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Drinking Motives Mediate the Relationship between Facets of Mindfulness and Problematic Alcohol Use

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Abstract

Mindfulness is a multi-faceted construct, and research suggests that certain components (e.g., Acting with Awareness, Nonjudging) are associated with less problematic alcohol use. Recent research has examined whether specific drinking motives mediate the relationship between facets of mindfulness and alcohol use. The current study sought to extend this research by examining whether certain drinking motives would mediate the relationship between facets of mindfulness and problematic alcohol use in a sample of 207 college students classified as engaging in problematic drinking. Participants completed the Five Facet Mindfulness Questionnaire (FFMQ), Drinking Motives Questionnaire-Revised (DMQ-R), and Alcohol Use Disorders Identification Test (AUDIT). Results indicated that lower levels of Coping motives significantly mediated the relationship between greater Acting with Awareness and lower AUDIT score and between greater Nonjudging and lower AUDIT score. Lower levels of Conformity motives significantly mediated the relationship between greater Acting with Awareness and lower AUDIT score. These findings offer insight into specific mechanisms through which mindfulness is linked to less problematic drinking, and also highlight associations among mindfulness, drinking motives, and alcohol use among a sample of problematic college student drinkers. Future research should determine whether interventions that emphasize Acting with Awareness and Nonjudging facets of mindfulness and/or target coping and conformity motives could be effective for reducing problematic drinking in college students.

Keywords

mindfulness; drinking motives; alcohol use; college students

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Ethical Standards All data collection procedures presented here were approved by the University's Institutional Review Board (IRB) and thus have been performed in accordance with the ethical standards in the 1964 Declaration of Helsinki and its later amendments.

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Introduction

Problematic drinking among college students is typically defined as an individual's rate of drinking (explained below) and/or the negative consequences experienced in relation to alcohol use (Ham & Hope, 2003). When compared to their non-college-aged peers, college students report greater levels of problematic drinking, specifically indicating higher rates of drinking alcohol, binge drinking (five or more drinks on one occasion), and heavy drinking (five or more drinks on one occasion on five or more days in past month) – statistics that have been consistent since the early 1990's (SAMSHA, 2014; Wechsler et al., 2002). Specifically, 59.4% of college students report drinking alcohol (39% of whom report binge drinking and 12.7% report heavy drinking; SAMHSA, 2014). In a review of the literature of college student drinking, Perkins (2002) reported a multitude of negative consequences associated with heavy drinking, including academic impairment, unintended and unprotected sexual activity, suicidal ideation and attempts, impaired driving, interpersonal violence, and property damage.

Excess alcohol use is commonly motivated by attempts to alleviate negative affect and/or enhance positive affect, and multiple theoretical models (e.g., Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Conger, 1956; Cooper, Frone, Russell, & Mudar, 1995) have proposed these relationships. Specifically, Cooper et al. (1995) examined a motivational model of alcohol use, theorizing that drinking alcohol is motivated by efforts to regulate both positive and negative mood states. Coping motives (i.e., drinking to regulate negative emotions), enhancement motives (i.e., drinking to increase positive emotions), and conformity motives (i.e., drinking due to pressure from others) are posited to differentially predict alcohol use and subsequent alcohol-related problems and can each be conceptualized as aiming to regulate mood in some way (whereas drinking for social motives, for instance, is considered drinking for positive, social reasons; Cooper, 1994). Specifically, adolescents and adults reporting higher levels of coping motives (when compared to those endorsing primarily enhancement motives) indicate higher levels of depression (Cooper et al., 1995). On the other hand, increased endorsement of enhancement motives (versus coping motives) has been linked to increased levels of positive affect in adults (Cooper et al., 1995). Importantly, alcohol-related problems have been associated with endorsement of coping motives (among adolescents and college students) and conformity motives (among adolescents; Cooper, 1994; Kuntsche, Knibbe, Gmel, & Engels, 2005). Enhancement motives have been associated with alcohol problems as well, via a mediational path that indicated heavy alcohol use mediated the relationship between enhancement motives and alcohol problems among adolescents (Cooper, 1994).

Understanding ways to reduce maladaptive drinking motives may contribute to decreasing alcohol problems and heavy alcohol use. Mindfulness is one such promising factor, and can be defined as “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p.4). Trait mindfulness (or the tendency for mindful attention and responding in daily life; Brown & Ryan, 2003) is negatively associated with alcohol use and drinking-related problems (Adams et al., 2015; Black, Semple, Pokhrel, & Grenard, 2011; Fernandez, Wood, Stein, & Rossi, 2010; Murphy & MacKillop, 2011). Mindfulness is considered a multi-faceted construct, and a commonly used measure of trait

mindfulness, the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), includes five subscales: 1) *Observing* (paying attention to thoughts, feelings and physical sensations), 2) *Describing* (putting thoughts, emotions, and other experiences into words), 3) *Acting with Awareness* (staying focused on present-moment activities; opposite of “auto-pilot”), 4) *Nonjudging* (noticing thoughts and feelings without judging them or criticizing oneself), and 5) *Nonreactivity* (perceiving thoughts and feelings without reacting or getting caught up in them).

Though not much research has examined which specific facets of mindfulness are associated with problematic alcohol use, both Fernandez et al. (2010) and Murphy and MacKillop (2011) found that higher scores on the Acting with Awareness and Nonjudging subscales were associated with decreased problematic use. Similarly, Reynolds et al. (2015) reported that Acting with Awareness was related to lower alcohol use (Reynolds, Keough, & O'Connor, 2015). Negative associations with problematic alcohol use have also been found for the subscales of Describing (Fernandez et al., 2010) and Nonreactivity (Murphy & MacKillop, 2011), and the interaction of Observing and Nonreactivity has predicted substance use (Eisenlohr-Moul, Walsh, Charnigo, Lynam, & Baer, 2012). Specifically, Observing was associated with less substance use when Nonreactivity was high, whereas Observing was associated with more substance use when Nonreactivity was low. These findings suggest that certain facets (e.g., Observe) may differentially predict substance use, depending on how the facets relate to one another. Implications of these unique interactions are important, as some facets, such as Observe, may be only useful in reducing substance use specifically when combined with other facets.

Mindfulness might be particularly relevant for reducing problematic drinking motives. Mindfulness involves paying attention to thoughts and emotions and accepting them as they are, without automatically reacting or trying to change them (Bishop et al., 2004; Kabat-Zinn, 1994). Thus, people with high levels of trait mindfulness might be less likely to turn to alcohol as a way to change uncomfortable affective states. In fact, Bowen and Enkema (2014) found that within a clinical sample of treatment-seeking substance users, among individuals who endorsed using substances as a way to avoid coping, greater dispositional mindfulness was associated with lower dependence severity, suggesting that mindfulness may act as a protective factor. Other research suggests that the association between perceived stress and alcohol use is weaker among more mindful individuals (Adams et al., 2015), and mindfulness-based treatment appears to weaken relationships among negative emotions, craving, and drinking (Witkiewitz & Bowen, 2010; Witkiewitz et al., 2011). Overall, mindfulness may reduce motivation to drink in attempt to manage mood, which could then lead to reductions in problematic alcohol use.

Research has begun to investigate the relationships among mindfulness, motives for drinking, and problematic alcohol use. Two prior studies (both using college student samples) have examined these associations. Reynolds et al. (2015) found that among undergraduate students at a western university ($n = 76$), the Accepting without Judgment facet of mindfulness was associated with lower likelihood of drinking for coping and conformity motives; the Acting with Awareness facet was negatively associated with alcohol use. In a sample of college students at a southwestern university ($n = 297$), Roos, Pearson,

and Brown (2015) found that coping motives mediated the relationship between Acting with Awareness, Describing, and Nonjudging and alcohol use/alcohol-related problems. Enhancement motives mediated the relationship between Acting with Awareness and Nonjudging and alcohol problems. Finally, conformity motives mediated the relationship between Acting with Awareness and Describing and alcohol problems. The results from these two studies highlight the importance of better understanding how specific aspects of mindfulness may be linked to drinking motives and behavior among college students. However, additional research on mindfulness and drinking motives among college student drinkers who are at-risk for developing more severe drinking behaviors is needed, which is the focus of the current study.

Despite high levels of binge drinking and heavy drinking among college students (SAMSHA, 2014), the vast majority of college student drinkers do not have a current alcohol use disorder. A nationally representative sample of college students found that 18% had a current diagnosis of an alcohol use disorder (either abuse or dependence; Slutske, 2005). However, the risk of developing a prolonged alcohol use problem is much higher for college students who engage in problematic drinking. Specifically, problematic drinking in college has been found to predict the future occurrence of alcohol-related problems (e.g., employment difficulties, lower educational attainment) and the development of alcohol-related disorders in a 10-year follow-up study (Jennison, 2004). Thus, it is critical to develop interventions for college students who exhibit high-risk drinking patterns. Brief intervention research has shown success through targeting problematic college student drinkers (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Borsari & Carey, 2000; Kulesza, Apperson, Larimer, Copeland, 2010; Kulesza, McVay, Larimer, & Copeland, 2013). Mindfulness-based interventions also have potential in this population (Ostafin & Marlatt, 2008; Ostafin, Bauer, & Myxter, 2012), and in order to tailor mindfulness-based interventions for those engaging in problematic drinking, it is important to understand mechanisms that might link mindfulness to healthier drinking patterns.

Thus, the present study examined drinking motives as potential mediators of the relationship between mindfulness and drinking behavior in a sample of problematic college student drinkers. Specifically, the current study investigated whether specific drinking motives (coping, enhancement, social, and conformity) would mediate the relationship between certain facets of mindfulness and problematic alcohol use. Based on previous research (Murphy & MacKillop, 2011; Reynolds et al., 2015; Roos et al., 2015), we hypothesized that Acting with Awareness and Nonjudging would be associated with lower problematic alcohol use. In addition, we expected that mindfulness would be more strongly related to coping motives than enhancement motives, given that mindfulness appears particularly helpful in preventing problematic drinking in reaction to negative emotions (Adams et al., 2015; Witkiewitz & Bowen, 2010; Witkiewitz et al., 2011). As such, we hypothesized that coping motives would mediate the relationship of Acting with Awareness and problematic alcohol use, as well as Nonjudging and problematic alcohol use. We also expected that conformity motives would mediate the relationship between Acting with Awareness and problematic alcohol use (based on findings from Roos et al., 2015).

Method

Participants

Participants were current undergraduate students at a large southeastern university. In order to target problematic college student drinkers, eligible participants had to score six or higher on the Alcohol Use Disorders Identification Test (AUDIT; Aertgeerts et al., 2000; Devos-Comby & Lange, 2008; Kokotailo et al., 2004; Meneses-Gaya et al., 2009) and endorse coping and/or enhancement as primary drinking motives on the Drinking Motives Questionnaire-Revised (DMQ-R). For complete details regarding number of participants deemed ineligible and reasons for ineligibility, please see original paper (masked for review).

Procedures

Data were drawn from a larger study examining the impact of a brief mindfulness intervention on affect and urge to drink in college student drinkers deemed to be at-risk for alcohol-related problems (masked for review). The current study utilized baseline measures from the parent study. The study was approved by the university's Institutional Review Board, and all participants completed the informed consent process.

Measures

Demographic Questionnaire—This measure collected information on participant demographics including age, gender, and race/ethnicity.

Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Bindle, Saunders, & Monteiro, 2001)—The AUDIT is a 10-item self-report questionnaire that assesses level of problematic drinking. Questions are rated on a Likert scale from 0 – 4 and are summed to form the total score. For college students, a score of six or higher has been identified as the best cut-off score for indicating levels of problematic drinking when examining ideal sensitivity and specificity outcomes (Aertgeerts et al., 2000; Devos-Comby & Lange, 2008; Kokotailo et al., 2004; Meneses-Gaya et al., 2009). For instance, among 302 college students, Kokotailo and et al. (2004) found that a score of six or greater had a sensitivity of 91% and specificity of 60% for detecting problematic levels of drinking. Aertgeerts et al. (2000) found that among 3,564 college students, a cut-off score of 6 showed a sensitivity of 80% and specificity of 78%. Thus, all participants scored six or higher on the AUDIT in the current analyses. Internal consistency for the current study was acceptable ($r = .64$).

Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994)—The DMQ-R is a 20-item self-report measure assessing four types of drinking motives: Coping, Enhancement, Social, and Conformity. Each question is rated from 1 (*never*) to 5 (*almost always*). Drinking primarily for coping and/or enhancement reasons has been previously identified as being associated with wanting to alter an emotional state (Cooper, 1994). Sample items From The Coping Subscale are “How often do you drink to cheer up when you’re in a bad mood?” and “How often do you drink to forget your worries?” Sample items from the Enhancement subscale include “How often do you drink because it’s exciting?”

and “How often do you drink because it gives you a pleasant feeling?” Sample items from the Social subscale include “How often do you drink to celebrate a special occasion with friends?” and “How often do you drink because it makes social gatherings more fun?” Sample items from the Conformity subscale include “How often do you drink to be liked?” “How often would you say you drink to fit in with the group you like?” and “How often do you drink so you don’t feel left out?” In college student samples, the DMQ-R has demonstrated high internal consistency (MacLean & Lecci, 2000) and good predictive validity of drinking problems and heavy drinking (Cooper, 1994). Internal consistency scores were as follows for the current study: Coping ($r = .83$), Enhancement ($r = .84$), Social ($r = .62$), and Conformity ($r = .84$).

Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006)—The FFMQ is a 39-item self-report measure that assesses trait mindfulness according to five subscales: Observing, Describing, Acting with Awareness, Nonjudging, and Nonreactivity. Each question is rated on a 5-point Likert scale from 1 (*never or rarely true*) to 5 (*very often or always true*). The FFMQ has demonstrated good internal consistency in college students (Baer et al., 2006). Internal consistency scores for each subscale were as follows for the current study: Observing ($r = .70$), Describing ($r = .91$), Acting with Awareness ($r = .87$), Nonjudging ($r = .87$), and Nonreactivity ($r = .71$).

Analytic Plan

First, linear regression analyses examined associations between FFMQ facets and AUDIT scores for the entire sample. Second, simple mediation models were tested with Hayes’ (2013) PROCESS macro (model number = 4) in order to test whether drinking motives (each subscale of the DMQ-R) mediated the relationship between facets of mindfulness (each subscale of the FFMQ) and problematic drinking (total AUDIT score). Five thousand bootstrapped samples were used to estimate the indirect effect, and bias-corrected confidence intervals were developed around the estimated indirect effect. This approach to mediation has several strengths such as not requiring normality of the sample distribution and providing greater statistical power (by using the bias-corrected bootstrapping; Hayes, 2013). Furthermore, this approach allows the estimate of the indirect effect to be independent of the total effect, and the total effect does not have to be significant in order for mediation to occur (Hayes, 2013). Thus, regardless of results from associations between FFMQ subscales and alcohol use, mediation models were tested for all FFMQ facets.

Results

Data were analyzed with SPSS version 22. Following screening, the final sample consisted of 207 problematic college student drinkers (76.3% women). Participants were primarily Caucasian (85.5%), followed by African American (6.3%), Hispanic (3.5%), and Other (4.8%). Means and standard deviations for all variables are presented for the entire sample in Table 1.

Drinking characteristics of the sample, including frequency, quantity, and binge drinking (defined in this study as consuming six or more drinks on one occasion, which is the wording utilized in the AUDIT) can be found in Table 2. Bivariate correlations among

FFMQ subscales, drinking motives, and problematic alcohol are displayed in Table 3. The FFMQ facet of Observe was associated with increased Social motives; Acting with Awareness was associated with lower Coping and lower Conformity motives; Nonjudging was also associated with lower Coping motives. Total AUDIT score was associated with increased Enhancement, Coping, and Conformity drinking motives, and with lower Acting with Awareness and Nonjudging scores.

When all subscales of the FFMQ were entered simultaneously to predict AUDIT score, the overall model was significant $F(5,206) = 2.78, p = .019, R^2 = .07$, and the Acting with Awareness facet was the only FFMQ subscale that was uniquely related to lower AUDIT score ($\beta = -.150; t = -2.08, p = .038$). We also entered each FFMQ facet individually to predict AUDIT score, and both Acting with Awareness $F(1,206) = 8.51, p = .004, R^2 = .04$ and Nonjudging [$F(1,206) = 4.26, p = .040, R^2 = .02$] separately predicted lower AUDIT score.

Lower levels of Coping motives significantly mediated the relationship between higher Acting with Awareness and lower AUDIT score (95% CI: $-.921, -.164$). Figure 1 presents the complete results for this model. Lower Coping motives also significantly mediated the relationship between greater Nonjudging and lower AUDIT score (95% CI: $-.711, -.139$) for the entire sample. Figure 2 presents the complete results for this model. Lower levels of Conformity motives significantly mediated the relationship between higher Acting with Awareness and lower AUDIT score (95% CI: $-.483, -.005$). Figure 3 presents the complete results for this model.

Discussion

The current cross-sectional investigation sought to determine whether drinking motives mediated relationships between facets of mindfulness and problematic alcohol use in college students who engage in at-risk drinking. This study is novel in that previous work has not examined problematic college student drinkers, and the present study focuses exclusively on this population. Both the Acting with Awareness and Nonjudging facets of mindfulness were associated with lower levels of problematic drinking. However, once all facets were entered in analyses simultaneously, only Acting with Awareness was uniquely related to lower problematic drinking. Primary findings indicated that Coping motives significantly mediated relationships between: 1) Acting with Awareness and AUDIT score, and 2) Nonjudging and AUDIT score. Conformity motives significantly mediated the relationship between Acting with Awareness and AUDIT score. If replicated in longitudinal studies, these findings could contribute to the development of interventions to reduce problematic drinking in college students. And although more research is needed to clarify the causal nature of these relationships, the findings offer insight into potential mechanisms underlying associations between mindfulness and alcohol use.

Regarding the first primary outcome, greater levels of Acting with Awareness were associated with lower likelihood of drinking as a way to cope with negative emotions, which was then related to lower levels of problematic drinking. This finding makes sense in light of current theories highlighting the importance of drinking to manage unpleasant mood (Baker

et al., 2004; Cooper et al., 1995; Conger 1956). Individuals who are less likely to function on automatic pilot and who are more likely to focus/pay attention to their present-moment behavior have lower levels of problematic drinking. This finding confirms prior research indicating that Acting with Awareness is negatively associated with problematic alcohol use (Fernandez et al., 2010; Murphy and MacKillop, 2011) and extends the findings of Roos et al. (2015) that Coping motives may be one important pathway explaining this relationship in both college student drinkers (Roos et al., 2015) and problematic college student drinkers (the current study). Mindfulness-based interventions that teach present-focused attention and purposeful action may help to reduce motives to cope with negative mood by drinking, which might result in decreased problematic drinking in college students.

Second, Coping motives significantly mediated the relationship between Nonjudging and total AUDIT score. Examples of Nonjudging items from the FFMQ include, “I criticize myself for having irrational or inappropriate emotions” and “I disapprove of myself when I have irrational ideas.” Thus, those who are less judgmental of their inner experiences may be less likely to drink in an attempt to cope with negative emotions, and accordingly are thus less likely to engage in problematic drinking. This finding is also supported by prior research indicating that the Nonjudging facet is negatively associated with problematic alcohol use (Fernandez et al., 2010; Murphy and MacKillop, 2011). However, our results indicate that at least part of the association between Nonjudging and alcohol use is due to lower motives to manage mood by drinking. Again, these results are also in alignment with Roos et al.’s (2015) findings who also found that coping motives mediated the relationship between Nonjudging and alcohol use/alcohol problems. Individuals who are able to notice their thoughts and emotions without judging them may feel less distressed, which would reduce motives to drink to manage mood and ultimately reduce problematic drinking.

Third, Acting with Awareness was associated with lower likelihood of drinking to conform to social situations, which was then related to lower levels of problematic drinking. Our findings indicate that individuals who thoughtfully consider how to act in a given situation (instead of being on autopilot) are less likely to endorse drinking to conform in these types of social situations, resulting in lower levels of problematic drinking. Combined with the findings from Roos et al. (2015), which also found that conformity motives mediated the relationship between Acting with Awareness and alcohol problems, evidence suggests that problematic college student drinkers show a similar pattern. It may be useful for future research to examine the role of conformity motives in relationships between mindfulness and alcohol use among individuals with elevated social anxiety, as almost 50% of individuals with lifetime social anxiety disorder also meet criteria for a lifetime alcohol use disorder (Buckner, Heimberg, Ecker, & Vinci, 2013; Grant et al., 2005; Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005). Previous research has found that individuals high in social anxiety are more likely to endorse drinking for conformity and coping motives (Lewis et al., 2008); however, other work has found no association between social anxiety and conformity motives (Ham, Bonin, & Hope, 2007). Constructs related to social anxiety, such as anxiety sensitivity and neuroticism, have been linked to increased endorsement of conformity and coping motives (Comeau, Stewart, & Loba, 2001; Stewart & Devine, 2000; Stewart, Loughlin, & Rhyno, 2001; Stewart & Zeitlin, 1995; Stewart, Zvolensky, & Eifert, 2002). Given that conformity and coping motives are often considered negative

reinforcement motives (e.g., drinking to avoid unpleasant emotional states or to avoid social rejection; Cooper, 1994), it follows that individuals endorsing anxiety-related symptoms might endorse these motives for drinking. Future research might examine whether greater Acting with Awareness could reduce social conformity motives and associated alcohol use in individuals with high levels of social anxiety.

Consistent with hypotheses, coping motives appeared more relevant than enhancement motives in explaining relationships between mindfulness and alcohol use, as enhancement motives did not mediate any of the relationships tested in the current study. One possible reason for the lack of findings regarding enhancement motives is that our sample was predominantly female (76.3%). Recently, Leigh and Neighbors (2009) found that for male college students, enhancement motives mediated the relationship between mind/body awareness and alcohol use, as well as nonattachment to thoughts and alcohol use. However, they did not find any significant results among women. Thus, the role of enhancement motives in mediating associations between mindfulness and drinking may be different for men vs. women. Additional research is needed to examine potential gender differences across various college student samples and specifically among problematic college student drinkers. A second reason for our null findings regarding enhancement motives may be that our study only included participants identified as engaging in problematic drinking. As such, mindfulness might be particularly beneficial in terms of preventing problematic drinking during moments of emotional distress for problematic drinkers. Extant research suggests that mindfulness minimizes emotional reactivity to distressing stimuli or situations (Arch & Craske, 2006, 2010; Britton, Shahar, Szepsenwol, & Jacobs, 2012; Feldman, Greeson, & Senville, 2010). Mindfulness may also weaken associations between emotional distress and problematic drinking (Adams et al., 2015; Witkiewitz et al., 2011). Furthermore, both Conger's (1956) tension reduction hypothesis and Baker et al.'s (2004) affective processing model highlight motivations to reduce emotional distress (rather than motivations to increase positive emotions) as primary factors promoting and maintaining problematic alcohol use.

Limitations of the current study should be noted. These data are cross-sectional and causal inferences cannot be made. For instance, our findings do not necessarily imply that being less judgmental causes a decrease in coping motives, resulting in decreased problematic drinking. It is plausible, for example, that individuals who do not drink as a way of managing their mood become less judgmental over time, which then results in less problematic drinking. Our findings can only assert that associations exist among these constructs. Thus, future research in this area should examine these variables in a longitudinal manner. The current sample consisted of college student drinkers who were primarily Caucasian women who engage in problematic drinking; therefore generalizability may be limited. Future research should examine whether the current findings extend to males and more racially/ethnically diverse populations. Of the prior studies examining relationships among mindfulness, drinking motives, and alcohol use (Reynolds et al., 2015; Roos et al., 2015), each utilized a college student sample. Additional research is needed in more diverse populations, including non-college students and individuals with clinical alcohol use disorders. Furthermore, examining potential gender differences regarding these variables would be useful in order to determine whether certain drinking motives and/or mindfulness facets are more/less important for men versus women. Gender differences were not

examined in the current study because of the relatively small number of male participants ($n = 49$). Readers should also note that the effect sizes for relationships between mindfulness facets and alcohol use were relatively small, and there are clearly a number of important factors (in addition to mindfulness) that may predict less problematic drinking.

Data for this study were taken from a larger study, in which participants were screened for problematic levels of drinking (i.e., AUDIT score of 6 or greater and endorsement of primarily enhancement and/or coping motives), and thus results may only generalize to students who engage in problematic drinking. Furthermore, the internal consistency of the AUDIT was at most adequate, and this should be considered when interpreting the current study's findings. The AUDIT and the DMQ-R were the only measures of alcohol use administered to participants in this study; future research should include additional measures to provide more detailed information on quantity, frequency, and binge drinking (e.g., by using the Timeline Followback; Sobell & Sobell, 2003). However, the current study is strengthened by a relatively large sample of at-risk drinkers, examination of multiple facets of mindfulness, and investigation of novel mediating pathways to elucidate mechanisms underlying relationships between mindfulness and alcohol use.

Overall, our findings highlight associations among mindfulness, drinking motives, and alcohol use for college students who engage in problematic drinking. Research should examine whether interventions emphasizing Acting with Awareness and Nonjudging facets of mindfulness and/or targeting coping and conformity motives could be effective for reducing problematic drinking in college students. Mindfulness-based treatments for substance use are very promising (Bowen et al., 2009; Bowen, Chawla, & Marlatt, 2011; Bowen et al., 2014; Brewer et al., 2009; Brewer et al., 2011; Chiesa & Serretti, 2014; Davis, Goldberg, Anderson, Manley, Smith, & Baker, 2014; Garland, Manusov, Froeliger, Kelly, Williams, & Howard, 2014; Grant et al., 2015; Himmelstein, Saul, & Garcia-Romeu, in press; Vidrine et al., under review; Witkiewitz et al., 2014). Refining and enhancing mindfulness-based treatments is a continuous process in order to provide the most efficacious treatments to college students with problematic substance use. Results of the current study offer insight into potential mechanisms linking specific aspects of mindfulness to lower alcohol use. If results are replicated in longitudinal studies, these findings could contribute to the development of effective interventions for problematic drinking in college students.

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Figure 1.

Model indicating the Mediating Effect of Coping Motives on Acting with Awareness and Alcohol Use (** = $p < .01$; * = $p < .05$)

Figure 2.

Model indicating the Mediating Effect of Coping Motives on Nonjudging and Alcohol Use

(** = $p < .01$; * = $p < .05$)

Figure 3.

Model indicating the Mediating Effect of Conformity Motives on Acting with Awareness and Alcohol Use (** = $p < .01$; * = $p < .05$)

Table 1

Means and Standard Deviations (in parentheses) on Study Variables

	Mean (SD)
% Caucasian	85.5%
Age	20.13 (1.89)
AUDIT Total	10.03 (4.28)
DMQ-R Coping	1.84 (.85)
DMQ-R Enhancement	3.35 (.97)
DMQ-R Social	1.17 (.33)
DMQ-R Conformity	2.77 (.91)
FFMQ Observe	3.25 (.59)
FFMQ Describe	3.47 (.76)
FFMQ Acting with Awareness	3.07 (.69)
FFMQ Nonjudgment	3.30 (.75)
FFMQ Nonreactivity	2.96 (.55)

Note. DMQ-R = Drinking Motives Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire

Table 2

Percent of Sample Endorsing Certain Drinking Behaviors

Frequency of Drinking	
Monthly or less	5.3%
2 – 4 times per month	36.2%
2 – 3 times per week	52.7%
4 or more times per week	5.8%
Quantity of Drinking	
1 – 2 drinks per day	9.2%
3 – 4 drinks per day	53.1%
5 or 6 drinks per day	29.5%
7 or more drinks per day	8.2%
Six or more drinks on one occasion	
Never	10.1%
Monthly or less	46.9%
2 – 4 times per month	35.3%
2 – 3 times per week	7.2%
Daily or almost daily	.5%

Table 3
Bivariate Correlations among AUDIT total, Drinking Motives, and FFMQ Subscales

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. AUDIT Total	-	-	-	-	-	-	-	-	-	-
2. DMQ-R Enhancement	.274**	-	-	-	-	-	-	-	-	-
3. DMQ-R Coping	.311**	.271**	-	-	-	-	-	-	-	-
4. DMQ-R Social	.028	.258**	.176*	-	-	-	-	-	-	-
5. DMQ-R Conformity	.201**	.789**	.392**	.338**	-	-	-	-	-	-
6. FFMQ Observe	.042	.070	.044	.183**	.077	-	-	-	-	-
7. FFMQ Describe	-.132	-.084	-.109	-.051	-.016	.163*	-	-	-	-
8. FFMQ Acting with Awareness	-.200**	-.125	-.248**	.017	-.148*	-.006	.249**	-	-	-
9. FFMQ Nonjudgment	-.143*	-.111	-.220**	-.044	-.044	-.122	.129	.205**	-	-
10. FFMQ Nonreactivity	-.117	.065	-.105	-.009	.058	.189**	.234**	.152*	.065	-

Note. DMQ-R = Drinking Motives Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire.

* $p < .05$;

** $p < .01$