Relations Among Motives, Negative Urgency, and Protective Skills in College Drinkers

by

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Abstract

Heavy alcohol use continues to be a common problem among the college student population, and numerous negative consequences can be attributed to student drinking. Several factors, including drinking motives and impulsivity, have been studied to better understand college drinking behaviors. Research has identified that *coping motives* (i.e., drinking to reduce negative affect) and *negative urgency* (i.e., the tendency for rash reaction in response to negative affect) are both closely linked to alcohol-related problems and to one another. The primary purpose of this study was to test if certain skills and abilities, specifically distress tolerance and mindfulness skills, moderate the relation between negative urgency and drinking to cope. To test for moderation, 683 college student drinkers responded to self-report measures of drinking behaviors, drinking motives, impulsivity, distress tolerance, and daily utilization of mindfulness skills. Five separate regression models tested for distress tolerance or the mindfulness skills of observing, describing, acting with awareness, and accepting without judgment as moderators to the relation between negative urgency and coping motives. The mindfulness skill of accepting without judgment significantly moderated (i.e., dampened) the positive relation between negative urgency and drinking to cope. Results may be useful in developing targeted intervention and prevention efforts to test among students, as skills training may benefit individuals with long-standing impulsive personality traits who engage in the traditionally problematic behavior of drinking to cope.

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Heavy alcohol use continues to represent a common problem among the college population, with national surveys reporting approximately 58% of full-time college students drinking alcohol in the past month and 37.9% of full-time college students binge drinking (i.e., 5 or more drinks in a 2 hour period for males, 4 or more drinks for females) within the past month (Substance Abuse and Mental Health Services Administration [SAMHSA]; 2015). These statistics suggest that approximately 65.3% of full-time college students who reported any amount of drinking within the past month also engaged in binge drinking. Further, 12.5% of full-time college students reported heavy alcohol use (i.e., at least 5 days of binge drinking within 30 days) within the past month, suggesting heavy alcohol use for approximately 21.6% of full-time college students who endorsed any amount of alcohol use within the past month (SAMHSA, 2015). Although there has been a slight decrease (approximately 4.3%) in college student binge drinking since 2005 (Hingson, Zha, & Smyth, 2017), rates for binge drinking and heavy alcohol use remain higher for college students compared to their unenrolled peers of ages 18-24 (SAMHSA, 2015).

Understandably, there are numerous negative consequences related to alcohol use for college students, especially those who engage in binge drinking and heavy alcohol use. Estimates suggest that alcohol use is associated with approximately 1,800 deaths, 599,000 unintentional injuries, 646,000 instances of physical assault, and 97,000 instances of sexual assault or rape per year among college students (Hingson, Zha, & Weitzman, 2009). Concerning behaviors that have been attributed to college drinking include risky sexual behaviors, driving while impaired, and physical altercations (Del Boca, Darkes, Greenbaum, & Goldman, 2004). Additionally, college binge drinking has been linked to impaired control related to alcohol use, episodes of blacking out, alcohol dependence symptoms, and negative

academic or occupational consequences (Read, Beattie, Chamberlain, & Merrill, 2008). Due to the scope and frequency of negative alcohol-related consequences in the college population, continued exploration of factors related to college student drinking is warranted.

Drinking Motives

One model that has been useful in furthering an understanding of drinking behaviors relates to individual differences in motivation for alcohol consumption. Cox and Klinger (1988) first proposed a behavioral model for alcohol use that highlighted a primary negative reinforcement motive (i.e., to reduce negative affect) and a primary positive reinforcement motive (i.e., to increase positive affect). Future development of the motivational model also identified a negative reinforcement motive of reducing feelings of social isolation in the company of drinkers and a positive reinforcement motive of enhancing social interaction. These four reinforcement motives were reflected in Cooper's (1994) four-factor drinking motives model, which included *coping* (i.e., reducing negative affect), *enhancement* (i.e., increasing positive affect), *conformity* (i.e., reducing feeling of social rejection), and *social* (i.e., enhancing social interaction) drinking motives. This four-factor model has been widely used in alcohol-related research to further an understanding of alcohol use behaviors, including those among college students (Kuntsche, Knibbe, Gmel, & Engels, 2005).

Drinking motives have been identified as useful in furthering an understanding of variables linked to alcohol-related outcomes among the college population. For example, in college samples, important relations have been found between alcohol-related problems and both positive and negative reinforcement motives, with negative reinforcement motives holding more predictive power than positive reinforcement motives (Carey & Correia, 1997).

Additionally, coping motives have shown a direct relation, above and beyond total alcohol consumption, to alcohol-related problems for college students (Park & Levenson, 2002; Simons, Gaher, Correia, Hansen, & Christopher, 2005). More specifically, direct associations were found between coping motives and unique alcohol-related problems, including risky behaviors, poor self-care, blacking out, diminished self-perception, dependence symptoms, and academic and occupational problems (Merrill, Wardell, & Read, 2014). Negative alcohol-related consequences have also been linked to enhancement motives, but not above and beyond total consumption (i.e., total number of drinks), which appears to statistically account for this positive relation (Merrill & Read, 2010; Simons et al., 2005). Due to all of these findings, a particular focus on coping motives as an important use-related variable is warranted.

Impulsivity

In addition to motives for consumption, personality variables, such as impulsivity, have also been linked to college student drinking. The influence of impulsivity in alcohol consumption behaviors and alcohol-related problems has been well established, with high levels of impulsivity predicting increased alcohol use and more negative alcohol-related consequences (e.g., Lejuez et al., 2010; Sher & Trull, 1994, Shin, Hong, & Jeon, 2012). While impulsivity as a broad construct has been linked to numerous problematic outcomes, Whiteside and Lynam (2001) developed a four-factor trait-based model of impulsivity to address the multidimensional nature of the construct. These four factors (UPPS) included *urgency*, which refers to the tendency for rash reaction in response to negative affect; (lack of) *perseverance*, referring to a likelihood to give up on tasks while experiencing boredom or failure; (lack of) *premeditation*, which involves a tendency for rash action without consideration of potential consequences; and *sensation seeking*, which can be understood as an individual's tendency to make rash decisions

to experience feelings of excitement. Later studies sought to examine the factor of urgency more thoroughly, and findings led to an expanded twofold understanding of the construct with *positive urgency* referring to a tendency for rash reaction in response to positive affect and with *negative urgency* referring to a tendency for rash reaction in response to negative affect (Cyders & Smith, 2007). The inclusion of positive urgency expanded Whiteside and Lynam's (2001) UPPS model to the UPPS-P (i.e., [negative] urgency, [lack of] perseverance, [lack of] premeditation, sensation seeking, positive urgency) model that has been widely used study these five dimensions of impulsivity.

The UPPS-P model of impulsivity has been found useful in identifying factors related to various alcohol-related outcomes, including overall alcohol consumption and alcohol-related problems (Magid & Colder, 2007). However, in order for the UPPS-P model to be most useful in this context, understanding the unique influence of each impulsivity facet on alcohol-related outcomes is of great importance; such an understanding may assist in identifying specific pathways in which individuals are particularly at risk for problematic alcohol use and could be useful in developing targeted prevention and intervention efforts. Smith and colleagues (2007) first examined the potential differences among UPPS (excluding positive urgency) impulsivity traits in their relation to various problematic behaviors, including those related to problematic alcohol use. Their findings suggested significant differences among traits in their relations to alcohol-related outcomes. More specifically, individuals who presented high levels of sensation seeking showed the highest levels of drinking *frequency* and overall *total alcohol consumption*. However, negative urgency showed the strongest relation with alcohol-related *problems* (e.g., blacking out, risky sexual behaviors, etc.) compared to other impulsivity traits. Both sensation seeking and negative urgency were more uniquely related to drinking variables than other UPPS

impulsivity traits. Additional studies have reported similar findings with the UPPS-P model, suggesting that sensation seeking is often most closely linked to total alcohol consumption, whereas negative urgency is most closely linked to negative alcohol-related consequences (Cyders, Flory, Rainer, & Smith, 2009; Kiselica, Echevarria, & Borders, 2015). Studies have continued to identify differences among UPPS-P traits and their relation to alcohol-related outcomes; multiple meta-analytic studies have concluded that negative urgency consistently serves as the strongest predictor of alcohol-related problems (Berg, Latzman, Bliwise, & Lilienfeld, 2015; Coskunpinar, Dir, & Cyders, 2013). Due to these considerations, an increased focus on negative urgency in relation to alcohol use behaviors is appropriate and warranted.

Negative urgency and drinking motives. In addition to negative urgency's relation to drinking outcomes, its relation to drinking motives has been examined as well. Among college students, negative urgency has been linked to coping, enhancement, social, and conformity motives (Jones, Chryssanthakis, & Groom, 2014). Despite its relation to all four specified drinking motives, its relation to coping motives has been found consistently stronger than its relation to enhancement, social, and conformity motives (Adams, Kaiser, Lynam, Charnigo, & Milich, 2012; Anthenian, Lembo, & Neighbors, 2017; Curcio & George, 2011).

The relation of negative urgency and drinking motives seems particularly important, as motives have been found to statistically account for the relation between negative urgency and alcohol-related problems. Adams and colleagues (2012) sought to examine the direct and indirect relations of UPPS-P impulsivity traits, drinking motives, and negative alcohol-related consequences among college students. Their findings indicated two potential paths for which negative urgency related to problematic drinking; coping motives statistically accounted for one path while enhancement motives statistically accounted for the other. Additional research has

also indicated coping motives as statistically accounting for the relation between urgency and negative alcohol-related consequences (Jones et al., 2014). With findings suggesting that coping motives may have a more direct relation to alcohol-related problems than the other three drinking motives (e.g., Merrill et al., 2013; Park & Levenson, 2002), and with negative urgency having a stronger relation to alcohol-related problems than the other UPPS-P impulsivity traits (e.g., Berg et al., 2015; Coskunpinar et al., 2013), relations among coping motives, negative urgency, and potentially moderating protective factors seems of great importance.

Skills and Abilities as Protective Factors

Due to the evident influence of coping motives and negative urgency on important alcohol-related outcomes, researchers have sought to identify skills and abilities that may serve as protective factors in relation to these variables. Two ability-based constructs that may influence the relations of drinking motives, urgency, and alcohol-related problems are *distress tolerance* and *mindfulness skills*. In order to understand the potential implications of these constructs, it is important to identify their proposed mechanisms of change as well as their specific relations to alcohol-related problems, drinking motives, and negative urgency.

Distress tolerance. Distress tolerance can be understood as the ability to experience and endure negative sensations or emotions without severe negative psychological consequences or engagement in harmful behaviors (Linehan, 1993). Low levels of distress tolerance have been linked to psychopathology and various psychological concerns, including substance use disorders and problematic substance use (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). More specifically, the influence of distress tolerance has been consistently established as an important variable in regard to mental health concerns, as low levels have shown strong relations with posttraumatic stress disorder (Vujanovic, Bonn-Miller, Potter, Marshall, & Zvolensky,

2011), anxiety disorders (Bernstein, Marshall, & Zvolesnky, 2011), eating disorders (Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007), and substance use concerns (Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005).

In regard to alcohol use, distress tolerance has been linked with problematic use among various subgroups. For example, in a validation study of the Distress Tolerance Scale (DTS) Simons and Gaher (2005) found and inverse relation between distress tolerance and alcohol-related problems among men; they did not, however, find this relation among women. Low levels of distress tolerance have also been linked to alcohol-related problems among individuals experiencing depression or depressive symptoms (Buckner, Keough, & Schmidt, 2007; Gorka, Ali, & Daughters, 2012). Interestingly, Dennhardt and Murphy (2011) found low distress tolerance and depression symptoms to be associated with alcohol-related problems in African American college students, whereas distress tolerance was not a statistical predictor for European American college students. For individuals with low levels of distress tolerance, problematic alcohol use has also been found particularly high among trauma samples (Vujanovic, Marshall-Berenz, & Zvolensky, 2011) and among individuals with high levels of anxiety sensitivity (Allen, Macatee, Norr, Raines, & Schmidt, 2015). A summation of these findings suggests that distress tolerance is an important factor in alcohol-related outcomes among specific populations; further identification of its predictive utility among various subgroups seems important.

Relations among distress tolerance, drinking motives, and negative urgency have been explored as well. Similar to negative urgency, low distress tolerance has been more robustly linked with coping drinking motives than with other drinking motives; these results have been reported with both clinical samples and nonclinical samples of young adults (Howell, Leyro, Hogan, Buckner, & Zvolensky, 2010; Marshall-Berenz, Vujanovic, & MacPherson, 2011).

Furthermore, a strong inverse relation between distress tolerance and negative urgency has been established (Kaiser, Milich, Lynam, & Charnigo, 2012). In regard to the relations of negative urgency and distress tolerance with alcohol-related outcomes, negative urgency has been identified as a stronger statistical predictor of both overall drinking frequency and alcohol-related problems (Kaiser et al., 2012). Additional findings have suggested that distress tolerance may statistically account for the relation between the broader construct of general impulsivity (but not specifically negative urgency) and drinking to cope (Marshall-Berenz et al., 2011). The strong relationship between negative urgency and distress tolerance may limit the moderating role of the latter in the relation between negative urgency and both coping motives. Further elucidation of the relations among distress tolerance, negative urgency, drinking motives, and alcohol problems is warranted.

Mindfulness skills. In addition to distress tolerance, mindfulness skills have been identified as one potentially important factor that may be related to various alcohol-related outcomes. Amid validation of the Kentucky Inventory of Mindfulness Skills (KIMS), Baer, Smith, and Allen (2004) introduced a model of four mindfulness skills that relate to implementing dispositional mindfulness facets in everyday life; these skills were found to be inversely related with problems in overall physical and mental health and well-being. The four skills, which were found to vary among a nonclinical sample of undergraduate students, included *observing*, *describing*, *acting with awareness*, and *accepting without judgment*. According to Baer and colleagues (2004), The skill of observing refers to the ability to intentionally attend to both internal and external stimuli, including bodily sensations, cognitions, emotions, and experiences. Describing refers to an individual's capacity to label or verbalize experiences, thoughts, and emotions without being emotionally influenced by such descriptions. Acting with

awareness can be understood as the skill of maintaining focus on present-moment experiences and activities without being distracted by other thoughts or emotions, especially those related to concerns about the past or the future. Finally, accepting without judgment is an individual's ability to experience and acknowledge internal thoughts, emotions, and sensations without being negatively affected by the corresponding cognitive appraisal; this skill involves understanding and accepting current situations without feeling a need for avoidance or immediate unnecessary change (Dimidjian & Linehan, 2003).

Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) added to the assessment of mindfulness-related factors with the introduction and validation of the Five Facet Mindfulness Questionnaire (FFMQ). This model included mindfulness facets based on three factors (i.e., *observing*, *describing*, and *acting with awareness*) from the KIMS model along with the facets of *nonjudging* and *nonreactivity*. Nonjudgment is closely related to the KIMS model skill of accepting without judgment, and nonreactivity refers to the ability to experience situations without immediate action as a response (Baer et al., 2006; Williams, Dlgleish, Karl, & Kuyken, 2014). While not entirely a skill-based measure, FFMQ model still contains skill-based components, as 24 of the 39 FFMQ's items were derived from the KIMS. Because the FFMQ is not an exclusively skill-based measure, we used the KIMS in our assessment of mindfulness skills; however, research conducted with the FFMQ will also be discussed to provide further rationale for the conducted study.

Mindfulness skills have been identified as protective factors for numerous problematic outcomes among students, including variables related to alcohol use. Understanding the potential impact of individual mindfulness skills is of importance for future intervention and prevention efforts among college students. In a study with a sample of undergraduate students,

Reynolds, Keough, and O'Connor (2015) evaluated mindfulness skills and their relation to alcohol-related variables, specifically drinking motives and overall rates of alcohol consumption. Their findings indicated inverse relations between accepting without judgment and both coping and conformity drinking motives. Acting with awareness, however, was the only mindfulness skill that was significantly associated with lower levels of total alcohol consumption. Another study with a primarily (93%) college-based sample also considered mindfulness in relation to alcohol-specific outcomes, with a particular focus on negative alcohol-related consequences. Both describing and acting with awareness were inversely related with total alcohol consumption and binge drinking, whereas acting with awareness and nonjudging were inversely related with negative alcohol-related consequences (Fernandez, Wood, Stein, & Rossi, 2010). Additional research has found evidence to suggest that low levels of coping motives statistically account for the inverse relation between acting with awareness and problematic drinking and the inverse relation between nonjudging and problematic drinking (Vinci, Spears, Peltier, & Copeland, 2016). Based on these findings, it seems that the KIMS-based skills of acting with awareness and accepting without judgment may serve as particularly important predictors of drinking motives and alcohol-related outcomes; describing has been inconsistently linked to rates of total alcohol consumption, and observing seems to have limited predictive utility in regard to alcohol-related variables.

In addition to mindfulness's relation to alcohol-related variables, a focus on correlates among mindfulness and impulsivity is important for better understanding drinking-related pathways as well. In a study that included 347 undergraduate students, relations among mindfulness facets and UPPS-P impulsivity traits were examined (Peters, Erisman, Upton, Baer, & Roemer, 2011). Significant inverse relations were found between negative urgency and

nonjudgment, acting with awareness, and nonreactivity. Positive urgency was negatively related to nonjudgment, acting with awareness, and observing. Lack of perseverance was inversely related with acting with awareness, nonjudgment, and describing. Lack of premeditation was negatively correlated with nonreaction, and sensation seeking was negatively correlated with observing.

Murphy and MacKillop (2012) investigated the relations among UPPS-P impulsivity traits, mindfulness, and alcohol-related outcomes with undergraduate students. Positive and negative urgency were found as the strongest predictors of total overall alcohol consumption, and consistent with prior research, negative urgency was the strongest predictor of negative alcohol-related consequences. Furthermore, describing, nonreactivity, acting with awareness, and nonjudging were negatively associated with negative urgency. No mindfulness facets were significant predictors of negative-alcohol related consequences above and beyond impulsivity traits (Murphy & MacKillop, 2012). This study did not evaluate the role of drinking motives among these relations, and no potential interactions among observed variables were tested.

Proposed Study

Prior research has investigated numerous variables, including drinking motives, impulsivity facets, and potential protective factors (e.g., distress tolerance and mindfulness skills) in relation to college drinking behaviors and outcomes. Due to the considerable impact that these variables appear to have on alcohol-related outcomes, furthering an understanding of how they relate to one another seems warranted. Such exploration may provide useful information to assist with more effective identification of particularly at-risk college drinkers and to provide a theoretical basis for more effective targeted intervention efforts.

Coping drinking motives and the impulsivity factor of negative urgency have each been found to be closely linked with alcohol-related problems among college drinkers (Jones et al., 2014; Simons et al., 2005). Furthermore, relations among negative urgency, coping motives, and alcohol-related problems have been explored, and important relations seem to exist among all three variables (Adams et al., 2012; Jones et al., 2014). While these variables seem to have important relations with one another and alcohol-related outcomes, further clarification of their relations with one another is warranted; more specifically, several studies that have investigated relations of negative urgency and coping motives have primarily relied on cross-sectional mediation analyses, which have been shown to yield limited predictive utility in longitudinal research (Maxwell, Cole, & Mitchell, 2011). Our study alternatively sought investigate the potential influence of specific skills and abilities as *moderators* in the relation between negative urgency and drinking to cope. Such analyses were used to determine if the relation between negative urgency and drinking to cope is impacted by college drinkers' levels of distress tolerance and their frequency of utilizing mindfulness skills in everyday life. Results from the study may provide useful information on circumstances in which students who are high in trait-level impulsivity are less likely to engage in drinking to cope, which is closely linked to heavy drinking and negative alcohol-related consequences (Simons et al., 2005). Distress tolerance and mindfulness skills were each introduced individually (i.e., a separate model for distress tolerance and each mindfulness skill) as potential moderators in the relation between negative urgency and drinking to cope, as depicted in Figure 1.

We hypothesized that the skill of acting with awareness, which has shown inverse relations to both negative urgency and coping drinking motives (Murphy & MacKillop, 2012; Reynolds et al., 2015), would moderate (i.e., dampen) the relation between negative urgency and

drinking to cope. We hypothesized that this mindfulness skill may serve as a protective factor for students who have long-standing impulsive tendencies but are more aware of the implications of their present-moment behaviors, including problematic drinking motives. Due to particularly strong relations with negative urgency and coping motives (Kaiser et al., 2012; Marshall-Berenz et al., 2011; Murphy & MacKillop, 2012), accepting without judgment and distress tolerance were not expected to serve as significant moderators. Because of their seemingly limited predictive utility (Reynolds et al., 2015), neither observing nor describing were hypothesized interact with negative urgency in this relationship either.

Method

Participants

Participants were compensated with extra credit through the university's psychology department research participation program, SONA. Because the primary purpose of the study involved alcohol-related variables (i.e., drinking motives), only college students who endorsed alcohol consumption within the past 28 days were included in the final sample. Students were also required to be between ages 18-24 to represent the typical college population. The total number of responders for the study included 1,012 college students; after determining eligibility, the final sample consisted of 683 college student drinkers. The sample was comprised of primarily female (78.5%) Caucasian (93.1%) college students. Also among the sample were students who identified as African American (5.4%), Asian (3.8%), American Indian or Alaskan Native (1.2%), and who reported their ethnicity as Hispanic or Latino (3.8%).

Measures

General information questionnaire. This measure assessed basic demographic information. Variables included include age, gender, current year in college, participation in Greek life, race, ethnicity, and current residence status (i.e., on-campus or off-campus).

Daily Drinking Questionnaire (DDQ). The DDQ (Collins, Parks, & Marlatt, 1985) was used to assess alcohol consumption within the past 28 days. Items asses for the amount of standard drinks consumed and number of hours spent drinking during each day of the week (i.e., Monday through Sunday) for both a typical week and the week in which the participant drank most heavily within the past 28 days. Participants are also asked to report how many standard drinks they consumed on the day in which they drank most within the past month.

Drinking Motives Questionnaire – Revised (DMQ-R). Drinking motives were assessed using the DMQ-R (Cooper, 1994), a 20-item measure that assesses the frequency in which individuals drink for 4 specific motives. Self-report items are scored on a Likert scale from 1 ("Almost never / never") to 5 ("Almost always / always"), with items corresponding to coping (e.g., "to forget your worries"), enhancement (e.g., "because you like the feeling"), social (e.g., "because it helps you enjoy a party"), and conformity (e.g., "so you won't feel left out") motives. Adequate levels of internal consistency were identified for each of the four individual drinking motives subscales ($\alpha s \geq .79$) among our sample.

UPPS-P Impulsive Behavior Scale. The UPPS-P Impulsive Behavior Scale (Lynam, Smith, Whiteside, & Cyders, 2006) is a 59 item self-report measure used to measure the degree to which individuals endorse trait-like impulsivity facets of negative urgency, lack of premeditation, lack of perseverance, sensation seeking, and positive urgency. Statements (e.g., "When I am upset, I often act without thinking", "I often get involved in things I often wish I could get out of")

related to the five impulsivity factors are rated on a scale from 1 ("Agree strongly) to 4 ("Disagree strongly). Each of the 5 scales are comprised of 10-14 items. Each of the five subscales yielded high levels of internal consistency (αs ≥ .81).

Distress Tolerance Scale (DTS). Distress tolerance abilities were measured with the DTS (Simons & Gaher, 2005), a 15-item self-report measure that includes 4 subscales of *tolerance* (i.e., the ability to handle negative feelings), *appraisal* (i.e., feeling capable of dealing with distress), *regulation* (i.e., responding to distress in a nonharmful manner), and *absorption* (i.e., the ability to avoid excessively focusing on feelings of distress). Statements such as "I can't handle feeling distressed or upset" and "When I feel distressed or upset, all I can think about is how bad I feel" are rated on a 5-point Likert scale, with a score of 1 representing "Strongly agree" and a score of 5 representing "Strongly disagree". A composite score of all 15 items is often used to measure overall distress tolerance abilities in research settings (Kaiser et al., 2012; Vujanovic et al., 2011) and was also used in this study; a high degree of internal consistency (α = .93) was found within our sample.

Kentucky Inventory of Mindfulness Skills (KIMS). The KIMS (Baer et al., 2004) is a 39-item self-report measure used to assess the utilization of dispositional mindfulness facets in everyday life. Items within the KIMS correspond to the skills of observing (e.g., "I intentionally stay aware of my feelings."), describing (e.g., "I'm good at finding the words to describe my feelings"), acting with awareness (e.g., "I drive on 'automatic pilot' without paying attention to what I'm doing.", and accepting without judgment (e.g., "I tell myself that I shouldn't be feeling the way I'm feeling."). Statements are rated on a 5-point Likert scale, with responses ranging from "Never or very rarely true" to "Very often or always true". The KIMS yielded adequate levels of internal consistency (αs ≥ .72) within the sample.

Procedure

Participants were recruited through the university's psychology department research participation program, SONA. All participants who were eligible to receive extra credit for psychology courses were compensated in this manner through the SONA system. Potential participants were given informed consent and were screened with online surveys of the general information questionnaire and DDQ; students who consumed alcohol within the past 28 days and were within the ages of 18-24 were determined eligible to complete all other online surveys, including the DMQ-R, UPPS-P Impulsive Behavior Scale, DTS, and KIMS. Prior to data collection, the study's procedure and measures were approved by the university Institutional Review Board (IRB).

Data Analysis

To test the primary hypotheses (i.e., whether distress tolerance and mindfulness skills serve as moderators in the relation between negative urgency and drinking to cope), hierarchical regression analyses were conducted; sets of hierarchical regression were conducted for distress tolerance and each of the four mindfulness skills, resulting in a total of five sets of regressions. Prior to analysis, predictor variables were mean-centered, and the five interaction terms were created by multiplying the mean-centered value of negative urgency with the mean-centered values of distress tolerance and each mindfulness skill (Aiken & West, 1991). The first model of each regression included negative urgency as a predictor of drinking to cope. The second step included one of the four mindfulness skills or distress tolerance and the interaction term of the ability multiplied by negative urgency. For significant interactions, simple slopes analysis (Aiken & West, 1991) was conducted to determine the relation between negative urgency and coping drinking motives at both high (i.e., 1 SD above the mean) and low (i.e., 1 SD below the

mean) levels of the tested mindfulness skill or distress tolerance. Due to previously discussed gender differences in the relation between distress tolerance and alcohol-related variables (Simons & Gaher, 2005), a third step for was added for each ability and additionally included the variables of gender; the product of gender and negative urgency; the product of gender and the ability; and the product of gender, negative urgency, and the ability (i.e., the potential 3-way interaction). Should any 3-way interactions have been identified, the moderating effect of the ability would have been examined by differences in gender.

Results

Preliminary analysis included calculation of means, standard deviations, and bivariate correlations for coping motives, negative urgency, distress tolerance, and the mindfulness skills of observing, describing, acting with awareness, and accepting without judgment. Consistent with expectations, a significant positive correlation was observed between negative urgency and drinking to cope ($r = .44$, $p < .001$). Also consistent with expectations, negative correlations were observed between coping motives and distress tolerance ($r = -.40$, $p < .001$), acting with awareness ($r = -.24$, $p < .001$), accepting without judgment ($r = -.34$, $p < .001$), and describing ($r = -.23$, $p < .001$). Surprisingly, significant positive correlations were found between the mindfulness skill of observing and both coping motives ($r = .14$, $p <.001$) and negative urgency ($r = .16$, $p < .001$). Correlations among subscales and means and standard deviations for each subscale can be found in Table 1.

Moderation effects were investigated through five series (i.e., one for each ability) of hierarchical regression analyses. The first step of each model included negative urgency as a predictor of drinking to cope. As expected, the overall model of the first step was significant, $R^2 = .20$, $F(1,682) = 166.42$, $p < .001$, and results indicated a positive relation between negative

urgency and drinking to cope, β = .44, $p < .001$. After step one, each of the five series of regressions additionally included the ability and interaction term (i.e., negative urgency x ability). Step two for each model indicated that the addition of the ability and interaction term accounted for a significant amount of variance in drinking to cope, above and beyond negative urgency alone. See Table 2 for specific regression results.

Contrary to our hypothesis, acting with awareness did not moderate the relation between negative urgency and drinking to cope, β = -.04, $p = .26$. However, in step 2 of the model, a significant negative relation was observed between acting with awareness and drinking to cope, β = -.09, $p = .01$. A similar pattern was identified for the mindfulness skill of describing, as the interaction term was not significant β = -.05, $p = .18$, and describing was inversely related to coping motives, β = -.12, $p = .001$. Interestingly, a positive relation was identified between observing and coping motives, β = .08, $p = .03$, and no significant interaction was identified, β = .05, $p = .19$. The interaction effect of distress tolerance was also not significant, β = -.06, $p = .06$, and an inverse relation was found between distress tolerance and drinking to cope, β = -.22, $p < .001$.

Although not hypothesized, a significant interaction was observed between negative urgency and the mindfulness skill of accepting without judgment, β = -.07, $p = .045$. Accepting without judgment was also inversely related with drinking to cope, β = -.17, $p < .001$. The interaction was probed by testing the effect of negative urgency on coping motives at 1 standard deviation below and above the mean value of accepting without judgment. At -1 standard deviation, the positive relation between negative urgency and drinking to cope was significant, β = .42, $p < .001$, as was the relation between negative urgency and drinking to cope at +1 standard deviation, β = .30, $p < .001$; results are depicted in Figure 2.

To test for the potential moderating effect of gender, a third step was added for each set of regressions. Results indicated that for all five abilities, the addition of gender and gender-related interaction terms did not significantly improve the model. See Table 2 for regression results.

Discussion

The current study aimed to replicate and extend research on impulsivity, mindfulness skills, distress tolerance, and variables related to college student drinking. More specifically, the effects of specific skills and abilities were examined to identify potential protective factors in relations between impulsivity and drinking to cope with negative affect. The current study added to existing research by testing if mindfulness skills or distress tolerance may dampen the relation between negative urgency and coping drinking motives. The findings are consistent with literature suggesting a strong relation between the tendency to act impulsively in response to negative affect (i.e., negative urgency) and choosing to drink in order to reduce negative affect (i.e., coping motives).

After accounting for negative urgency, the abilities of distress tolerance, accepting without judgment, acting with awareness, and describing each had a negative effect on drinking to cope. Surprisingly, the mindfulness skill of observing (i.e., noticing and attending to both internal and external stimuli) had a positive effect on drinking to cope. This presents a new and unique finding, as previous results have not indicated any relations between observing and drinking-related variables (e.g., Vinci et al., 2016). One potential explanation of the positive relation between observing and drinking to cope could be an increased awareness of negative emotional states. Individuals who spend more time observing may have increased sensitivity to

affect, and enhanced recognition of in the moment affect may lead to more behaviors to reduce negative affect (e.g., drinking to cope).

Concerning our hypotheses, acting with awareness did not moderate the relation between negative urgency and drinking to cope. Regardless of an individual's self-reported ability in acting with awareness, the strong link between negative urgency and coping motives seems to persist. Acting with awareness has been identified as a protective factor for alcohol-related variables, including overall consumption and negative consequences (Fernandez et al., 2010; Vinci et al., 2016); although the skill showed a significant negative effect on drinking to cope above and beyond negative urgency, it did not dampen the relation between negative urgency and coping motives. These findings suggest that even individuals who are particularly aware of present-moment behaviors are still likely to endorse traditionally problematic drinking motives (i.e., coping) when high on the trait of negative urgency. Thus, the skill of acting with awareness may still represent a protective factor in drinking to cope for reasons not hypothesized in this study; further research to clarify the mechanisms in which acting with awareness affects coping motives is warranted.

Consistent with our hypotheses, observing and describing did not moderate the relation between negative urgency and coping motives. The moderating role of distress tolerance was not found significant at the $p < .05$ level either. However, the interaction effect of distress tolerance and negative urgency was marginally significant at the $p < .07$ level. While marginally significant results must be interpreted with caution, the relation among negative urgency and coping motives was weaker for individuals with higher levels of distress tolerance. Further research is warranted to determine conditions under which distress tolerance may be a protective

factor for drinking-related outcomes among individuals who endorse high levels of negative urgency.

Although not hypothesized, the mindfulness skill of accepting without judgment did serve as a significant moderator in the relation between negative urgency and coping motives. As individuals were better able to allow thoughts, situations, and emotions to occur without being impacted by their immediate evaluations, the link between negative urgency and coping motives became weaker. By definition, individuals who are high on negative urgency report an increased tendency to *act* impulsively when experiencing negative affect (Whiteside & Lynam, 2001). Interestingly, even for people who do report this tendency, the skill of accepting without judgment seemed to have a dampening effect on these individuals' likelihood to drink for the purpose of reducing negative affect. Thus, the impact of accepting without judgment may suggest that drinkers who endorse high levels of negative urgency find other means of reacting impulsively than drinking to cope. Because accepting without judgment has yielded unique negative correlations with *both* negative reinforcement drinking motives (i.e., coping and conformity; Reynolds et al., 2015), it is plausible that individuals who are high on negative urgency and accepting without judgment find less problematic ways to reduce negative affect. More specifically, in comparison to all other mindfulness skills, accepting without judgment has yielded significantly larger effects sizes for negative relations with thought suppression and experiential avoidance (Baer et al., 2006). Thought suppression, particularly related to negative affect, is conceptually linked to the behavior of drinking to cope (e.g., "to forget my worries"), and thus, individuals who more frequently utilize the skill of accepting without judgment may be less likely to use alcohol in order to avoid negative affect-related thoughts, even in the presence of other impulsive tendencies.

Limitations

The current study is not without limitations that should be considered when interpreting results from the study and planning directions of future research. Firstly, the data collected for the study consisted of cross-sectional observational data. Therefore, it is imperative that main effects and interaction effects are not interpreted as causal in nature. For example, while seemingly important relationships have been identified in our findings, it cannot be assumed that improving impulsive students' skills in accepting without judgment will lead to less instances of drinking to cope. For this reason, longitudinal designs and experiments should be considered.

Another noteworthy limitation of the current study is the sample of college drinkers with which the study was conducted. Due to convenience sampling, the participants consisted primarily of Caucasian female students; therefore, generalizability of findings for all college drinkers may be limited. Furthermore, the study considered gender as a potential factor in the relations among skills and negative urgency, and the limited number of male students may have yielded insufficient power to adequately test for the potential moderating effects of gender. Future studies should aim to replicate findings with a more representative sample of college drinkers (i.e., more male students and ethnic minorities).

Implications and Future Directions

The findings observed in our study yield important considerations for future intervention and prevention efforts among college student drinkers. Firstly, distress tolerance and mindfulness skills, other than observing alone, seem to have a negative relationship with one of the most useful predictors of negative alcohol-related consequences (i.e., coping drinking motives). Furthermore, even for individuals who act impulsively in response to negative affect, the mindfulness skill of accepting without judgment may make these individuals less likely to

drink for this purpose. Generally, these findings indicate that increased mindfulness skills and distress tolerance might benefit students in decreasing drinking for reasons that are traditionally linked to a wide range of negative outcomes (e.g., Carey & Correia, 1997, Merrill et al., 2014).

In regard to prevention and intervention efforts, continued assessment for impulsivity-related variables, mindfulness skills, and coping motives should be considered. Among universities, brief interventions based on a motivational interviewing framework and personalized feedback interventions have been widely implemented and found effective in reducing problematic alcohol consumption and consequences (Walters & Neighbors, 2005). Such programs may provide readily available opportunities for further assessment of variables discussed in the present study. Students who endorse high levels of negative urgency and coping motives may be considered for further education and additional brief intervention efforts. Brief mindfulness interventions have been implemented in the university setting, and efficacy studies have indicated positive effects on the development of mindfulness skills and improved mental health outcomes, including reduced negative affect (Schumer, Lindsay, & Creswell, 2018). Due to the feasibility and potential benefits of providing such assessment and skills training, continued research on mindfulness skills training among college drinkers, especially in relation to accepting without judgment and impulsivity is warranted.

Additionally, continued research should consider the impact of observing on drinking-related outcomes. Because our findings suggested a unique positive relation between observing and drinking to cope, further efforts to explain this phenomenon are warranted. Outcome studies for brief mindfulness interventions can inform the degree to which improving mindfulness skills altogether impacts alcohol-related outcomes. Observing should be considered in comparison to mindfulness skills (i.e., accepting without judgment, acting with awareness) that have been

linked to fewer negative consequences to determine if such findings persist. Should similar findings emerge, future research on the link between observing and other predictors of drinking to cope should be explored.

References

Adams, Z. W., Kaiser, A. J., Lynam, D. R., Charnigo, R. J., & Milich, R. (2012). Drinking motives as mediators of the impulsivity-substance use relation: Pathways for negative urgency, lack of premeditation, and sensation seeking. *Addictive Behaviors*, *37*(7), 848-855. doi:10.1016/j.addbeh.2012.03.016

Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage

Allan, N. P., Macatee, R. J., Norr, A. M., Raines, A. M., & Schmidt, N. B. (2015). Relations between common and specific factors of anxiety sensitivity and distress tolerance and fear, distress, and alcohol and substance use disorders. *Journal of Anxiety Disorders*, *33*, 81-89. doi:10.1016/j.janxdis.2015.05.002

Anthenien, A. M., Lembo, J., & Neighbors, C. (2017). Drinking motives and alcohol outcome expectancies as mediators of the association between negative urgency and alcohol consumption. *Addictive Behaviors*, *66*, 101-107. doi:10.1016/j.addbeh.2016.11.009

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, *11*, 191-206. doi:10.1177/1073191104268029

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using Self-Report Assessment Methods to Explore Facets of Mindfulness. *Assessment*, *13*, 27-45. doi:10.1177/1073191105283504

Bernstein, A., Marshall, E. C., & Zvolensky, M. J. (2011). Multi-method evaluation of distress tolerance measures and construct(s): Concurrent relations to mood and anxiety

psychopathology and quality of life. *Journal of Experimental Psychopathology*, *2*, 386-399. doi:10.5127/jep.006610

Berg, J. M., Latzman, R. D., Bliwise, N. G., & Lilienfeld, S. O. (2015). Parsing the heterogeneity of impulsivity: A meta-analytic review of the behavioral implications of the UPPS for psychopathology. *Psychological Assessment*, *27*, 1129-1146. doi:10.1037/pas0000111

Borsari, B., & Carey, K. B. (2000). Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology*, *68*, 728-733. doi:10.1037/0022-006X.68.4.728

Brown, R. A., Lejuez, C. W., Kahler, C. W., Strong, D. R., & Zvolensky, M. J. (2005). Distress tolerance and early smoking lapse. *Clinical Psychology Review*, *25*, 713-733. doi:10.1016/j.cpr.2005.05.003

Buckner, J. D., Keough, M. E., & Schmidt, N. B. (2007). Problematic alcohol and cannabis use among young adults: The roles of depression and discomfort and distress tolerance. *Addictive Behaviors*, *32*, 1957-1963. doi:10.1016/j.addbeh.2006.12.019

Carey, K. B., & Correia, C. J. (1997). Drinking motives predict alcohol-related problems in college students. *Journal of Studies on Alcohol*, *58*, 100-105. doi:10.15288/jsa.1997.58.100

Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*, *53*, 189-200. doi:10.1037/0022-006X.53.2.189

Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, *6*, 117-128. doi:10.1037/1040-3590.6.2.117

Correia, C. J., Carey, K. B., & Borsari, B. (2002). Measuring substance-free and substance-related reinforcement in the natural environment. *Psychology of Addictive Behaviors*, *16*, 28-34. doi:10.1037/0893-164X.16.1.28

Corstorphine, E., Mountford, V., Tomlinson, S., Waller, G., & Meyer, C. (2007). Distress tolerance in the eating disorders. *Eating Behaviors*, *8*, 91-97. doi:10.1016/j.eatbeh.2006.02.003

Coskunpinar, A., Dir, A. L., & Cyders, M. A. (2013). Multidimensionality in impulsivity and alcohol use: A meta-analysis using the UPPS model of impulsivity. *Alcoholism: Clinical and Experimental Research*, 37, 1441-1450. doi:10.1111/acer.12131

Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology*, *97*, 168-180. doi:10.1037/0021-843X.97.2

Cyders, M. A., Flory, K., Rainer, S., & Smith, G. T. (2009). The role of personality dispositions to risky behavior in predicting first-year college drinking. *Addiction*, *104*, 193-202. doi:10.1111/j.1360-0443.2008.02434.x

Cyders, M. A., & Smith, G. T. (2007). Mood-based rash action and its components: Positive and negative urgency. *Personality and Individual Differences*, *43*, 839-850. doi:10.1016/j.paid.2007.02.008

Del Boca, F. K., Darkes, J., Greenbaum, P. E., & Goldman, M. S. (2004). Up close and personal: Temporal variability in the drinking of individual college students during their first

year. *Journal of Consulting and Clinical Psychology*, *72*, 155-164. doi:10.1037/0022-006X.72.2.155

Dennhardt, A. A., & Murphy, J. G. (2011). Associations between depression, distress tolerance, delay discounting, and alcohol-related problems in European American and African American college students. *Psychology of Addictive Behaviors*, *25*, 595-604. doi:10.1037/a0025807

Dimidjian, S., & Linehan, M. M. (2003). Defining an agenda for future research on the clinical application of mindfulness practice. Clinical Psychology: *Science and Practice*, *10*, 166-171. doi:10.1093/clipsy/bpg019

Dir, A. L., Karyadi, K., & Cyders, M. A. (2013). The uniqueness of negative urgency as a common risk factor for self-harm behaviors, alcohol consumption, and eating problems. *Addictive Behaviors*, *38*, 2158-2162. doi:10.1016/j.addbeh.2013.01.025

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191. doi:10.3758/BF03193146

Fernandez, A. C., Wood, M. D., Stein, L. R., & Rossi, J. S. (2010). Measuring mindfulness and examining its relationship with alcohol use and negative consequences. *Psychology of Addictive Behaviors*, *24*, 608-616. doi:10.1037/a0021742

Gorka, S. M., Ali, B., & Daughters, S. B. (2012). The role of distress tolerance in the relationship between depressive symptoms and problematic alcohol use. *Psychology of Addictive Behaviors*, *26*, 621-626. doi:10.1037/a0026386

Hingson, R., Zha, W., & Smyth, D. (2017). Magnitude and trends in heavy episodic drinking, alcohol-impaired driving, and alcohol-related mortality and overdose hospitalizations

among emerging adults of college ages 18–24 in the united states, 1998–2014. *Journal of Studies on Alcohol and Drugs*, *78*, 540-548. doi:10.15288/jsad.2017.78.540

Hingson, R. W., Zha, W., & Weitzman, E. R. (2009). Magnitude of and trends in alcohol-related mortality and morbidity among US college students ages 18-24, 1998-2005. *Journal of Studies on Alcohol and Drugs, Supplement*, *16*, 12-20. doi:10.15288/jsads.2009.s16.12

Howell, A. N., Leyro, T. M., Hogan, J., Buckner, J. D., & Zvolensky, M. J. (2010). Anxiety sensitivity, distress tolerance, and discomfort intolerance in relation to coping and conformity motives for alcohol use and alcohol use problems among young adult drinkers. *Addictive Behaviors*, *35*, 1144-1147. doi:10.1016/j.addbeh.2010.07.003

Jones, K. A., Chryssanthakis, A., & Groom, M. J. (2014). Impulsivity and drinking motives predict problem behaviors relating to alcohol use in university students. *Addictive Behaviors*, *39*, 289-296. doi:10.1016/j.addbeh.2013.10.024

Kaiser, A. J., Milich, R., Lynam, D. R., & Charnigo, R. J. (2012). Negative Urgency, Distress Tolerance, and substance abuse among college students. *Addictive Behaviors*, *37*, 1075-1083. doi:10.1016/j.addbeh.2012.04.017

Kiselica, A. M., Echevarria, J. M., & Borders, A. (2015). The relative contributions of impulsivity facets to drinking outcomes. *Addictive Disorders & Their Treatment, 14*, 152-158. doi:10.1097/ADT.0000000000000067

Kuntsche, E., Knibbe, R., Gmel, G., & Engels, R. (2005). Why do young people drink? A review of drinking motives. *Clinical Psychology Review*, *25*, 841-861. doi:10.1016/j.cpr.2005.06.002

Lejuez, C. W., Magidson, J. F., Mitchell, S. H., Sinha, R., Stevens, M. C., & De Wit, H. (2010). Behavioral and biological indicators of impulsivity in the development of alcohol use,

problems, and disorders. *Alcoholism: Clinical and Experimental Research*, *34*, 1334-1345. doi:10.1111/j.1530-0277.2010.01217.x

Linehan, M. M. (1993). *Cognitive behavioral therapy of borderline personality disorder*. New York, NY: Guilford Press

Lynam, D. R., Smith, G. T., Whiteside, S. P., & Cyders, M. A. (2006). The UPPS-P: Assessing five personality pathways to impulsive behavior. *West Lafayette, IN: Purdue University*.

Magid, V., & Colder, C. R. (2007). The UPPS Impulsive Behavior Scale: Factor structure and associations with college drinking. *Personality and Individual Differences*, *43*, 1927-1937. doi:10.1016/j.paid.2007.06.013

Marshall-Berenz, E. C., Vujanovic, A. A., & MacPherson, L. (2011). Impulsivity and alcohol use coping motives in a trauma-exposed sample: The mediating role of distress tolerance. *Personality and Individual Differences*, *50*, 588-592. doi:10.1016/j.paid.2010.11.033

Martens, M. P., Neighbors, C., Lewis, M. A., Lee, C. M., Oster-Aaland, L., & Larimer, M. E. (2008). The roles of negative affect and coping motives in the relationship between alcohol use and alcohol-related problems among college students. *Journal of Studies on Alcohol and Drugs*, *69*, 412-419. doi:10.15288/jsad.2008.69.412

Maxwell, S. E., Cole, D. A., & Mitchell, M. A. (2011). Bias in cross-sectional analyses of longitudinal mediation: Partial and complete mediation under an autoregressive model. *Multivariate Behavioral Research*, *46*, 816-841. doi:10.1080/00273171.2011.606716

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin*, *114*, 376–390. doi10.1037/0033-2909.114.2.376

Merrill, J. E., & Read, J. P. (2010). Motivational pathways to unique types of alcohol consequences. *Psychology of addictive behaviors*, *24*, 705-711. doi: 10.1037/a0020135

Merrill, J. E., Wardell, J. D., & Read, J. P. (2014). Drinking motives in the prospective prediction of unique alcohol-related consequences in college students. *Journal of Studies on Alcohol and Drugs*, *75*, 93-102. doi:10.15288/jsad.2014.75.93

Miller, E. T., Neal, D. J., Roberts, L. J., Boer, J. S., Cresskr, S. O., Metrik, J., & Marlatt, G. A. (2009). Test-retest reliability of alcohol measures: Is there a difference between internet-based assessment and traditional methods?. In G. A. Marlatt, K. Witkiewitz, G. A. Marlatt, K. Witkiewitz (Eds.), *Addictive behaviors: New readings on etiology, prevention, and treatment* (pp. 323-341). Washington, DC, US: American Psychological Association. doi:10.1037/11855-01

Murphy, C., & MacKillop, J. (2012). Living in the here and now: Interrelationships between impulsivity, mindfulness, and alcohol misuse. *Psychopharmacology*, *219*, 527-536. doi:10.1007/s00213-011-2573-0

Park, C. L., & Levenson, M. R. (2002). Drinking to cope among college students: prevalence, problems and coping processes. *Journal of studies on alcohol*, *63*, 486-497. doi:10.15288/jsa.2002.63.486

Peters, J. R., Erisman, S. M., Upton, B. T., Baer, R. A., & Roemer, L. (2011). A preliminary investigation of the relationships between dispositional mindfulness and impulsivity. *Mindfulness*, *2*, 228-235. doi:10.1007/s12671-011-0065-2

Read, J. P., Beattie, M., Chamberlain, R., & Merrill, J. E. (2008). Beyond the "binge" threshold: Heavy drinking patterns and their association with alcohol involvement indices in college students. *Addictive behaviors*, *33*, 225-234. doi:10.1016/j.addbeh.2007.09.001

Reynolds, A., Keough, M. T., & O'Connor, R. M. (2015). Is being mindful associated with reduced risk for internally-motivated drinking and alcohol use among undergraduates?. *Addictive Behaviors*, *42*, 222-226. doi:10.1016/j.addbeh.2014.11.027

Schumer, M. C., Lindsay, E. K., & Creswell, J. D. (2018). Brief mindfulness training for negative affectivity: A systematic review and meta-analysis. *Journal of Consulting and Clinical Psychology*, *86*, 569-583. doi:10.1037/ccp0000324

Sher, K. J., & Trull, T. J. (1994). Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *Journal of Abnormal Psychology*, *103*, 92-102. doi:10.1037/0021-843X.103.1.92

Shin, S. H., Hong, H. G., & Jeon, S. M. (2012). Personality and alcohol use: the role of impulsivity. *Addictive behaviors*, *37*, 102-107. doi:10.1016/j.addbeh.2011.09.006

Simons, J. S., & Gaher, R. M. (2005). The Distress Tolerance Scale: Development and validation of a self-report measure. *Motivation and Emotion*, *29*, 83-102. doi:10.1007/s11031-005-7955-3

Simons, J. S., Gaher, R. M., Correia, C. J., Hansen, C. L., & Christopher, M. S. (2005). An affective-motivational model of marijuana and alcohol problems among college students. *Psychology of Addictive Behaviors*, *19*, 326-334. doi:10.1037/0893-164X.19.3.326

Smith, G. T., Fischer, S., Cyders, M. A., Annus, A. M., Spillane, N. S., & McCarthy, D. M. (2007). On the validity and utility of discriminating among impulsivity-like traits. *Assessment*, *14*, 155-170. doi:10.1177/1073191106295527

Substance Abuse and Mental Health Services Administration. (2015). *2015 National Survey on Drug Use and Health (NSDUH)*. Table 6.84B—Tobacco Product and Alcohol Use in

Past Month among Persons Aged 18 to 22, by College Enrollment Status: Percentages, 2014 and 2015. Available at: https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015.htm#tab6-84b.

Vinci, C., Spears, C. A., Peltier, M. R., & Copeland, A. L. (2016). Drinking motives mediate the relationship between facets of mindfulness and problematic alcohol use. *Mindfulness*, *7*, 754-763. doi:10.1007/s12671-016-0515-y

Vujanovic, A. A., Bonn-Miller, M. O., Potter, C. M., Marshall, E. C., & Zvolensky, M. J. (2011). An evaluation of the relation between distress tolerance and posttraumatic stress within a trauma-exposed sample. *Journal of Psychopathology and Behavioral Assessment*, *33*, 129-135. doi:10.1007/s10862-010-9209-2

Vujanovic, A. A., Marshall-Berenz, E. C., & Zvolensky, M. J. (2011). Posttraumatic stress and alcohol use motives: A test of the incremental and mediating role of distress tolerance. *Journal of Cognitive Psychotherapy*, *25*, 130-141. doi:10.1891/0889-8391.25.2.130

Walters, S. T., & Neighbors, C. (2005). Feedback interventions for college alcohol misuse: What, why and for whom?. *Addictive Behaviors*, *30*, 1168-1182. doi:10.1016/j.addbeh.2004.12.005

White, H. R., & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*, *50*, 30-37. doi:10.15288/jsa.1989.50.30

Whiteside, S. P., & Lynam, D. R. (2001). The five factor model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and individual differences*, *30*, 669-689. doi:10.1016/S0191-8869(00)00064-7

Williams, M. J., Dalgleish, T., Karl, A., & Kuyken, W. (2014). Examining the factor structures of the Five Facet Mindfulness Questionnaire and the Self-Compassion Scale. *Psychological Assessment*, *26*, 407-418. doi:10.1037/a0035566

Zvolensky, M. J., Vujanovic, A. A., Bernstein, A., & Leyro, T. (2010). Distress tolerance: Theory, measurement, and relations to psychopathology. *Current Directions in Psychological Science*, *19*, 406-410. doi:10.1177/0963721410388642

Appendix

Table 1
Descriptives and Bivariate Correlations for Coping Motives, Negative Urgency, and Abilities

	Mean	SD	1.	2.	3.	4.	5.	6.	7.
1. Coping	8.80	3.72	1						
2. NU	26.20	7.09	.44***	1					
3. Obs	38.77	7.22	.14***	.16***	1				
4. Desc	27.07	5.62	-.23***	-.25***	.23***	1			
5. Act	28.54	4.94	-.24***	-.35***	-.09*	.26***	1		
6. Accept	28.40	6.21	-.34***	-.48***	.39***	.22***	.31***	1	
7. DT	49.80	12.91	-.40***	-.56***	-.15***	.31***	.27***	.52***	1

Note. Coping = Coping Motives; NU = Negative Urgency; Observe = Observing; Desc = Describing; Act = Acting with Awareness; Accept = Accepting without Judgment; DT = Distress Tolerance; * $p < .05$, *** $p < .001$.

Table 2

Hierarchical Regression Analyses with Coping Motives as the Outcome Variable

	DT		Accept		Act		Desc		Obs	
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.20***		.20***		.20***		.20***		.20***	
NU		.44***		.44***		.44***		.44***		.44***
Step 2	.04***		.03***		.01*		.02**		.01*	
NU		.31***		.36***		.41***		.41***		.43***
Ablty		-.22***		-.17***		-.09*		-.12**		.08*
NUxAblty		-.06		-.07*		-.04		-.05		.05
Step 3	<.01		<.01		.01		<.01		.01	
NU		.28**		.37***		.44***		.44***		.50***
Ablty		-.27**		-.18*		-.16*		-.14		-.03
NUxAblty		-.06		-.05		-.14		-.08		-.05
Gen		-.05		-.02		-.02		-.02		-.04
NUxGen		.02		-.01		-.03		-.03		-.08
AbltyxGen		<.01		.02		.07		.02		.12
NUxAbltyxGen		.05		-.02		.12		.05		.11

Note. NU = Negative Urgency; DT = Distress Tolerance; Accept = Accepting without judgment; Act = Acting with Awareness; Desc = Describing; Obs = Observing; Ablty = Ability; Gen = Gender; * $p < .05$, ** $p < .01$, *** $p < .001$.

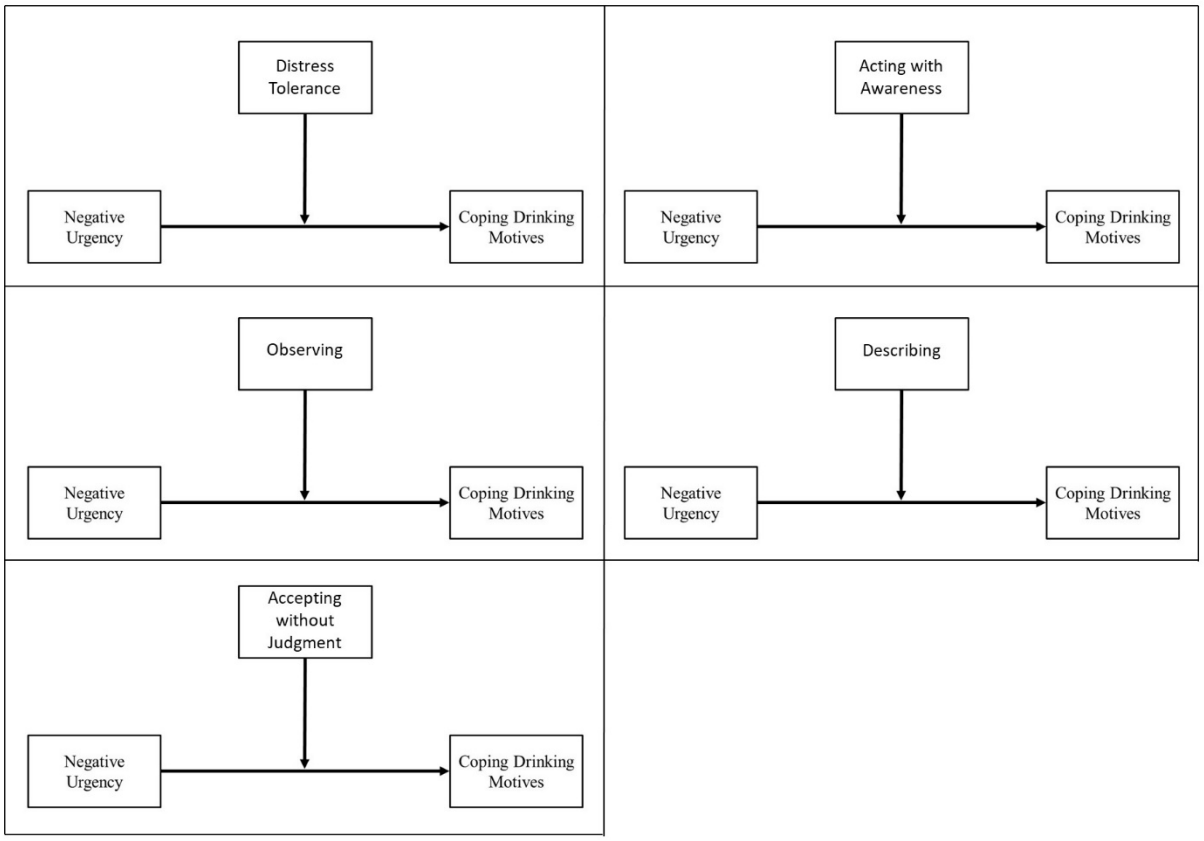

Figure 1. Proposed Model of Distress Tolerance or Mindfulness Skills as Moderators to the Relation Between Negative Urgency and Coping Drinking Motives

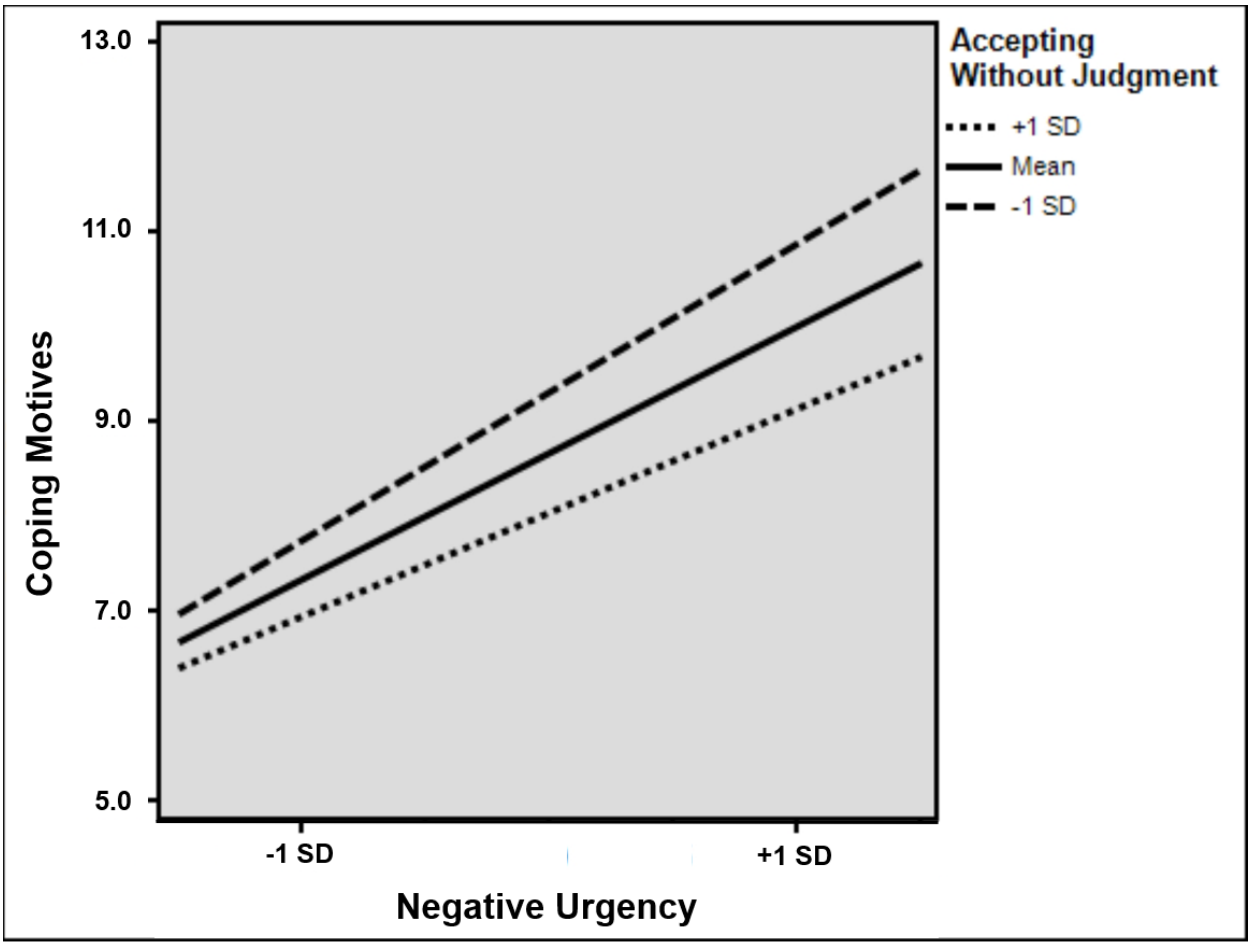

Figure 2. Moderating Effect of Accepting Without Judgment on the Relation Between Negative Urgency and Coping Drinking Motives