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## Solitary and Social Heavy drinking, Suicidal Ideation, and Drinking Motives in Underage College Drinkers

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### Abstract

In college students, solitary heavy drinking (i.e., while alone) is associated with depression and with higher rates of drinking problems than heavy drinking in social contexts. This study explored the relationship among heavy episodic drinking context, suicidal ideation, and drinking motives among underage college drinkers ( $n = 91$ ) with a history of passive suicidal ideation. Participants completed measures of depression, suicidal ideation, alcohol consumption and problems, and drinking motives. Multiple regression analyses revealed that suicidal ideation, but not depression, was significantly related to solitary heavy drinking. Neither was related to social heavy drinking. Enhancement motives for drinking, but not other drinking motives (i.e., social, conformity, drinking to cope), were significantly associated with social heavy drinking. In contrast, only drinking to cope was associated with solitary heavy drinking. These findings suggest that greater suicidal ideation is associated with greater frequency of becoming intoxicated while alone, and that this drinking is motivated by attempts to cope. Solitary heavy drinking is a potentially dangerous coping strategy for an individual experiencing suicidal ideation.

### Keywords

suicidal ideation; drinking alone; alcohol problems; heavy episodic drinking; binge drinking; drinking to cope

## 1. Introduction

Although few studies have examined the consequences associated with solitary drinking, it is typically viewed as pathological or harmful and is conventionally believed to be associated with alcoholism (Demers & Bourgault, 1996). A study of solitary drinking among adults in Montreal, Canada, found that individuals who engaged in solitary drinking did not have increased drinking problems (Bourgault & Demers, 1997). However, individuals who engaged in solitary heavy drinking (5 or more drinks per occasion) were significantly higher in alcohol-related problems. Bourgault and Demers (1997) suggest that it is not solitary drinking per se

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that is problematic, but rather solitary intoxication that is associated with greater alcohol problems.

College students evidence high rates of heavy episodic drinking and alcohol problems, with underage drinkers being at particular risk (Knight et al., 2002; O'Malley & Johnston, 2002; Wechsler, Lee, Nelson, & Kuo, 2002). While drinking among college students is typically for social reasons (Kuntsche, Knibbe, Gmel, & Engels, 2005; LaBrie, Hummer, & Pedersen, 2007; Stewart, Zeitlin, & Samoluk, 1996) and in social contexts (Christiansen, Vik, & Jarchow, 2002; Mohr et al., 2001; Wechsler, Dowdall, Davenport, & Castillo, 1995), drinking in response to negative experiences and affect has been associated with drinking in solitary contexts. A daily process study of drinking in social or solitary contexts found that among students high in the tendency to experience negative emotional states (neuroticism), days with greater negative interpersonal experiences predicted solitary drinking (Mohr et al., 2001). In contrast, days with greater positive personal experiences were associated with drinking more in social contexts, regardless of level of neuroticism (Mohr et al., 2001). Similarly, students who engage in solitary heavy drinking episodes (i.e., 4 or more drinks at one time while alone for women, 5 or more for men) have been found to be higher in depression and to have more alcohol problems than students who drink heavily only in social contexts (Christiansen et al., 2002). Together these studies suggest that the relationship between negative affect and drinking may be context specific, with solitary drinking contexts being particularly associated with depression and related constructs, while social drinking appears not to be affected by negative emotions.

Drinking context also may be important in the well-documented relationship between drinking and suicidality (ideation, attempts, and deaths). Alcohol use just prior to a completed suicide or to a nonfatal suicide attempt is common, as are alcohol use disorders among suicide attempters and completers (Cherpitel, Borges, & Wilcox, 2004; Hufford, 2001; Powell et al. 2001; Wilcox, Conner, & Caine, 2004). Suicidal ideation is relatively common among young college students, with 11% of 18- to 24-year-old students reporting seriously considering suicide in the previous year (Brenner, Hassan, & Barrios, 1999). Among students, suicidal ideation is associated with heavy episodic drinking, more frequent alcohol use, and greater alcohol problems (Brenner et al., 1999; Gonzalez, Bradizza, & Collins, in press; Levy, & Deykin, 1989; Stephenson, Pena-Shaff, & Quirk, 2006). The role of drinking context in relation to suicidality has not previously been explored. However, the strong relationship between depression and suicidality (e.g., Konick & Gutierrez, 2005; Walker et al., 2008) and the finding that solitary heavy drinking is associated with increased depression among college students (Christiansen et al., 2002) suggest that drinking context also may be important in the relationship between heavy drinking and suicidality among college students.

Drinking motives are thought to play a role in drinking context. According to motivational models of alcohol use, drinking to enhance positive emotions or to reduce negative emotions represent psychologically distinct and strategically motivated behaviors (Cooper, Frone, Russell, & Mudar, 1995). Drinking to cope with negative emotions is motivated by efforts to escape, avoid, or lessen negative affect, while enhancement motives involve the use of alcohol to increase positive affective states (Cooper et al., 1995). Of the drinking motives, enhancement motives demonstrate the strongest association with collegiate heavy drinking (see Kuntsche et al., 2005 for a review). However, it has been suggested that drinking to cope with negative affect may motivate heavy drinking among college students in the absence of the social influences commonly associated with collegiate heavy drinking (Christiansen et al., 2002). In addition, Cooper et al. (1992) examined the associations of drinking motives with drinking behavior in various contexts among a general sample of adults. They found that drinking to cope with negative affect was positively associated with drinking alone, while social and enhancement motives were positively associated with social drinking contexts.

Drinking motives have been shown to be more proximal to drinking behavior than alcohol expectancies and to mediate the relationship between alcohol expectancies and drinking behavior (Cooper et al., 1995). Thus, although few studies have examined the relationships of drinking motives and drinking in particular contexts, findings regarding alcohol expectancies provide useful insights regarding these possible relationships. Adolescents who engaged in solitary alcohol use have been shown to hold stronger beliefs regarding alcohol's ability to enhance positive or relieve negative affect (Tucker, Ellickson, Collins, & Klein 2006). Similarly, college students who engaged in solitary heavy drinking were higher in alcohol negative mood regulation expectancies and expectancies that alcohol could reduce social distress than were students who drank heavily only in social contexts (Christiansen et al., 2002). Although actual motives for drinking were not examined, Christiansen et al.'s results suggest that solitary heavy drinkers may be motivated by attempts to cope. However, these authors also found that solitary drinkers were higher in *all* of the expectancies examined (i.e., personal and social enhancement), bringing into question whether there is a particular relationship between coping expectancies and solitary heavy drinking episodes.

In the present study, we examined social and solitary heavy drinking in a sample of underage college drinkers who reported a history of at least mild passive suicidal ideation. Although solitary drinkers have been found to also engage in social drinking (Demers & Bourgault, 1996), the extent to which solitary heavy drinkers are engaging in social heavy drinking has not been examined. Little also is currently known about solitary heavy drinkers' frequency of engaging in this behavior. Therefore in this study, we examined the rate of solitary heavy drinking and how often this behavior occurred relative to social heavy drinking among heavy drinkers.

To further knowledge regarding the associations among heavy episodic drinking context, suicidal ideation and drinking motives, we examined four specific hypotheses. Our first and second hypotheses were that level of suicidal ideation would be positively associated with the frequency of solitary heavy drinking (hypothesis 1), but not with the frequency of social heavy drinking (hypothesis 2). These hypotheses are supported by previous findings that college students who engaged in solitary heavy drinking were higher in depression than students who engaged in heavy drinking only in social contexts. Given the strong association between suicidal ideation and depression, we included depression as a control variable in the regression models that explored the associations between suicidal ideation and heavy drinking. This allowed us to examine the unique relationships of suicidal ideation to drinking context. Our third hypothesis was that solitary heavy drinking would be associated with drinking to cope motives. This hypothesis is supported by the predictions of motivational theories of drinking, the higher levels of depression and drinking problems among students who drink heavily in solitary contexts, and the positive association between drinking to cope and drinking alone in a general sample of adults. Our fourth hypothesis was that heavy drinking in social contexts would be primarily associated with enhancement drinking motives (cf. Kuntsche et al., 2005). Along with our fourth hypothesis, we also examined whether solitary and social heavy drinkers differed in their motivation for social heavy drinking. Given the relationship between depression and solitary heavy drinking, we thought it possible that solitary heavy drinkers would be more likely to engage in heavy drinking, even in social contexts, because of drinking to cope motives. It also was possible that when drinking in social settings solitary heavy drinkers have similar motives as their peers, with their focus being on regulating their affect by attempting to increase their positive affect (i.e., enhancement motives).

## 2. Method

### 2.1 Participants

Participants were 91 underage (between 18 and 20 years old) female (52.7%,  $n = 48$ ) and male (47.3%,  $n = 43$ ) college drinkers attending a large public university in New York State. All participants were current drinkers and had a history of at least passive suicidal ideation (see Procedures for further detail). The average age of the study sample was 19 years ( $SD = .74$ ) and 100% were single (never married). The sample was 75.8% White/European American, 12.6% Asian American, 4.2% Black/African American, 4.2% Latino, and 3.2% multiethnic. The majority of participants (94.7%) did not live with their parents, and a large proportion of the sample (74.7%) lived on-campus. Only 6.6% ( $n = 6$ ) of participants reported living alone, and none of these individuals were solitary heavy episodic drinkers.

### 2.2 Procedures

The study protocol was approved by the Institutional Review Board of the university where the study took place. Participants were recruited via advertising in the university school newspapers and flyers on campus. Advertisements directed potential participants to a webpage that assessed for study eligibility. Eligibility criteria included: (1) being a full- or part-time student, (2) having consumed at least four standard alcoholic beverages in the past month, (3) being between the ages of 18 and 20 years, and (4) reporting a history of passive suicidal ideation (endorsement of a single item, “In the past, have you thought it would be better if you were not alive?”). A total of 100 individuals screened as eligible and completed the protocol. However, nine of these individuals did not meet the eligibility criteria based on an examination of their responses to the study questionnaires. These individuals were not included in this study.

Eligible individuals were directed to a webpage informing them of their eligibility, what was required of them to participate, and the compensation they would receive for participating in the study (\$20). Eligible individuals were contacted via email and scheduled for a data collection session held on campus.

Study materials consisted of a packet of self-report questionnaires that were administered in a single session in groups of between two and 12 participants. Participants provided informed consent prior to completing the study materials. Measures were counterbalanced to control for possible ordering or fatigue effects. However, general alcohol consumption questions always immediately preceded solitary alcohol consumption questions. At the end of the study participants met individually with the first author and were informed of counseling services available through the university, as well as additional resources for mental health and substance abuse treatment. No adverse events (e.g., participant distress or disclosure of suicidal intent) were noted.

### 2.3 Measures

**Alcohol consumption**—Alcohol consumption during the past year was measured using items modified from the National Institute of Alcohol Abuse and Alcoholism’s (NIAAA) alcohol consumption question set (NIAAA, 2003). Items were open response and asked about the following for a typical month during the past 12 months: drinking days per month, number of standard drinks consumed on a typical drinking day, and the number of days on which heavy drinking occurred (i.e., days during a typical month a participant drank 4 or more—women, or 5 or more—men, drinks on one occasion or sitting). We computed a Quantity  $\times$  Frequency product and divided this by 4 to index drinks per week on a typical month during the past year (drinks per week).

At the time of this study there were no published measures of solitary drinking behavior. Therefore, we modified a single item developed by Christiansen et al. (2002) regarding ever having drunk heavily while alone or while no one else present was drinking. Our modified items drew on content from the NIAAA alcohol consumption questions described above. Participants reported the number of days on a typical month they drank 4 or more—women, or 5 or more—men, drinks on one occasion or sitting while alone or while no one else was drinking (solitary heavy drinking). In order to calculate the number of heavy drinking episodes that occurred in a social context (social heavy drinking), the number of solitary heavy drinking episodes was subtracted from the overall number of heavy drinking episodes.

**Drinking motives**—The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) is comprised of 20 self-report items, measuring four subscale domains: Social Motives, Coping Motives (to cope with negative affect), Enhancement Motives (to enhance positive emotions), and Conformity Motives. Respondents rated their relative frequency of consuming alcohol for these motives during the past year on a 4-point scale from *never/almost never* (1) to *always/almost always* (4). The subscales of the DMQ-R demonstrate good convergent and concurrent validity (Cooper et al., 1995; Stewart & Devine, 2000). In our sample, the subscales demonstrated high internal consistency with alphas ranging from .79 to .88.

**Alcohol Problems**—The Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006) is a 48-item self-report inventory of problems associated with alcohol use among college students. Items are rated dichotomously as present or absent in the past year. The YAACQ has demonstrated good convergent and concurrent validity (Read et al., 2006). The total scale demonstrated high internal consistency in our sample (alpha coefficient = .92). Total score on the YAACQ was used to represent alcohol problems during the past year.

**Suicidal Ideation**—The Adult Suicidal Ideation Questionnaire (ASIQ; Reynolds, 1991) is a 25-item self-report measure of suicidal thoughts and behavior experienced during the past month. Items are rated on a 7-point scale (0 = *never had the thought*, 6 = *almost everyday*). Items range from general wishes one were dead to thoughts of planning a suicide attempt. The ASIQ demonstrates high 2-week test-retest reliability and evidences good convergent validity in college students (Gutierrez et al., 2000; Reynolds, 1991). This scale demonstrated high internal consistency in our sample (coefficient alpha = .96). Total score on the ASIQ was used to represent level of suicidal ideation.

**Depression**—The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a widely used 21-item self-report scale that measures depressive symptoms. Items are rated from 0 to 3, with higher scores indicating greater severity of depressive symptoms. The BDI-II evidences high test-retest reliability, criterion, and convergent validity (Sprinkle et al., 2002). In our sample the BDI-II total score demonstrated high internal consistency (coefficient alpha = .91). Total score on the BDI-II was used to represent severity of depression.

## 2.4 Analyses

Solitary heavy drinking was operationalized in two ways. The first involved dichotomizing participants as solitary or social heavy drinkers. If the participant reported a heavy drinking episode while alone at least once during a typical month in the past year then they were classified as a solitary heavy drinker. If the participant reported no episodes of solitary heavy drinking during a typical month in the past year and had at least one episode of social heavy drinking during a typical month in the past year then they were classified as a social heavy drinker. This dichotomous variable was used only in one analysis to compare solitary and social heavy drinkers on alcohol use and problems. The second method for operationalizing solitary

heavy drinking involved examining solitary heavy drinking as a continuous construct. Thus, we examined participants' reported frequency of solitary heavy drinking in relation to other constructs (e.g., drinking motives). This continuous variable was used in all other analyses involving solitary heavy drinking.

Separate standard regression analyses for solitary and social heavy drinking were completed to examine the unique influence of (1) depression and suicidal ideation and (2) drinking motives (social, coping, enhancement, conformity) on each heavy drinking variable. Gender was entered into all analyses to control for its possible effects on drinking or negative affect variables (e.g., Harrell, & Karim, 2008).

Two variables were transformed prior to analyses due to significant departures from normality. Drinks per week was square-root transformed to improve normality. Frequency of solitary heavy drinking was inverse transformed and then reflected to improve normality and reduce the influence of outliers.

### 3. Results

During the past year, 48.4% ( $n = 44$ ) of the sample drank alone on one or more days a month. Nearly half of these individuals ( $n = 21$ ) reported drinking moderate amounts when alone, while 25.3% ( $n = 23$ ) of the sample (slightly more than half of individuals that reported any solitary drinking) reported heavy drinking when alone at least once on a typical month. All solitary heavy drinkers and nearly all (97.1%,  $n = 66$ ) individuals who did not report solitary heavy drinking engaged in social heavy drinking episodes at least once a month.

As expected, the inclusion criterion of a history of at least passive suicidal ideation resulted in a sample with higher rates of suicidal ideation and behavior than is found among typical college samples. In our study, the mean score on the ASIQ was 22.84 ( $SD = 20.08$ ) compared with the mean of 11.43 ( $SD = 14.60$ ) reported by Reynolds (1991b) in a sample of college undergraduates. Additionally, 22% ( $n = 20$ ) of our sample was above the clinical cutoff on the ASIQ (i.e., actively thinking about suicide), while approximately 5% of college students in the normative sample were above the clinical cutoff (Reynolds, 1991a). In our study, 3.3% ( $n = 3$ ) of the sample reported a suicide attempt in the past year, compared to 1.7% in the National College Health Risk Behavior Survey of 18-to 24-year-old college students (Barrios, Everett, Simon, & Brener, 2000).

#### 3.1 Drinking variables and univariate associations among variables

Univariate correlations revealed that frequency of social heavy drinking showed a large positive association with alcohol problems, a small positive association with social drinking motives, and a moderate positive association with enhancement motives for drinking (see Table 1). Frequency of solitary heavy drinking showed moderate positive associations with alcohol problems, coping motives, and suicidal ideation. Drinks per week showed large positive associations with social heavy drinking and alcohol problems, and a moderate positive association with solitary heavy drinking.

Gender was moderately associated with drinking behavior. Men engaged in social and solitary heavy drinking more frequently than women and consumed more drinks per week. Men and women did not differ significantly on alcohol problems, drinking motives, depression, or suicidal ideation. Men (42.9%,  $n = 18$ ) significantly outnumbered women (10.6%,  $n = 5$ ) in regards to being solitary as opposed to only social heavy drinkers ( $\chi^2 = 12.01$ ,  $p < .001$ ,  $\phi = -.37$ ).

### 3.2 Comparison of solitary and social heavy drinkers on drinking behavior and problems

A Multivariate Analyses of Covariance (MANCOVA), with gender as a covariate, was used to compare social heavy drinkers ( $n = 66$ ) and solitary heavy drinkers ( $n = 23$ ) on alcohol variables, including: quantity-frequency index of typical drinking in the past year (drinks per week), frequency of social heavy drinking episodes, and number of alcohol problems in the past year. Individuals who reported no form of heavy drinking ( $n = 2$ ) were excluded from this analysis.

The MANCOVA revealed that solitary and social heavy drinkers differed significantly on alcohol variables ( $F = 8.31, p < .001, \eta^2 = .23$ ). This analysis also revealed that men and women differed significantly on these variables ( $F = 2.89, p < .05, \eta^2 = .09$ ). However, univariate analyses of gender differences revealed only one significant difference, with men engaging in social heavy drinking more often than women ( $F = 8.13, p < .01, \eta^2 = .09$ ). Univariate tests revealed no significant difference between solitary and social heavy drinkers in their frequency of social heavy drinking, with both groups reporting social heavy drinking episodes approximately 5.8 days a month (see Table 2). However, solitary heavy drinkers engaged in additional heavy drinking an average of 3.65 days a month when alone or no one else was drinking. Based on overall frequency of heavy drinking episodes, solitary heavy drinkers were engaging in heavy drinking 62.8% more frequently than social heavy drinkers. Solitary heavy drinkers also drank significantly more than social heavy drinkers, based on drinks per week, and experienced greater alcohol problems.

### 3.3 Association of depression and suicidal ideation with social and solitary heavy drinking episodes

Separate standard multiple regression analyses were conducted for frequency of social and solitary heavy drinking episodes to examine their associations with depression and suicidal ideation. One case was identified as a univariate and multivariate outlier (Mahalanobis distance  $p < .001$ ), owing to the participant's score on the suicidal ideation variable, and was therefore excluded from these analyses.

Regression analyses revealed that suicidal ideation, but not depression, was significantly associated with solitary heavy drinking (see Table 4). Neither depression nor suicidal ideation was significantly associated with social heavy drinking.

### 3.4 Association of drinking motives with social and solitary heavy drinking episodes

Standard multiple regression analyses revealed that enhancement motives for drinking were significantly associated with social heavy drinking, while other drinking motives were not (see Table 4). In contrast, only drinking to cope motives were significantly associated with solitary heavy drinking.

A sequential (hierarchical) regression analysis also was conducted to examine possible differences between the motives for social heavy drinking reported by solitary versus social heavy drinkers. In the first step, gender, mean centered drinking motive variables, and heavy drinking status (social [0], solitary [1]) were entered into the model. In the second step, four interaction terms were entered into the model. These interaction terms were the cross-products of each mean centered drinking motive and heavy drinking status. The addition of this set of interaction terms did not add significantly to the regression model for social heavy drinking episodes ( $\Delta R^2 = .02, p < .05$ ), indicating there were no differences between solitary and heavy drinkers in their motives for drinking heavily in social contexts.

## 4. Discussion

This is the first study, to our knowledge, to explore the role of drinking context in the relationship of suicidal ideation to alcohol use. Our findings suggest that drinking context plays an important role in the relationship between suicidal ideation and heavy episodic drinking among underage college students. As hypothesized, we found that higher levels of suicidal ideation were associated with greater frequency of solitary heavy drinking, but not with frequency of social heavy drinking. Also as hypothesized, solitary heavy drinking was motivated by efforts to forget problems and to manage depressed mood (i.e., drinking to cope). This finding is consistent with Cooper et al.'s (1992) finding that drinking alone is associated with drinking to cope. Social heavy drinking was motivated by efforts to enhance positive affect (i.e., enhancement motives). This finding is consistent with studies of general populations of college students, whose heavy drinking tends to be associated with enhancement motives (Kuntsche et al., 2005) and to occur in social contexts (Christiansen et al., 2002).

In this sample of underage college drinkers with a history of at least passive suicidal ideation, solitary heavy drinkers engaged in social heavy drinking to the same extent and for the same reason (enhancement) as social heavy drinkers. Thus it would appear that the greater suicidal ideation associated with solitary heavy drinking was not affecting students' motivation for social heavy drinking. These findings seem to be consistent with those of Mohr et al. (2001), who found that the tendency to experience negative emotions affected the relationship of negative interpersonal experiences and solitary drinking, but did not affect the relationship of positive experiences and drinking in social contexts. Together these findings suggest that negative affective states and/or traits do not appear to affect college students' drinking in social contexts, which is primarily motivated by efforts to increase or enhance positive affect.

Solitary heavy drinkers drank more and experienced significantly more alcohol problems and than social heavy drinkers. Solitary heavy drinkers engaged in heavy drinking episodes over 60% more frequently than social heavy drinkers. While solitary heavy drinkers engaged in social heavy drinking to the same extent as social heavy drinkers, they engaged in additional solitary heavy drinking episodes. Solitary heavy drinkers also drank significantly more drinks per week, although this finding is likely not independent of their greater number of heavy drinking episodes.

Our findings are consistent with a motivational model of alcohol use in which different motives underlie drinking in different contexts and are associated with different psychological states. The concept of different underlying motivational process often is discussed or analyzed in such a way that it suggests or presupposes that different individuals have different motivational processes underlying their drinking behavior across contexts. While this may be the case for some individuals, it also may be that different motivational processes are working to influence drinking in different contexts within the same individual. Cooper et al. (1995) explored this issue of cross-situational consistency in drinking motives. They classified drinkers as coping drinkers or enhancement drinkers based on their having scores above the median on one drinking motive scale and below the median on another and found that only 24% to 30% of the drinkers could be simply classified. This suggests that between 70% and 76% of drinkers did not have a predominant drinking motive. It appears that while some individuals drink primarily for a given motive across contexts, the majority of individuals drink for a particular motive in a particular context.

Given the cross-sectional design of the current study conclusions regarding directionality of the effects are not possible. Prospective studies are needed to begin to establish causal, directional association among suicidal ideation, drinking to cope, and solitary heavy drinking. Other important considerations when interpreting the results of our study are: (1) the small



sample size, particularly of solitary heavy drinkers; (2) that our sample was drawn from a single institution; and (3) that owing to our inclusion criteria, the sample as a whole displayed a moderate amount of depression as well as higher levels of suicidal ideation than is found in a typical college student sample. These may limit the generalizability of our findings. Given findings that drinking to cope is more highly associated with negative affect and depression than are other drinking motives (e.g., Cooper, Agocha, & Sheldon, 2000; Rafnasson, Jonsson, & Windle, 2006), it might be expected that in a sample such as ours it would be less likely that one would find contextual differences in motivations for alcohol use. However, despite this possibility, we found support for the notion that motivation for heavy drinking varies by the context in which the drinking is occurring.

In contrast to Christiansen et al. (2002), who found that solitary heavy drinkers were higher in depression, we did not find that depression was significantly associated with solitary heavy drinking. However, we did find that level of suicidal ideation was positively associated with solitary heavy drinking. One possibility for these inconsistent findings is that our sample was not a general student sample, as was studied by Christiansen and colleagues. Our findings are consistent with a number of other studies that have failed to find a significant relationship between depression and alcohol use (e.g., Camatta & Nagoshi, 1995; Schuckit et al., 2006), while finding a significant positive relationship between depression and alcohol problems (e.g., Camatta & Nagoshi, 1995; Hutchinson, Patock, Cheong, & Nagoshi, 1998; Kassel et al., 2000).

Whether heavy drinking in a solitary context by suicidal individuals is by choice and design or by virtue of the particular circumstances was not explored in our study and further research on this is needed. Our finding that solitary heavy drinkers were engaging in social heavy drinking to the same extent as social heavy drinkers would suggest that in general solitary heavy drinkers are not particularly socially isolated, alienated from their peers, or lacking in drinking partners. However, because solitary heavy drinking was associated with drinking to cope motives, while social heavy drinking was associated with enhancement motives, our findings may suggest that solitary heavy drinking occurs by design. Given the nature of the findings in this study, it may be that solitary heavy drinkers are self-isolating when they are experiencing distress, such as suicidal ideation, and engaging in solitary heavy drinking in an effort to cope, rather than attempting to cope by seeking out social company and support. If this were the case, we would expect that the relationship of drinking to cope and solitary heavy drinking would vary by the degree to which an individual self-isolates in response to distress. We will explore this possibility in future studies.

In conclusion, this study is the first to our knowledge to examine the association of solitary and social heavy drinking with suicidal ideation. Our findings suggest that greater suicidal ideation is associated with greater frequency of heavy drinking while alone but not in social settings, and that this drinking is motivated by attempts to cope. Solitary intoxication is a potentially dangerous coping strategy for an individual experiencing suicidal ideation. Suicidal behavior in this context may be more likely given that social support and the potential protection of having others present are not immediately available. This lack of immediate social support, coupled with the risk for suicidal behavior that is associated with intoxication, may lessen the suicidal individual's ability to generate or implement alternative coping responses, increase aggression, and worsen mood (Hufford et al., 2001). Because of the potential risk associated with solitary drinking among suicidal individuals, further research is needed into this behavior. A clinical implication of our findings is that suicidal college students should be assessed with regards to their drinking behavior, and counseled about the potential dangers associated with drinking in response to suicidal ideation and negative affect. Students who are misusing alcohol in response to suicidal ideation and in efforts to cope should be taught to use more adaptive alternatives for coping.

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Table 1

Means, standard deviations, and intercorrelations of study variables (N = 91)

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
1. Social heavy drinking episodes	5.82	4.47	-.03									
2. Solitary heavy drinking episodes <sup>a</sup>	.92	2.54	.67***	-.36***								
3. Drinks per week <sup>a</sup>	15.91	13.32	.51***	.26*	-.50***							
4. Alcohol problems	19.90	9.67	.22*	.04	.27**	-.21*						
5. Social motives	3.77	.79	.19	.27**	.24*	.41***	-.46***					
6. Coping motives	2.58	1.00	.37***	.15	.36***	.38***	.49***	-.34***				
7. Enhancement motives	3.42	.87	.08	.10	.07	.21*	.33***	.39***	-.11			
8. Conformity motives	1.95	.95	.16	.10	.11	.39***	.23*	.45***	.08	-.30***		
9. Depression	18.13	10.38	.07	.29**	.19	.33**	.11	.39***	.14	.24*	-.64***	
10. Suicidal ideation <sup>b</sup>	22.84	20.08	.07	.29**	.19	.33**	.11	.39***	.14	.24*	-.64***	
11. Gender <sup>c</sup>	--	--	-.26*	-.37***	-.28**	-.17	.00	-.05	-.14	-.14	-.10	-.19

<sup>a</sup>Variable was transformed prior to analyses. Means and standard deviations shown are for the untransformed variables.<sup>b</sup>N = 90<sup>c</sup>Gender was coded such that men = 0 and women = 1.

\* p &lt; .05.

\*\* p &lt; .01.

\*\*\* p ≤ .001.

Comparisons of solitary and social heavy episodic drinkers on typical drinks per week, frequency of social heavy drinking episodes, and alcohol problems.

**Table 2**

	Solitary heavy drinkers ( <i>n</i> = 23)		Social heavy drinkers ( <i>n</i> = 66)		Univariate test	$\eta^2$
	Mean (SD)		Mean (SD)			
Drinks per week	23.22 (14.42)		13.71 (12.14)		$F(1, 86) = 5.23^*$	.06
Social heavy drinking episodes (days/month)	5.87 (4.67)		5.98 (4.38)		$F(1, 86) = 1.32$	.01
Solitary heavy drinking episodes (days/month)	3.65 (4.01)		--		--	--
Alcohol problems	24.43 (8.29)		18.72 (9.57)		$F(1, 86) = 4.40^*$	.05

Note: Drinks per week over the past year was square-root transformed prior to analyses. Mean and standard deviation shown are for the untransformed variable. Univariate test results reported are from analyses of covariance (ANCOVA). Gender was controlled for in all analyses.  $\eta^2$  = effect size (eta squared).

\*  $p < .05$ .

Multiple regression analyses predicting frequency of social and solitary heavy drinking episodes from negative affect and drinking motives.

Table 3

Analysis and predictor	Social heavy drinking episodes			Solitary heavy drinking episodes				
	$R^2$	$B$	$SEB$	$\beta$	$R^2$	$B$	$SEB$	$\beta$
Negative affect <sup>a</sup>	.09*				.19***			
Gender		-2.29	.94	-.26*		-.19	.06	-.32**
Depression		.09	.06	.21		-.004	.004	-.13*
Suicidal ideation		-.02	.03	-.11		.005	.002	.31*
Drinking motives <sup>b</sup>	.19**				.21***			
Gender		-1.94	.89	-.22*		-.21	.06	-.35***
Social motives		.31	.70	.05		-.04	.05	-.11
Coping motives		.30	.52	.07		.09	.03	.30***
Enhancement motives		1.52	.59	.30*		.02	.04	.06
Conformity motives		-.14	.52	-.03		-.01	.04	-.04

Note: Gender coded men = 0 and women = 1.

<sup>a</sup>  $N = 90$ .

<sup>b</sup>  $N = 91$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p \leq .001$ .