College Students' Drinking Motives and Social-Contextual Factors: Comparing Associations across Levels of Analysis

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Abstract

Prior investigations have established between-person associations between drinking motives and both levels of alcohol use and social-contextual factors surrounding that use, but these relations have yet to be examined at the within-person level of analysis. Moreover, exploring previously posited subtypes of coping motives (i.e., coping with depression, anxiety, and anger) may shed light on the within-person processes underlying drinking to cope. In this daily diary study of college student drinking ($N = 722$; 54% female), students reported each day how many drinks they consumed the previous evening in both social and nonsocial settings along with their motives for each drinking episode. Additionally, they reported whether they attended a party the evening before, the number of people they were with, the gender makeup of that group, and their perceptions of their companions' drinking prevalence and quantity. External reasons for drinking —social and conformity motives—showed patterns largely consistent across levels of analysis and in agreement with motivational models. However, internal reasons for drinking—enhancement and coping motives—demonstrated divergent associations that suggest different processes across levels of analysis. Finally, coping subtypes showed differing associations with drinking levels and social-contextual factors dependent on the predisposing emotion and the level of analysis. These results suggest that internal drinking motives have unique state and trait components, which could have important implications for the application of motivational models to prevention and treatment efforts. We recommend including drinking motives (including coping subtypes) as within-person measures in future micro-longitudinal studies.

Keywords

Drinking motives; college students; social context; daily diary

College students often consume dangerous amounts of alcohol, leading to elevated risk for physical and social consequences (Hingson, Heeren, Winter, & Wechsler, 2005; Jackson, Sher, & Park, 2005). A prominent approach to understanding college student drinking has been to examine students' drinking motives, or their specific reasons for consuming alcohol. Motives are posited to be the proximal psychological antecedents to drinking behavior (Cox & Klinger, 1988) and are essential in predicting not only individuals' levels of alcohol use,

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but also the social milieu and consequences of their consumption (Cooper, Frone, Russell, & Mudar, 1995; Littlefield, Sher, & Wood, 2010; Merrill & Read, 2010).

Despite the fact that motivational models characterize alcohol consumption as being driven by proximal drinking motives, the majority of research has conceptualized these motives as trait-like constructs that change only over relatively long periods of time (Cooper et al., 2008; Crutzen, Kuntsche, & Schelleman-Offermans, 2013; Littlefield et al., 2010; Schelleman-Offermans, Kuntsche, & Knibbe, 2011). However, recent findings using micro-longitudinal designs (Bolger & Laurenceau, 2013) indicate significant within-person, or state-like, variation in drinking motives (Arbeau, Kuiken, & Wild, 2011; Armeli, O'Hara, Ehrenberg, Sullivan, & Tennen, 2014; O'Hara et al., 2014). Focusing on within-person changes in motives would allow for more accurate mapping of the episode-specific correlates of each motive and could lead to a more nuanced understanding of acute episodes of heavy drinking, as well as the emergence of drinking-related problems (Littlefield et al., 2010; Merrill & Read, 2010). The goal of the current daily diary study, therefore, was to examine associations between drinking motives and both drinking levels and social-contextual factors during specific drinking episodes among college students. Furthermore, we sought to better understand drinking to cope, a process that has been directly associated with negative drinking-related consequences (Kuntsche, Knibbe, Gmel, & Engels, 2005), by examining subtypes of this motive (see Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007).

Drinking Motives

Cooper (1994) posited four distinct motives for alcohol consumption: enhancement (drinking to maintain or amplify positive affect), coping (drinking to avoid or dull negative affect), social (drinking to improve parties or gatherings), and conformity (drinking due to social pressure or a need to fit in). In establishing the construct validity of these scales among both adolescents (Cooper, 1994) and middle-aged adults (Cooper, Russell, Skinner, & Windle, 1992), Cooper found theoretically predicted cross-sectional associations between drinking motives and alcohol-related variables. Stronger endorsement of enhancement, social, and coping motives was associated with higher frequency and quantity of drinking, whereas stronger endorsement of conformity motives was related to lower drinking levels. Perhaps more interesting was that drinking motives were differentially associated with the social context of alcohol use. Individuals with stronger social and conformity motives were more likely to drink at parties; those with stronger enhancement motives were more likely to drink at bars; and those with stronger coping motives were more likely to drink at home. Moreover, stronger endorsement of social motives was associated with drinking more often with other people; stronger enhancement motives with drinking more often in same-gender groups; and stronger coping motives with more often drinking alone. These associations with social-contextual factors capture the nature of drinking spurred by each type of motive and suggest what consequences may arise. For example, drinking to cope has been shown to be a particularly problematic form of alcohol use (Kuntsche et al., 2005; Littlefield et al., 2010), which may be due to its associations with drinking both at home and alone.

To date, no micro-longitudinal research has examined episode-specific relations between drinking motives and social-contextual factors. In fact, only recently have investigations focused on the state-like nature of drinking motives by measuring them for each drinking episode reported by participants. Arbeau et al. (2011) showed that college students reported higher enhancement motives on days when they reported high positive affect, and higher coping motives on days when they reported high negative affect and low positive affect. Moreover, O'Hara et al. (2014) demonstrated among a sample of African-American college students that social drinking was higher on evenings when students reported elevated social or enhancement motives, whereas nonsocial drinking was higher during evenings marked by elevated coping motives. Finally, Armeli et al. (2014) showed that on days following drinking-to-cope episodes college students reported lower positive mood, higher negative mood, and more fatigue-related symptoms. Together, these studies demonstrate the utility of capturing proximal associations among motives, alcohol use, and other relevant factors at the episode-specific level. The current study continues this approach by examining how within-person changes in drinking motives correlate with both drinking levels and the social circumstances surrounding drinking episodes.

Subtypes of Drinking to Cope

Another emerging issue in the drinking motives literature is whether coping with discrete types of emotions produces different patterns of alcohol use. Evidence from college students indicates that subtypes of coping motives, namely coping with depression and coping with anxiety, show unique relations with drinking-related outcomes: coping-depression predicted more alcohol use 1 year later, whereas coping-anxiety predicted less drinking yet more alcohol-related problems (Grant et al., 2007). Moreover, these motives differentially predicted within-day associations between drinking levels and both sadness and anxiety in a daily diary study of college students (Grant, Stewart, & Mohr, 2009). These studies suggest that different reasons for coping produce different types of drinking behavior, but these subtypes have yet to be measured at the episode-specific level. Furthermore, no study has included coping with anger as a subtype of coping motives. Multiple studies have identified anger as particularly relevant to alcohol and substance use (Boynton, O'Hara, Covault, Scott, & Tennen, 2014; Gibbons et al., 2010), as this externalizing emotion is theorized to promote a risk-taking orientation (Curry & Youngblade, 2006; Lerner & Keltner, 2001). To further explore coping subtypes in the current study, we measured coping-depression, coping-anxiety, and coping-anger motives for each drinking episode.

The Current Study

To better understand the proximal correlates of distinct types of drinking motives, we examined associations of episode-specific changes in social, conformity, enhancement, and multiple subtypes of coping motives with evening drinking levels and social-contextual factors in a daily diary study of college students. Differences in between-person versus within-person associations would speak to the complexity of relations among motives, contexts, and drinking behavior, as well as the utility of episode-specific measures of motives. We offer several hypotheses consistent with previous evidence (Cooper, 1994; Cooper et al., 1992). First, drinking episodes with elevated social motives would be

associated with higher levels of social drinking, more social companions, and a higher likelihood of attending a party and being with a mixed-gender group. Second, relatively higher levels of enhancement motives during drinking episodes would be related to more social drinking, higher perceived levels of drinking prevalence and quantity among social companions, and a higher likelihood of students socializing in a same-gender group. Third, we predicted that drinking episodes with relatively higher conformity motives would be related to lower levels of social and nonsocial drinking but more social companions and a higher likelihood of party attendance. Finally, we hypothesized that drinking episodes with relatively higher coping motives would be associated with higher levels of nonsocial drinking, fewer social companions, and a lower likelihood of attending a party. Given the relative dearth of information concerning relations between social-contextual factors and subtypes of coping motives, especially coping-anger, we considered analysis of coping subtypes exploratory and offer no *a priori* hypotheses.

Method

Participants

Procedures were approved by the institutional review board at a large state university in the northeastern United States. To be eligible, students had to be at least 18 years old, have consumed alcohol at least twice in the past 30 days, and never undergone treatment for alcohol problems (measured during prescreening). Recruitment occurred from Spring 2008 – Spring 2012 through the undergraduate psychology participant pool and email-based campus-wide announcements, but social-contextual factors were included in a separate form of the daily survey administered to a subsample of participants ($N = 890$) starting in Fall 2010. Of these students, 80 (9%) failed to comply with study protocol (i.e., completed less than 50% of the diary study), 86 (10%) did not drink during the study, and 2 (< 1%) had missing baseline data, leaving a final sample of 722 students. The sample for analysis had an average age of 19.3 years ($SD = 1.3$); 54% were female; and 82% were European American, 12% Asian or Pacific Islander, 3% Black or African American, 2% Latino or Hispanic American, and <1% Native American or other. Men ($\chi^2[1] = 5.29$, $p < .05$) and minority students ($\chi^2[1] = 13.94$, $p < .001$) were more likely to be omitted from the final sample; no differences were found for age. Students in the final sample completed 19185 diaries ($M = 26.6$, $SD = 3.8$; 89% adherence). However, because we were interested in event-level associations between drinking motives and alcohol-related variables, we only analyzed data from the 3862 days (20% of diaries) on which the 722 students in the final sample reported drinking the previous evening ($M = 5.3$, $SD = 3.6$).[1]

Procedure

Approximately 1 month following the start of the semester, students provided informed consent and completed an online baseline survey containing demographics and a variety of

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[1]Given the focus of this project on alcohol use, students who missed a diary entry were queried at their next log-in about their drinking behavior for up to 3 days prior (see O'Hara, Armeli, & Tennen, 2014). Addition of these backfilled responses resulted in a total of 4459 total reports of evening alcohol consumption ($M = 6.2$, $SD = 4.1$). However, other variables relevant to the current analyses (e.g., drinking motives) were only measured during on-time reports of alcohol use, thereby omitting these additional 597 drinking episodes.

behavioral and personality measures. Students began the daily diary study approximately 2-4 weeks later. Each day for 30 days, students accessed the survey via a secure website between 2:30 p.m. – 7:00 p.m. This window approximated the time between the end of the school day for most undergraduates and the start of evening activities. Germane to the current analyses, this brief survey measured the previous evening's alcohol use, drinking motives, and social setting. If participants missed that day's survey, they could contact the researchers to complete it up to noon the next day; late surveys accounted for approximately 10% of data. Students were paid and, when applicable, provided with classroom credit for both the baseline survey and the daily diary study.

Measures

Evening alcohol use was measured by asking students how many standard alcoholic drinks they consumed the night before (i.e., after completing yesterday's survey, or after 6:00 p.m. yesterday). Students were reminded each day that a standard drink was defined as one 12-oz beer or wine cooler, one 5-oz glass of wine, or a 1-oz measure of liquor straight or in a mixed drink. Separate items assessed *number of social drinks* (i.e., while interacting with others) and *number of nonsocial drinks* (i.e., while alone or not interacting with others). Distinguishing social from nonsocial drinking is important as the latter has been associated with more maladaptive alcohol use among college students (Christiansen, Vik, & Jarchow, 2002; Gonzalez & Skewes, 2012). Responses were provided on a 17-point scale (0 to 15, in 1-drink increments, with an option for >15).

Episode-specific drinking motives were assessed for each evening for which students reported alcohol consumption (for items and descriptive statistics, see Table 1). Students were asked "why did you drink last night?" and responded to 13 statements adapted from the Drinking Motives Questionnaire—Revised (Cooper, 1994) and the Modified Drinking Motives Questionnaire—Revised (Grant et al., 2007). We altered the response scale to 0 (*no*), 1 (*somewhat*), or 2 (*definitely*) to better fit the revised wording for discrete drinking episodes. For *enhancement*, *social*, and *conformity motives* we selected two of the higher-loading items from Cooper's original scale. Given our interest in distinct aspects of drinking-to-cope, we used seven items to measure coping motives, which could be subdivided into three subtypes: four coping-depression items, two coping-anxiety items, and a single, face-valid coping-anger item written by the researchers.

Social-contextual factors were measured for each evening regardless of alcohol use, but we only analyzed data for evenings on which students consumed alcohol. *Number of social companions* was measured by asking "How many people were you with last night?" using a 12-point scale from 0 to 10, with an option for >10. Students were then asked about the gender makeup of those individuals, responding on a 5-point categorical scale (1 = *male only*; 2 = *female only*; 3 = *mixed group but mostly men*; 4 = *mixed group but mostly women*; 5 = *mixed group but about an even amount of men and women*). *Group gender* was coded 0 if students indicated a same-gender group (i.e., a man who responded '1' or a woman who responded '2') and 1 for a mixed-gender group (all other combinations). *Companions' perceived drinking prevalence* was measured by asking "Approximately what percent of all the people you were with last night were drinking alcohol?" using an 11-point scale from

0%-100% in 10% increments. *Companions' perceived drinking quantity* was measured by asking "Of those you were with last night who were drinking (if any), how many drinks did these people have on average?" using a 17-point scale from 0 to 15, with an option for >15. Finally, *party attendance* was derived from a scale measuring evening stress levels. Students who indicated that they 'went to a party/get-together' were coded as '1'; students who did not attend a party were coded as '0'.

Analysis

To examine episode-specific associations among drinking motives, drinking levels, and social-contextual factors, we used multilevel modeling with HLM 6.08 (Raudenbush, Bryk, Cheong, & Congdon, 2004). This technique accounts for the non-independence of daily diary (i.e., repeated measures) data, and allows for disentangling within-person from between-person effects (Raudenbush & Bryk, 2002). All models were estimated using restricted maximum likelihood. Models predicting social and nonsocial drinking were estimated with a Poisson distribution for count data; models predicting number of companions, companions' perceived drinking prevalence, and companions' perceived drinking quantity were modeled with a linear distribution; and models predicting party attendance and group gender were modeled with a Bernoulli distribution for dichotomous outcomes. Intraclass correlations, which indicate the proportion of variance at the between-person level, were calculated for each variable of interest by estimating an empty model and using variances of 1.0 for count models and $\pi^2/3$ for Bernoulli models (Snijders & Bosker, 1999).

In the first set of models, daily predictors (i.e., the level 1 model) included enhancement, social, conformity, and coping motives (i.e., the average of all seven drinking-to-cope items), as well as whether the drinking episode occurred on a weekend (0 = weeknight; 1 = Thursday, Friday or Saturday night). Episode-specific drinking motives were person-mean centered, thus effects represented differences in alcohol-related correlates based on deviations from each individual's mean motive levels (Enders & Tofighi, 2007). Random slopes were tested for the four drinking motives and non-significant random effects were fixed to zero in the final models (Nezlek, 2001). Between-person effects (i.e., the level 2 model) included gender (0 = male, 1 = female), age, and aggregate episode-specific drinking motives, the latter of which allowed us to disambiguate the within-person and between-person effects of episode-specific drinking motives (Curran & Bauer, 2011; Raudenbush & Bryk, 2002). Age and aggregate drinking motives were grand-mean centered.

A second set of models examined subtypes of coping motives. In these models, coping motives were replaced at the within- and between-person levels with the coping-depression, coping-anxiety, and coping-anger measures. These models, therefore, tested the effects of coping subtypes controlling for enhancement, social, and conformity motives. Again, coping subtypes were person-mean centered at level 1, and their aggregate means entered as between-person predictors at level 2 (grand-mean centered). Random slopes were again estimated for drinking motives, but due to the generally low endorsement of coping subtypes, random effects for these measures were fixed to zero.

Results

Descriptive Statistics

In the final sample for analysis, students engaged in an average of 4.6 social drinking episodes ($SD = 3.7$) and 0.8 nonsocial drinking episodes ($SD = 1.8$) during the study month. During these episodes, students consumed an average of 5.1 social drinks ($SD = 2.7$) and 3.6 nonsocial drinks ($SD = 3.0$). On evenings when students consumed alcohol, they were with an average of 7.2 social companions ($SD = 3.0$), and 86.0% of these groups were mixed-gender. Furthermore, students estimated that 70%-80% of their social companions consumed alcohol on evenings when they were drinking ($M = 7.6$, $SD = 2.1$) and that their companions drank an average of 5.3 drinks ($SD = 2.5$). As shown in Table 1, enhancement motives were the most strongly endorsed motive across the study month, followed by social motives, coping motives, and conformity motives.

Table 2 displays correlations among drinking motives at both the episode-specific (within-person) and aggregate (between-person) levels of analysis. As expected, correlations were positive and significant (with three exceptions for coping-anger). Episode-specific correlations were typically smaller in magnitude than the corresponding aggregate-level correlation, indicating that even motives that were highly correlated at the between-person level (e.g., coping and conformity motives: $r = .60$, $p < .001$) did not necessarily co-occur when examining individual drinking episodes ($r = .32$, $p < .001$).

Finally, intraclass correlations shown in Table 2 indicate that a large portion of the total variability in drinking motives was episode-specific (within-person) variation. The proportion of episode-specific variation ranged from 40%-60%, with the exception of coping-anger at 72%. For drinking levels (see Table 3), 50% of the variance in social drinking and 24% of the variance in nonsocial drinking was at the episode-specific level. Finally, the majority of the variance for social-contextual factors (see Table 3) was explained at the episode-specific level, ranging from 57% for companions' perceived drinking quantity to 80% for party attendance.

Multilevel Models

First, we present the between-person associations of students' typical reasons for drinking (i.e., aggregate episode-specific drinking motives) with their mean levels of social and nonsocial alcohol use and social-contextual factors (displayed in the lower half of Table 3). In Model 1, we include the four main drinking motives (i.e., enhancement, social, conformity, and coping motives) as predictors. In Model 2, we decompose coping motives into three subtypes (coping-depression, coping-anxiety, and coping-anger) to examine whether they differentially relate to levels of social and nonsocial drinking, as well as social contexts for drinking. Results from these models (specifically, Model 1) can be more readily compared to prior studies that used cross-sectional data (i.e., Cooper, 1994; Cooper et al., 1992) given that both sets of analyses focus on between-person effects. Next, we show the episode-specific associations between drinking motives and alcohol-related correlates (upper half of Table 3) to determine how these relations compare to those at the between-person level.

Between-Person Associations

As expected, higher mean levels of enhancement motives were associated with higher perceived drinking prevalence among companions, but unrelated to mean levels of social drinking, average number of social partners, the frequency of party attendance, and group gender composition. Additionally, higher mean levels of enhancement motives were related to lower mean levels of nonsocial drinking. Higher mean levels of social motives, as anticipated, were related to higher mean levels of social drinking and more frequent party attendance, although not group gender composition. Also consistent with theory, mean levels of social motives were positively associated with mean number of social companions, and mean levels of perceived prevalence and quantity of drinking among companions. As expected, mean levels of conformity motives were positively associated with party attendance, mean number of social companions, and mean level of companions' perceived drinking quantity. Mean conformity motives, however, were unrelated to mean drinking levels. Finally, and consistent with predictions, mean levels of coping motives were positively associated with mean levels of nonsocial drinking and negatively associated with mean levels of social drinking. Higher aggregate levels of coping motives were also associated with lower mean levels of social companions and lower average perceived prevalence and quantity of drinking among companions.

Episode-Specific Associations

As anticipated, drinking episodes with relatively higher levels of enhancement motives were associated with higher levels of social (but not nonsocial) drinking, greater likelihoods of attending a party and being in a mixed-gender group, and higher perceived prevalence and quantity of alcohol use among companions. Drinking episodes with relatively higher levels of social motives were associated with more social drinking (and less nonsocial drinking), and greater likelihoods of party attendance and being with a mixed-gender group. Higher episode-specific social motives were also related to being with more social companions who were perceived to be higher in drinking prevalence and quantity. Consistent with theory, drinking episodes characterized by relatively higher conformity motives were associated with being with more social companions who were perceived to have consumed a higher quantity of alcohol. Contrary to expectations, however, episode-specific conformity motives were unrelated to party attendance and positively related to social drinking. Finally, drinking episodes characterized by relatively higher levels of coping motives were related to more social and nonsocial alcohol use, with the latter association being stronger. Episode-specific coping motives were unrelated to social-contextual factors.

Drinking-to-Cope Subtypes

At the between-person level, higher mean aggregate coping-depression motives were associated with a greater prevalence of same-gender social groups. Higher mean levels of coping-anxiety motives were related to higher mean levels of companions' perceived drinking prevalence, as well as more mixed-gender social groups. Finally, higher mean levels of coping-anger motives were associated with higher mean levels of nonsocial drinking and lower perceived prevalence and quantity of drinking among companions.

At the within-person level, drinking episodes characterized by relatively higher levels of coping-anxiety motives showed a similar pattern of correlates to social and conformity motives: more social drinking, more social companions, higher perceived drinking prevalence among companions, and a higher likelihood of being in a mixed-gender group. Drinking episodes with relatively higher levels of coping-anger motives, however, reflected the anticipated patterns for drinking to cope more generally: more nonsocial drinks and social companions who were perceived to drink less in terms of prevalence and quantity. Evenings characterized by relatively higher levels of coping-depression motives were only associated with a higher likelihood of being in a same-gender group.

Discussion

This was the first study to examine associations between college students' drinking motives and both drinking levels and social-contextual factors surrounding drinking episodes at the within-person and between-person levels of analysis. Between-person results were generally consistent with past findings on motivational models of alcohol use (Cooper, 1994; Cooper et al., 1992). Findings at the within-person level of analysis, though similar in many instances, differed in some important aspects that could further explicate the motivational processes of interest. Finally, examination of coping motive subtypes showed distinct patterns of associations at both levels of analysis.

Associations with Drinking Motives across Levels of Analysis

Of primary interest was the degree to which associations differed across levels of analysis. External reasons for drinking—social and conformity motives—showed patterns generally consistent across levels and in support of previous studies of adolescents (Cooper, 1994) and middle-aged adults (Cooper et al., 1992). Drinking for social reasons was associated with higher quantities of social drinking, as well as a social milieu consistent with heavy alcohol use: being at parties with more drinking companions who were themselves perceived as drinking more. Similarly, higher conformity motives were related to more social companions and higher perceived drinking quantity among those individuals. Interestingly, we found no association between mean levels of conformity motives and mean drinking levels, although consistent with prior evidence the trends were negative (Cooper, 1994). These findings suggest that drinking due to social forces—positive (socializing) or negative (conformity)—operates similarly across levels of analysis.

Episode-specific correlates of internal reasons for drinking—enhancement and coping motives—diverged from those observed at the between-person level to a greater degree than seen for external motives. Higher mean enhancement motives were associated with less nonsocial drinking and higher perceived drinking quantity among social companions. Episodes with higher enhancement motives, however, unfolded in a manner more consistent with theory: more social drinking and social companions who were perceived as higher in drinking prevalence and quantity. Contrary to expectations, however, these episodes were characterized by drinking at parties and among mixed-gender groups. Between-person correlates of coping motives suggested a pattern of nonsocial drinking (i.e., fewer social drinks, more nonsocial drinks, and being around fewer companions who were lower in

perceived drinking prevalence and quantity) that was consistent with previous findings (Cooper, 1994; Cooper et al., 1992). At the within-person level of analysis, however, coping motives were related to more social and nonsocial drinking (see O'Hara et al., 2014), but unrelated to social-contextual factors.

Differences across levels of analysis could indicate unique trait and state components of drinking motives, with more pronounced distinctions for internal motives. For example, trait-level coping motives might predispose individuals to avoid social drinking situations in general, whereas state-level coping motives might prompt increased drinking when an individual is in a specific social drinking setting. The tendency for individuals with higher average levels of drinking-to-cope motivation to show more isolated, nonsocial drinking could also be due to third-variable personality traits that tend to covary with global coping motives, such as neuroticism (Cooper, Agocha, & Sheldon, 2000). Given the importance ascribed to internal motives in models of alcohol use (e.g., Cooper et al., 1995), differences between correlates at the within- versus between-person levels are particularly worthy of future research to understand whether and how episode-specific processes might give rise to patterns seen more globally.

Understanding distinctions between the current results and those from prior investigations requires consideration of the unique social context of alcohol use experienced by college students versus either adolescents or middle-aged adults (Cooper, 1994; Cooper et al., 1992). For example, college students may find few opportunities to socialize outside of a mixed-gender setting; in fact, 86% of drinking evenings in this sample involved mixed-gender groups. Moreover, the majority of college student drinking is social in nature (Christiansen et al., 2002), and students in the current study engaged in nonsocial drinking approximately once on average during the study month, suggesting that characterizing instances of drinking alone may be challenging in this population. Finally, when students in the current study consumed alcohol, they reported on average that over 70% of their social companions were also drinking, and that these individuals drank over five drinks on average, a rate associated with heavy episodic drinking (NIAAA, 2004). College students may be particularly susceptible to heavy drinking regardless of specific motivations due to the high rates of consumption typical in this environment (Jackson et al., 2005). Future micro-longitudinal studies of within-person changes in drinking motives should examine individuals across a wider range of developmental stages and broader social contexts, especially considering that all investigations to date have recruited college samples (Arbeau et al., 2011; Armeli et al., 2014; O'Hara et al., 2014).

Decomposition of Coping Motives

As previously suggested by Grant et al. (2007), and expanded upon here with the addition of coping with anger, examining subtypes of coping motives revealed useful information about drinking-to-cope processes. Again, we focus our discussion on differences across levels of analysis. Episodes with higher coping-anxiety motives appeared similar to episodes with higher social motives: more social drinking, more social companions of whom more were perceived to be drinking, and a higher likelihood of a mixed-gender group. These associations could derive from social anxiety caused by the drinking situation itself, such as

might be expected when interacting with the opposite sex. At the between-person level, however, coping-anxiety motives were not related to levels of alcohol use nor social-contextual factors. These findings might help shed light on prior evidence showing generally weak cross-sectional associations between social anxiety and drinking levels among college students (e.g., Ham & Hope, 2006; Stewart, Morris, Mellings, & Komar, 2006). For example, individuals high in social anxiety might typically self-select out of social drinking situations (Morris, Stewart, & Ham, 2005), but when in such situations, their anxiety will tend to result in higher levels of drinking—processes which could cancel each other out in terms of the overall association between social anxiety and drinking. Future research focusing on anxiety emanating from social interaction versus other sources is needed to better test this interpretation.

Drinking to cope with depression showed a pattern opposite to coping-anxiety motives in that significant correlates were found primarily at the aggregate level. Between-person associations of coping-depression motives were similar to those found for composite coping motives: less social drinking, more nonsocial drinking, and fewer social companions. Episodes marked by elevated coping-depression motives, however, were only related to a higher likelihood of being with a mixed-gender group. These findings highlight potentially important differences in processes related to trait versus state levels of depression-related drinking motivation. Future research examining relevant correlates at each level of analysis is needed to better understand these associations.

Finally, coping with anger was related to nonsocial drinking at both levels of analysis: more nonsocial drinks and fewer social companions who were perceived as less likely themselves to drink. Additionally, higher coping-anger was associated at the within-person level with lower perceived quantity of drinking among companions, and at the between-person level with more social drinking. In general, these findings support earlier evidence that drinking in response to anger may be particularly problematic (Boynton et al., 2014; Gibbons et al., 2010) as anger may promote social withdrawal and the subsequent problems associated with drinking alone (Christiansen et al., 2002; Gonzalez & Skewes, 2012). As this was the first study to include coping-anger in a motivational framework, however, we encourage replication of these findings before suggesting modifications to theory and implications for interventions.

Limitations and Future Directions

Measuring drinking motives at the episode-specific level revealed important relations among motives, alcohol use, and social contexts not observed at the between-person level, underlining the utility of this approach for future studies. A pivotal issue that could not be addressed by these data, however, is the causal direction of effects. In one direction, students may possess a predisposing set of drinking motives for a given evening based on internal factors, such as mood (Arbeau et al., 2011), which direct them to find or develop social situations that facilitate satisfaction of those needs. This causal narrative makes the most sense for when students drink for internal reasons—enhancement or coping motives. In the other direction, however, students may find themselves in social situations that engender certain drinking motives. For example, a student may enter a situation where alcohol is

available with no intention of drinking, but once in that atmosphere, consume alcohol for social or conformity reasons. These external motives for drinking may better fit this situational perspective, but the same could be said for internal motives, which could be elicited by social contexts that promote positive or negative affect. In reality, both directions are plausible and likely occur under different circumstances. Future studies employing more fine-grained assessment procedures, such as ecological momentary assessment (Shiffman, Stone, & Hufford, 2008), would help us better understand the temporal unfolding of drinking motives and social-contextual factors (e.g., Kuntsche & Labhart, 2013).

Another limitation of our study was that drinking motives were reported retrospectively the next day (or, rarely, 2 days later), raising the possibility that students reconstructed their motives as a function of how much they drank, the contexts in which they drank, or the consequences they experienced. Likewise, students' evaluations of their social companions' prevalence and quantity of alcohol use may have been colored by their own behavior or the social milieu. Although we consider episode-specific measures superior to global reports that rely upon retrospection over vast periods of time, future studies may consider using ecological momentary assessment to measure drinking motives and social-contextual factors throughout the course of a drinking episode. Not only would this approach reduce retrospective error, but it could also capture within-evening variation in drinking motives and contextual factors (e.g., number of social companions; gender makeup of companions). This procedure would allow for observation of how drinking patterns change, for example, as students transition between same-gender and mixed-gender groups, or from drinking alone to at parties or bars. It should be noted, however, that such techniques have their own limitations, such as asking participants to report on the behavior, cognition, and emotions of themselves and others while in distracting environments or while inebriated.

Finally, our measures were limited and, in some cases, showed less than optimal reliability due to the brevity required by daily surveys. For example, our measure of the gender makeup of students' social companions was subjective and thus was coded in an extreme (i.e., all men or all women) albeit unambiguous manner. Future work should use more precise measures and examine whether a tipping point exists for change in drinking behavior as a function of the gender of one's companions. Also, coping with anger, a relatively novel construct, was measured with a single item. However, given the adequacy of brief scales (including single-item measures; Wanous & Reichers, 1996) and the pattern of convergent and discriminant validity exhibited by our measures, we believe our findings and conclusions to be sound. Nevertheless, future studies would be advised to use complete drinking motives scales at the episodic level (e.g., Kuntsche & Kuntsche, 2009; Grant et al., 2007), as well as to develop additional items to tap drinking to cope with anger, in order to examine the factor structure of coping motives at multiple levels of analysis.

Limitations notwithstanding, we believe that these findings not only add to our understanding of drinking motives at a theoretical level, but also have potential applied implications. Our cross-level comparisons uncovered important distinctions between the within- and between-person processes of interest, most notably with respect to coping motivation and its subtypes. Given the well-established links between drinking-to-cope and drinking problems (e.g., Kuntsche et al., 2005), a greater understanding of the proximal

correlates of various forms of coping motivation—and its interplay with other motives—can better inform treatment and prevention efforts. Although preventive recommendations are beyond the scope of the current study, we strongly encourage future research that collects key measures at the within-person level of analysis and leverages those data to improve drinking-related outcomes.

Acknowledgments

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Table 1

Descriptive Statistics and Reliabilities for Episode-specific Drinking Motive Measures

SCALE / ITEM	MEAN	*SD*	RELIABILITY (α)
ENHANCEMENT	1.22	0.66	0.62
Because I like the pleasant feeling	1.12	0.77	
To have fun	1.33	0.77	
SOCIAL	1.08	0.75	0.87
To make party/gathering more fun	1.17	0.79	
To improve party/gathering	1.00	0.81	
CONFORMITY	0.19	0.39	0.60
Because my friends pressure me	0.14	0.40	
To fit in with a group I like	0.23	0.51	
COPING	0.23	0.43	0.85
COPING-DEPRESSION	0.23	0.45	0.71
To feel less depressed	0.15	0.44	
To cheer up	0.31	0.57	
To forget my ongoing problems/worries	0.30	0.58	
To avoid dealing with my ongoing problems	0.18	0.47	
COPING-ANXIETY	0.27	0.47	0.72
To feel more confident/sure of myself	0.29	0.56	
To feel less nervous	0.24	0.51	
COPING-ANGER			
Because I was angry	0.08	0.33	

Notes. Items based on the Drinking Motives Questionnaire-Revised (Cooper, 1994) and the Modified Drinking Motives Questionnaire (Grant et al., 2007). Scale: 0 (*no*), 1 (*somewhat*), 2 (*definitely*). Items were averaged together to create scale composites. Reliability coefficients (α's) calculated across person-days.

Table 2

Correlations among Drinking Motives at Episode-specific and Aggregate Levels

	ICC	Enhancement	Social	Conformity	Coping	Coping-depression	Coping-anxiety	Coping-anger
Enhancement	.44		.65***	.10***	.19***	.15***	.26***	−.03
Social	.40	.58***		.31***	.29***	.20***	.40***	.03
Conformity	.52	.10***	.15***		.60***	.51***	.58***	.46***
Coping	.55	.16***	.17***	.32***				
Coping-depression	.51	.13***	.10***	.24***			.60***	.62***
Coping-anxiety	.50	.20***	.26***	.29***		.34***		.39***
Coping-anger	.28	−.03*	−.02	.22***		.45***	14***	

Note. ICC = intraclass correlation. Episode-specific level correlations below the diagonal (*N* = 3874); episode-specific values person-mean centered. Aggregate level correlations above the diagonal (*N* = 724).

*
p .05

***
p .001.

Table 3

Multilevel Models Predicting Drinking Levels and Social-Contextual Factors

	Social drinks[1]		Nonsocial drinks[1]		Number of social partners[2]		Others' drinking prevalence[2]		Others' drinking quantity[2]		Attended Party[3]		Social group gender[3]	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intraclass correlations	.49		.76		.40		.23		.43		.20		.276	
Within-person associations														
Weekend[4]	0.22***	0.22***	0.31***	0.27***	0.67***	0.67***	1.30***	1.30***	1.19***	1.20***	0.51***	0.51***	0.522***	0.522***
Enhancement[5]	0.27***	0.26***	−0.10	−0.09	0.27	0.26	0.56***	0.54***	0.64***	0.62***	0.37***	0.36***	0.290*	0.298*
Social[5]	0.42***	0.41***	−0.35**	−0.33*	1.80***	1.75***	1.30***	1.25***	1.29***	1.26***	1.10***	1.10***	0.832***	0.759***
Conformity[5]	0.11***	0.11***	−0.09	−0.07	0.50*	0.42	0.25	0.15	0.72***	0.72***	0.21	0.25	−0.254	−0.379
Coping[5]	0.09*		0.54*		−0.05		−0.11		−0.03		−0.37		0.014	
Coping-depression[5]		0.05		0.16		−0.14		0.01		0.02		−0.05		−0.508*
Coping-anxiety[5]		0.06*		−0.02		0.35*		0.34*		0.24		−0.19		0.800***
Coping-anger[5]		−0.05		0.29**		−0.35		−0.57***		−0.41*		−0.26		0.037
Between-person associations														
Gender[6]	−0.36***	−0.36***	−0.42**	−0.35	0.56**	0.51**	0.40***	0.36**	−0.68***	−0.68***	0.39***	0.37***	0.562***	0.561***
Age[7]	−0.05***	−0.05***	0.044	0.04	−0.32***	−0.33***	−0.08*	−0.08	−0.26***	−0.26***	−0.08	−0.07	−0.104*	−0.104*
Enhancement[7]	0.08	0.10*	−0.75***	−0.71***	0.13	0.12	0.41**	0.39*	0.17	0.16	0.22	0.23	0.138	0.150
Social[7]	0.40***	0.40***	−0.27	−0.14	1.82***	1.68***	1.01***	0.99***	1.70***	1.68***	0.82***	0.78***	0.366	0.363
Conformity[7]	−0.02	−0.04	−0.07	−0.09	0.92*	0.87	0.15	0.23	0.80*	0.62	0.52*	0.42	−0.317	−0.349
Coping[7]	−0.13*		1.86***		−2.22***		−1.10***		−1.03***		−0.11		−0.299	
Coping-depression[7]		−0.21**		0.96**		−1.45***		−0.37		−1.13***		−0.33		−0.190
Coping-anxiety[7]		0.00		0.00		0.10		−0.23		0.03		0.32		0.005
Coping-anger[7]		0.22*		0.29*		−1.22*		−1.05**		0.64		0.05		−0.051

Note. Unstandardized coefficients. Model 1: Four main drinking motives. Model 2: Decomposed coping[1] motives. **Boldface** indicates inclusion of significant random slope for that effect; random slopes for coping subtypes were fixed to zero *a priori*.

[1] Poisson models.

[2] Linear models.

[3] Bernoulli models (0 = no party, 1 = attended party; 0 = same-gender; 1 = mixed-gender).

[4] 0 = weeknight, 1 = weekend (Thursday, Friday, Saturday).

[5] Person-mean centered.

[6] 0 = male, 1 = female.

[7] Grand-mean centered.

*
p .05

**
p .01

***
p .001.