HHS Public Access

Author manuscript

J Am Coll Health. Author manuscript; available in PMC 2018 November 01.

Published in final edited form as:

J Am Coll Health. 2017 ; 65(8): 534–541. doi:10.1080/07448481.2017.1351445.

An Examination of the Impact of Maladaptive Coping on the Association between Stressor Type and Alcohol Use in College

Isha W. Metzger[1,2], **Claire Blevins**[3], **Casey D. Calhoun**[1], **Tiarney D. Ritchwood**[1,4], **Amanda K. Gilmore**[1], **Regan Stewart**[1], and **Kaitlin E. Bountress**[1]

[1]Department of Psychiatry & Behavioral Sciences, Medical University of South Carolina, 67 President St., MSC 861, 2nd Floor, IOP South Building, Charleston, SC 29425

[2]To whom correspondence should be addressed: email: metzgeri@musc.edu

[3]Department of Psychiatry and Human Behavior, Warren Alpert Medical School of Brown University, Box G-A1, Providence, RI 02912

[4]Department of Public Health Sciences, Medical University of South Carolina, 135 Cannon St., MSC 835, Charleston, SC 29425

Abstract

Objective: Examine the impact of maladaptive coping style on the association between source of stress (academic, interpersonal, intrapersonal, environmental) and alcohol use (consumption, heavy episodic drinking, driving under the influence) among college students.

Participants: 1,027 college students completed a survey online in April 2014.

Methods: To test the mediating effects of maladaptive coping on the association between academic stress and alcohol use variables, indirect effects were examined using the PROCESS analytical framework for SPSS.

Results: Maladaptive coping and academic stress were associated with alcohol use outcomes. Moreover, maladaptive coping mediated the relationship between academic stress and two of three alcohol use outcomes (consumption, heavy episodic drinking).

Conclusions: Among college students, the association between academic stress and alcohol use may be driven by maladaptive coping. College students may benefit from interventions that seek to improve coping skills, potentially alleviating the burden of academic stress and decreasing problematic alcohol use.

Keywords

alcohol; stress; coping; mediation; college

Alcohol use is common on college campuses, with up to 80% of students reporting some alcohol use and approximately half reporting heavy episodic drinking (defined as 4 or more drinks in 2 hours or less for women and 5 or more for men). [1–3] The pairing of alcohol with driving is also a significant public health problem within this group, with approximately 30% reporting driving under the influence of alcohol. [4] Heavy episodic drinking among college students is associated with adverse behavioral outcomes, including interpersonal

problems, academic impairment, dropout, neurobiological abnormalities, mortality, and alcohol use disorders in adulthood. [5–8] Given the extensive consequences that can result from problematic alcohol use during college, identifying factors that may contribute to risky drinking is vital. One such factor—stress—has been repeatedly linked to increased alcohol consumption among adults in the general population and in college. [9–14]

While various forms of stressors are prevalent among emerging adults (e.g., increased social demands, financial worries, family obligations, planning for the future, identity exploration), some stressors appear to be unique to the college environment. Specifically, college students may have to adjust to: communal living, reduced access to previous sources of social support, financial constraints related to funding their education, college social climate, and increased academic performance demands, [15] all of which contribute to increased cognitive and emotional burden. Although college students experience a multitude of stressors, preliminary work suggests that academic-related stressors (i.e., work load, time management, academic performance, conflict with faculty, suboptimal study environments) may cause more distress than interpersonal (i.e., socially-oriented stressors), intrapersonal (i.e., stressors pertaining to individual functioning), or environmental stressors (i.e., external, non-interpersonal factors) for college students. However, it is unclear if different stressor types are uniquely associated with alcohol use. Given the number of stressors present during college life, it is imperative to examine a multitude of stressor types to better understand the association between stressors and alcohol use among college students. If academic stress is associated with drinking behaviors of students and other stressors do not reveal this same association, it would greatly inform our understanding of how to intervene to reduce the impact of drinking on college campuses.

A prominent theory explicating the association between stressors and drinking is the self-medication hypothesis. This theory posits that individuals may use alcohol to cope with negative emotions that they experience as a result of stressful events [9–12] Individuals who are more likely to use maladaptive coping strategies, including drinking to cope, tend to be motivated to alleviate short-term distress via removing unpleasant internal or external stimuli (i.e., avoidance-based strategies) rather than addressing issues needed to alleviate long-term distress. Students who generally use maladaptive coping strategies (i.e., denial, substance use, behavioral disengagement, self-blame) to manage stress may be at increased risk of problematic behavioral and psychological outcomes, including problematic alcohol use. [9] Drinking alcohol to cope with stress is a prominent motive for alcohol use [11] and has the potential to spur a vicious cycle for students where the use of maladaptive coping strategies and problematic drinking can increase stress levels (drinking alcohol to cope from academic stressors, for example, may result in failed grades, thus raising academic stress).

To date, few studies have directly examined maladaptive coping as a mediating factor connecting various forms of stress and alcohol use in young adults, [13] with even fewer focusing on this association among college students. [14, 16] Such research would help to corroborate the self-medicating function of alcohol use and identify students at greatest risk for problematic alcohol use. Even more, examining links between stress and alcohol use separately by stressor type will help to clarify which specific stressors are most difficult for students to manage, and in turn, most likely to increase risk for maladaptive coping and

alcohol use. This information could be used to tailor prevention and early intervention efforts focused on reducing alcohol use through improved stress management.

Current Study

This study examined the association between stressor type (intrapersonal, interpersonal, academic, environmental) and alcohol use behavior (e.g., frequency of alcohol consumption, heavy episodic drinking, driving under the influence). It was hypothesized that academic stress would be the most predictive of each alcohol use behavior. Maladaptive coping was examined as a mediator of the identified associations. It also was hypothesized that students reporting higher stress from each type of stressor and greater use of maladaptive coping strategies would report higher levels of alcohol consumption, heavy episodic drinking, and driving under the influence. Last, we hypothesized that maladaptive coping would mediate significant associations between stressor type and drinking variables, and explored effects of race, gender, SES, and GPA on these relationships.

Methods

Participants

After human subject approval from the University's Institutional Review Board, a total of 1,027 students were recruited from a predominantly white institution located in a mid-sized city in the southeastern United States. Inclusion criteria were current enrollment at the university and age between 18 and 25.

Procedure

Undergraduate and graduate students were recruited by: advertising on email listservs, the psychology subject pool, posting flyers, sampling student organizations (e.g., fraternities and sororities), and additional snowball/network sampling methods targeting diverse students (e.g., emailing leadership of African American Student organizations). After students provided informed consent online, eligible participants completed the 15–20 minute web-based survey. Individuals who indicated that they were not university students or who were outside the 18–25 age range were not permitted to complete the survey. Participants were given the choice between instantly receiving a $10 gift card at survey completion or being entered in a raffle to win a $100 gift card. Individuals recruited through the institution's Participant Pool received course credit for participation instead of payment.

Measures

Stressor Type.—The Student Stress Survey (SSS) [17] is a 41-item scale used to assess the major sources of stress among college students. The SSS addresses each of the four dimensions of stress that the literature has shown affect college students: interpersonal, intrapersonal, academic, and environmental sources of stress. The Likert-type scale that students used to rate each stressful event ranged from 0–3 (i.e., "not a problem at all," to "very much a problem"), and ratings were provided in response to the prompt: "In the last six months, how much of a problem have the following been to you?" Interpersonal sources of stress that were assessed included 6 items (α = .76) regarding social adjustments such as

having a new boyfriend/girlfriend, conflict with roommate or boyfriend/girlfriend, and change in social activities. The intrapersonal sources of stress dimension included 16 items (α = .79) addressing experiences such as decline in personal health, death of a family member, new responsibilities, and financial difficulties. Academic stressors were measured with 8 items (α = .67) assessing school-related difficulties, including transferring schools, getting in a serious argument with an instructor, changing a major, and receiving a lower grade than anticipated (α =.67). The environmental sources of stress dimension included 11 items (α = .81) assessing potential stressors such as messy living conditions, change in living environment, car trouble, and divorce between parents.

Maladaptive Coping.—Coping strategies were assessed by the Brief COPE, [18] a 28-item measure that is designed to assess the frequency in which individuals utilize various coping strategies on a scale of 1 (I usually don't do this at all) to 4 (I usually do this a lot). The subscales of denial (e.g., I say to myself "this isn't real"), substance use (e.g., I use alcohol or other drugs to make myself feel better), behavioral disengagement (e.g., I give up trying to deal with it), and self-blame (e.g., I criticize myself) were utilized to represent maladaptive coping (α =.76).

Alcohol Use.—Two items from the Youth Risk Behavior Survey (YRBS) [19] were used to assess aspects of youth alcohol use, specifically, alcohol consumption and heavy episodic drinking. Consumption and heavy episodic drinking in the past 30 days and the past 6 months were both assessed. A single item question assessed alcohol consumption: "On how many days did you have at least one drink of alcohol DURING THE [PAST 30 DAYS/PAST 6 MONTHS]?" A second single item question assessed heavy episodic drinking: "On how many days did you have 5 or more (if male) or 4 or more (if female) drinks of alcohol in a row, that is, within a couple of hours DURING THE [PAST 30 DAYS/PAST 6 MONTHS]?" Students estimated the number of days they engaged in each behavior using a Likert-type scale from 0 ("0 days"), 1 ("1 to 3 days"), 2 ("once a month or less"), 3 ("2 or 3 days a month"), 4 ("1 or 2 days a week"), 5 ("3 to 5 days a week") to 6 ("every day or almost every day").

Driving Under the Influence.—Participants reported on their drinking and driving habits over the past 30 days ("During the past 30 days, how many times did you drive a car or other vehicle after drinking alcohol?"), using a 0–4 scale where responses ranged from "0 times" to "6 or more times." Participants also reported on drinking and driving during their lifetime ("Overall, how often do you drink and drive?") using a scale of 0 (Never) to 4 (Always).

Demographic Variables.—The current study explores the impact of race, SES, gender, and GPA on the identified relationship, as research indicates they are associated with risk behavior engagement. [20] For the current study, age was represented numerically; females = 0, and males =1; and SES was measured by parents' education level (coded 0= *None*, 1= *High school equivalency (e.g., GED)*, 2= *High school diploma*, 3= *Vocational tech diploma*, 4= *Associate degree*, 5= *R.N. degree*, 6= *Bachelor's degree*, 7= *Master's degree*, 8= *M.D., Ph.D., Law, Dental*). For indirect analyses, race/ethnicity was dichotomously coded as either

Caucasian (1) or non-Caucasian (0). Current GPA was represented numerically on a scale of 0.0–4.0.

Planned Analyses

Descriptive statistics and bivariate correlations were utilized to evaluate coping-, stress-, and alcohol-related variables as well as their relations with one another. Evaluation of skewness and kurtosis revealed that variables were within the acceptable range, suggesting normal distribution. Hierarchical linear regression was conducted to test the association between stressor type and alcohol use behaviors. Mediation of maladaptive coping was also tested. Separate regressions were conducted for each stressor type. In step 1, covariates were entered into the equation (GPA, gender, SES, and race). In Step 2, stressor type and maladaptive coping were simultaneously entered into a multiple regression model to test each drinking/drinking and driving outcome to determine the role of each variable above and beyond the impact of the covariates (see Table 1). Missing data was deleted listwise.

To test the mediating effects of maladaptive coping on the association between the academic stress and the alcohol use variables, indirect effects were examined using the PROCESS analytical framework for SPSS, an ordinary least squares or logistic regression-based path analytic approach that uses conditional processing to test for both the direct and indirect effects of an association [21]. Indirect effects were examined with bootstrapping set at 5,000 resamples. Ninety-five percentile confidence intervals (CIs) were utilized for beta indices. [22, 23] Lastly, in exploratory moderated-mediation analyses, we probed for potential moderating effects of race, gender, SES, and GPA on the indirect path established in the mediation model. Specifically, we assessed whether these factors would moderate the association among academic stress, maladaptive coping, and alcohol use/drinking and driving outcomes.

Results

The sample (M= 20.17, SD= 1.66) was similar to the demographic makeup of the university: 69.3% Caucasian, 22.9% Black or African American (22.9%), 3.6% Asian, 2.7% Hispanic/Latino, 0.6% American Indian or Alaska Native, 0.4% Native American/American Indian, and 0.3% Native Hawaiian or Pacific Islander. The majority of the participants were female (74.5%; N=765). The education level break down was as follows: 30.1% (N=309) freshmen, 19.1% (N=196) sophomores, 23.6% (N=242) juniors, 25.8% (N=265) seniors, and 1.5% (N=15) graduate students. Participants had a mean GPA of 3.38 (range=2.0–4.0). Participants came from families of diverse educational backgrounds. For example, 27.2% of participants had a mother with a high school diploma or equivalent while 20.1% had a mother with who held a postgraduate degree. Similarly, 27.6% of participants had a father who held a high school degree or equivalent, while 21.3% had fathers who held a postgraduate degree.

Participants reported stressors across type and use of maladaptive coping strategies (see Table 2). Participants reported engaging in alcohol use, heavy episodic drinking, and drinking and driving at least monthly on average (see Table 2). Bivariate correlations

indicated that maladaptive coping and academic stress were consistently associated with alcohol variables, while other forms of stress were less consistently related (see Table 2).

Results from regression analyses indicated that maladaptive coping was positively associated with each drinking variable (drinking past 30 days, drinking past 6 months, heavy episodic drinking past 30 days, heavy episodic drinking past 6 months) at the $p<.01$ level. Academic stress was positively associated with both alcohol consumption variables (30 days, 6 months; all $ps<.05$). Additionally, maladaptive coping was associated with past 30 day drinking and driving rates and lifetime drinking and driving rates (all $ps<.01$), while academic stress was associated with past 30 day drinking and driving ($p<.05$). Neither interpersonal stress, intrapersonal stress, nor environmental stress was associated with alcohol use variables. Only intrapersonal stress was associated with past 30 day drinking and driving; however, contrary to our hypothesis, the direction of the association was negative (i.e., more interpersonal stress was associated with lower likelihood of drinking and driving). Given the general lack of significant findings for the intrapersonal, interpersonal, and environmental stress variables, subsequent analyses focused on maladaptive coping and academic stress variables only.

Given that preliminary analyses determined several demographic variables were significantly and positively correlated with alcohol use, socioeconomic status, race, gender, and current GPA were used as covariates in the mediation analyses. Results indicated significant indirect effects between academic stress and each of the alcohol use and heavy episodic drinking variables, when maladaptive coping was entered as the mediator of the associations (see Table 3). However, indirect tests were nonsignificant when maladaptive coping was entered as the mediator of the associations between academic stress and the drinking and driving variables. Thus, maladaptive coping strategies partially explained the positive association between stress and drinking alcohol (consumption, heavy episodic drinking) but not the association between academic stress and drinking and driving.

Exploratory moderated-mediation analyses were conducted to evaluate whether indirect associations were different at different levels of potential moderators. First, the proposed moderator variables were independently added to the indirect effects model to determine whether they were significantly associated. Gender, race/ethnicity, SES, and current GPA were all independently significant predictors in the model ($ps<.01$). Subsequently, analyses tested significance according to level of each predictor (e.g., male vs. female). There were no significant differences between genders, race/ethnicity, SES level, or current GPA. Additionally, results indicated that there was no significant change in variance explained by adding gender, race/ethnicity, or SES into the model as moderators to the original indirect effects model. This pattern of results indicates that, although demographic factors are associated with alcohol use variables, they do not significantly impact the association between stress, maladaptive coping, and alcohol use/alcohol behavior. Given the lack of significant findings, demographic variables were included as covariates and not included in the final model as moderators.

Comment

This study aimed to clarify whether different sources of stress are associated with alcohol use behaviors for college students and whether maladaptive coping mediated these effects. Consistent with preliminary work indicating that college students may perceive academic-related stressors as their most prominent source of stress, [24, 25] the present study found that academic stress was the only source of stress that was associated with greater overall alcohol use, heavy episodic drinking, and drinking and driving. Interpersonal and environmental stressors were not associated with any of the drinking indices while intrapersonal stress was negatively associated with drinking and driving. Further, mediation analyses supported the hypothesis that the use of maladaptive coping strategies partially explained the association of greater academic stress with alcohol use variables, but not driving under the influence.

Academic stressors may generate greater stress and be more likely to predict drinking due to their chronicity and their potential influence on perceptions of the future. In college, students are continuously completing assignments and studying for their multiple courses. To successfully manage of all of their competing coursework, students not only use their cognitive faculties to complete the tasks but they must also track tasks, secure resources, organize materials, and establish timelines for completion of all tasks. The cognitive effort required to manage college coursework may feel overwhelming for some students and contribute substantially to both their stress levels and the need to cope. Students with better time management strategies, more effective study techniques, and greater resourcefulness often experience lower levels of stress. [26, 27] Academic stress may also result from the extrinsic motivation to secure future vocational success, which often emerges in late adolescence and early adulthood.[28] Extrinsically motivated students who feel that they are not accomplishing their academic goals may feel increased stress primarily derived from their fear of not being able to pursue their chosen career.[29] Further, if students equate good grades with future success, then they will likely experience a great deal of pressure to perform well and feel highly stressed when they perform poorly. This could be compounded with family pressure to succeed in college or financial stressors of paying for college given that many students attend college with financial assistance which has specific grade requirements.

From the self-medication hypothesis perspective, students who generally use more maladaptive coping strategies may fail to effectively manage their academic stress and, according to the self-medication hypothesis, they may be more likely to drink alcohol in order to experience short-term stress relief. [9] Alcohol generally impairs higher order thought processes implicated in anxious thought patterns. [30] Therefore, students who have difficulty reducing stressful thoughts may seek out alcohol to interrupt neural processes responsible for planning, problem-solving, and conscientiousness. As students build tolerance to alcohol, they may require greater quantities of alcohol to maintain the same mood boosting effects, and as noted earlier, greater consumption increases risk of negative outcomes, including decreased academic performance. Even more, excessive alcohol use impairs cognitive abilities required for completing coursework to the best of one's ability. Taken altogether, the current study's findings could also suggest that students who consume high levels of alcohol may experience higher levels of academic stress because their alcohol consumption

negatively impacts their ability to cope, perceptions of stress, and academic performance capabilities.

It is interesting that although academic stress was associated with drinking and driving, maladaptive coping did not mediate this association. This suggests that academic stress is associated with drinking and driving, but not via maladaptive coping. Although alcohol use is normative in college students (with 80% reporting alcohol use)[2], drinking and driving may be a more significant indicator of a current or potentially future alcohol-related problem. Thus it is possible that individuals who experience more academic stress and who go on to develop more significant mental health problems as a result (e.g., depression, anxiety disorder) will be at greater propensity for drinking and driving and other indicators of potentially serious alcohol misuse. More research is needed to examine whether these and potentially other mental health problems may mediate the effect of academic stress on drinking and driving behaviors in college students.

Limitations, Future Directions, and Recommendations

Although there are many strengths of the current study, it is not without limitations. First, the cross sectional nature of the current study does not provide information about the directionality of the main findings. Future longitudinal work is needed to help to clarify whether academic stress leads to drinking, or whether alcohol use leads to greater educational worries. Further, this study assessed alcohol use and academic stress after students had entered college, which makes it difficult to determine whether the rise in academic stress predicted an increase in alcohol use, or vice versa. Prospective studies that assess alcohol use and academic stress before and after the college transition are needed to confirm that a rise in academic stress increases students' tendencies to adopt and use maladaptive coping strategies. Also, study participants were predominately White females reporting fairly high GPAs, low levels of stressors, and maladaptive coping strategies, suggesting that these findings may not be generalizable to more diverse individuals with higher stressor levels and maladaptive coping strategy use. A study limitation exists regarding our assessment of drinking and driving in that we relied on self-report rather than other, more reliable sources of retrospective information (e.g., DUI records). Although considering the impact of maladaptive coping on the association between stressor type and drinking behaviors, other intrapersonal factors (e.g., perfectionism [14]) should be included in future research. Further, findings from this study, which was recruited at one university via convenience sample, may not generalize to other populations. Although we assessed alcohol-related problems (e.g., in the form of driving under the influence), future studies should further examine the relation between academic stress and problematic decisions like the choice to drive after drinking, and include the exploration of other negative outcomes (e.g., academic failure, interpersonal problems. depression/anxiety disorder).

Conclusions

By identifying academics as the source of stress most closely connected with alcohol use, and identifying maladaptive coping as a reason for this connection, this study provides targeted direction for intervention and prevention efforts. Additionally, clinical trials are needed to determine if incorporating approach-oriented strategies for managing stress may

reduce the likelihood that students experiencing high levels of academic stress will use alcohol, and whether this is due to a reduction in maladaptive coping strategies. Focusing on approach-oriented coping strategies that are specifically tailored to academic stress may be most beneficial for psychologists, campus officials, nurses and doctors, and health educators working with college students. Alcohol use is an avoidant coping strategy, whereby students avoid confronting the source(s) of their academic difficulties. Approach-oriented strategies, on the other hand, focus on directly addressing stressors such that the person experiences less stress over time, and could be beneficial to integrate into both primary and secondary prevention efforts by a range of service providers. Intervention programs that incorporate approach-oriented strategies have a long history of being effective for reducing stress over time. For example, providers could incorporate approach-oriented elements by providing students with resources on study strategies and tutoring services to address concerns tied to intellectual ability and performance factors. Additionally, utilizing cognitive-behavioral therapy (CBT) techniques could reduce distress by providing psychoeducation regarding the impact of alcohol on stress vulnerability, training students to restructure problematic thoughts (i.e., cognitive distortions) and effective emotion regulation strategies. At least two recent studies have demonstrated that students who received a CBT-informed intervention focused on coping with stress reported improvements in stress levels, healthy coping strategies, and problematic cognitions. [31, 32] The integration of CBT-informed interventions into student orientation programs and educational support services could not only improve academic performance but also prevent stressed students from adopting coping strategies, such as alcohol use, that increase risk of negative outcomes and psychopathology.

Findings from this study contribute substantially to the broader literature on reducing alcohol-related problems in college student populations. By revealing a critical factor connecting academic stress and alcohol use, this study provides insight as to why college students may be particularly at-risk for alcohol problems and also how interventions could be most effective for fostering resiliency and preventing problem drinking in college.

Acknowledgments

Preparation of this manuscript was supported in part by grants R01DA025616–04S1 from the National Institute on Drug Abuse (NIDA), NIH, and T32MH18869 from the National Institute of Mental Health (NIMH), NIH. Views expressed in this article do not necessarily reflect those of the funding agencies acknowledged.

References

1. NIAAA. NIAAA Council approves definition of binge drinking. NIAAA Newsletter. 2004;3(5).
2. Windle M Alcohol use among adolescents and young adults. Population. 2003;45(5.9):19–15.
3. Mitka M College binge drinking still on the rise. Jama. 2009;302(8):836–837. [PubMed: 19706853]
4. Hingson RW, Zha W, Weitzman ER. 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. 2009(16):12–20.
5. Brown SA, Tapert SF. Adolescence and the trajectory of alcohol use: basic to clinical studies. Annals of the New York Academy of Sciences. 2004;1021(1):234–244. [PubMed: 15251893]
6. Read JP, Kahler CW, Strong DR, Colder CR. Development and preliminary validation of the young adult alcohol consequences questionnaire. Journal of studies on alcohol. 2006;67(1):169–177. [PubMed: 16536141]

7. White A, Hingson R. The burden of alcohol use: excessive alcohol consumption and related consequences among college students. Alcohol research: current reviews. 2014;35(2):201.
8. Plunk AD, Agrawal A, Tate WF, Cavazos-Rehg P, Bierut LJ, Grucza RA. Did the 18 drinking age promote high school dropout? Implications for current policy. Journal of Studies on Alcohol and Drugs. 2015;76(5):680–689. [PubMed: 26402348]
9. Park CL, Armeli S, Tennen H. The daily stress and coping process and alcohol use among college students. Journal of studies on alcohol. 2004;65(1):126–135. [PubMed: 15000512]
10. LaBrie JW, Hummer JF, Pedersen ER, Lac A, Chithambo T. Measuring college students' motives behind prepartying drinking: Development and validation of the prepartying motivations inventory. Addictive behaviors. 2012;37(8):962–969. [PubMed: 22564754]
11. Grant VV, Stewart SH, O'Connor RM, Blackwell E, Conrod PJ. Psychometric evaluation of the five-factor Modified Drinking Motives Questionnaire—Revised in undergraduates. Addictive behaviors. 2007;32(11):2611–2632. [PubMed: 17716823]
12. Corbin WR, Farmer NM, Nolen-Hoekesma S. Relations among stress, coping strategies, coping motives, alcohol consumption and related problems: A mediated moderation model. Addictive Behaviors. 2013;38(4):1912–1919. [PubMed: 23380486]
13. Stewart SH, Loughlin HL, Rhyno E. Internal drinking motives mediate personality domain—drinking relations in young adults. Personality and Individual Differences. 2001;30(2):271–286.
14. Rice KG, Van Arsdale AC. Perfectionism, perceived stress, drinking to cope, and alcohol-related problems among college students. Journal of Counseling Psychology. 2010;57(4):439.
15. Merrill JE, Carey KB. Drinking over the lifespan: focus on college ages. Alcohol research: current reviews. 2016;38(1):103. [PubMed: 27159817]
16. Goldstein AL, Flett GL, Wekerle C. Child maltreatment, alcohol use and drinking consequences among male and female college students: An examination of drinking motives as mediators. Addictive behaviors. 2010;35(6):636–639. [PubMed: 20199849]
17. Ross SE, Niebling BC, Heckert TM. Sources of stress among college students. Social psychology. 1999;61(5):841–846.
18. Carver CS. You want to measure coping but your protocol'too long: Consider the brief cope. International journal of behavioral medicine. 1997;4(1):92–100. [PubMed: 16250744]
19. Eaton DK, Kann L, Kinchen S, Shanklin S, Ross J, Hawkins J, Harris WA, Lowry R, McManus T, Chyen D. Youth risk behavior surveillance—United States, 2007. MMWR Surveill Summ. 2008;57(4):1–131.
20. Pergamit M, Huang L, Lane J. The Long Term Impact of Adolescent Risky Behaviors and Family Environment. Office of the Assistant Secretary for Planning and Evaluation US Department of Health and Human Services.–August. 2001.
21. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach: Guilford Press; 2013.
22. Hayes MH. Statistical digital signal processing and modeling: John Wiley & Sons; 2009.
23. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior research methods. 2008;40(3):879–891. [PubMed: 18697684]
24. Britz J, Pappas E. Sources and outlets of stress among university students: Correlations between stress and unhealthy habits. Undergraduate Research Journal for the Human Sciences. 2010;9(1).
25. Dusselier L, Dunn B, Wang Y, Shelley iI, MC, Whalen DF. Personal, health, academic, and environmental predictors of stress for residence hall students. Journal of American college health. 2005;54(1):15–24. [PubMed: 16050324]
26. Akgun S, Ciarrochi J. Learned resourcefulness moderates the relationship between academic stress and academic performance. Educational Psychology. 2003;23(3):287–294.
27. Misra R, McKean M. College students' academic stress and its relation to their anxiety, time management, and leisure satisfaction. American Journal of Health Studies. 2000;16(1):41.
28. Strathman A, Joireman J. Understanding behavior in the context of time: Theory, research, and application: Psychology Press; 2006.

29. Dweck CS, Leggett EL. A social-cognitive approach to motivation and personality. Psychological review. 1988;95(2):256.

30. Kushner MG, Abrams K, Borchardt C. The relationship between anxiety disorders and alcohol use disorders: a review of major perspectives and findings. Clinical psychology review. 2000;20(2): 149–171. [PubMed: 10721495]

31. Shatkin JP, Diamond U, Zhao Y, DiMeglio J, Chodaczek M, Bruzzese J-M. Effects of a Risk and Resilience Course on Stress, Coping Skills, and Cognitive Strategies in College Students. Teaching of Psychology. 2016:0098628316649457.

32. Steinhardt M, Dolbier C. Evaluation of a resilience intervention to enhance coping strategies and protective factors and decrease symptomatology. Journal of American College Health. 2008;56(4): 445–453. [PubMed: 18316290]

Table 1.

Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Maladaptive Coping	1.84	0.63	1										
2. Academic Stress	0.57	0.45	0.24**	1									
3. Interpersonal Stress	0.54	0.45	0.20**	0.45**	1								
4. Intrapersonal Stress	0.48	0.36	0.28**	0.62**	0.55**	1							
5. Environmental Stress	0.47	0.43	0.18**	0.55**	0.53**	0.66**	1						
6. Drink past 30 days	2.02	1.48	0.16**	0.12**	0.06	0.06*	0.03	1					
7. Drink past 6 months	2.79	1.62	0.14**	0.10**	0.04	0.01	0.01	0.83**	1				
8. Heavy Episodic Drinking past 30 days	1.17	1.27	0.14**	0.10**	0.07*	0.08*	0.08*	0.75**	0.65**	1			
9. Heavy Episodic Drinking past 6 months	1.86	1.63	0.13**	0.09**	0.06	0.05	0.04	0.71**	0.74**	0.79**	1		
10. Drinking and driving past 30 days	2.49	0.87	0.17**	0.15**	0.09*	0.06	0.10**	0.44**	0.36**	0.40**	0.37**	1	
11. Drinking and driving lifetime	2.49	0.71	0.16**	0.14**	0.07*	0.11*	0.12*	0.32**	0.24**	0.31**	0.28**	0.63**	1

*Correlation is significant at the 0.05 level

**Correlation is significant at the 0.01 level

Table 2.

Standardized Regression Coefficients

	Drinking				Heavy Episodic Drinking				Drinking and Driving			
	30 Days		6 Months		30 Days		6 Months		30 Days		Lifetime	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Step 1:												
GPA	−0.13**	0.11	−0.13**	0.11	−0.10**	0.09	−0.14**	0.12	−0.17**	0.08	−0.15**	0.06
Gender	0.08*	0.11	0.06	0.12	0.10**	0.11	0.08**	0.12	0.10**	0.08	0.07*	0.06
Mother Degree	0.07	0.03	0.08*	0.03	0.09*	0.03	0.05	0.03	−0.06	0.02	−0.08*	0.01
Father Degree	0.06	0.03	0.05	0.03	0.07	0.03	0.09*	0.03	0.06	0.02	0.12**	0.01
Race	0.21**	0.11	0.22**	0.12	0.23**	0.11	0.23**	0.12	−0.03	0.08	−0.07	0.06
Step 2:												
Maladaptive Coping	0.15**	0.08	0.14**	0.09	0.12**	0.07	0.12**	0.09	0.14**	0.06	0.12**	0.04
Academic Stress	0.10*	0.14	0.10*	0.16	0.05	0.12	0.04	0.12	0.11*	0.10	0.06	0.08
Interpersonal Stress	−0.03	0.13	−0.01	0.15	−0.02	0.11	−0.01	0.15	0.04	0.10	0.00	0.07
Intrapersonal Stress	0.01	0.20	−0.07	0.22	0.01	0.17	−0.01	0.22	−0.16**	0.14	−0.04	0.11
Environmental Stress	−0.02	0.15	−0.01	0.17	0.04	0.13	−0.01	0.17	0.09	0.11	0.10	0.08

*Beta is significant at the 0.05 level (2-tailed).

**Beta is significant at the 0.01 level (2-tailed).

Table 3.

Indirect Analyses

Drinking						
X	**M**	**Y**	**a (X-M)**	**b (M-Y)**	**c (X-Y)**	**c' (indirect)**
Academic Stress	Maladaptive	30 Days	0.34**	0.37**	0.32**	0.13 [0.07 / 0.21]
Academic Stress	Maladaptive	6 Months	0.34**	0.35**	0.25*	0.12 [0.06 / 0.21]
Heavy Episodic Drinking						
X	**M**	**Y**	**a (X-M)**	**b (M-Y)**	**c (X-Y)**	**c' (indirect)**
Academic Stress	Maladaptive	30 Days	0.34**	0.27**	0.26**	0.12 [0.05 / 0.16]
Academic Stress	Maladaptive	6 Months	0.34**	0.23*	0.23*	0.11 [0.05 / 0.21]
Drinking and Driving						
X	**M**	**Y**	**a (X-M)**	**b (M-Y)**	**c (X-Y)**	**c' (indirect)**
Academic Stress	Maladaptive	30 Days	0.48**	0.16	0.19	0.08 [−.03 / 0.22]
Academic Stress	Maladaptive	Lifetime	0.41**	0.04	−0.16	0.02 [−0.07 / 0.11]

*Beta is significant at the 0.05 level (2-tailed).

**Beta is significant at the 0.01 level (2-tailed).

Confidence intervals are in brackets