Episode-Specific Drinking-to-Cope Motivation, Daily Mood, and Fatigue-Related Symptoms Among College Students

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ABSTRACT. Objective: The goal of the present study was to examine whether within-person, episode-specific changes in drinking-to-cope (DTC) motivation from the previous evening were associated with concurrent daily mood and fatigue-related symptoms among college student drinkers (N = 1,421; 54% female). **Method:** We conducted an Internet-based daily diary study in which students reported over 30 days on their previous night's drinking level and motivation and their current mood (i.e., sadness, anxiety, anger/hostility, and positive mood) and fatigue-related symptoms. Hypotheses were tested using hierarchical linear models in which the current day's outcome was predicted by last night's levels of DTC motivation and drinking, controlling for drinking to enhance motivation, sex, current day's physical symptoms and drinking, and yesterday's level of the outcome. Subsequent models also predicted outcomes 2 days following the drinking event. **Results:** Relative increases in previous night's DTC motivation were associated with higher levels of current day negative mood and fatigue-related symptoms and lower levels of positive mood. Also, the association between episode-specific DTC motivation and negative mood was stronger in the positive direction when individuals reported higher levels of nonsocial drinking from the previous night. Last, episode-specific DTC showed similar associations with sadness and anger/hostility 2 days after the drinking event. **Conclusions:** The results are generally consistent with the posited attention allocation and ego-depletion mechanisms. Findings suggest that the deleterious effects of repeated episodes of DTC, over time, could help to explain the increased likelihood of alcohol-related problems seen in prior studies. (*J. Stud. Alcohol Drugs, 75,* 766–774, 2014)

MOTIVATIONAL MODELS OF ALCOHOL USE assert that people often drink to regulate emotions (Cooper et al., 1995). Specifically, people drink to maintain or amplify positive moods (drinking to enhance; DTE) or to alleviate negative moods (drinking to cope; DTC). It is also posited that the reasons people drink, and not just the amount they drink, influence the consequences they might experience as a result of their alcohol use. For example, it is commonly found that DTC motivation is related to drinking-related problems independent of drinking levels (e.g., Cooper et al., 1995; Merrill and Read, 2010; Simons et al., 2005). One of the mechanisms hypothesized to underlie this association is that DTC might have the paradoxical effect of further deteriorating individuals' emotion regulation and coping abilities, resulting in a greater likelihood of experiencing problems (Abrams and Niaura, 1987; Cooper et al., 1988). The goal of the present study was to further elucidate the microprocesses that underlie the deleterious effects of DTC by examining whether reports of such motivation from discrete drinking episodes predict aspects of daily well-being relevant to emotion regulation and coping ability, namely negative mood and fatigue-related symptoms (FRS). We examined these effects among college student drinkers—a high-risk population for drinking-related problems (Jackson et al., 2005; O'Malley and Johnston, 2002).

Received: November 21, 2013. Revision: March 6, 2014.

This research was supported by National Institute on Alcohol Abuse and Alcoholism (NIAAA) Grant 5P60-AA003510, and preparation of this manuscript was supported by NIAAA Grant 5T32-AA07290.

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Effects of drinking to cope on coping-relevant resources

Social learning–based motivational models of alcohol use posit that coping deficits are a precursor for DTC motivation and that continued DTC contributes to further deterioration of an individual's ability to manage stress and regulate emotions (Abrams and Niaura, 1987; Cooper et al., 1988). Indeed, evidence from a longitudinal study of college students showed that changes in DTC motivation in young adulthood, but not changes in DTE motivation, correlated with changes in coping-relevant personality dimensions such as neuroticism and impulsivity (Littlefield et al., 2010). However, the mechanisms through which DTC motivation has these effects have been neither fully explicated nor examined in depth. We propose that the posited long-term deleterious effects of DTC motivation on emotion regulation and coping ability are due, in part, to an accumulation of effects of repeated DTC episodes on negative mood and self-control resources.

Two theoretical models provide a framework for understanding the proposed proximal effects of DTC motivation: Steele and Josephs' (1988) Attention Allocation Model (AAM) and Baumeister and colleagues' ego-depletion model (e.g., Baumeister et al., 2007; Muraven and Baumeister, 2000). According to the AAM, alcohol constricts attention, resulting in increased focus on internal states and environmental cues. During negative moods, especially in the absence of distractions that might shift attention from distress, this alcohol-induced focus can have the paradoxical effect of exacerbating such moods (Armeli et al., 2003; Steele and Josephs, 1988, 1990). Such exacerbation might be especially prevalent when DTC is a salient motivating factor (i.e., when distress is the focal point of attention). Consistent with this notion, college students, especially those high in DTC motivation, report crying as a common intoxicated behavior (Westmaas et al., 2007). Other research indicates that rumination is associated with increased substance use and, specifically, DTC (Caselli et al., 2010; Nolen-Hoeksema and Harrell, 2002).

Increases in negative mood as a result of AAM-related processes prompted by DTC might be accompanied by further attempts to cope with and regulate emotions. According to ego-depletion theory, self-regulation of emotion, thought, or behavior draws on self-control resources—a theoretical limited supply of strength or energy that, like a muscle, gets depleted from exertion (Baumeister et al., 2007). Reductions in self-control resources because of one activity inhibit self-control efforts in other domains until that resource can be replenished (Baumeister et al., 2007; Hagger et al., 2010; Muraven and Baumeister, 2000). Decrements in self-control during drinking episodes characterized by relatively high DTC motivation would be consistent with research showing mean levels of DTC motivation, controlling for drinking level, predict drinking-related problems such as risk taking, impaired control, and impulsive behavior (e.g., Merrill and Read, 2010; Merrill et al., 2014). Moreover, meta-analytic results indicated significant effects of ego depletion on both negative mood and fatigue (Hagger et al., 2010), thus raising the possibility that negative mood and decrements in self-control might extend beyond the drinking episode to affect other aspects of daily life that require focused attention and discipline. This possibility would be consistent with findings showing that independent of drinking level, DTC motivation predicted changes in self-care (e.g., being less physically active, not eating properly), impaired control, and academic and occupational problems 1 year later (Merrill et al., 2014).

Present study

We used a daily diary design to examine whether recall of DTC motivation from the previous night's drinking episode was related to current and next-day negative mood and FRS, controlling for drinking level and pre-drinking episode level of the outcomes. More specifically, we examined the association between changes in DTC motives—i.e., within-person deviations from one's mean level of DTC motivation from one drinking episode to another—and changes in temporally proximal levels of the outcomes of interest. Evidence for these within-person associations would help rule out unmeasured person-level confounds associated with overall high levels of DTC motivation, which cannot be teased out using cross-sectional designs. The daily design also allowed us to assess drinking motivation for a discrete episode after only a very brief time lag, thus greatly reducing recall error; in contrast, the overwhelming majority of studies on this topic have assessed drinking motivation by having individuals recall their usual reasons for drinking across multiple episodes over long periods. We also examined whether within-person changes in episode-specific reports of DTC motivation were related to outcomes reported the following day; this allowed us to examine the longevity of the effects of interest and to disentangle reports of motivation from concurrent levels of mood and FRS.

Our primary hypothesis was that individuals would report greater negative mood and FRS on days following nighttime drinking episodes characterized by relatively higher levels of DTC motivation. We examined anxiety, sadness, and anger/hostility separately, given their distinct attribution and arousal profiles (e.g., Larsen and Diener, 1992; Smith and Ellsworth, 1985). Evidence of differential DTC-related exacerbation of these mood states might shed further light on the processes at play.

To further support our proposed mechanisms of interest, we also tested several other hypotheses. First, consistent with the AAM's propositions that greater consumption will lead to increased constriction of attention and that the exacerbating effects of drinking on mood will be greatest when not distracted, we predicted that the effects of DTC motivation on subsequent mood and FRS would be stronger during episodes characterized by relatively higher levels of nonsocial drinking (i.e., drinking while not interacting with others or alone) compared with drinking in more social situations. We also compared the effects of previous night's DTC motivation to DTE motivation. Because DTE motivation pertains to increasing and/or maintaining positive mood, we did not expect drinking for such reasons to exacerbate the negative outcomes. In a related fashion, we examined positive mood as an outcome. Demonstrating stronger effects of episode-specific DTC on negative mood compared with positive mood would be consistent with meta-analytic findings that ego-depletion manipulations had stronger effects on the former (Hagger et al., 2010). In all models, we controlled for present-day physical or hangover-type symptoms, as such states might be correlated with the outcomes, and individuals feeling ill might be more likely to attribute the previous night's drinking to coping reasons.

Method

Participants and procedure

Procedures were approved by the institutional review board at the University of Connecticut. Students (N = 1,818) were recruited across nine semesters through the psychology research pool, as well as campus-wide broadcast emails and flyers, to participate in a study about daily experiences and health-related behavior. Only students who reported drinking alcohol at least twice in the past month and had not received treatment for alcohol use (measured during prescreening) were eligible. Approximately 6 weeks following the start of the semester, participants began the daily diary portion of the study. Each day for 30 days, between the hours of 2:30 P.M. and 7:00 P.M., participants accessed a secure website and completed a brief survey. This time window was selected to coincide with most undergraduate students' naturally occurring end of school day but before typical evening activities begin (including drinking). Relevant to our study, participants were asked each day to report their current mood, FRS, and physical ailments, as well as alcohol consumption for the past evening (i.e., after the previous day's survey) and for the current day. If any alcohol use was reported, participants were queried about their episode-specific drinking motivation (i.e., DTC and DTE). Participants were paid for both the baseline survey and the daily diary portions of the study.

Students who did not complete at least 15 diary entries (n = 173), did not report nighttime drinking (n = 166), or reported unusually high levels of daytime drinking (i.e., >6 *SD* higher than the next highest value; n = 1) were excluded. Furthermore, to analyze whether drinking influenced next-day mood and fatigue, students needed, at least once, to report on 2 consecutive days and indicate nighttime drinking (i.e., they drank the night before) on the second of those days. Fifty-seven more students failed to provide valid data for this reason, resulting in 1,421 participants eligible for analysis. The final sample had a mean age of 19.3 years (*SD* = 1.4), was 54% female, was mostly freshmen and sophomores (72%), and was mostly White (83%). Excluded participants were more likely to be male (55%), $\chi^2(1)$ = 10.2, p = .001; non-White (34%), $\chi^2(1)$ = 50.9, p < .001; and freshmen and sophomores (80%), $\chi^2(1)$ = 11.9, p = .001; and were younger (M_{age} = 19.1, *SD* = 1.5), $t(1814)$ = 1.97, p = .049. The sample for analysis completed 37,623 diaries out of a possible 42,630 (88% compliance), a mean of 26.5 daily reports (*SD* = 3.7) per participant.

Measures

Alcohol use. Based on Armeli et al.'s (2003) procedures, participants reported each day the number of alcoholic drinks they consumed the previous night "with others/in a social setting" (i.e., social drinking) and "alone/not interacting with others" (i.e., nonsocial drinking). Participants followed the same procedure for reporting number of drinks they consumed that day up to reporting time; given the low levels of daytime drinking, we collapsed across the social and nonsocial categories to create a daytime total. A drink was defined as one 12-oz. can or bottle of beer, 5-oz. glass of wine, 12-oz. wine cooler, or 1-oz. measure of distilled spirits straight or in a mixed drink. Responses were made using a 17-item scale ranging from 0 to 15, or >15 (recoded as 16).

Episode-specific drinking motives. We used an adapted version of Cooper's (1994) coping and enhancement drinking motives scales. Specifically, if participants reported having at least one drink they were asked, "Why did you drink last night?" DTC was assessed with the following items: *To forget my ongoing problems/worries, To feel less depressed, To feel less nervous, To avoid dealing with my ongoing problems, To cheer up, Because I was angry,* and *To feel more confident/sure of myself.* DTE was assessed with two items (*Because I like the pleasant feeling* and *To have fun*) derived from two of the higher loading items in Cooper (1994). Participants responded to each item using a 3-point scale (0 = *no,* 1 = *somewhat,* 2 = *definitely*). Responses were averaged together; Cronbach's α's were .84 for the coping subscale and .65 for the enhancement subscale.

Mood. Participants reported on their mood states for each day using adjective rating scales derived from the Positive and Negative Affect Schedule–Expanded (Watson et al., 1988) and Larsen and Diener's (1992) mood circumplex; responses were made using a 5-point scale (1 = *not at all* to 5 = *extremely*). Negative moods were measured with two items each: anxiety (*nervous* and *anxious*), sadness (*sad* and *dejected*), and anger/hostility (*angry* and *hostile*). Positive mood was assessed with four items (*happy, cheerful, content,* and *enthusiastic*). Responses were averaged together. Cronbach's α's were as follows: anxiety = .67, sadness =.72, anger/hostility = .78, and positive mood = .88.

Fatigue-related symptoms. Participants responded to three items, interspersed with the previously described mood items, derived from measures of emotional exhaustion, fatigue, and work-related burnout (e.g., Poghosyan et al., 2009; Simbula, 2010). Specifically, participants rated how "spent," "depleted," and "drained" they felt today using a 5-point scale (1 = *not at all* to 5 = *extremely*). Responses were averaged together (Cronbach's α = .85).

Physical symptoms. Participants rated whether they were "feeling ill: cold, flu, headache, etc." today using a 7-point scale (0 = *not at all* to 6 = *extremely*).

Data analysis

We used two-level hierarchical linear models to test the main hypothesis that within-person changes in episode-specific DTC motivation would predict changes in negative mood and FRS. We first predicted the current day's outcome

Table 1. Multilevel regression results predicting mood and fatigue-related symptoms the day after drinking episodes

	Sadness		Anxiety		Anger/hostility		Positive mood		FRS	
Variable	*b*	β	*b*	β	*b*	β	*b*	β	*b*	β
Level 2 (person) variables										
Sex[a]	0.025	.019	0.022	.014	-0.011	-.009	0.162***	.087	0.025	.014
Mean social drinking[b]	0.003	.006	0.014	.023	0.004	.008	-0.001	-.001	0.006	.008
Mean nonsocial drinking[b]	0.059*	.041	0.015	.009	0.084***	.063	-0.017	-.008	-0.002	-.001
Mean DTC[b]	0.728***	.299	0.688***	.244	0.532***	.236	-0.351***	-.100	0.692***	.206
Mean DTE[b]	-0.073	-.055	-0.066**	-.042	-0.061***	-.049	0.211***	.110	-0.019	-.010
Level 1 (daily) variables										
Weekend[c]	-0.046***	-.036	-0.089***	-.059	-0.033**	-.027	0.173***	.093	-0.112***	-.063
Physical illness	0.036***	.080	0.039***	.074	0.019***	.045	-0.066***	-.100	0.134***	.213
Daytime drinking	0.006**	.015	0.005*	.012	0.023***	.065	0.044***	.080	-0.008	-.016
DV on drinking day	0.212***	.208	0.180***	.200	0.200***	.204	0.310***	.310	0.295***	.292
Last night social drinking	0.002	.011	-0.008**	-.035	0.002	.010	-0.012***	-.044	0.027***	.102
Last night nonsocial drinking	0.009*	.024	0.009*	.020	0.014***	.038	-0.006	-.011	0.007	.013
ES DTC	0.440***	.146	0.322***	.092	0.279***	.100	-0.261***	-.060	0.291***	.070
ES DTE	-0.084***	-.058	-0.034†	-.020	-0.077***	-.058	0.218***	.105	-0.024	-.012
Level 1 × Level 1 interactions										
ES DTC × Social Drinking	-0.016†	-.018	-0.010	-.009	-0.024**	-.029	0.014	.010	-0.005	-.004
ES DTC × Nonsocial Drinking	0.026*	.015	0.023	.011	0.028*	.017	0.021	.008	0.011	.005

Notes: *b* = unstandardized coefficients; β = standardized coefficients; interaction terms were entered in a separate step. FRS = fatigue-related symptoms; DTC = drinking to cope; DTE = drinking to enhance; DV = dependent variable; ES = episode-specific. [a]0 = male, 1 = female; [b]mean levels across all drinking episodes; [c]0 = weekday, 1 = weekend.
†$p < .10$; *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

from the previous evening's levels of episode-specific DTC and DTE motivation and social and nonsocial drinking, the current day's physical illness symptoms and total daytime alcohol use up to reporting time (all reported on day *t*), and the prior day's level of the dependent variable (reported on day $t - 1$). A similar set of models was estimated for mood and FRS reported on day $t + 1$; specifically, all predictors were identical to the first model, except day $t + 1$ (instead of day *t*) reports of physical illness symptoms and daytime alcohol use were used as controls (given that we wanted to partial out their effects on concurrent mood reports). To test the hypothesis that the effects of episode-specific DTC motivation would be moderated by nonsocial drinking (as opposed to social drinking), we entered into the Level 1 portion of the model the product terms between episode-specific DTC motivation and both social and nonsocial drinking.

We also controlled for sex (coded 0 = male, 1 = female) and weekend–weekday differences (coded 0 = Sunday through Thursday; 1 = Friday and Saturday). Episode-specific DTC and DTE motivation and social and nonsocial drinking were person-mean centered, and the person-means for these predictors were grand-mean centered and incorporated into the Level 2 intercept portion of the models, allowing us to tease apart within-person versus between-person effects of interest (Curran and Bauer, 2011; Raudenbush and Bryk, 2002). For parsimony—and because we were not interested in disentangling their within- and between-person effects—daytime drinking, physical symptoms, and the weekend dummy code were also grand-mean centered (Raudenbush and Bryk, 2002). Also for parsimony, only the intercepts and drinking motive slopes were specified as random effects; nonsignificant variance components were fixed to zero. To aid in the evaluation of the strength of the effects, we calculated standardized coefficients as per Hox (2010).

Results

Descriptive statistics

There were 6,419 nighttime drinking events with corresponding drinking motives reported, a mean of 4.5 events (*SD* = 3.2) per participant. Participants reported episode-specific DTE and DTC motivation greater than zero ("no") on 89.4% and 42.5% of drinking occasions, respectively. Mean levels across all drinking episodes were 1.2 (*SD* = 0.7) for DTE motivation and 0.2 (*SD* = 0.3) for DTC motivation. Social and nonsocial drinking occurred on 95.9% and 15.9% of nighttime drinking episodes, respectively. Participants reported a mean of 5.8 drinks (*SD* = 4.4) in total per drinking occasion. On nights when social drinking was reported, they consumed a mean of 5.5 social drinks (*SD* = 3.8), and on nights when nonsocial drinking was reported, they consumed a mean of 3.5 nonsocial drinks (*SD* = 3.4).

We also estimated the average within-person correlations (*p* values obtained via multilevel regression) among the key predictor variables (all person-mean centered). There were significant, albeit weak, associations between nighttime social and nonsocial drinking levels ($r = .08$, $p = .002$) and episode-specific DTC and DTE ($r = .16$, $p < .001$). We found similar-sized associations between episode-specific DTC and both nonsocial drinking ($r = .08$, $p = .004$) and social drinking ($r = .13$, $p < .001$). Last, there was a marginally signifi-

TABLE 2. Multilevel regression results predicting mood and fatigue-related symptoms two days after drinking episodes

	Sadness		Anxiety		Anger/hostility		Positive mood		FRS	
Variable	*b*	β	*b*	β	*b*	β	*b*	β	*b*	β
Level 2 (person) variables										
Sex[a]	0.035†	.027	0.060	.037	-0.007	-.006	0.112***	.062	.003	.002
Mean social drinking[b]	-0.010	-.020	-0.013	-.020	-0.009	-.018	0.013	.017	.001	.001
Mean nonsocial drinking[b]	0.040	.026	-0.046	-.024	0.088***	.064	-0.054	-.025	-.040	-.019
Mean DTC[b]	0.605***	.245	0.705***	.227	0.462***	.206	-0.266***	-.077	.622***	.182
Mean DTE[b]	-0.046*	-.034	-0.031	-.019	-0.052*	-.042	0.168***	.090	-.007	-.004
Level 1 (daily) variables										
Weekend[c]	-0.074***	-.057	-0.287***	-.174	-0.058***	-.048	0.207***	.113	-.128***	-.071
Physical illness	0.051***	.106	0.047***	.078	0.042***	.096	-0.071***	-.106	.161***	.242
Daytime drinking	0.033***	.066	0.042***	.066	0.054***	.118	0.054***	.077	.019*	.027
DV on drinking day	0.257***	.245	0.154***	.155	0.204***	.208	0.248***	.254	.245***	.237
Last night social drinking	0.002	.010	0.003	.013	0.003	.017	-0.014***	-.052	.013***	.048
Last night nonsocial drinking	0.004	.010	0.010†	.021	0.008†	.023	-0.007	-.012	.009	.017
ES DTC	0.126*	.041	0.106†	.027	0.125**	.045	-0.035	-.008	.011	.003
ES DTE	-0.021	-.015	-0.029	-.016	-0.004	-.003	0.012	.006	-.025	-.012
Level 1 × Level 1 interactions										
ES DTC × Social Drinking	-0.008	-.009	-0.020	-.017	0.006	.007	-0.001	-.001	.007	.005
ES DTC × Nonsocial Drinking	0.011	.006	-0.008	-.004	0.000	.000	0.022	.009	-.037*	-.015

Notes: b = unstandardized coefficients; β = standardized coefficients; interaction terms were entered in a separate step. FRS = fatigue-related symptoms; DTC = drinking to cope; DTE = drinking to enhance; DV = dependent variable; ES = episode-specific. [a]0 = male, 1 = female; [b]mean levels across all drinking episodes; [c]0 = weekday, 1 = weekend.
†$p < .10$; *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

cant association between episode-specific DTE and nonsocial drinking ($r = .03$, $p = .09$) and a moderate-sized association between episode-specific DTE and social drinking ($r = .36$, $p < .001$). These findings indicate that the core predictors of interest were relatively independent.

Multilevel regression models predicting mood and fatigue-related symptoms

Results of models predicting day *t* outcomes are listed in Table 1. All of the specified intercept and slope (episode-specific DTE and DTC motivation) variance components were significant, indicating individual differences in the within-person associations between motives and outcomes. As expected, participants reported greater negative mood and FRS, as well as lower positive mood, on days immediately following drinking episodes characterized by relatively higher levels of DTC motivation. As a comparison, relatively higher levels of episode-specific DTE motivation were uniquely associated with significantly lower negative mood (marginal for anxiety) and higher positive mood on day *t*. We found no effect for changes in episode-specific DTE motivation on FRS. In general, the associations were associated with small effect sizes.

Results from models predicting outcomes on day $t + 1$ are listed in Table 2. These models required complete data from 3 consecutive days, which resulted in 5,748 observations nested within 1,365 participants. In these models, only the intercept and DTC motivation slopes were significant; DTE slope variance components were fixed to zero. Similar to the effects found for day *t* outcomes, changes in episode-specific DTC motivation were positively associated with negative mood on day $t + 1$, although the anxiety effect was only marginally significant. The effects of episode-specific DTC motivation on positive mood and FRS seen for day *t,* however, were not present for day $t + 1$. Episode-specific DTE motivation was unrelated to outcomes on day $t + 1$. Again, effect sizes for the hypothesized effects were small.

Moderating effect of episode-specific drinking levels

We next entered the interaction terms for changes in episode-specific DTC motivation and social and nonsocial drinking in all of the models (the results are shown at the bottom of each table). As predicted, the episode-specific DTC Motivation × Nonsocial Drinking interaction was significant in the day *t* sadness and anger/hostility models. Specifically, the association between episode-specific DTC motivation and each negative mood was stronger in the positive direction for episodes characterized by relatively higher levels of nonsocial drinking (see Figure 1 for model predicting anger/hostility). Nonsocial drinking also moderated the effect of changes in episode-specific DTC motivation on FRS in the day $t + 1$ model, the form of which indicated a negative association between DTC motivation and FRS when nonsocial drinking was high and a positive association when nonsocial drinking was low. None of the other interactions involving nonsocial drinking were significant in predicting anxiety or FRS.

We also found that social drinking moderated the effect of changes in episode-specific DTC motivation on anger/hostility on day *t*. The form of this interaction indicated

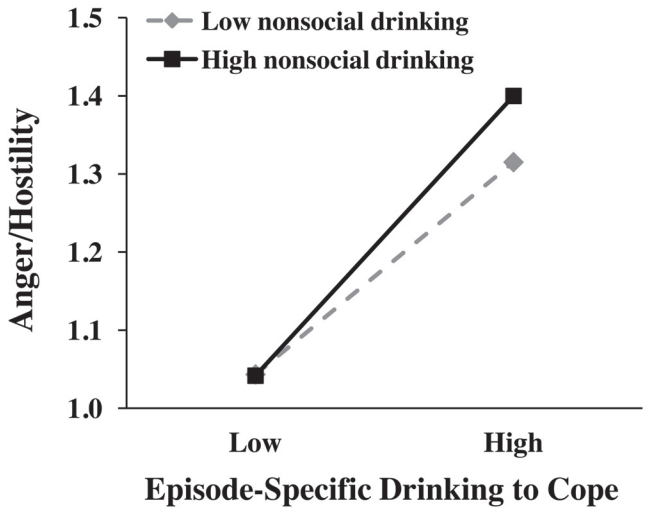

FIGURE 1. The association between episode-specific drinking to cope (DTC) and anger/hostility as a function of the level of nonsocial drinking. High/low values of drinking represent ±1 *SD* from the mean, and high/low values of episode-specific DTC correspond to ±2 *SD* from the mean.

that the association between episode-specific DTC and anger/hostility was weaker (less positive) when individuals reported greater than average levels of social drinking. A similar interactive effect, but of marginal significance, was found for sadness on day *t*. No significant interactions between episode-specific DTC and social drinking were found for any outcomes on day $t + 1$. Last, in a subsequent set of models, we found no significant interactive effects of episode-specific DTE motivation with prior night's levels of social and nonsocial drinking. The effect sizes for all of the interactions were small.

Discussion

We found that on days when individuals recalled relatively higher levels of DTC motivation from the previous night's drinking episode, they reported higher levels of negative mood and FRS and lower levels of positive mood. The effect of episode-specific changes in DTC motivation was also detected on negative mood, but not the other outcomes, on the following day. Some evidence was found for the moderating effect of episode-specific drinking level, with the association between episode-specific DTC motivation and anger/hostility and sadness being (a) stronger when individuals reported greater than average levels of nonsocial drinking and (b) weaker when individuals reported greater than average levels of social drinking.

Our core findings that relative increases in DTC motivation—over and above the amount of alcohol consumed—were positively associated with negative mood and FRS are consistent with our posited attention allocation and ego-depletion mechanisms. Namely, drinking with the expressed goal of alleviating distress might increase focus on that distress, exacerbating such states and triggering emotion-regulation efforts, thus taxing self-control resources. Further support for our hypothesized mechanisms came from results showing that the effect of episode-specific DTC motivation was distinct from that of DTE motivation, the latter of which showed the opposite effect on mood states and no effect on FRS. Moreover, the findings for DTE motivation are consistent with the notion that attempts to augment positive emotions should not result in self-control resource depletion (Hagger et al., 2010).

The effects of episode-specific DTC motivation were also detected on negative moods, but not other outcomes, 2 days after the drinking episode. The specificity of these effects might indicate that processes influencing negative mood are more robust and complex than for the other outcomes. One possibility is that FRS caused by decrements in self-control are, for the most part, ameliorated by replenishment of such resources, which naturally occurs via sleep, relaxation, and the passage of time (Baumeister et al., 1994; Tyler and Burns, 2008). In contrast, heightened negative mood might be initially driven by the mechanisms described above but is perpetuated by additional processes, such as rumination (Caselli et al. 2010; Nolen-Hoeksema and Harrell, 2002), that do not affect FRS. Future research using more fine-grained approaches (e.g., ecological momentary assessment) is needed to test the temporal unfolding of these hypothesized processes.

Also consistent with the posited attention allocation mechanism were our results showing that the effect of relative increases in episode-specific DTC motivation on negative mood states was stronger when individuals reported relatively higher levels of nonsocial drinking. Drinking alone or while not interacting with others might increase the probability that alcohol-induced constricted attention remains focused on salient negative mood states (i.e., because individuals were not distracted), thus resulting in the predicted exacerbation effect. The moderating effect of nonsocial drinking was not detected on mood states on the subsequent day, which might indicate the diminishing effects, over time, of these processes.

Interestingly, we found that the moderating effect of nonsocial drinking was limited to sadness and anger/hostility. The lack of findings for anxiety is puzzling and somewhat at odds with Armeli et al.'s (2003) daily study findings showing that the within-person association between daily stress and anxiety, but not sadness and anger, was stronger in the positive direction when individuals reported relatively more nonsocial drinking. It should be noted, however, that Armeli et al. did not specifically measure episode-specific DTC motivation, and they examined changes in mood and concurrent drinking from daytime to early evening. In the present study, we examined the effects of changes in nighttime drinking and DTC motivation on mood the day after

drinking (and the subsequent day). Thus, making direct comparisons of findings across studies is difficult. One possibility is that the exacerbating effect of nonsocial drinking might have a more immediate and fleeting effect on anxiety (and thus not observed in the present study) and a more delayed and long-lasting effect on sadness and anger/hostility. It should also be noted that the size of the coefficients for the interaction effect in predicting anxiety were similar; thus, the lack of significance might have been attributable to greater error variance, possibly associated with the complex anxiolytic and anxiogenic effects of alcohol on anxiety. The lack of findings related to nonsocial drinking for positive mood is consistent with theory regarding the distinct nature of positive and negative affective systems in general (Tellegen et al., 1999) and might indicate that the exacerbating effects of attention allocation processes are limited to negative moods.

We did not find the anticipated interactive effects for changes in episode-specific DTC motivation and nonsocial drinking in predicting next day's FRS. Again, these null effects might be indicative of the more proximal links between attention allocation processes and negative moods. In other words, the synergistic effects of drinking in nondistracting situations and DTC motivation might have the strongest effects for negative mood amplification, which more distally influences emotion regulation and ego depletion. More puzzling, however, were findings that nonsocial drinking moderated the effect of episode-specific DTC motivation on FRS 2 days after the drinking episode and in the direction opposite to prediction. Given the unpredicted nature of this interaction, we hesitate to speculate on any processes underlying this effect.

We also found that relative increases in social drinking moderated the effect of DTC motivation on next-day anger/hostility and sadness (marginally). As opposed to the effects for nonsocial drinking, increases in DTC motivation displayed a weaker (less positive) association with negative mood when drinking episodes were characterized by relatively higher levels of social drinking. We did not make specific predictions about this interaction given that our measure of social drinking did not specify the nature of the social interaction that occurred. Such interaction might have been related to the coping process itself, possibly in the form of adaptive (e.g., emotional and instrumental support seeking) or maladaptive (e.g., venting emotions) coping, or completely unrelated to the distressing situation. This ambiguity notwithstanding, the form of the obtained interactions is consistent with both attention allocation processes (i.e., distraction during drinking shifting attention away from distressing thoughts) and/or use of adaptive coping, both of which would serve to lessen the effect of DTC motivation on negative mood. Similar to our findings for nonsocial drinking, this interaction was not significant for anxiety. Again, future research is needed to explicate the nature of both social and nonsocial drinking contexts to better understand the divergent findings across the negative moods.

Future research should also examine whether episode-specific DTC motivation indirectly affects mood and fatigue through drinking. We found that episode-specific DTC motivation was positively associated with both nonsocial and social drinking. We also found that higher levels of nonsocial drinking were associated with higher levels of next-day negative mood and that higher levels of social drinking were associated with lower levels of next-day anxiety, but greater fatigue. Although these effects were not predicted—and our cross-sectional assessment does not lend to disentangling their temporal order—these patterns raise interesting questions about complex countervailing indirect influences. Research is also needed to examine how DTC motivation from one episode might lead to subsequent drinking episodes that could propagate or even exacerbate its effects. Again, this was not the purpose of our study, and modeling this complex feedback process could be daunting given the need to simultaneously incorporate subsequent days' drinking in different contexts, motivation levels (which were only reported on drinking days), negative affect, and fatigue.

Although the findings from our study were generally consistent with hypotheses, our core findings were associated with small effect sizes (attesting to the high power of the study). However, we do not believe that our results should be deemed unimportant. For example, although a unit change in episode-specific DTC motivation might be related only to a small change in negative affect or fatigue (on average), our findings represent just a snapshot of these effects over a brief period. Over many months and years, these incremental effects might accumulate, causing more pronounced deficits in self-control and coping ability. The possibility that repeated instances of DTC, over time, might further reduce coping ability and resources, and thus raise the risk for drinking-related problems, is consistent with findings that hangover frequency and severity (including symptoms such as neglecting work and school as a result of drinking) among college students was predictive of later alcohol use disorders, controlling for drinking level (Piasecki et al., 2005). Long-term longitudinal studies are needed to examine whether individuals who show maladaptive responses to episode-specific DTC motivation (i.e., marked increases in negative affect and indicators of reduced self-control) are more at risk for alcohol use disorders.

Several limitations of the present study are also worth noting. First, our sample was drawn from one university and was predominantly White and freshmen/sophomores, thus limiting generalizability to other populations. Second, the primary analyses examining the effect of recalled motives on current mood and fatigue were cross-sectional at the daily level. In addition, although we assessed drinking motives after only a brief period (i.e., the day after nighttime drinking episodes), there is still a possibility of recall error.

Although we did control for mood states before the previous night's drinking episode—and the results from our prospective models were generally consistent with our hypotheses—experimental paradigms are needed to definitively rule out alternative interpretations of causality. These limitations notwithstanding, we believe that our approach is an improvement over that taken in the vast majority of studies examining the effects of drinking motives on various outcomes, which typically entails having individuals recall their usual reasons for drinking and average levels of drinking-related problems over unspecified periods.

To summarize, we believe our findings shed some light on the link between DTC motivation and alcohol-related problems independent of drinking level. Specifically, DTC-induced negative mood, reduced self-control resources, and associated fatigue provide a viable mechanism linking such motivation to commonly observed reports among college students of drinking-related irresponsibility, poor self-care, and academic problems (e.g., Merrill and Read, 2010). More generally, our findings might be informative about the processes linking depressive symptoms and drinking-related problems (e.g., Dennhardt and Murphy, 2011). One possibility is that depressed students are more likely to demonstrate these processes, which, in turn, serve to maintain such symptoms (i.e., high negative affect and fatigue). Counselor-administered interventions that can be tailored to also focus on coping skills and motives for drinking relevant to life stress and depressed mood might be most efficacious in treating college students displaying such characteristics (e.g., Monahan et al., 2013).

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