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The Moderating Role of Positive Affect in Understanding the Relationship Between Stress and Alcohol Use

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THE MODERATING ROLE OF POSITIVE AFFECT IN UNDERSTANDING THE
RELATIONSHIP BETWEEN STRESS AND ALCOHOL USE

BY

MELISSA R. SCHICK

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OF

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ABSTRACT

Binge drinking among college students presents a significant public health concern given the frequency and the associated negative health and social consequences. There are a variety of reasons why college students decide to binge drink (and to drink more broadly), including drinking to cope with negative emotional experiences, including when stressed. One factor that may be playing a role in the relationships among stress, drinking to cope, and binge drinking is positive emotion. Positive emotion has been found to be linked to the ways in which individuals appraise stressful situations, with those higher in positive emotion being more likely to appraise stressful situations as moments in which they can gain some mastery rather than obstacles that will be difficult to overcome. Further, individuals who endorse drinking to cope have been found to be lower in positive emotions. These positive emotions may be serving as a buffer, limiting experiences of stress or changing the way stress is perceived, and therefore making people less likely to use alcohol to cope with stress. To explore these associations, college students from the University of Rhode Island completed an online survey assessing their self-rated levels of stress, intensity and frequency of experiencing positive emotions, and frequency of binge drinking. Approximately three-quarters of the sample reported having consumed alcohol during the past month and of those, nearly two-thirds reported at least one binge drinking episode during the past month. Stress and positive emotions did not appear to be significantly related to frequency of binge drinking, but were significantly correlated with coping motives for drinking. Regression analyses with all predictors, age, and gender entered into the model revealed the same results: stress and positive

emotion were not significantly related to binge drinking, but were significantly related to coping motives. The interaction between stress and positive emotions predicting frequency of binge drinking or coping motives was nonsignificant. Findings of the present study indicate that, among college students, stress may not be a contributing factor to the decision to binge drink. It may be that college students are engaging in other behaviors to manage stress, or that measures included in the current study do not fully capture college students' experiences of stress or positive emotional experiences. Findings of the present study suggest the potential utility of targeting positive emotions in efforts to decrease coping-related alcohol use among those college students who are receiving treatment due to their alcohol consumption.

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CHAPTER 1.

INTRODUCTION

College Student Binge Drinking

Alcohol consumption, specifically binge drinking, among college students is of significant public health concern. Binge drinking is operationally defined by NIAAA as five or more standard drinks in a two-hour period for males and four or more standard drinks in a two-hour period for females, the amount that would be required to raise an individual's blood alcohol content (BAC) to .08 if they were of average height and weight (Health & Services, 2015). The college years represent the time in life with the highest level of alcohol consumption and the highest prevalence of alcohol use disorders (Dawson, Goldstein, & Grant, 2007), with 60% of college students reporting past-month alcohol use and two-thirds of those reporting past-month binge drinking (SAMHSA, 2015).

Binge drinking exposes college students to significantly increased risk of numerous alcohol-related consequences, compared to students who do not binge drink (Jennison, 2004). Binge drinking in college increases the risk of consequences such as hangovers, being late to class (Perkins, 2002), blacking out (Merrill et al., 2016), poor academic performance (Singleton, 2007; Singleton & Wolfson, 2009), legal ramifications (Wechsler, Lee, Nelson, & Kuo, 2002), and sexual assaults (McCauley, Calhoun, & Gidycz, 2010; Testa & Livingston, 2009), with at least half of sexual assaults occurring among college students involving the perpetrator of the assault, the victim of the assault, or both being intoxicated (Abbey, 2002). Those who binge drink

are also at increased risk for health-related consequences, such as cancers, cirrhosis of liver, and cardiovascular disease (Rehm et al., 2009). Each year, approximately 599,000 college students are unintentionally injured and 1,800 are killed as a result of alcohol-related injuries, including motor vehicle accidents (Hingson, Zha, & Weitzman, 2009). Additionally, college students who do not binge drink are placed at risk for disrupted studies, sexual assault, and injury from their binge drinking peers (Perkins, 2002).

Alcohol Use and Stress

The college years tend to be a time of increased stress for young adults (Blanco et al., 2008), with college students reporting high levels of stress relating to academic performance in classes, pressure to be successful, and developing plans for after graduation (Beiter et al., 2015). Since the 1950s, the relationship between stress and alcohol consumption has been explained, in large part, by the tension-reduction hypothesis (Conger, 1951, 1956). The tension-reduction hypothesis states that: a) under most circumstances, drinking alcohol will lead to a reduction in stress, and b) when stressed, people will be more motivated to drink alcohol. Much of the work that has explored this hypothesis has focused on the second prong, that in times of increased stress, people will be more likely to drink alcohol, possibly due to the popular belief that alcohol has stress-response-dampening (SRD) effects (Levenson, Sher, Grossman, Newman, & Newlin, 1980), though laboratory work focusing on both prongs has been notably mixed. For example, some work has found that alcohol increased objective measures of stress (for a review, see Greeley & Oei, 1999), while other work has found that, at sufficiently high doses (e.g., those which one might

consume when binge drinking), alcohol consumption has a direct dampening effect on physiological measures of stress (Donohue, Curtin, Patrick, & Lang, 2007), and that this effect is significantly more robust at higher levels of stress (Moberg, Weber, & Curtin, 2011). One study examining the effects of anticipatory stress on college student alcohol consumption found that those in a placebo condition (i.e., those anticipating completing a non-stressful activity) consumed significantly more alcohol than did those in the experimental condition (i.e., those anticipating giving a stressful speech). However, this effect was found to be moderated by past three month drinking, such that the effect was reversed for those reporting heavy drinking (Bernstein & Wood, 2017), indicating that those with higher baseline levels of alcohol consumption may be more motivated to drink alcohol to cope with stress. Another study examining the role of psychosocial stress on differences in alcohol consumption among undergraduate students found no difference in alcohol consumption between stress and no stress conditions (Larsen, Engels, Granic, & Huizink, 2013).

The idea that drinking motives may explain the relationship between stress and alcohol consumption is consistent with the tension-reduction hypothesis. Drinking motives refer to individuals' self-reported reasons for drinking alcohol. They have been found to be important predictors of quantity of alcohol consumption, maintenance of drinking behaviors and patterns, and likelihood of experiencing negative alcohol-related consequences among college students (Carey & Correia, 1997). Drinking motives have been found to fall into four categories: enhancement (i.e., drinking to induce, increase, or maintain positive affective states), social lubrication (i.e., drinking to enhance social situations and make them more enjoyable),

conformity (i.e., drinking because others are drinking, or to fit in), and coping (i.e., drinking to ameliorate negative affective states, including perceived stress) (Cooper, 1994; Read, Wood, Kahler, Maddock, & Palfai, 2003). Several studies have found that drinking to cope is a significant risk factor for alcohol-related problems and physiological dependence (Carey & Correia, 1997; Kassel, Jackson, & Unrod, 2000; MacLean & Lecci, 2000; Merrill, Wardell, & Read, 2014). Individuals reporting strong coping motives for drinking may lack other effective strategies for regulating negative affect and related states, such as stress (Cooper, Frone, Russell, & Mudar, 1995; Merrill & Thomas, 2013). However, findings regarding these relations among college students have been mixed. For instance, one prospective study found that, among college students in particular, endorsement of drinking coping motives was directly related to experiencing subsequent negative alcohol-related consequences (Merrill et al., 2014), and cross-sectional studies have found increased endorsement of coping motives to be related to increased alcohol consumption (Park & Levenson, 2002). On the other hand, some work has found this relationship to be less robust among college students, for whom heavy episodic drinking is more normative (Bradizza, Reifman, & Barnes, 1999; Perkins, 1999), thus suggesting that once drinking is established, there may be reasons other than coping for why individuals drink.

Positive Affect

There has been a relative dearth of research on the role of positive affective experiences in alcohol use. Much of the work in positive affect has been in the relapse/recovery literature (for a review, see Krentzman, 2013). Positive affect reflects

the degree to which a person feels enthusiastic, alert, and active (Watson, Clark, & Tellegen, 1988) and has been shown to be related to numerous positive outcomes including increased creativity (Isen, Daubman, & Nowicki, 1987) and intuition (Bolte, Goschke, & Kuhl, 2003), future positive self-rated health (Siahpush, Spittal, & Singh, 2008), and even increased lifespan (Danner, Snowdon, & Friesen, 2001). Frequent experiences of positive affect have also been shown to widen the scope of attention and expand our ability to identify potential behavioral options (Fredrickson & Branigan, 2005) and to potentially act as an antidote to stressful situations, such that individuals who are higher in positive affect bounce back from stress more quickly (Folkman, 1997, 2008). Further, it has been implicated in relation to the way individuals appraise potentially stressful situations, with those higher in positive affect being more likely to appraise stressful situations as challenges they are capable of handling (Folkman & Lazarus, 1985). Therefore, for these individuals, it is likely that they would not be as affected by stress and may see other alternative options to engaging in binge drinking to alleviate stress.

Purpose of the Study

In sum, the relationship between stress and alcohol use among college students has been widely investigated with mixed findings. Literature examining the role of coping motives for drinking in college student alcohol use has also shown mixed results. Further, some work has suggested that those who endorse coping motives for drinking tend to experience lower positive affect (Armeli, O'Hara, Ehrenberg, Sullivan, & Tennen, 2014). Little work, however, has examined the relations among stress, positive affect, alcohol use, and coping motives. It may be that when

individuals who experience frequent positive affect are faced with a stressor, they are able to generate lots of different ways to cope with the situation (based upon Fredrickson's Broaden and Build Theory (Fredrickson & Branigan, 2005) and therefore less likely to drink. These individuals should also report decreased coping motives for drinking.

Therefore, the purpose of this study is to examine the following hypotheses:

1. Frequency of binge drinking will be positively associated with levels of perceived stress and negatively associated with levels of positive affect.
2. Endorsement of coping motives for drinking will be positively associated with levels of perceived stress and negatively associated with levels of positive affect.
3. Positive affect will moderate the relationship between stress and binge drinking.
 - a. Specifically, perceived stress will be associated with decreased frequency of binge drinking for those individuals who report increased intensity and frequency of positive emotions.
4. Positive affect will moderate the relationship between stress and coping motives.
 - a. Specifically, perceived stress will be negatively associated with endorsement of coping motives for those individuals who report increased intensity and frequency of positive emotions.

CHAPTER 2.

METHODOLOGY

Sample.

Participants for the current study were a sample of 351 undergraduate students at the University of Rhode Island collected in February 2018 through online advertisements in classes. Two participants were removed from the sample for missing more than 30% item-level data on any primary variable of interest (see Measures). Thus, the final sample consisted of 347 participants. The average age of the sample was 19.7 years ($SD = 2.14$; range: 18-40 years). Of the total participants, 259 (74.6%) identified as female, 83 (23.9%) identified as male, 3 (0.9%) identified as transgender, and 2 (0.6%) identified as a non-binary gender identity. The majority of the sample was non-Hispanic (93.4%), and White (85.6%), followed by bi-/multi-racial (5.5%), Asian (3.5%), and Black or African American (3.2%). The majority of respondents were in their freshman (41.8%) or sophomore (25.9%) years of college. Sample demographic characteristics are summarized in Table 1.

Measures.

Stress was measured using the stress subscale of the Rhode Island Stress and Coping Inventory (RISCI-S) (Fava, Ruggiero, & Grimley, 1998), which includes 7 items measuring the degree to which situations in an individual's life are appraised as stressful. Participants rate each item in terms of how often each statement was true for them in the preceding month with five possible response options (1 = *never*, 5 = *frequently*), with higher scores indicating increased levels of stress in the preceding month. Cronbach's alpha in the current sample was good, $\alpha = 0.87$.

Positive affective experience was measured using the positive affect subscale of the Positive and Negative Affect Schedule (PANAS-P) (Watson et al., 1988) and the positive affect subscale of the Scale of Positive and Negative Experiences (SPANE-P) (Diener et al., 2010). The PANAS-P includes 10 items measuring the intensity with which individuals have experienced a range of positive emotions over the preceding week. Participants rate each item based on the extent to which they have felt each of the emotions over the preceding week with five possible response options (1 = *very slightly or not at all*, 5 = *extremely*) for a possible total score between 10 and 50, and with higher scores indicating higher intensity of positive affective experiences over the preceding week. The SPANE-P includes 6 items measuring the frequency with which individuals have experienced a range of positive emotions over the preceding month. Participants rate each item based on the extent to which they have felt each of the emotions over the preceding week with five possible response options (1 = *very rarely or never*, 5 = *very often or always*) for a possible total score between 6 and 30, and with higher scores indicating more frequency positive affective experiences over the preceding month. Cronbach's alpha for the PANAS-P and SPANE-P in the current sample were good, $\alpha = 0.90$ and 0.91 , respectively. To capture overall positive affect experiences, both intensity and frequency, a product term was created by multiplying scores on the PANAS-P and SPANE-P.

Alcohol use was measured using the NIAAA recommended 6 Question Set (Questions, 2003), which includes questions about past month frequency of alcohol use, quantity of drinks consumed, and frequency of binge drinking.

Coping motives were measured using the Drinking Motives Questionnaire – Revised (DMQ-R; (Cooper, 1994) Coping Subscale, which assesses the frequency with which adolescents and young adults choose to drink alcohol for reasons related to coping. Participants respond to each item with five possible response options (1 = *almost never/never*, 5 = *almost always/always*). A summed score is created with possible scores ranging from 0 to 20 and higher scores indicating more frequent endorsement of specific drinking motives. Cronbach’s alpha for the DMQ-R in the current sample was good, $\alpha = .88$.

Participant demographics were assessed with questions regarding participants’ age, gender identity, race/ethnicity, and college enrollment status.

Procedure.

Participants for the current study were undergraduate students recruited from the University of Rhode Island via e-mail and on-line course sites. Those interested in participating utilized a link within the advertisement to access a Qualtrics survey, at which point they were asked to read a consent form and confirm their willingness to participate by selecting “yes” at the bottom of the form. Participants who provided consent to participate were asked to complete the online Qualtrics survey, which took approximately 30 minutes to complete, and participants did not receive any compensation for completing the survey. No identifying information was collected during the course of this study and all study procedures were approved by the University of Rhode Island Institutional Review Board.

Data Analysis Plan.

As recommended by Tabachnik and Fidell (2001), all variables of interest were assessed for adherence to assumptions of generalized linear models. Then, Pearson product-moment correlations were calculated between relevant study variables to explore their bivariate associations. For all further analyses, only those who reported having a drink of alcohol in preceding 30 days were selected. To address the question of whether perceived stress and positive affect are uniquely related to frequency of binge drinking after controlling for the effects of age and gender, a poisson regression model was used with age, gender, perceived stress, and positive affect as predictors and frequency of binge drinking as the outcome. Poisson regression models were selected given the count nature of the data (Coxe, West, & Aiken, 2009). Then, to examine whether perceived stress, positive affect, and/or their interaction were associated with frequency of binge drinking, moderation analyses were conducted using the PROCESS macro in SPSS (Hayes, 2012). Second, to address the question of whether perceived stress and positive affect are uniquely related to coping motives after controlling for the effects of age and gender, a multiple linear regression model was used with age, gender, perceived stress, and positive affect as predictors and endorsement of coping motives as the outcome. Then, to examine whether perceived stress, positive affect, and/or their interaction predict coping motives, moderation analyses were conducted using the PROCESS macro in SPSS (Hayes, 2012). In both moderation analyses, predictor variables were mean centered prior to construction of the interaction term to aid in interpretation of parameter estimates and to lessen the correlation between the interaction term and its component variables. The PROCESS procedures use ordinary least squares regression and bootstrapping methodology,

which confers more statistical power than do standard approaches to statistical inference and does not rely on distributional assumptions (Hayes, 2012).

Bootstrapping was done with 5,000 random samples generated from the observed covariance matrix to estimate bias-correct 95% confidence intervals (CIs) and significance values.

CHAPTER 3.

FINDINGS

Alcohol Use Topography.

Three-fourths of the present sample reported having had a drink containing alcohol in the preceding 30 days. Of those who had drunk alcohol, participants reported drinking on approximately two days out of the week ($M = 1.62$, $SD = 1.23$, range = 0-6), and having approximately three and a half drinks per drinking day ($M = 3.59$, $SD = 2.10$, range = 0-13). Nearly two-thirds of participants reported having at least one binge drinking episode in the preceding 30 days ($n = 169$, 63.8%). Of those who endorsed at least one binge drinking episode in the preceding 30 days, participants reported an average of nearly three such episodes ($M = 2.82$, $SD = 2.72$). Further, nearly all participants reported some degree of coping motives for drinking (i.e., 18.3% reported “never” drinking to cope), and approximately half of participants scored higher on the DMQ-R coping subscale compared to mean scores presented in previous studies (e.g., (Neighbors, Larimer, Markman Geisner, & Knee, 2004).

Bivariate Correlations.

Pearson product-moment correlations revealed that there was a significant negative correlation between perceived stress and intensity ($r(341) = -.34$, $p < .001$) and frequency of positive affective experiences ($r(339) = -.44$, $p < .001$), and with their product term ($r(336) = -.41$, $p < .001$). See Table 2 for bivariate correlations among all variables of interest.

Primary Analyses.

Hypothesis 1. Examination of Pearson product-moment correlations revealed that perceived stress did not appear to be significantly related to frequency ($r(256) = .09, p=.17$) or quantity of alcohol consumption ($r(254) = .04, p=.57$), or to frequency of binge drinking ($r(344) = .01, p=.88$). Positive affect also did not appear to be significantly related to frequency ($r(254) = -.09, p=.17$) or quantity of alcohol consumption ($r(252) = .04, p=.50$), or to frequency of binge drinking ($r(339) = .03, p=.55$). Next, a poisson regression model was estimated to evaluate the unique associations of perceived stress and positive affect to frequency of binge drinking after controlling for age and gender. Neither perceived stress ($B = .01, \text{Wald's } \chi^2 = 2.07, p = .15$), nor positive affect ($B = .02, \text{Wald's } \chi^2 = 3.66, p = .06$) appeared to be significantly related to frequency of binge drinking in this model.

Hypothesis 2. Pearson product-moment correlations revealed that there was a significant positive correlation between perceived stress and coping motives ($r(255) = .28, p < .001$). Positive affect was significantly negatively associated with coping motives ($r(253) = -.28, p < .001$). Next, a multiple linear regression model was estimated to evaluate the unique associations of perceived stress and positive affect to coping motives after controlling for age and sex. Higher scores on perceived stress were significantly associated with greater endorsement of coping motives ($\beta = .16, t = 2.86, p = .005$), while lower ratings of positive affect were significantly associated with greater endorsement of coping motives ($\beta = -.20, t = -2.87, p = .005$).

Hypothesis 3. Moderation analysis was conducted to examine the interactive effects of perceived stress and positive affect on frequency of binge drinking, controlling for the effects of age and gender. No significant main effects were detected

for either perceived stress ($b = .02$, $SE = .03$, $t = .80$, $p = .42$, 95% $CI [-.04, .08]$), or positive affect ($b = .02$, $SE = .04$, $t = .61$, $p = .54$, 95% $CI [-.05, .09]$), nor was their interaction significant ($b = -.002$, $SE = .01$, $t = -.43$, $p = .67$, 95% $CI [-.01, .01]$).

Hypothesis 4. A second moderation analysis was conducted to examine the main and interactive effects of perceived stress and positive affect on coping motives, controlling for the effects of age and gender. Significant main effects were found for perceived stress ($b = .17$, $SE = .06$, $t = 2.96$, $p = .003$, 95% $CI [.06, .28]$), and for positive affect ($b = -.20$, $SE = .07$, $t = -2.86$, $p = .005$, 95% $CI [-.34, -.06]$). However, their interaction was nonsignificant ($b = .01$, $SE = .01$, $t = .88$, $p = .38$, 95% $CI [-.01, .03]$).

CHAPTER 4.

CONCLUSION

The goals of this study were twofold: 1) to examine the relations among perceived stress, positive emotions, frequency of binge drinking behavior and coping motives, and 2) to examine the potential moderating role of positive emotions on the relation between stress and frequency of binge drinking and endorsement of coping motives for drinking. We extended the tension-reduction hypothesis to explain not only actual drinking behavior, but also coping motives. We expected that greater positive affect would be associated with lower endorsement of coping motives based upon prior literature finding that coping motives for drinking is associated with lower daily positive affect (Armeli et al., 2014). Our results were largely consistent with the tension reduction hypothesis and suggested that increased perceived stress was associated with increased coping motives, while increased positive emotions was associated with decreased coping motives. This suggests that individuals who experience more positive emotions are less likely to endorse drinking as a way to alleviate distress or negative emotions, which aligns well with previous research that has found those higher in positive emotion to be better able to “bounce back” and effectively cope with difficult life situations (Tugade, Fredrickson, & Feldman Barrett, 2004).

Previous research has evaluated positive emotion in terms of recovery from substance use disorders (Krentzman, 2013), but positive emotion has largely been unexplored in the college student drinking literature. Our work attempted to extend the

role of positive emotion to binge drinking behavior and drinking coping motives. Based on the broaden-and-build theory of positive emotions (Fredrickson, 2001; Fredrickson & Branigan, 2005), we expected that positive affect would be negatively associated with frequency of binge drinking and that it would serve as a protective factor in this way in the relationship between perceived stress and frequency of binge drinking. Contrary to our expectations, we found that neither perceived stress nor positive affect were significantly associated with frequency of binge drinking. It is notable, however, that the association of positive affect to frequency of binge drinking was trending towards significance ($p = .053$). As we expected, however, positive affect was revealed to be significantly related to endorsement of drinking to cope motives. Also contrary to expectations, moderation analyses did not reveal a significant perceived stress by positive affect interaction on either frequency of binge drinking or drinking to cope motives.

Findings of the present study are consistent with some research that has found that enhancement and social motives for alcohol consumption are most predictive of heavy drinking among undergraduate students, and that coping motives may be more predictive of experiencing negative-problems related to alcohol consumption than of actual consumption itself (Read et al., 2003). It may be that perceived stress is not a primary factor that is driving college students' decision to binge drink. This explanation would be consistent with what has been shown in prior lab studies, which have found participants in no-stress experimental conditions to have increased alcohol consumption compared to participants in induced-stress experimental conditions, (e.g., (Bernstein & Wood, 2017; Larsen et al., 2013), though some others have found that

the opposite is true among those reporting recent patterns of heavy drinking (Bernstein & Wood, 2017). The present study adds to this mixed literature, finding that while students may not be binge drinking in particular in response to high levels of perceived stress but that despite this, some do report coping motives for drinking. One potential explanation for this discrepancy between the influence of stress on reported drinking motives and on actual observed drinking behavior may be that coping motives (as measured by the DMQ-R) assess drinking to cope regarding a variety of negative emotional experiences, only one of which is stress. It may be that other negative emotions are more related to reasons for drinking than stress (e.g., social anxiety, depressed mood). Further, it may be that students are engaging in behaviors other than binge drinking to manage stress, including marijuana use (McCormack, Laybold, Dickerman-Nelson, & Budd, 1993), and that rates of marijuana use may continue to rise as its legalization becomes more widespread. In recent years, rates of marijuana use have continued to rise, nearing but not yet reaching the level of heavy alcohol use (Lipari & Jean-Francois, 2013). Therefore, one avenue of future research may be to investigate these relationships with marijuana use as the outcome.

Alternatively, the relatively fewer males in our sample may also have presented a problem as some extant literature has found that male college students are significantly more likely to endorse heavy alcohol use as a viable means of coping with stressors as compared to females (McCormack et al., 1993; Park & Levenson, 2002). Therefore, future research should try to include a more representative sample of males and females.

Further, in the present sample, respondents appeared to be binge drinking nearly every time they drank, which may be related to the influence of permissive norms on widespread college student drinking (Borsari & Carey, 2003). This lack of variability in the frequency of binge drinking may have limited our ability to detect significant relationships among our variables of interest. This suggests that there may be strong drinking norms on college campuses that students are drinking for the purpose of drinking rather than for the purposes of stress or emotion management (Borsari & Carey, 2003). Future research should be done to examine motives for drinking related to specific drinking contexts or situations. For instance, University of Rhode Island undergraduates anecdotally report that students most commonly drink at specific bars on Tuesday and Thursday nights, and on Friday and Saturday nights at parties. Therefore, it seems likely that context is also an important component to consider in understanding both motives for drinking and actual drinking behaviors. For example, where one drinks may be differentially related to different drinking motives and to drinking to cope with stress in particular. Drinking in certain establishments on certain nights might be more related to social enhancement motives and less because individuals are feeling stressed, whereas drinking that occurs in one's dormitory or off-campus apartment might be more likely to occur during times of stress (O'hara, Armeli, & Tennen, 2015).

Limitations and Future Directions.

While findings of the present study add to the mixed literature regarding the relations among stress, positive affect, binge drinking, and drinking to cope motives, it should be considered within the context of its limitations. Firstly, the Rhode Island

Stress and Coping Inventory (Fava et al., 1998) asks about the perception of stress over the past month rather than using a more immediate measure of stress, which may be one potential explanation for the discrepancy between findings of the present study and prior work that has found college students consume more alcohol on days that they perceived as being more stressful (Park, Armeli, & Tennen, 2004). Park and colleagues (2004) examined the relationship between stress and alcohol consumption at a daily level, asking respondents to rate the degree to which they had perceived the most challenging thing that had happened that day as stressful. A scale reflecting specific stressful experiences (e.g., financial concerns, studying for exams, difficulties making friends, romantic relationships) that students may be more likely to face could potentially better reflect students' actual discrete experiences of stress (e.g., the Revised University Student Hassles Scale (Pett & Johnson, 2005), including those situation-specific stressors that serve as triggers for high levels of alcohol consumption. Further, while many self-report measures are the gold standard for collecting information on relevant constructs, the nature of self-report data has its limitations. For instance, respondents may not be accurately describing actual drinking behaviors, either because of misremembering or fear about ramifications of accurately reporting drinking. Regarding stress, respondents may not be accurately describing their overall levels of stress over the past month, and may have instead responded according to the level of stress they were experiencing in the moment rather than over the specified time period that questionnaire asks about (Gorin & Stone, 2001; Schwarz, 1999). Future research could instruct respondents to hone in on a particularly stressful week and examine positive affect and drinking behaviors during that time

frame only. Alternatively, real-time data collection procedures (i.e., ecological momentary assessment, experience sampling methods, daily diary methods) may provide a means by which to increase accuracy of reporting, as well as providing an opportunity to examine temporal associations between moments of stress and alcohol consumption (Stone & Shiffman, 1994), which are not possible to examine with data of a cross-sectional, correlational nature.

Further, the use of the Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) and Scale of Positive and Negative Experiences (Diener et al., 2010) may have influenced outcomes. Specifically, they do not measure positive affective experiences over the same time scale – the PANAS asks the respondent to consider the last seven days, while the SPANE asks the respondent to consider the last month. Future research could do several different things. One may be to adjust the timing so the two scales ask about the same time frame. Alternatively, perhaps a more intense measure may be to use daily data collection methodologies to improve in the validity of measurement of affect and to examine the temporal relationships between positive affect and health behaviors, including drinking. However, while the PANAS in particular has been criticized for measuring only those positive affective experiences with high activation (Barrett & Russell, 1999), it remains the gold standard for self-report assessment of affect (Crispim, Archer, & Cruz, 2014).

Together, the results of the present study help to increase our understanding of reasons for binge drinking use among college students. Our findings suggest that the relations among stress, positive affect, drinking behaviors and drinking reasons are complex. In the present sample, drinking to cope motives, but not frequency of binge

drinking, appeared to be particularly related to perceived stress and positive affect. Given prior literature suggesting that endorsement of coping motives for drinking is associated with increased negative alcohol-related consequences (e.g., car accidents, problems with friends or family), assessment of motives for alcohol use may be particularly important in screening for points of intervention, and it may be useful to offer skills building around coping with stress for students referred for alcohol treatment. Further, given the relationship found between positive affect and endorsement of coping motives, it may be beneficial to incorporate elements of positive psychotherapy (Seligman & Csikszentmihalyi, 2000), which seeks to increase positive affective states, into treatment for students seeking to address their alcohol consumption, specifically among those who endorse drinking to cope motives. Positive psychotherapy interventions have been used as an effective treatment to target negative emotionality and increase subjective well-being (Bolier et al., 2013; Sin & Lyubomirsky, 2009), and may be well-suited to provide college students who are drinking to cope with alternative methods of coping with distress.

Table 1. Sample demographic characteristics

	<i>M (SD)</i>	Range	%
Age	19.66 (2.14)	18-40	
Gender			
Female			74.6%
Male			23.9%
Transgender			0.9%
Nonbinary			0.6%
Hispanic			6.6%
Race/Ethnicity			
American Indian/Alaskan Native			0.9%
Asian			3.5%
Native Hawaiian or other Pacific Islander			0.3%
Black or African American			3.2%
White			86.6%
Bi-/Multi-racial			5.5%
Year in college			
1 st Year/Freshman			41.8%
2 nd Year/Sophomore			25.9%
3 rd Year/Junior			15.6%
4 th Year/Senior			14.1%
Other			2.6%
Past 30-day alcohol use			75.8%

Drinking days per week	1.62 (1.24)	0-6
Drinks per drinking day	3.59 (2.10)	0-13
Binge drinking episodes	1.36 (2.36)	0-20
Coping drinking motives	10.45 (5.07)	5-23
Psychosocial characteristics		
Perceived stress	21.19 (5.94)	7-35
Positive affect intensity	3.16 (0.80)	1-5
Positive affect frequency	3.48 (0.77)	1-5
Positive affect (product term)	11.42 (4.79)	1-25

Table 2. Correlations among relevant constructs

	1	2	3	4	5	6	7	8
1. RISC- Stress	-	-.34**	-.44**	-.41**	.09	.04	.01	.28**
2. PANAS-P		-	-.74**	.94**	-.04	.09	.04	-.22**
3. SPANE-P			-	.91**	-.13*	-.02	-.02	-.32**
4. Positive Affect				-	-.09	.04	.01	-.28**
5. Drinking Frequency					-	.18*	.44**	.30**
6. Drinking Quantity						-	.56**	.27**
7. Binge Drinking Frequency							-	.37**
8. Coping motives								-

Note: RISC- = Rhode Island Stress and Coping Inventory, PANAS-P = Schedule of Positive and Negative Affective Experiences – Positive Affect Subscale, SPANE-P = Scale of Positive and Negative Experiences – Positive Affect Subscale, * $p < .01$,

** $p < .001$

Table 3. Poisson regression model predicting frequency of binge drinking

Source	<i>B</i>	<i>SE</i>	X^2	<i>p</i>
Constant				
Age	-.02	.02	.55	.46
Gender	-.12	.11	1.14	.29
RISCI-Stress	.01	.01	2.07	.15
Positive Affect	.02	.01	3.66	.06

Note: RISCI = Rhode Island Stress and Coping Inventory

Table 4. Multiple linear regression model predicting coping motives

Source	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	95% <i>CI</i>
Constant						
Age	-.18	.15	-.07	-1.17	.24	[-.47, .12]
Gender	.51	.73	.04	.70	.48	[-.93, 1.95]
RISCI-Stress	.16	.06	.19	2.86	.005	 [.05, .27]
Positive Affect	-.20	.07	-.19	-2.87	.005	 [-.34, -.06]

Note: RISCI = Rhode Island Stress and Coping Inventory, bolded typeface indicates significance at the $p < .01$ level

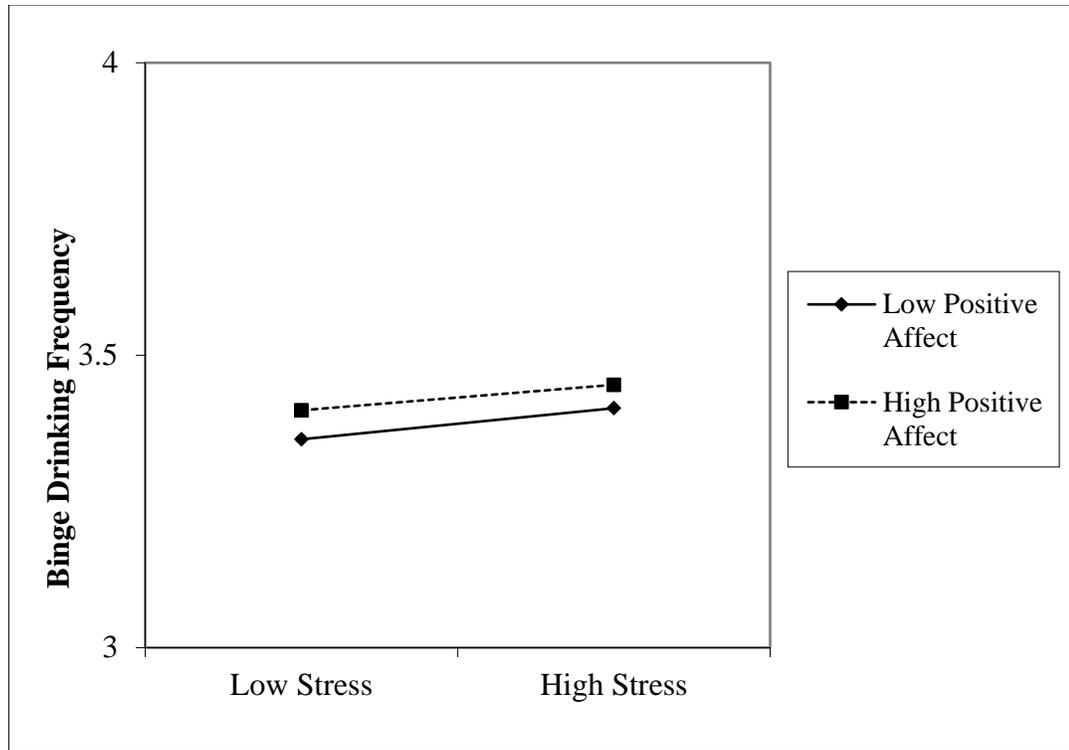


Figure 1. Perceived stress by positive affect interaction for binge drinking frequency

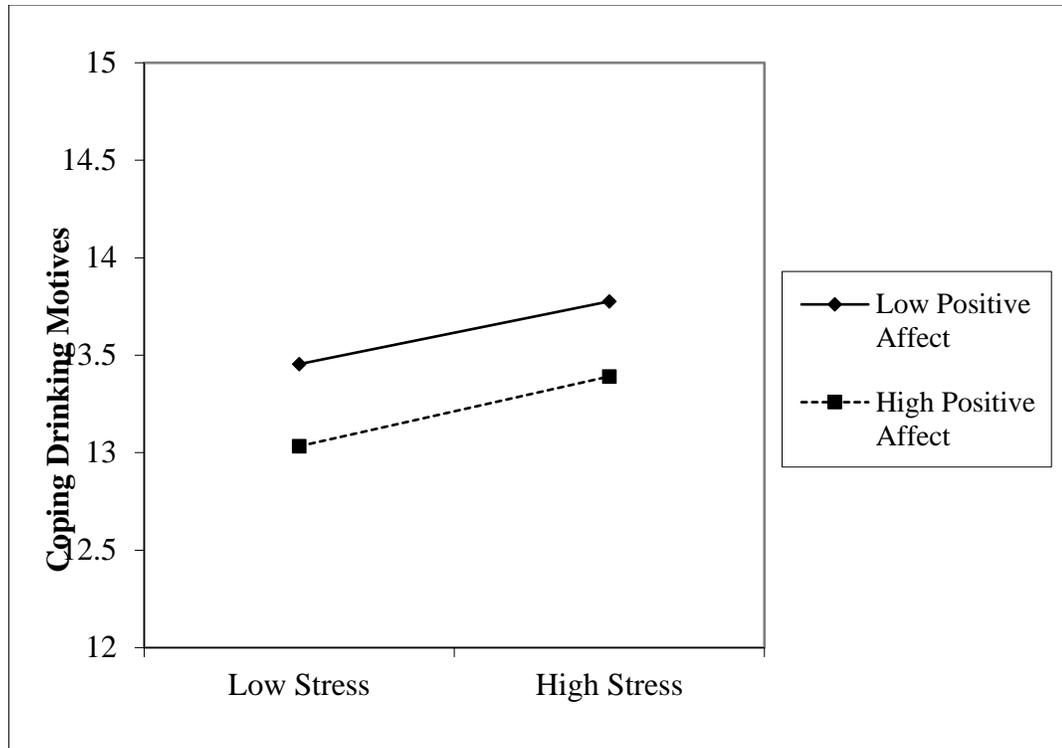


Figure 2. Perceived stress by positive affect interaction for coping motives

APPENDICES

Appendix A

Demographic Questions

1. How old are you? _____
2. What is your gender identity?
 - a. Female
 - b. Male
 - c. Transgender male to female
 - d. Transgender female to male
 - e. Not listed, please specify: _____
3. Are you Hispanic?
 - a. Yes
 - b. No
4. What is your racial/ethnic identity?
 - a. American Indian/Alaskan Native
 - b. Asian
 - c. Native Hawaiian or other Pacific Islander
 - d. Black or African American
 - e. White
 - f. Bi-/multi-racial → What is your racial/ethnic identity? (Please choose all that apply.)
 - i. American Indian/Alaskan Native
 - ii. Asian

- iii. Native Hawaiian or other Pacific Islander
- iv. Black or African American
- v. White

5. What is your current marital status?

- a. Single
- b. Married
- c. Separated
- d. Divorced
- e. Widowed

6. Are you currently a student at URI?

a. Yes

i. What year of college are you in?

- 1. 1st year/Freshman
- 2. 2nd year/Sophomore
- 3. 3rd year/Junior
- 4. 4th year/Senior
- 5. Other, please specify: _____

ii. What is your current college/university enrollment status?

- 1. Full Time
- 2. Part Time

b. No

7. Are you currently employed?

a. Yes

- i. Where is your job located?
 - 1. On campus
 - 2. Off campus
 - b. No
- 8. Where do you live?
 - a. On campus
 - b. Off campus
- 9. With whom do you live?
 - a. With parents/family
 - b. With a roommate(s)
 - c. Alone
 - d. With a significant other
- 10. Do you have a military background?
 - a. Yes, I serve(d) in the military myself
 - b. Yes, I have close ties to someone in the military (e.g., spouse, siblings, kids, parents)
 - c. No, I have no ties to the military

Appendix B

Rhode Island Stress & Coping Inventory (RISCI)

(Fava et al., 1998)

Please rate how often the following statements have been true for you in the past month.

Rated on a 5-point scale: 1 = *Never*, 2 = *Seldom*, 3 = *Occasionally*, 4 = *Often*, 5 = *Frequently*

1. I felt there was not enough time to complete my daily tasks.
2. I felt I had more stress than usual.
3. I took on more than I could handle.
4. I felt overwhelmed.
5. I was pressured by others.
6. I felt stressed by unexpected events.
7. I had no time to relax.
8. I successfully solved problems that came up.
9. I was able to cope with unexpected problems.
10. I was able to cope with difficult situations.
11. I felt able to meet demands.
12. I felt able to cope with stress.

Appendix C

Positive and Negative Affect Schedule (PANAS)

(Watson et al., 1988)

Please rate the extent to which you have felt the following over the past week.

Rated on a 5-point scale: 1 = *Very slightly or not at all*, 2 = *A little*, 3 = *Moderately*, 4 = *Quite a bit*, 5 = *Extremely*

1. Interested
2. Distrressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive

18. Jittery

19. Active

20. Afraid

Appendix D

Scale of Positive and Negative Experience (SPANE)

(Diener et al., 2010)

Rated on a 5-point scale: 1 = *Very rarely or never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *Very often or always*

1. Positive
2. Negative
3. Good
4. Bad
5. Pleasant
6. Unpleasant
7. Happy
8. Sad
9. Afraid
10. Joyful
11. Angry
12. Contented

Appendix E

Past Month Alcohol Use

(Questions, 2003)

1. In the past month, have you ever had a drink containing alcohol?
 - a. Yes
 - b. No

For each of the following questions asking for number of drinks, one drink equals: 12 oz. of beer (8 oz. Canadian, malt liquor, or ice beers or 10 oz. of microbrew) 10 oz. of wine cooler 4 oz. of wine 1 cocktail with 1 oz. of 100 proof liquor or 1 ¼ oz. of 80 proof liquor. Consider the past month:

2. In the past month, on average how many days per week did you drink alcohol?
3. In the past month, on average how many days did you drink alcohol?
4. In the past month, on average how many drinks did you have each time you drank?
5. In the past month, what is the maximum number of drinks you drank on any one occasion?
6. **Females only:** Please consider the last four weeks. On how many occasions did you consume four or more drinks in a row?
7. **Males only:** Please consider the last four weeks. On how many occasions did you consume five or more drinks in a row?

Appendix F

Drinking Motives Questionnaire - Revised (DMQ-R)

(Cooper, 1994)

Listed below are 20 reasons people might be inclined to drink alcoholic beverages.

Using the five-point scale, decide how frequently your own drinking is motivated by each of the reasons listed.

Rated on a 5-point scale: 1 = *Never/almost never*, 2 = *Some of the time*, 3 = *Half of the time*, 4 = *Most of the time*, 5 = *Almost always/always*

1. To forget your worries.
2. Because your friends pressure you to drink.
3. Because it helps you enjoy a party.
4. Because it helps you when you feel depressed or nervous.
5. To be sociable.
6. To cheer you up when you are in a bad mood.
7. Because you like the feeling.
8. So that others won't kid you about not drinking.
9. Because it's exciting.
10. To get high.
11. Because it makes social gatherings more fun.
12. To fit in with a group you like.
13. Because it gives you a pleasant feeling.
14. Because it improves parties and celebrations.
15. Because you feel more self-confident and sure of yourself.

16. To celebrate a special occasion with friends.
17. To forget about your problems.
18. Because it's fun.
19. To be liked.
20. So you won't feel left out.

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