Tears in your beer: Gender differences in coping drinking motives, depressive symptoms and drinking

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Abstract

This study evaluates associations between coping drinking motives (CDM; drinking to regulate negative affect), depressive symptoms, and drinking behavior and extends the literature by also taking into account gender differences. Two hundred forty-three college students (Mean age = 22.93, SD = 6.29, 82% female) participated. Based on previous research, we expected that CDM would be positively associated with drinking and problems, particularly among those higher in depressive symptoms, as individuals experiencing higher levels of negative affect (i.e. depressive symptoms) and who drink to cope are likely to drink more and experience more alcohol-related problems. Lastly, based on established gender differences, we expected that CDM would be positively associated with drinking and problems, especially among females higher in depressive symptoms. Unexpectedly, findings suggested that CDMs were positively related to peak drinking, especially among those *lower* in depressive symptoms. Results further revealed a significant three-way interaction between CDM, depressive symptoms, and gender when predicting alcohol-related problems and drinking frequency. Specifically, we found that CDM were more strongly associated with problems among women who were *lower* in depressive symptoms; whereas CDM were more strongly associated with problems among men who were *higher* in depressive symptoms. These findings offer a more comprehensive depiction of the relationship between depressive symptoms, CDM, and drinking behavior by taking into account the importance of gender differences. These results provide additional support for considering gender when designing and implementing alcohol intervention strategies.

Keywords

alcohol; sex; motives; depressive symptoms

Reducing heavy drinking among college students has been announced by the U.S. Surgeon General as a primary health goal for the nation (U.S. Department of Health and Human Services, 2009). Therefore, it is of utmost importance to conduct additional research in

efforts to better understand undergraduate drinking patterns. Although the majority of U.S. college students are younger than the legal drinking age of 21, periods of heavy alcohol consumption are most often reported during the ages of 18-21 (Chen & Kandel, 1995). Recent research demonstrates that undergraduates report drinking more heavily than their non-college peers (Johnston, O'Malley, Bachman, & Schulenberg, 2012). According to "Monitoring the Future," a nation-wide survey conducted by the National Institute on Drug Abuse, approximately 80% of college students consume alcohol (Johnston et al., 2006). Furthermore, an estimated 44% of undergraduates consumed more than five consecutive alcoholic beverages on one occasion within the previous two weeks and are thus classified as heavy drinkers (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009; Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002; Wechsler, Lee, Nelson, & Kuo, 2000). College drinkers are more likely to experience negative consequences such as problems with authorities, hangovers, injuries, antisocial behavior, poor general health, psychosocial problems, depression, eating disorders, risky sexual behavior and sexual assault (Dunn, Larimer, & Neighbors, 2002; Geisner, Larimer, & Neighbors, 2004; Hingson, Heeren, Winter, & Wechsler, 2005; Kaysen, Neighbors, Martell, Fossos, & Larimer, 2006; Wechsler, Kuo, Lee, & Dowdall, 2000). Moreover, although approximately 20% of undergraduates meet criteria for alcohol abuse or dependence, fewer than 5% seek treatment or counseling for alcohol problems (NIAAA, 2007). Thus, additional research is needed to better understand behavior factors that may protect against problematic drinking among at-risk college students.

Drinking motives

Alcohol behaviors are motivated by a variety of factors, and motivations for drinking have been shown to play influential roles in undergraduate alcohol consumption (Cooper, 1994; Kuntsche et al., 2005). Drinking motives can be conceptualized as proximal antecedents of alcohol use and have demonstrated predictive validity with respect to drinking and related problems (Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995; Cooper, Russell, Skinner, Windle, 1992; Stewart, Loughlin, & Rhyno, 2001). Addictions researchers have identified four recurrent motivations for drinking: 1) enhancement; 2) social; 3) conformity; and 4) coping (Cooper; 1994; MacLean & Lecci, 2000; Stewart & Devine, 2000; Stewart et al., 2001). *Enhancement* motives refer to drinking to experience positive emotions (e.g., drinking because it's exciting). *Social* rewards motives include drinking to enjoy social situations (e.g., drinking at a party) or to help one be more sociable with others. *Conformity* motives refer to drinking as a result of explicit or implicit social pressures to do so (e.g., perceived or actual peer pressure). *Coping* motives refer to drinking to escape negative internal experiences such as uncertainty, anxiety, or depression (e.g., drinking to alleviate stress).

Drinking motives have been linked to heavier alcohol use among adolescents (Cooper, 1994; Cox & Klinger, 1988). It is important to note that although drinking motives impact undergraduate alcohol behavior (Kuntsche et al., 2005) the relationship between motives and drinking appears to be less robust in college compared to adolescent samples. Research suggests that over time, associations between drinking motives and alcohol use diminish (Sher et al., 1996) or disappear (Read et al., 2003). This might indicate a more complex

relationship between drinking motives and alcohol consumption among undergraduates than the direct linkage evidenced during adolescence.

Undergraduate students frequently endorse enhancement and social motives, and these are often linked with higher drinking levels (Kuntsche et al., 2005; LaBrie et al., 2007; Lewis et al., 2007). Conformity and coping motives are less frequently endorsed by undergraduates, however, they (particularly coping motives) are consistently and more strongly associated with negative alcohol-related consequences relative to social and enhancement motives (Kuntsche et al., 2005). The nature of this relationship is not fully understood. For example, two studies found that coping drinking motives (CDM) were directly associated with alcohol-related problems (Kassel, Jackson, & Unrod, 2000; Martens et al., 2008), while another study found that the relationship between CDM and problems was mediated by drinking (Ham et al., 2009). Further, CDM has been shown to relate both directly and indirectly to problems (Carey & Correia, 1997; Kuntsche et al., 2007; Merrill & Read, 2010). Although the literature has generally demonstrated that CDMs are linked with problems, the nature of this relationship needs further elucidation.

The current study seeks to address this need by focusing specifically on CDM. Past research has repeatedly shown that CDM reliably predicts undesired alcohol-related consequences (e.g., Carey & Correia, 1997; Neighbors, Lee, Lewis, Fosos, & Larimer, 2007; Read, Wood, Kahler, Maddock, & Palfai, 2003; Simons, Gaher, Correia, Hansen, & Christopher, 2005). Undergraduates might be inclined to drink to regulate negative affect and reduce tension associated with typical college experiences such as negative social interactions or academic difficulties (Higgins & Marlatt, 1975; Kidorf & Lange, 1999). The relaxed social inhibitive (Labouvie & Bates, 2002) and tension-reduction (Goldman et al., 1999) effects of alcohol might make it appear particularly desirable as a coping mechanism during times of tension or stress. Additionally, drinking is more likely to be used as a coping mechanism to regulate negative affect if an individual lacks feasible or salient alternative coping strategies and if that individual expects drinking to be helpful in that particular situation (Abrams & Niaura, 1987; Higgins, 1976). A recent study found that alcohol expectancies mediated the effect of generalized anxiety on CDM, and that CDM in turn mediated the effect of alcohol expectancies on heavy drinking in situations where one experienced negative affect (Goldsmith, Tran, Smith, & Howe, 2009). Furthermore, CDM has been shown to mediate the relationship between generalized anxiety and heavy drinking to reduce negative affect (Goldsmith et al., 2009). Stated simply, individuals who have positive alcohol expectancies, experience generalized anxiety, and endorse CDM tend to drink more based on beliefs that alcohol will attenuate anxiety. CDMs have also been related to heavier drinking and related problems among individuals with high and moderate levels of social anxiety, but this relationship was not found for those with low social anxiety (Ham, Bonin, & Hope, 2007). Moreover, CDM have been consistently related to psychological factors such as anxiety, and thus, it is important to understand how these psychological factors, particularly factors that tend to co-occur with anxiety (e.g., depressive symptoms) influence the relationship between CDM and drinking (e.g., Grant et al., 2004).

Depressive symptoms

Depressive symptoms have been positively associated with increases in drinking among adults (e.g., Dixit & Crum, 2000; Grant et al., 2004) and college students (e.g., Geisner, Mallett, & Kilmer, 2012). However, this relationship is stronger among adults (non-college age) and appears to be more complex among undergraduates (Geisner et al., 2012). Several studies evaluating these constructs show nonsignificant correlations between depressive symptoms and various indices of drinking (e.g., Armeli, Conner, Cullum, & Tennen, 2010; Gonzalez, Collins, & Bradizza, 2009; Nagoshi, 1999; Patock-Peckham, Hutchinson, Cheong, & Nagoshi, 1998). Nonsignificant relationships between drinking and constructs that are conceptually similar to depressive symptoms (including negative affect and psychosocial distress) have also been shown (e.g., Geisner, Larimer, & Neighbors, 2004; Park & Grant, 2005). However, significant associations between depressive symptoms and problems (e.g., missing class, becoming ill as a result of drinking alcohol, or getting into trouble with authorities) have emerged with correlations ranging from .22 to .43 (Camatta & Nagoshi, 1995; Gonzalez et al., 2009; Gonzalez, Reynolds, & Skewes, 2011; Nagoshi, 1999; Patock-Peckham et al., 1998). This has been corroborated via studies measuring constructs that theoretically overlap with depressive symptoms such as negative affect (e.g., Park & Grant, 2005). As such, the relationship between depressive symptoms and alcohol behaviors among college students appears to be more complex than simple correlation. Studies evaluating potential moderators of the relationship have found that CDM moderates the influence of depressive symptoms on implicit evaluations of alcohol (Ralston & Palfai, 2012), such that depressive symptoms were positively associated with implicit alcohol evaluations, particularly among those high in CDM. It stands to reason that individuals who experience higher levels of negative affect such as depressive symptoms might drink more than those who are lower in negative affect, especially if they drink to cope, as those with more negative affect would have greater motivation for drinking to relieve recurrent unpleasant mood states. Therefore, we expect that CDM and depressive symptoms will interact to predict drinking behavior such that individuals high in CDM and high in depressive symptoms will report more problematic drinking than those who are low in CDM and/or depressive symptoms.

Gender

Behavioral scientists have begun to understand that gender plays an important role in influencing or determining health behaviors and studies evaluating gender differences show that depressive symptomatology predicts drinking (e.g., Pedrelli et al., 2011) and other health risk behaviors including suicidality (e.g., Waelde et al., 1994) and smoking (e.g., Husky et al., 2008) differentially among males and females. Furthermore, research indicates that gender moderated the relationship between depressive symptoms and daily alcohol use such that depressive symptoms were positively linked with daily drinking and risk for compulsive drinking for male undergraduates (Pedrelli et al., 2011). Examinations of this relationship among female undergraduates revealed that depressive symptoms increased the risk for compulsive drinking but not for daily drinking (Pedrelli et al., 2011). Research demonstrates that gender is an important factor to consider in drinking, and males have consistently been shown to be at greater risk for increased drinking and problems relative to

females (e.g., Caetano, 1994; Greenfield et al., 2000; Korcuska et al., 2003; Randolph et al., 2009). Given established gender differences in drinking (e.g., men drink more relative to women; Wagoner et al., 2012) and depressive symptoms (e.g., women report higher depressive symptoms relative to men; Piccinelli & Wilkinson, 2000), it stands to reason that gender may play an important role in the relationship between CDM, depressive symptoms, and drinking. Based on previous research showing that women report more depressive symptoms (Piccinelli & Wilkinson, 2000) and more often report drinking to cope than men (Hussong, 2007; LaBrie, Ehret, Hummer, & Prenovost, 2012; Rice & Van Arsdale, 2010), we expect that the association between CDM and drinking will be stronger among women higher in depressive symptoms.

Current study

The present study seeks to address a gap in the literature by evaluating the influence of gender and depressive symptoms on the relationship between CDM and drinking in a sample of college students. Based on previous research, we expect correlations and main effects such that: CDM will be positively associated with drinking outcomes; depressive symptoms will be positively associated with drinking outcomes; and males will report consuming more alcohol than females. Because individuals with higher levels of depressive symptoms likely have more occasion to use alcohol to cope with negative affect compared to individuals lower in depressive symptoms, we hypothesized that depressive symptoms would moderate the association between CDM and drinking such that individuals higher in depressive symptoms and who also drink to cope would report higher drinking levels. Furthermore, due to prior research that suggests that women report higher CDM and depressive symptoms compared to men (Hussong, 2007; LaBrie et al., 2012; Piccinelli & Wilkinson, 2000; Rice & Van Arsdale, 2010), we expected that depressive symptoms would moderate the effect of CDM on drinking outcomes such that CDM would be more positively associated with drinking and problems, particularly among women who are higher in depressive symptoms.

Method

Participants

Two hundred forty-three undergraduate students (Mean age = 22.93, SD = 6.29, 82% female) completed online study materials as part of a larger experiment. Data for the present study were taken from the baseline assessment of a longitudinal trial. Participants were recruited via in-class recruitment and flyers posted around the university campus. Extra credit was provided as compensation. Participants self-reported the following races: 34% Caucasian, 19% Black/African American, 20.6% Asian/Pacific Islander, 6% Multi-Ethnic, 0.4% Native American/American Indian, and 20% Other. Additionally, 30% of participants reported as Hispanic/Latino.

Measures

Demographics—Participants reported demographic information such as year in school, racial background, ethnicity, age, and gender.

Alcohol consumption—The Quantity/Frequency Scale (QF; Baer, 1993; Marlatt et al., 1995) was used to assess drinking. The QF is comprised of five-items that assess the number of alcoholic beverages and the number of hours spent consuming them on a peak drinking event within the previous month, as well as the number of days out of the past month that alcohol was consumed (0 = *I do not drink at all*, 1 = *about once per month*, 2 = *two to three times a month*, 3 = *once or twice per week*, 4 = *three to four times per week*, 5 = *almost every day*, 6 = I *drink once daily or more*). The Daily Drinking Questionnaire (DDQ; Collins et al., 1985; Kivlahan et al., 1990) was also used to evaluate alcohol consumption. The DDQ asks participants to estimate the number of standard drinks consumed on each day of a typical week (Monday-Sunday) within the previous three months. Standard drinks on each day of the week are summed in order to derive the average number of alcoholic beverages that are consumed over the course of each week. Compared with alternative indices of drinking, weekly drinking is a reliable index of alcohol problems among college students (Borsari, Neal, Collins, & Carey, 2001).

Alcohol-related problems—The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) was used to assess negative alcohol-related consequences. The RAPI is a 25-item scale that assesses alcohol-related problems in the previous month. Responses range from *Never* (1) to *10 times or more* (5). The measure was modified to add items related to driving. Items were rated based on how many times each problem occurred while drinking, such as "went to work or school high or drunk." Total possible scores range from 25 to 125 (White & Labouvie, 1989).

Depressive symptoms—The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was used to evaluate depressive symptoms. The CES-D assesses the frequency of 20 depressive symptoms experienced during the previous week. Symptoms are rated on a 0 to 3 scale, yielding total scores ranging from 0 to 60. Studies show that the CES-D has good psychometric properties (Husaini, Neff, Harrington, Hughes, & Stone, 1980; Radloff, 1977) and factor structure (Golding & Aneshensel, 1989; Hertzog, Van Alstine, Usala, Hultsch, & Dixon, 1990; Nguyen, Kitner-Triolo, Evans, & Zonderman, 2004; Wong, 2000).

Coping drinking motives—The Drinking Motives Questionnaire-Revised (DMQR; Cooper, 1994) was used to evaluate coping drinking motives. Participants provided ratings on a five-point scale ranging from 1 (*Never/Almost Never*) to 5 (*Almost Always/Always*) regarding 20 reasons why individuals might be motivated to drink. The measure yields four subscales, but for the purposes of this research, we focused on the coping motives subscale, (e.g., "To forget your worries"; α = .88).

Results

Descriptives

Means, standard deviations, and correlations for all variables are presented in Table 1. Alcohol variables (peak drinks, drinking frequency, drinks per week, and problems) were significantly and positively correlated with each other. Motives subscales (coping, social,

enhancement, and conformity) were positively correlated with each other. All motives subscales were positively associated with all drinking variables. Depressive symptoms were marginally and positively associated with coping and social drinking motives but were not significantly correlated with any drinking variables. Gender was positively associated with all drinking variables (but only marginally for drinking frequency), drinking motives, and depressive symptoms. The gender variable was dummy coded such that males received a 1 and females received a 0. Thus, positive correlations indicate that males drank more and reported higher drinking motives and depressive symptoms relative to women (Table 1).

Primary analyses

We conducted multiple hierarchical regressions to evaluate depressive symptoms as a moderator of the effect of CDM on drinking outcomes. CDM and depressive symptoms were entered into the regression model as independent variables (IV's) and drinking variables (peak drinks, drinking frequency, drinks per week, alcohol-related problems) as dependent variables (DV's) or outcomes. All IV's were mean centered prior to being entered in the regression model. Main effects were evaluated at Step 1. There were consistent main effects of CDM on drinking outcomes such that CDM positively predicted both drinking and problems. There was no main effect for depressive symptoms in predicting drinking or problems. Two-way product terms were evaluated at Step 2. CDM and depressive symptoms interacted in predicting peak drinks (Figure 1); however this interaction did not emerge for any other outcome (Table 2). The interaction suggests that CDM was positively associated with peak drinks, and this relationship was stronger among individuals lower in depressive symptoms.

We then re-ran the same regression models and included an additional IV: a dummy coded gender variable (males = 1, females = 0) to evaluate gender effects (Table 3). Just as above, other IV's (CDM and depressive symptoms) were mean centered. The two- and three-way interactions were graphed using parameter estimates from the regression equation where low and high values were specified as one standard deviation below and above their respective means (Cohen, Cohen, West, & Aiken, 2003). Main effects were assessed at Step 1. CDM consistently and positively predicted drinking outcomes, even when controlling for gender. There were no significant main effects of depressive symptoms on drinking outcomes; however, there was a main effect of gender on peak drinks. Two-way product terms were assessed at Step 2. No significant interactions emerged when controlling for gender. Three-way interactions were assessed at Step 3. A marginally significant three-way interaction emerged between CDM, depressive symptoms, and gender when predicting drinks per week. Significant three-way interactions emerged when predicting alcohol-related problems and drinking frequency (Figure 2). The three-way interaction suggests that CDM and problems are positively associated, particularly among females lower in depressive symptoms. The opposite was true for males such that CDM were positively linked with problems, especially for males higher in depressive symptoms (Figure 2). Furthermore, an additional three-way interaction demonstrated that CDM were positively related to drinking frequency, and this was particularly true among females lower in depressive symptoms relative to males (Figure 3).

Discussion

The present study extends previous research evaluating CDM, depressive symptoms, and drinking by considering potential gender differences among college students. Consistent with the literature, we found that CDM positively correlated with drinking and problems. Also in line with previous research, we found that males reported higher drinking levels relative to females. However, contrary to expectations, depressive symptoms were not associated with drinking or problems.

As previously discussed, a reason for this finding might be that the relationship between depressive symptoms and drinking or problems is more complex among college populations than adult populations. Although previous literature has demonstrated the concurrence of depressive symptoms with drinking in adult populations (e.g., Grant et. al., 2004), results have been mixed among college students, and as such, the relationship between depressive symptoms and undergraduate drinking has yet to be firmly established. In fact, multiple studies have found weak or non-significant correlations between depressive symptoms and drinking (e.g., Armeli, et al., 2010; Gonzalez, et al., 2009; Nagoshi, 1999; Patock-Peckham, et al., 1998). This suggests that college students may have motivations for drinking other than to alleviate negative affect, a view that is consistent with the social norms literature which demonstrates that social norms (i.e., drinking in order to feel accepted or to avoid rejection from peers) are one of the most consistent predictors of college drinking (Borsari & Carey, 2001; Lee, et al., 2007; Perkins, 2002). As such, controlling for perceived social norms might allow for better isolation of the effect of depressive symptoms on CDM. Replications of this research might investigate whether taking social norms into account might better explicate the relationship between depressive symptoms and CDM.

The current study also evaluated depressive symptoms as a moderator of the effect of CDM on drinking. We hypothesized that individuals who reported higher levels of depressive symptoms would drink more relative to those who report lower depressive symptoms, especially if they are also high in CDM, because these individuals might be more likely to drink to cope with their negative affect. However, contrary to expectations, the positive relationship between CDM and peak drinking was more true for those *lower* in depressive symptoms. In retrospect, it is possible that college students who are lower in depressive symptoms may be drinking for other reasons (e.g., to facilitate social bonding). In support of this view, we found that social drinking motives were positively correlated with peak drinks and drinks per week. In addition, studies have shown that drinking for social reasons (e.g., to reap social benefit) is related to higher drinking levels (e.g., Halim, et al., 2012; Lee, et al., 2007). Therefore, individuals who engage in an occasional night of heavy drinking (captured via peak drinks), such as with friends at a fraternity party, do not appear to experience many depressive symptoms. Moreover, such positive social interactions may in fact serve to buffer against or attenuate negative affect.

As previously noted, gender may be an important factor to consider when exploring depressive symptoms, CDM, and drinking among college students. Because the literature has demonstrated that women tend to report higher depressive symptoms (Piccinelli & Wilkinson, 2000) and more often report drinking to cope relative to men (Hussong, 2007;

LaBrie, et al., 2012; Rice & Van Arsdale, 2010), we expected that depressive symptoms would moderate the effect of CDM on drinking outcomes, such that CDM would be positively related to drinking and problems. Furthermore, it was anticipated that this association would be stronger for women who are higher in depressive symptoms.

We tested this prediction by evaluating four hierarchical regression models including depressive symptoms, CDM, and gender in the prediction of drinking outcomes. Significant three-way interactions emerged when predicting both alcohol-related problems and drinking frequency. However, contrary to our predictions, CDM were more positively associated with problems, particularly for women *lower* in depressive symptoms. Conversely, the opposite relationship was evidenced for men, such that CDM were positively related to problems, especially for males higher in depressive symptoms. Additionally, CDM were positively associated with problems and drinking frequency among women who were lower in depressive systems. Similarly, the reverse relationship was observed for men, such that CDM were positively related to drinking frequency, especially for males higher in depressive symptoms. Moreover, tests of the simple slopes revealed that the slopes for men and women for both of the two, three-way interactions were significantly different to zero.

Higher CDM remained a risk factor for higher drinking frequency and associated problems for both men and women. It makes intuitive sense that the more strongly an individual endorses drinking to cope, the more alcohol he or she may consume, and the more alcohol-related problems the person may experience. Therefore, regardless of gender, those who use alcohol to cope with anxiety produced via stress-inducing situations, such as exams or other situations pertinent to college stress, appear to be at highest risk for problematic drinking patterns and consequences. Additionally, males and females lower in CDM are less likely to use alcohol to cope. As noted above, it could be that these individuals utilize alternative coping mechanisms for dealing with stress such as exercising or talking to a friend (social support).

The gender differences that emerged add a layer of complexity to the findings. Contrary to expectations, results showed that among females, the positive links between CDM and drinking frequency and problems were stronger for those lower in depressive symptoms. This suggests that females lower in depressive symptoms and higher in CDM are at increased risk for drinking more frequently and experiencing more problems relative to females lower in CDM or higher in depressive symptoms. These results also beg the question as to why females higher in CDM are at greater risk if they are lower in depressive symptoms. The literature demonstrates that depressive symptoms are not always positively linked with drinking among undergraduate students (e.g., Pedrelli et al., 2011). This suggests that heavy college drinking most likely stems from social pressures. A potential explanation for these findings is related to the pervasiveness of drinking in college. Furthermore, it might be the case that female students higher in coping motives and who are experiencing problems might be more likely to drink to cope with situations or circumstances other than depression. Additionally, because females are more relationally-orientated relative to males (e.g., Kiecolt-Glaser & Newton, 2001), females higher in depressive symptoms but lower in CDM may alleviate stress in alternate ways, such as talking to friends.

On the other hand, CDM were associated more strongly with alcohol-related problems and drinking frequency among males higher in depressive symtoms. This suggests that males higher in both depressive symptoms and CDM are at increased risk for alcohol-related problems and drinking more frequently relative to males lower in either. This result suggests that males who endorse drinking to cope and experience depressive symptomology might drink more often to mitigate stress or tension. This is consistent with previous research that suggests that depressive symptoms and CDM increase risk for heavier drinking (Dixit & Crum, 2000; Geisner et al., 2012; Grant et al., 2004). Further, this is in line with the perspective that individuals who expect drinking to be helpful in alleviating stress and who also lack feasible alternative coping strategies are more likely to use alcohol as a coping mechanism to regulate negative affect (Abrams & Niaura, 1987; Higgins, 1976). Previous work suggests that this might be more evident among non-college adults relative to college students (Geisner et al., 2012); however, the present study indicates that these relationships are evident among college males but not females. It is important to note that these results were particularly true when predicting alcohol-related problems. Differences in slopes between lower and higher depressive symptoms in the relationship between CDM and drinking frequency were less pronounced, particularly for males. Thus, it is possible that the moderating role of depressive symptoms might be less critical among males with respect to drinking frequency compared to alcohol-related problems.

Limitations and future directions

The strengths of this study should be considered in light of its limitations. As gender was one of the factors we examined, a limitation of the study was that the sample consisted of primarily of females. In addition, we recruited college students to participate in this study, and as such, generalizability may be limited. However, although this may seem to be a sample of convenience, college students are at increased risk for alcohol problems, and as such, research among this population is necessary (SAMHSA, 2009). An additional limitation is that anxiety was not measured in this study. As past research examining CDM has examined drinking to cope with negative affect, (i.e., drinking to reduce anxiety and stress; Goldsmith et al., 2009; Ham et al., 2007), future research might benefit from measuring and/or controlling for anxiety as it conceptually overlaps with and is often correlated with depressive symptoms. Moreover, research that focuses on potential differences in drinking patterns (e.g., moderate drinkers versus heavy drinkers) might facilitate understanding for whom depressive symptoms or drinking is more of a risk factor. Finally, future research might examine whether other individual differences such as alcohol expectancies might be possible mediators of the relationship between depressive symptoms and CDM in predicting drinking outcomes. Positive alcohol expectancies have been repeatedly associated with higher drinking rates (Goldman, Darkes, & Del Boca, 1999; Ham & Hope, 2003; Jones, Corbin, & Fromme, 2001). Thus, additional research is needed to determine whether individuals with positive alcohol expectancies are more likely to drink to regulate negative affect.

Conclusion

Overall implications of these findings highlight the importance of considering gender differences in the relationship between depressive symptoms and CDM. Clinical

implications relate to the importance of tailoring intervention programs to target psychosocial factors that increase risk for heavy drinking. This is particularly important among college drinkers who are at risk for engaging in problematic drinking behavior and experiencing related negative outcomes.

This study further expands extant literature and sheds light on the relationship between gender, depressive symptoms, and motives which students endorse for drinking. More specifically, we found that CDM were more strongly associated associated with alcohol-related problems and drinking frequency among females lower in depressive symptoms. This suggests that females may be motivated to drink for alternate reasons, other than to regulate negative affect. That is, other factors such as social pressures may be more of a driving force behind drinking for women above and beyond depressive symptoms alone. Furthermore, this study found that males higher in depressive symptoms and CDM were at greater risk for alcohol-related problems relative to females. Finally, the relationship between CDM and drinking frequency was found to be stronger for males who were higher in depressive symptoms. The current research informs interventions targeting college students and drinking and emphasizs the importance of considering gender differences when devising and executing alcohol intervention strategies.

Acknowledgments

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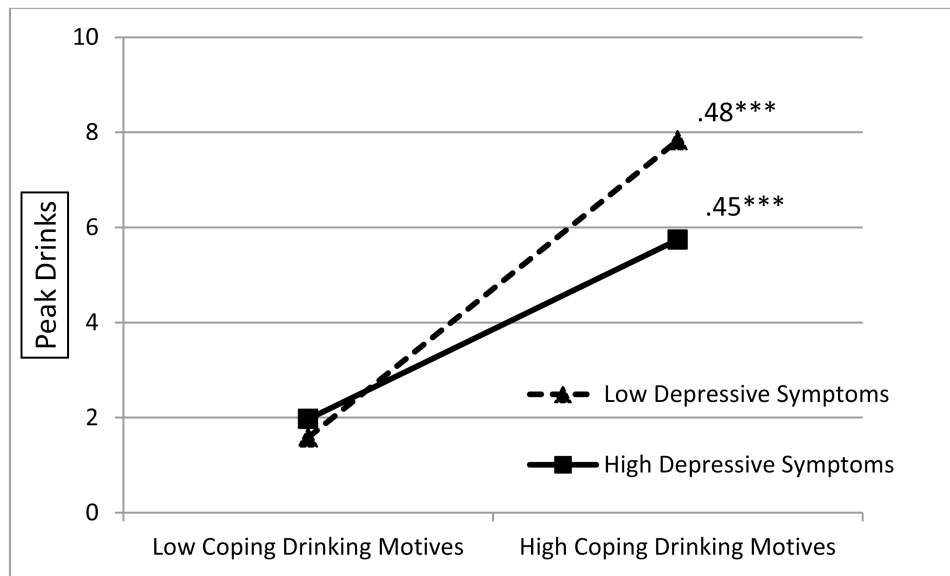
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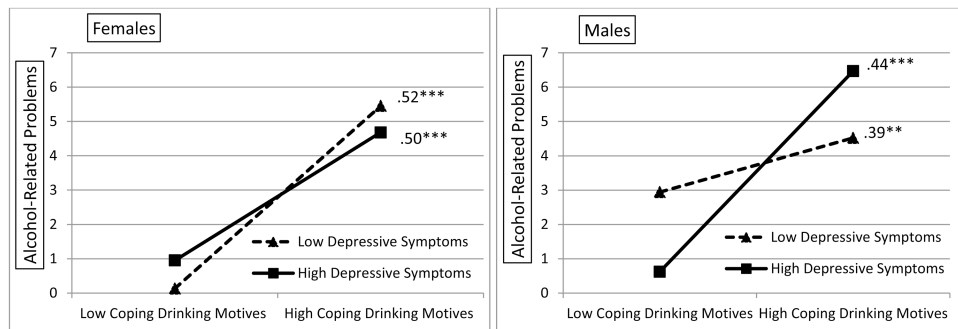
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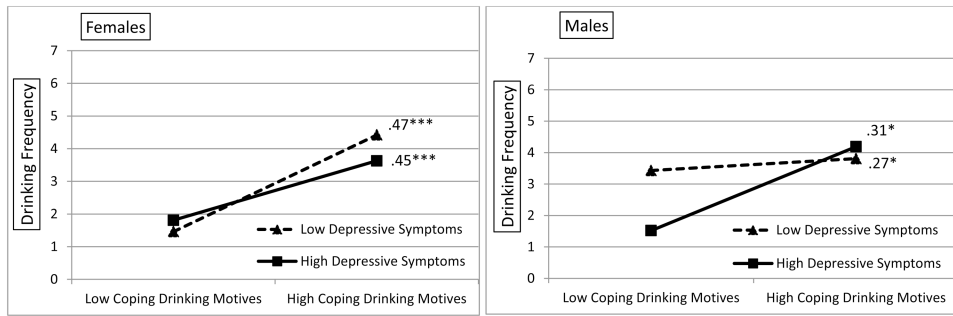
Figure 1.
This two-way interaction demonstrates that depressive symptoms moderates the association between CDM and peak drinks such that CDM are positively related to peak drinks, particularly among individuals low in depressive symptoms.

Figure 2.
This three-way interaction demonstrates that there is a positive relationship between CDM and alcohol-related problems, and this was more true among individuals with low depressive symptoms if they were female. The opposite was true for males such that CDM was positively associated with problems, particularly for those high in depressive symptoms.

Figure 3.
This three-way interaction demonstrates that CDM is positively related to drinking frequency, and this relationship was stronger among low in depressive symptoms. This was more true for females compared to males.

Table 1

Correlations among Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Drinking Frequency	--	0.63***	0.73***	0.77***	0.39***	0.43***	0.44***	0.48***	0.06
2. Alcohol-Related Problems	0.73***	--	0.55***	0.60***	0.47***	0.48***	0.52***	0.45***	0.12
3. Peak Drinks	0.72***	0.58***	--	0.79***	0.40***	0.38***	0.38***	0.41***	0.05
4. Drinks per Week	0.81***	0.67***	0.81***	--	0.36***	0.34***	0.33***	0.37***	0.03
5. Coping Drinking Motives	0.30*	0.37*	0.41**	0.36*	--	0.84***	0.80***	0.80***	0.19**
6. Social Drinking Motives	0.32*	0.46**	0.29†	0.82***	0.82***	--	0.89***	0.84***	0.18*
7. Enhancement Drinking Motives	0.22	0.37*	0.39**	0.77***	0.84***	0.84***	--	0.87***	0.21**
8. Conformity Drinking Motives	0.21	0.35*	0.35*	0.75***	0.81***	0.94***	0.94***	--	0.19**
9. Depressive Symptoms	-0.11	-0.01	-0.20	-0.17	-0.18	-0.17	-0.13	-0.13	--
Males Means	3.43	29.16	7.25	6.19	0.30	0.24	0.42	0.27	-0.10
Std Dev	2.64	5.03	7.60	7.49	0.77	0.81	1.04	0.82	6.82
Females Means	2.67	27.54	3.54	3.58	-0.06	-0.06	-0.09	-0.06	0.02
Std Dev	2.59	4.27	4.55	5.28	0.67	0.77	0.94	0.73	7.04

Note. Correlations for women are above the diagonal and correlations for men are below. N = 44 males, N = 199 females.

***
$p < .001$.

**
$p < .01$.

*
$p < .05$.

†
$p < .10$

Table 2

Hierarchical regression analysis for variables predicting drinking and problems from coping drinking motives and depressive symptoms

Criterion		Predictor	B	SE B	β
Peak drinks	Step 1	Coping Drinking Motives (CDM)	3.33	0.45	0.43***
		Depressive Symptoms (DEP)	-0.05	0.05	-0.06
	Step 2	CDM * DEP	-0.13	0.06	-0.12*
Drinking frequency	Step 1	CDM	1.43	0.22	0.38***
		DEP	-0.005	0.02	-0.01
	Step 2	CDM * DEP	-0.007	0.03	-0.01
Drinks per week	Step 1	CDM	3.22	0.50	0.39***
		DEP	-0.04	0.05	-0.05
	Step 2	CDM * DEP	-0.08	0.07	-0.07
Alcohol-Related problems	Step 1	CDM	2.89	0.37	0.46***
		DEP	0.02	0.04	0.04
	Step 2	CDM * DEP	0.003	0.05	0.004

Note. N = 243

***
$p < .001$.

**
$p < .01$.

*
$p < .05$.

†
$p < .10$

Table 3

Hierarchical regression analysis for variables predicting drinking and problems from coping drinking motives, depressive symptoms, and gender

Criterion		Predictor	B	SE B	β
Peak drinks	Step 1	Coping Drinking Motives (CDM)	3.05	0.45	0.40***
		Depressive Symptoms (DEP)	-0.05	0.04	-0.06
		Gender (GEN)	2.70	0.82	0.19**
	Step 2	CDM * DEP	-0.06	0.07	-0.06
		CDM * GEN	-0.72	1.13	-0.04
		DEP * GEN	0.11	0.12	0.06
	Step 3	CDM * DEP * GEN	-0.16	0.15	0.08
Drinking frequency	Step 1	CDM	1.39	0.23	0.37***
		DEP	-0.005	0.02	0.05
		GEN	0.30	0.41	0.10
	Step 2	CDM * DEP	-0.009	0.03	-0.02
		CDM * GEN	-0.56	0.57	-0.07
		DEP * GEN	-0.02	0.06	-0.02
	Step 3	CDM * DEP * GEN	0.18	0.07	0.17*
Drinks per week	Step 1	CDM	3.05	0.50	0.44***
		DEP	0.04	0.05	0.03
		GEN	1.60	0.91	0.06†
	Step 2	CDM * DEP	-0.04	0.07	-0.04
		CDM * GEN	0.23	1.27	0.01
		DEP * GEN	-0.04	0.14	-0.02
	Step 3	CDM * DEP * GEN	0.30	0.17	0.13†
Alcohol-related problems	Step 1	CDM	2.82	0.37	0.44***
		DEP	0.03	0.04	0.04

Criterion	Predictor	B	SE B	β
	GEN	-0.69	0.67	0.06
Step 2	CDM * DEP	0.002	0.06	0.003
	CDM * GEN	-0.47	0.94	-0.04
	DEP * GEN	0.02	0.10	0.01
Step 3	CDM * DEP * GEN	0.30	0.12	0.18*

Note. N = 243

***
$p < .001.$

**
$p < .01.$

*
$p < .05.$

†
$p < .10$