greater alcohol-related consequences. Elevated mood or drinking context may relate to drinking more than planned (or intended) among college students. The aims of the current study were to test (a) whether positive and negative mood and contextual factors on a given day were associated with the likelihood of *unplanned heavy drinking* (defined as unplanned heavy episodic or high-intensity drinking), and (b) whether days with unplanned heavy drinking were associated with more negative consequences. **Method:** The analytic sample included 352 college students (53.4% female; 71.3% non-Hispanic White) who completed daily assessments via automated telephone interviews. Multilevel models were used to test predictors of unplanned heavy drinking (Aim 1) and predictors of consequences (Aim 2). **Results:** Almost a

third (29.60%) of drinking days were unplanned heavy drinking days. Individuals with higher average positive mood across the sampled days had lower odds of unplanned heavy drinking. No significant associations were observed between negative mood and unplanned heavy drinking. Weekend days and days with special occasions were associated with lower odds of unplanned heavy drinking. Unplanned heavy drinking was associated with more negative consequences on that day. **Conclusions:** Students were frequently not able to accurately predict the amount of alcohol they would consume on that day, which conferred an increased risk of negative consequences. Interventions could incorporate strategies that help students anticipate their alcohol consumption in order to employ protective behavioral strategies in high-risk contexts. (*J. Stud. Alcohol Drugs*, 80, 331–339, 2019)

HEAVY EPISODIC DRINKING (HED; 4+/5+ drinks for women/men) and high-intensity drinking (8+/10+ drinks for women/men) remain prevalent among college students. National estimates indicate that 32% of college students consumed 5+ drinks in a row and 13% consumed 10+ drinks in a row in the past 2 weeks (Schulenberg et al., 2017). Because of high blood alcohol levels, HED and high-intensity drinking are associated with numerous negative consequences and increased risks such as unintentional injuries, sexual assault, and motor vehicle accidents (Hingson & White, 2013; Hingson et al., 2017; Patrick & Terry-McElrath, 2017; Patrick et al., 2016a, 2016b). On any given occasion, drinking may be planned in advance (e.g., one expects to have eight drinks at a friend's party) or unplanned (e.g., one drinks more as a result of the party atmosphere). The current study used daily data to determine whether mood and context are associated with un-

planned heavy episodic and high-intensity drinking, as well as whether unplanned heavy episodic and high-intensity drinking are associated with more negative consequences among college students.

Theory of planned behavior and intention-behavior link

The theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1975) posits that several psychological constructs (i.e., attitudes, subjective norms, and perceived behavioral control) predict behavioral intentions, which in turn predict behavior. This theory has been effectively applied to college student alcohol use (Fekadu & Kraft, 2001; Huchting et al., 2008; Norman, 2011) and HED (Glassman et al., 2010; Johnston & White, 2003). A key tenet of the theory of planned behavior is that an individual's behavioral intentions directly predict behavior. However, the results of a recent meta-analysis underscore that behavioral intention does not fully predict drinking behavior (Cooke et al., 2016), and the strength of the intention-behavior link may also be affected by the location of the data collection (e.g., campus bar or library; Cooke & French, 2011). Intention may be even less predictive of behavior among extreme heavy drinkers (Collins & Carey, 2007) and during specific events such as college football games (Glassman et al., 2010). Thus, there is a need to better understand factors associated with drinking occasions for which intentions are less predictive of behavior.

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Drinking intentions versus consumption

Research suggests that young adults do underestimate the amount of alcohol they will consume on a given night or special occasion (Brister et al., 2010; Lee et al., 2017b; Pearson & Henson, 2013; Trim et al., 2011). In cross-sectional work, Pearson and Henson (2013) found that a higher tendency to engage in unplanned drinking was associated with more consequences among college students. Brister et al. (2010) found that college students turning 21 were highly inaccurate in anticipating how much they would drink on their 21st birthdays, with 68% underestimating the amount consumed. Trim and colleagues (2011) examined intentions of getting drunk and found that 24% of college students who reported no intention to get drunk on a given night consumed five or more drinks that same night. Lee et al. (2017b) found similar results examining drinking during college student spring break, with 29% underestimating the amount of alcohol consumed. Men and fraternity/sorority members were more likely to underestimate the maximum number of drinks they would consume on a single day during spring break. Importantly, students who underestimated their maximum number of drinks also reported more consequences. Therefore, unplanned drinking has been associated with more consequences cross-sectionally or as measured retrospectively during specific high-risk occasions.

Of note, HED and high-intensity drinking may or may not be planned—which may affect whether students plan ahead to reduce their risk of consequences. Students may be less inclined to plan for and implement protective behavioral strategies (i.e., cognitive behavioral strategies used to reduce alcohol use or minimize consequences; Pearson, 2013) when they expect that it will be a low-drinking night.

Positive and negative mood as predictors of unplanned heavy drinking

Motivational models of drinking and affect regulation models assert that affect (or mood) is a core component in drinking, whereby drinking may be used to dampen negative affect or increase positive affect (Cooper et al., 1995; Cox & Klinger, 1988; Simons et al., 2005; Wills & Shiffman, 1985). Daily data from college students show that higher daily positive mood is associated with greater likelihood of drinking, overall consumption, and HED (Howard et al., 2015; Simons et al., 2014). It is possible that positive mood is associated with higher drinker intentions, because individuals may expect to drink more in an attempt to enhance both social effects and positive affect. Findings on daily negative mood have been mixed. Some studies have found daily associations between negative affect and alcohol consumption and dependence symptoms (Dvorak et al., 2014; Simons et al., 2014), whereas others have not (Gottfredson & Hussong,

2013; Howard et al., 2015). Alternative frameworks for conceptualizing relations between mood and drinking have also been useful (e.g., greater variability in positive and negative mood has been associated with a greater likelihood of drinking; Gottfredson & Hussong, 2013), and the experience of negative mood states may be associated with the time until drinking on subsequent days (Armeli et al., 2008; Hussong, 2007).

The current study focuses on the experience of elevated mood (i.e., more positive or more negative than average). When individuals experience elevated mood states, they may drink to further enhance a positive mood or cope with a negative mood, consistent with affect regulation models. This may decrease the likelihood of unplanned heavy drinking under circumstances when mood states are linked to higher drinking intentions.

Context as predictors of unplanned heavy drinking

Contextual features of the drinking environment have long been associated with alcohol consumption or consequences, such as higher consumption at off-campus parties (Brown et al., 2008; Hughes et al., 2011; Paschall & Saltz, 2007; Studer et al., 2015; Thombs et al., 1997). Drinking in a bar has also been associated with greater alcohol use compared with drinking in a private setting, for both underage and legal-age college students (Clapp et al., 2006). Special occasions and events associated with increased alcohol consumption include birthday celebrations, spring break, and holidays (Day-Cameron et al., 2009; Goldman et al., 2011; Henslee et al., 2015; Neighbors et al., 2011, 2014). The current study examined whether unplanned heavy drinking was associated with special occasions, drinking alone or with others, and drinking at a bar or party.

Current study

The aims of the current study were to examine (a) whether daily-level positive and negative mood and contextual factors were associated with *unplanned heavy drinking* (defined as unplanned heavy episodic or high-intensity drinking; see “Measures”) on a given day after number of drinks consumed was controlled for and (b) whether days with unplanned heavy drinking were associated with more negative consequences. We hypothesized that elevated positive mood and negative mood as well as special events would be associated with a lower likelihood of unplanned heavy drinking because students may already expect to drink heavily; drinking with others and drinking at a bar or party would be associated with a greater likelihood of unplanned heavy drinking because these contexts can produce a heightened drinking culture in the moment. We also hypothesized that unplanned heavy drinking would be associated with more negative consequences.

Method

Participants and procedures

Participants were recruited as part of a longitudinal daily study on alcohol expectancies, use, and consequences. A random sample of undergraduates selected from the university's registrar's list received mailed and emailed invitations to complete a brief web-based screening survey (including consent information). Upon consent, they completed the brief web-based screening survey and, if eligible, a web-based baseline survey. Eligibility criteria included being 18–24 years old; having consumed alcohol at least twice per week in the last month; freshman, sophomore, or junior status; not intending to study abroad in the next year; and owning a cell phone with a monthly plan and agreeing to use a cell phone for the daily study and to receive text messages.

Of the 3,210 individuals who completed screening (\$10 compensation), 539 met eligibility criteria and were invited to complete a baseline interview online and to schedule an in-person training session (consisting of the consent process for longitudinal participation, a review of study procedures, and instructions for completing daily surveys via mobile phone). Participants started the first 2-week period the day after the in-person session. Of the 539 eligible participants, 516 completed the baseline survey (\$30 compensation). Of these, 352 completed in-person training, started the daily interviews, and thus were fully enrolled in the longitudinal study (for recruitment details, see Lee et al., 2018).

Over 1 year, students completed a 2-week daily reporting period in each of four academic quarters. Participants completed assessments three times per day (each 10 or fewer minutes): morning (9 A.M.–noon), afternoon (3 P.M.–6 P.M.), and evening (9 P.M.–midnight). They received \$2 for each completed assessment, plus a \$16 bonus if they completed 36 of 42 assessments in each 2-week period. Completion rates for morning, afternoon, and evening interviews were 84.9%, 86.7%, and 84.0%, respectively; the mean number of interviews for which participants provided any data was 141 of 168 interviews ($SD = 40.8$, range: 2–168). In the last of the four 2-week periods, 85.5% of the sample provided at least one morning report. All procedures were approved by the university institutional review board, and a federal Certificate of Confidentiality was obtained from the National Institutes of Health. No adverse events were reported.

Analytic sample

The current study used data from baseline and daily assessments. The analytic sample included 352 students (53.4% female; 55.0% fraternity/sorority; baseline $M_{\text{age}} = 19.71$ years [$SD = 1.27$]). The majority (71.3%) identified as non-Hispanic White, followed by 9.9% Hispanic or Latino/a, 8.0% Asian, and 7.7% multiracial; the remaining 3.1% were

of another race or did not answer. There were 4,247 days for which students reported drinking intentions and drinks consumed, which were needed to determine days with unplanned heavy drinking.

Measures

Demographics. At baseline, participants reported birth sex (coded 1 = *female* and 0 = *male*), age, and fraternity or sorority membership (coded 1 = *yes* and 0 = *no*). They reported their race (American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, Black or African American, White, multiracial, and other) and ethnicity (Hispanic or Latino[a]).

Drinking intention. Drinking intentions were collected in the afternoon in order to measure intentions and alcohol expectancies proximal to a potential drinking event (compared with assessing in the morning interview), as pilot data showed that students were more likely to have considered their plans for later that evening during the afternoon assessment compared with earlier. Participants reported whether they were planning to drink that night, and, if so, they were queried, “How many drinks do you think you will drink tonight?” They were also asked at the start of the afternoon report whether they had consumed any alcohol that day.

Alcohol consumption. In the morning, participants were asked whether they had drunk any alcohol on the previous day “from the time you got up to the time you went to sleep,” and, if so, they reported the total number of drinks consumed.

Coding drinks intended versus consumed. Intended and consumed drinks were coded into four categories: no drinking (0 drinks), nonheavy drinking (1–3 drinks for women/1–4 drinks for men), HED (4–7 drinks for women/5–9 drinks for men), and high-intensity drinking (8+ drinks for women/10+ drinks for men) (Patrick et al., 2016a; White et al., 2006). Days on which students engaged in unplanned heavy drinking (i.e., unplanned heavy episodic or high-intensity drinking; coded “1”) were defined as (a) days with no intention to drink but engaging in HED or high-intensity drinking, (b) days with nonheavy drinking intentions but engaging in HED or high-intensity drinking, and (c) days with HED intentions but engaging in high-intensity drinking (Figure 1). All other drinking days were coded as 0 = not unplanned heavy drinking, which included drinking days on which drinks intended and consumed were in the same drinking category (e.g., intended HED and consumed HED) or a lower drinking category (e.g., intended HED but engaged in nonheavy drinking).

Alcohol consequences. On mornings when participants reported alcohol use the previous day, they reported whether they had experienced each of seven negative consequences (e.g., became aggressive, felt nauseated or vomited) as a result of drinking the previous day, coded 0 = *did not occur*

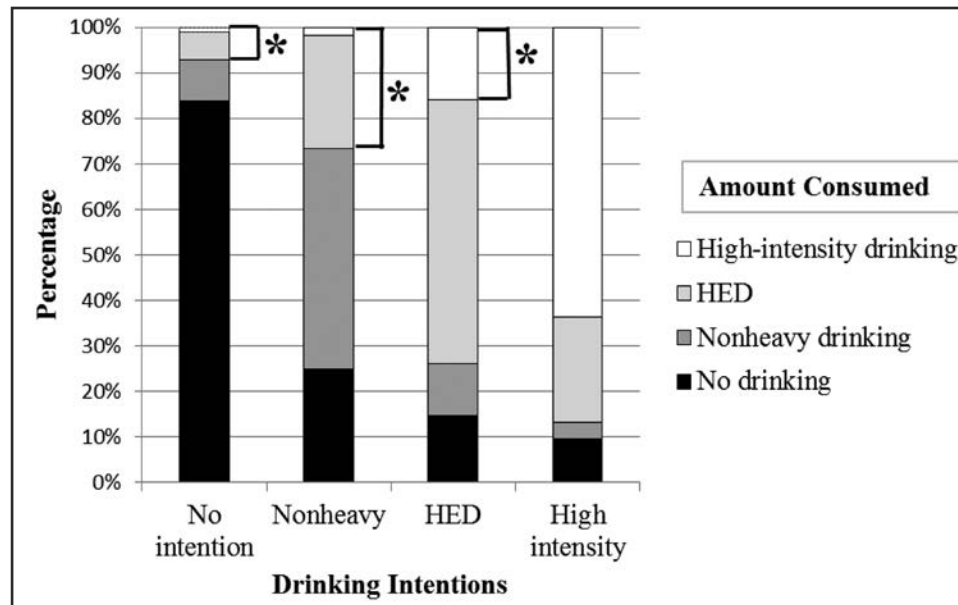


FIGURE 1. Percentage of days characterized by no drinking, nonheavy drinking, heavy episodic drinking (HED), and high-intensity drinking based on drinking intentions. The figure includes 11,378 available days for which drinking intentions and drinks consumed were reported. Nonheavy drinking was considered 1–3 drinks for women and 1–4 drinks for men. HED was considered 4–7 drinks for women and 5–9 drinks for men. High-intensity drinking was considered 8+ drinks for women and 10+ drinks for men. Days marked with an asterisk (*) denote unplanned heavy drinking days. The 7,625 days on which participants did not report any drinking were excluded from the Aim 1 and Aim 2 analyses, leaving 3,753 days on which participants reported drinking (29.6% of the drinking days were unplanned heavy drinking days).

and 1 = *did occur*. Responses were summed to form a total score (Lee et al., 2017a).

Positive and negative mood. Mood was assessed in the evening, and participants reported how they felt in general on that day. Positive mood was coded as a mean of five items (i.e., happy, relaxed, alert, excited, energetic). Negative mood was coded as a mean of five items (i.e., lonely, angry, irritable, stressed, depressed). Response options ranged from 1 = *not at all* to 9 = *very much*.

Contextual characteristics. In the morning, participants reported whether they were more often “alone” (coded 0) or “with other people” (coded 1) when drinking the previous day (Patrick et al., 2016a). They reported where they did most of their drinking (i.e., home, bar or party, or somewhere else); two dummy codes were created: one for “at a bar or party” (coded 1) and one for “somewhere else” (coded 1), with “at home” as the reference group (coded 0). In the afternoon, participants reported whether there was a special event or occasion on that day (1 = *yes* and 0 = *no*). Weekend was a covariate in all analyses (1 = *Thursday, Friday, Saturday* and 0 = *Sunday through Wednesday*).

Data analysis plan

Data were included in the analyses regardless of whether all bursts were completed. On 4.33% of the days ($n = 599$

days), participants reported that they had consumed alcohol by the time of the afternoon report, and these days were excluded from all analyses. Before testing our aims, we conducted descriptive analyses on the discrepancy between intended and consumed drinks (i.e., under- and over-estimation). Discrepancy scores could be calculated only for days when students provided the number of both intended and consumed drinks—resulting in 4,247 days nested within 352 participants. Descriptive analyses also examined the number of intended versus consumed drinks based on categorization into no-drinking, nonheavy drinking, HED, and high-intensity drinking days.

To test Aim 1, we examined daily-level mood and contextual factors as predictors of unplanned heavy drinking using multilevel models with a logit function, given the binary outcome. Drinking days were modeled at Level 1 (daily level) and nested within people at Level 2 (person level). Two multilevel models were estimated, and the number of days analyzed varied because of missingness on the predictors: mood (3,080 days nested within 339 participants) and context (3,743 days nested within 341 participants). Level 2 covariates included female birth sex, baseline age, fraternity/sorority membership, and person-mean alcohol use; Level 1 covariates included daily-level alcohol use, a time trend (i.e., study quarter), and weekend. To test Aim 2, we examined unplanned heavy drinking as a

TABLE 1. Descriptive information on intended drinks, drinks consumed, and their discrepancy

Category	Intended drinks <i>M (SD)</i>	Drinks consumed <i>M (SD)</i>	Discrepancy (no. consumed – no. intended)		
			<i>M (SD)</i>	<i>Mdn</i>	Range
All available days (<i>N</i> = 4,247 days)	3.69 (3.45)	4.80 (3.65)	1.11 (3.79)	1	-21 to 25
Days underestimated (by at least one drink) (58.79%; <i>n</i> = 2,497 days)	2.39 (3.14)	5.77 (3.58)	3.38 (2.73)	2	1 to 25
Days matched (no difference) (13.99%; <i>n</i> = 594 days)	5.57 (2.99)	5.57 (2.99)	N.A.	N.A.	N.A.
Days overestimated (by at least one drink) (27.22%; <i>n</i> = 1,156 days)	5.52 (3.03)	2.30 (2.85)	-3.22 (2.47)	-2	-21 to -1

Notes: Only drinking days with sufficient data to calculate a discrepancy score were included. Underestimation and overestimation were defined as a discrepancy of at least one drink. No. = number; N.A. = not applicable.

predictor of negative consequences using a negative binomial distribution for the outcome.¹

Results

Descriptive information on discrepancy between the number of intended and consumed drinks

Based on 4,247 days, drinking was underestimated by at least one drink on 58.79% of days (Table 1), whereas intentions and amount consumed matched on 13.99% of days. Students overestimated how much they would consume by at least one drink on 27.22% of days. Although the difference between the number of drinks intended and consumed varied greatly (-21 to 25), the median for both under- and over-estimation was two drinks.

As shown in Figure 1, on 83.82% of days on which students reported no intention to drink, they also reported no drinking on that day; on the remaining 16.18% of days students did not intend to drink but did. On days on which students intended HED, they reported HED on 58.05% of the days, and on days on which students intended high-intensity drinking, they reported engaging in high-intensity drinking on 63.58% of the days. Of 3,753 drinking days, 29.60% were identified as unplanned heavy episodic or high-intensity drinking days.

Mood and context as predictors of unplanned heavy drinking (Aim 1)

With a range from 1 to 9 and higher values reflecting greater endorsement, positive mood had a mean of 5.36 across drinking days, and negative mood had a mean of 3.38

¹For both Aims 1 and 2, we explored cross-level interactions between average alcohol use at Level 2 with each of the key Level 1 predictors to determine whether associations were stronger among lighter drinkers (e.g., two cross-level interactions with mood predicting unplanned heavy drinking). Given that the cross-level interactions did not improve model fit, we report the results for the more parsimonious models that do not include the interaction terms.

across drinking days (Table 2)². About 15.60% of the drinking days were considered to have a special occasion or event, and students drank with others on the vast majority of days. Drinking occurred at a bar or party on half of drinking days. Unconditional multilevel models showed minimal variation in unplanned heavy drinking between people (ICC = .10), such that the majority of the variance was within people across days.

For Aim 1, person-level effects showed that students with higher positive mood ratings across the sampled days had lower odds of unplanned heavy drinking (Table 3). Contrary to expectations, no significant daily-level effects were observed for either positive or negative mood. Daily-level findings for context showed that, as hypothesized, days with a special occasion or event were associated with lower odds of unplanned heavy drinking. Contrary to expectation, days when students drank at other locations (besides a bar or party) were associated with greater odds of unplanned heavy drinking compared with days when they drank at home. Effects of the covariates in both models showed that females had greater odds of unplanned heavy drinking, as did students with greater alcohol use across the sampled days. At the daily level, higher-than-average alcohol use on a given day was also associated with greater odds of unplanned heavy drinking, and weekend days were associated with lower odds of unplanned heavy drinking.

Unplanned heavy drinking as a predictor of consequences (Aim 2)

Person-level findings showed that younger students experienced more consequences (Table 4). Female birth sex,

²Positive mood and negative mood exhibited a small negative correlation ($r = -.26$), such that, on days participants more strongly endorsed positive feelings, they tended to endorse negative feelings less. Intraclass correlation (ICC) shows the proportion of variance between people, which is relatively low for both positive mood (ICC = .29) and negative mood (ICC = .33); thus, the majority of the variance is due to individuals' mood scores varying across days.

TABLE 2. Descriptive statistics on the variables in the multilevel models predicting unplanned heavy drinking

Variable	Cases <i>n</i> ^a	<i>M</i> (<i>SD</i>) or %	Range
Mood model			
Level 2 (between person)			
Female birth sex	339	52.80%	0–1
Age (at baseline)	339	19.71 (1.25)	18–24
Fraternity/sorority membership	339	54.87%	0–1
Alcohol use (person mean)	339	5.37 (2.27)	1.00–14.67
Positive mood (person mean)	339	5.42 (0.88)	1.88–8.20
Negative mood (person mean)	339	3.45 (1.08)	1.00–7.70
Level 1 (within person)			
Alcohol use (number of drinks)	3,080	5.31 (3.36)	1–24
Time trend (i.e., study quarter)	3,080	1.32 (1.12)	0–3
Weekend	3,080	58.25%	0–1
Positive mood	3,080	5.36 (1.32)	1–9
Negative mood	3,080	3.38 (1.53)	1–9
Context model			
Level 2 (between person)			
Female birth sex	341	53.08%	0–1
Age (at baseline)	341	19.71 (1.25)	18–24
Fraternity/sorority membership	341	54.84%	0–1
Alcohol use (person mean)	341	5.44 (2.20)	1–12.80
Level 1 (within person)			
Alcohol use (number of drinks)	3,743	5.43 (3.41)	1–26
Time trend (i.e., study quarter)	3,743	1.36 (1.12)	0–3
Weekend	3,743	59.15%	0–1
Special occasion or event	3,743	15.60%	0–1
Drinking with others (vs. alone)	3,743	93.13%	0–1
Location	3,743		
Drinking at home		40.40%	ref.
Drinking at a bar or party		49.51%	0–1
Drinking at another location		10.10%	0–1

Notes: Ref. = reference. ^aAt Level 2, number of cases refers to the number of participants. At Level 1, number of cases refers to the number of days.

fraternity/sorority membership, and total number of days with unplanned heavy drinking across the sampled days were not associated with consequences. Daily-level findings showed that, as hypothesized, days with unplanned heavy drinking were associated with more negative consequences. In addition, weekends were associated with more negative consequences.

Discussion

This study of college students using data from four 2-week bursts over 1 year found that almost a third of drinking days (29.60%) were unplanned heavy episodic or high-intensity drinking days. A key finding indicated that unplanned heavy drinking was associated with more alcohol-related negative consequences, supporting the notion that unplanned heavy drinking confers risk. Future research should investigate how students' use of protective behavioral strategies varies in accordance with their drinking intentions. Although positive and negative mood on a given day were not associated with unplanned heavy drinking at the daily level, students with higher positive mood ratings on average across days had lower odds of unplanned heavy drinking. This finding may relate to individuals commonly reporting

being in a good mood when they drink (Fairlie et al., 2016; Howard et al., 2015; Simons et al., 2014). When experiencing a positive mood, students may expect to drink heavily as an attempt to enhance existing positive affect—thus limiting the likelihood of unplanned (rather than intentional) heavy drinking.

Another key finding was that weekend days and days with a special occasion were associated with lower odds of unplanned heavy drinking. Research has found that college students are more likely to drink on weekends (Hoepfner et al., 2012; Tremblay et al., 2010; Wood et al., 2007) and on special occasions (Goldman et al., 2011), so again students may expect to drink heavily on weekends and special occasions. We also found that drinking at other locations (besides a bar or party) was associated with greater odds of unplanned heavy drinking compared with days students drank at home. It is possible that students were drinking in outdoor places (Studer et al., 2015) or in places with fewer restrictions than would be found in an onsite alcohol establishment (e.g., bar)—resulting in a decreased ability to anticipate how much alcohol they would consume.

In addition, characteristics of the drinking environment may have been unexpected, which may be associated with greater consumption in the moment (Clapp et al., 2006; Trim et al., 2011). Future studies should collect detailed information about drinking context (e.g., expected vs. unexpected) and test whether these factors relate to unplanned heavy drinking, and also whether individuals high on impulsivity may be more likely to engage in unplanned heavy drinking, especially on days when they experience an elevated positive mood (Leeman et al., 2012; Pearson & Henson, 2013; Stevens et al., 2017; Tomko et al., 2014).

No significant associations were observed between negative mood and unplanned heavy drinking. It may be important to assess variability in negative affect within a day (Mohr et al., 2015; Shadur et al., 2015). Here mood was measured once in the evening, and participants may have already started drinking—which could have limited variability in reports of negative mood. Drinking motives may also play an important role in understanding mood (Armeli et al., 2008, 2015). Negative mood may be a better predictor of unplanned heavy drinking on days when students report higher drinking-to-cope motives.

Clinical implications

The current study demonstrates that students are routinely unable to accurately predict the amount of alcohol they will consume on a given day; on a significant subset of these occasions, they unexpectedly engaged in HED or high-intensity drinking. It is worth noting that some students do have HED or high-intensity drinking intentions and do consume that amount of alcohol—which attests to the need to also consider planned HED or high-intensity drinking days in interven-

TABLE 3. Multilevel models testing mood and context as predictors of unplanned heavy drinking

Predictor	Estimate (SE)	<i>t</i>	Odds ratio [95% CI]
Mood model			
Level 2 (person level, between person)			
Female birth sex	0.45 (0.13)	3.47***	1.56 [1.21, 2.01]
Age	-0.03 (0.05)	-0.65	0.97 [0.88, 1.07]
Fraternity/sorority membership	-0.13 (0.13)	-1.03	0.88 [0.69, 1.13]
Alcohol use (person mean)	0.32 (0.03)	9.58***	1.38 [1.29, 1.47]
Positive mood (person mean)	-0.22 (0.07)	-3.09**	0.81 [0.70, 0.92]
Negative mood (person mean)	0.02 (0.06)	0.41	1.03 [0.91, 1.16]
Level 1 (daily level, within person)			
Alcohol use (person centered)	0.39 (0.02)	18.29***	1.48 [1.41, 1.54]
Time trend (i.e., study quarter)	0.14 (0.04)	3.31***	1.15 [1.06, 1.25]
Weekend	-0.51 (0.10)	-5.29***	0.60 [0.50, 0.73]
Positive mood (person centered)	-0.03 (0.05)	-0.75	0.97 [0.88, 1.06]
Negative mood (person centered)	0.02 (0.04)	0.64	1.03 [0.95, 1.11]
Context model			
Level 2 (person level, between person)			
Female birth sex	0.49 (0.12)	4.00***	1.63 [1.28, 2.07]
Age	-0.003 (0.05)	-0.07	1.00 [0.91, 1.09]
Fraternity/sorority membership	-0.08 (0.12)	-0.65	0.93 [0.73, 1.17]
Alcohol use (person mean)	0.32 (0.03)	10.29***	1.38 [1.30, 1.47]
Level 1 (daily level, within person)			
Alcohol use (person centered)	0.41 (0.02)	20.13***	1.50 [1.45, 1.56]
Time trend (i.e., study quarter)	0.15 (0.04)	3.90***	1.16 [1.08, 1.25]
Weekend	-0.51 (0.09)	-5.76***	0.60 [0.51, 0.72]
Special occasion or event	-1.11 (0.13)	-8.56***	0.33 [0.26, 0.43]
Drinking with others ^a	-0.15 (0.20)	-0.78	0.86 [0.58, 1.26]
Location			
Drinking at a bar or party ^b	0.06 (0.10)	0.60	1.06 [0.87, 1.30]
Drinking at another location ^b	0.46 (0.15)	3.00**	1.59 [1.17, 2.15]

Notes: The model testing mood analyzed 3,080 drinking days across 339 people, and the model testing context analyzed 3,743 drinking days across 341 people. CI = confidence interval. ^aReference category is drinking alone; ^breference category is drinking at home.

p* < .01; *p* < .001.

tions. Individuals may be more at risk for unplanned heavy drinking if they are generally more willing or more open to consuming alcohol, which could be especially problematic when they are presented with an unexpected opportunity to drink (Gerrard et al., 2008; Gibbons et al., 2003; Zimmermann & Sieverding, 2011).

The findings presented here indicated that the days with unplanned heavy drinking were associated with more negative consequences. Future research should examine whether students may underestimate their potential risk on these

occasions and be less likely to use protective behavioral strategies because they had planned to engage in lower-risk drinking. The current findings suggest that it may be useful to develop strategies that help students be more accurate when anticipating their alcohol consumption, particularly in high-risk contexts (Hendriks et al., 2012), and similarly to increase risk perception associated with drinking in atypical locations where usual protective behavioral strategies may not be readily accessible or cues for using such strategies may not be immediately available (Gerrard et al., 2008).

Limitations

First, it could not be determined whether unplanned heavy drinking occurred on days with missing data. It is possible that the students may have failed to complete a morning report after a night of drinking—potentially resulting in missing data for days with unplanned heavy drinking. Second, mood was assessed in the evening and referred to how participants felt in general that day. Mood earlier in the day may be linked to drinking intentions, such that individuals experiencing elevated moods or negative moods may be more likely to report intentions to drink. Third, the participants did not specify the nature of the special occasion or

TABLE 4. Multilevel negative binomial model testing unplanned heavy drinking as a predictor of consequences

Predictor	Estimate (SE)	<i>t</i>
Level 2 (person level)		
Female birth sex	0.15 (0.09)	1.72
Age	-0.13 (0.04)	-3.58***
Fraternity/sorority membership	0.12 (0.09)	1.24
Number of days with unplanned heavy drinking (person sum)	0.005 (0.015)	0.35
Level 1 (daily level)		
Time trend (i.e., study quarter)	-0.19 (0.03)	-7.40***
Weekend	0.31 (0.06)	5.10***
Unplanned heavy drinking	0.75 (0.06)	12.31***

Notes: Analysis includes 3,717 days nested in 341 people.

****p* < .001.

event as positive or negative, so celebratory and noncelebratory (e.g., exam) events could have been included.

Finally, daily data were collected during 8 weeks over the course of a year from a sample of freshman, sophomore, and junior students at a single university who reported drinking at least twice a week at baseline. Therefore, findings may not generalize across universities or across college enrollment and may not generalize to more diverse populations, particularly with respect to race, ethnicity, age, and socioeconomic status. Despite limitations, the results are important for extending our current understanding of predictors and consequences of unplanned heavy drinking.

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