

5-2018

The Moderating Effects of College Stress on the Relationship Protective Behavioral Strategies Has with Hazardous Alcohol Consumption and Negative Consequences

Bobbi Lynn Lee

Follow this and additional works at: https://aquila.usm.edu/honors_theses



Part of the [Counseling Psychology Commons](#)

Recommended Citation

Lee, Bobbi Lynn, "The Moderating Effects of College Stress on the Relationship Protective Behavioral Strategies Has with Hazardous Alcohol Consumption and Negative Consequences" (2018). *Honors Theses*. 608.
https://aquila.usm.edu/honors_theses/608

This Honors College Thesis is brought to you for free and open access by the Honors College at The Aquila Digital Community. It has been accepted for inclusion in Honors Theses by an authorized administrator of The Aquila Digital Community. For more information, please contact Joshua.Cromwell@usm.edu.

The University of Southern Mississippi

The Moderating Effects of College Stress on the Relationship Protective Behavioral
Strategies Has with Hazardous Alcohol Consumption and Negative Consequences

by

Bobbi Lynn Lee

A Thesis
Submitted to the Honors College of
The University of Southern Mississippi
In Partial Fulfillment
of the Requirements for the Degree of
Bachelor of Science
In the Department of Psychology

May 2018

Approved by

Michael Madson, Ph.D., Thesis Adviser
Professor of Psychology

D. Joe Olmi, Ph.D., Chair
Department of Psychology

Ellen Weinauer, Ph.D., Dean
Honors College

Abstract

Hazardous drinking continues to be a problem on college campuses especially when considering the increased negative consequences often associated with use at these levels. Although alcohol use is viewed as normative behavior among college students, many factors may predict increased or decreased use and negative consequences. Protective behavioral strategies (PBS) are related to decreased hazardous drinking and alcohol-related negative consequences. Specifically, controlled consumption PBS (PBS-CC) are related to less hazardous drinking while serious harm reduction PBS (PBS-SHR) are often related to fewer alcohol-related negative consequences. Stress is also linked with hazardous drinking as students may drink to cope with this stress. However, there may be unique characteristics of the college experience of stress that require further investigation of this relationship given the rates of hazardous drinking. The purpose of this study was to explore how college stress moderated the relationship between the types of PBS and hazardous drinking and alcohol-related negative consequences. Participants were 550 college students ages 18 to 24 who drank alcohol in the past 30 days and completed measures of protective strategy use, college stress, hazardous drinking, and alcohol-related negative consequences. College stress moderated the relationship between PBS and hazardous drinking such that increased use of PBS-CC strategies was associated with less hazardous drinking especially for students who experienced less stress; however, increased PBS-SHR was linked with more hazardous drinking for those who experienced less stress. College stress only moderated the relationship between PBS-SHR and alcohol-related negative consequences such that increased PBS-SHR use was associated with decreases in alcohol-related negative consequences especially for those experiencing higher levels of stress.

Dedications

My family, Dr. Madson, & Honors College

Thank you for the support and guidance you have given me.

Acknowledgements

I would like to thank my family for the support they have given me for my pursuit of higher education. My advisor Dr. Madson for guiding me through my research and future endeavors.

This thesis could not have been completed without him.

Also, I would like to thank the Honors College for the opportunity to challenge myself.

Table of Contents

List of Tables.....	v
List of Abbreviations.....	vi
Chapter 1: Introduction.....	1
Protective Behavioral Strategies.....	2
College Stress.....	2
Distress & PBS Use.....	4
Chapter 2: Methods.....	7
Participants & Procedures.....	7
Measures.....	8
Data Analysis.....	10
Chapter 3: Results.....	10
Chapter 4: Discussion.....	15
Research Questions & Hypotheses.....	15-17
Limitations & Future Research Implications.....	17-18
Chapter 5: Conclusion.....	19
References.....	20
Appendix.....	25

List of Tables

Table 1.....	11
Table 2.....	12

List of Abbreviations

PBS	Protective Behavioral Strategies
PBS-CC	Protective Behavioral Strategies-Controlled Consumption
PBS-SHR	Protective Behavioral Strategies-Serious Harm Reduction
AUDIT	Alcohol Use Disorders Identification Test
RAPI	Rutgers Alcohol Problem Index

Introduction

Hazardous alcohol use is drinking alcohol at rates in which the frequency/quantity of consumption exceed daily and weekly low risk drinking guidelines (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2015). This is a concern on college campuses in part because alcohol use is considered normative and is often the traditional drink choice at college events (Martinez, Sher, & Wood, 2008). The college environment appears to have a distinct element that fosters hazardous drinking. For instance, 58% of college students consumed alcohol in the past month compared to 48% non-college same age peers (NIAAA, 2015). Similarly, about 32% of college students engage in heavy drinking compared to 24% of their same age non-college peers (Johnston, O'Malley, Bachman, Schulenberg, & Miech 2016), and 38% of those students reported heavy episodic drinking (five or more drinks for men and four or more drinks for women drinking in a two-hour period) compared to 33% of non-college peers (NIAAA, 2015). Students who drink at these levels are at an increased risk of developing an alcohol use disorder (AUD) because of the increased consumption of alcohol each week (NIAAA, 2015). In fact, about 20% of college students meet the criteria for AUD (NIAAA, 2015). Regardless of whether students develop an AUD, hazardous drinking places them at risk for a plethora of alcohol-related negative consequences.

Alcohol-related negative consequences can range from mild (e.g., showing up to class late, a hangover) to severe (e.g., physical or sexual assault, injury, death; Ham & Hope, 2003). White and Hingson (2013) found that 1,800 deaths, 599,000 injuries, 646,000 physical assaults, 97,000 sexual assaults, and 150,000 reported health problems were related to alcohol use annually. Furthermore, Ham and Hope (2003) indicated that hazardous drinkers can affect those around them by making unwanted sexual advances towards others, humiliating others, imposing on friends, disrupting others' sleep, and damaging property. Because of the far-reaching effects

of hazardous drinking, researchers and university communities seek to better understand the factors related to increased and decreased alcohol use. Protective behavioral strategies (PBS) are one approach to harm reduction (Pearson, Kite, & Henson 2013).

Protective Behavioral Strategies

Protective behavioral strategies (PBS) can be used by students to keep themselves safe while drinking (Pearson, Kite, & Henson, 2013). Patrick, Lee, and Larimer (2011) demonstrated a link between PBS use and fewer alcohol-related negative consequences. Specifically, not using PBS has been associated with experiencing more alcohol-related negative consequences (Linden-Carmichael, Braitman, & Henson 2015). There are two subtypes of PBS: controlled consumption (PBS-CC) and serious harm reduction (PBS-SHR). DeMartini and colleagues (2013) refer to the subtypes of PBS as indirect or direct strategies. Direct strategies refer to PBS-CC, as these are strategies students use while directly consuming alcohol (DeMartini et al., 2013) and are related to decreased alcohol consumption (DeMartini et al., 2013). Indirect strategies refer to PBS-SHR, as these are strategies students use related to their drinking environment and may not be directly related to alcohol consumption (DeMartini et al., 2013). However, indirect strategies are related to decreased alcohol-related negative consequences (DeMartini et al., 2013)

There is a growing body of research supporting the importance of PBS use among students with psychological distress/mental health problems. Among college students with poor mental and physical health, PBS use was associated with fewer alcohol-related negative consequences (LaBrie, Kenney, & Lac, 2010). However, Villarosa, Moorner, Madson, Zeigler-Hill, and Noble (2014b) found that PBS-CC strategies did not mediate the relationship between social anxiety and alcohol-related negative consequences. PBS-CC appears to be related to reduced alcohol consumption, but not fewer alcohol-related negative consequences among

college students with mental health problems (Labrie et al., 2010; Villarosa et al., 2014b). Students with depressive symptoms reported using less PBS-CC strategies while drinking to cope (Villarosa, Messer, Madson, & Zeigler-Hill, 2018). Students who reported that they had heavy drinking episodes reported the least amount of PBS (Walters, Roudsari, Vader, & Harris, 2007). PBS-SHR appears to be linked to fewer alcohol-related negative consequences (e.g., Villarosa et al., 2014b). For example, socially anxious students who used less PBS-SHR reported more alcohol-related negative consequences with hazardous drinking (Villarosa et al., 2014b). Additionally, students with depressive symptoms using fewer PBS-SHR strategies reported experiencing more alcohol-related negative consequences with hazardous drinking (Villarosa et al., 2018). LaBrie, Lac, Garcia, and Ferraiolo (2009) showed that the relationship between PBS and risky drinking and negative consequences was moderated by mental and social health, such that PBS use was particularly important for those with poorer mental and social health – a finding further supported by Kenny and LaBrie (2013). Further, Landry, Moorer, Madson and Zeigler-Hill (2014) found that disordered eating was associated with high alcohol consumption and fewer PBS. Also, college students with anxiety may use alcohol to cope with symptoms of anxiety and experience more alcohol-related negative consequences as a result, in part due to use of fewer PBS (Napper, LaBrie, & Hummer 2015; Villarosa, Madson, Zeigler-Hill, Noble, & Mohn, 2014a). It is important to identify additional factors that are related to increased PBS use and decreased alcohol-related negative consequences. Generally, the research shows PBS, alcohol-related negative consequences, alcohol, and psychological distress interact. However, less is known about distress factors experienced by most students distress factors might buffer the relationship PBS has with hazardous drinking and alcohol-related negative consequences. One such factor may be college stress.

College Stress

Stress is a common human experience that, when occurring, can make it difficult to meet the demands of life (Cosby, 2012). Increased exposure to stressors are associated with greater likelihood of developing a substance use problem (Sinha, 2008). For example, Dawson, Grant and Ruan (2005) found a positive relationship between stress, specifically legal and job stress, and frequent heavy drinking among adults. The college experience can include unique stressors such as financial stress, academics, adjustment, and loneliness (Gold, 2016). Further, Borsari, Murphy, and Barnett (2007) suggested that the first year as a college student is a transitional period, which likely predicts hazardous drinking. Additionally, students often find that they have more freedom in college than they have experienced before, so the demands of life may seem more pressing than ever (Coccia & Darling, 2016). This is because students find themselves focusing on relationship building, self-reflection, cultural tolerance, life planning, decision-making, and social support (Arnett, 2004). Andersson, Johnsson, Berglund, and Öjehagen (2009) found that high stress paired with entering a certain university interacted with the dropout rate over the 12-month time period. Wong and colleagues (2006) showed that first year students exhibited depression, anxiety, and stress symptoms.

During strenuous or stressful times, people tend to have less self-control (Cosby, 2012) and may engage in harmful behaviors to cope. Students may turn to alcohol to cope seeing that alcohol has stress reducing effects (Gold, 2016). Armeli and colleagues (2014) demonstrated that alcohol consumption and alcohol-related negative consequences were associated with drinking-related problems specifically for students who reported drinking to cope. On the other hand, Park, Armelli, and Tennen (2004) demonstrated that students who perceived daily events more stressful drank less; however, this study did not assess students' consumption whether it

increased or decreased on a given day. Essentially, when pressed with copious amounts of stress, college students may drink to cope (Woolman, Becker, & Klanecky, 2015) because drinking to cope can help college students mitigate the pressure that an individual feels due to stressors (Dermody, Cheong, & Manuck, 2013).

The relationships that PBS have with hazardous alcohol consumption and alcohol-related negative consequences have been well established (Pearson, Kite, & Henson 2013). Further, there is growing evidence that mental health factors buffer these relationships. One factor that has yet to be explored is college stress, given its established relationship with hazardous alcohol use. Thus, the purpose of the current study was to explore the degree to which college stress moderates the relationships PBS, specifically the PBS-CC and PBS-SHR subtypes, have with hazardous alcohol use and alcohol-related negative consequences. The current study will attempt to answer the following questions:

Question 1: To what degree is the relationship between PBS types (CC & SHR) and hazardous alcohol consumption moderated by college stress?

Hypothesis 1a: College stress will moderate the relationship between PBS-CC and hazardous alcohol consumption, such that the relationship between PBS-CC and hazardous alcohol consumption will be weaker for students who report more college stress.

Hypothesis 1b: College stress will moderate the relationship between PBS-SHR and hazardous alcohol consumption such that the relationship between PBS-SHR and hazardous alcohol consumption will be weaker for students who report more college stress.

Question 2: To what degree is the relationship between PBS types (CC & SHR) and alcohol-related negative consequences moderated by college stress?

Hypothesis 2a: College stress will not moderate the relationship between PBS-CC and alcohol-related negative consequences.

Hypothesis 2b: College stress will moderate the relationship between PBS-SHR and alcohol-related negative consequences such that relationship between PBS-SHR and alcohol-related negative consequences will be stronger for students who report higher college stress.

Methods

Participants and Procedure.

This study was a part of a larger study that explored personality, alcohol use, PBS, and alcohol-related negative consequences among college students. Participants were 550 traditional age (18 to 25; $M = 20.41$, $SD = 1.62$) undergraduate college students attending a university in the Southeastern region of the United States. To be eligible, participants had to have reported drinking alcohol in the 30 days prior to participation. Participants classified themselves as a freshman (41.4%), sophomore (22.6%), junior (20.2%), or senior (15.8%) and identified as White Non-Hispanic (57.7%), African American (35.9%), Hispanic (0.7%), American Indian or Alaskan Native (0.7%), Asian (1.7%), Native Hawaiian or Other Pacific Islander (0.5%), and other (1.7%). The majority of participants identified as female (59.9%).

Participants were recruited through two methods. First, participants signed up through the Department of Psychology research participation website and completed the survey as partial fulfillment of a research requirement. Second, an email that advertised the study with a link to the research website was sent through the university student announcements. Once participants

clicked on the study link, they were sent to an informed consent page, which described the study, completion instructions, and confidentiality. After providing informed consent, participants completed the demographic form followed by the study measures presented randomly in an effort to minimize order effects.

Measures

Demographic Questionnaire. Participants completed a questionnaire collecting basic demographic information such as employment status, part-time or full-time status, sex, race, and year in school.

Protective Behavioral Strategies Scale-revised (PBSS-r). The 18-item PBSS-r was used to assess PBS use (Madson, Arnau, & Lambert, 2013). Participants were asked to “indicate the degree to which you engage in the following behaviors while drinking or partying” using a 6-point Likert scale. Response options ranged from 1 (*never*) to 6 (*always*). PBS-CC behaviors include alternating alcoholic and non-alcoholic drinks and avoiding shots, while PBS-SHR behaviors include knowing where your drink has been at all times and using a designated driver. Scores on the PBS-SHR subscale score ranges from 6 to 36 and on the PBS-CC subscale they range from 6 to 72 with higher scores indicating more PBS use. The PBSS-r has been shown to be reliable and valid, specifically with undergraduate college students, with internal consistencies ranging from good to excellent for the PBSS-r total and this performs consistently across gender and race (Madson et al., 2013). The internal consistency was strong in the present sample (PBS-CC $\alpha = .94$; PBS-SHR $\alpha = .92$).

College Student Stress Scale (CSSS). The 11-item CSSS (Feldt, 2008) was used to assess the degree to which participants experienced unique stressors related to the college experience. Participants rated the degree to which they felt anxious or distressed during the

semester in relation to items, such as “personal relationships”, “academic matters”, or “being away from home”, using a 5-point Likert-type scale ranging from 1 (never) to 5 (very often; Pintrich, Smith, Garcia, & McKeachie, 1993). Scores ranged from 11 to 55 with higher scores indicating experiencing more stress. The CSSS has evidence of good reliability and validity (Feldt & Koch, 2011). The internal consistency of the CSSS in this sample was strong ($\alpha = .92$).

Alcohol Use Disorders Identification Test-C (AUDIT-C). Hazardous drinking was measured using the AUDIT-C (Saunders, Aasland, Babor, De La Fuente, & Grant, 1993). This is a 3-item measure that was used to evaluate hazardous drinking over the past year among diverse groups, such as college students (e.g., Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Kokotailo et al., 2004). Participants responded to items using a Likert-type scale ranging from 0 (*Never*) to 4 (*Daily*). Scores range from 0 to 12 with higher scores indicating more hazardous drinking and greater risk for developing an alcohol use disorder. The AUDIT-C includes cutoff scores to classify different types of drinkers; however, in this study it was used as a continuous score of hazardous drinking (Ham, Zamboanga, Bacon, & Garcia, 2009; Zamboanga et al., 2007). The internal consistency of the AUDIT-C in this sample was adequate ($\alpha = .82$).

Rutgers Alcohol Problem Index (RAPI). The 23-item RAPI was used to assess alcohol-related negative consequences (Earleywine, LaBrie, & Pederson, 2008). Participants indicated how often they experienced a negative consequence, such as “neglected your responsibilities”, using a 5-point Likert-type scale which ranged from 0 (*never*) to 4 (*more than 10 times*). Scores ranged from 0 to 92 with higher scores indicating more alcohol-related negative consequences experienced. The RAPI is considered a reliable and valid measure for showing experienced alcohol-related negative consequences among undergraduate college

students ($\alpha=.88$; Earleywine et al., 2008). The internal consistency of the RAPI in this sample was excellent ($\alpha = .97$).

Data Analysis

A series of moderation analyses were conducted to examine the degree to which college stress moderated the association PBS subtypes (PBS-CC & PBS-SHR) had with hazardous alcohol use and alcohol-related negative consequences. This was accomplished by conducting separate hierarchical regression analysis for hazardous alcohol use and alcohol-related negative consequences. The main effects of PBS and college stress were entered on Step 1 and the two-way interaction of these main effect terms were entered on Step 2. All continuous predictor variables were centered for the purpose of testing interactions (Darlington & Hayes, 2017; Frazier, Tix, & Barron, 2004). For any significant two-way interactions, simple slopes analysis was conducted to further explain how the relationship between PBS type and college stress interact when examining both hazardous alcohol consumption and alcohol-related negative consequences.

Results

Means, standard deviations, and intercorrelations are reported in Table 1. The relationship between PBS-CC and AUDIT-C was negative and significant; in contrast, the relationship between PBS-SHR and AUDIT-C was negative and not significant. The relationship between AUDIT-C and CSS was positive and not significant; in comparison, the relationship between AUDIT-C and RAPI was positive and significant.

Table 1: Means, Standard Deviations, & Correlations

	1	2	3	4	5
1. CC	-				
2. SHR	.63***	-			
3. CSS	.04	.03	-		
4. AUDIT-C	-.37***	-.10	.01	-	
5. RAPI	-.21	-.35***	.24***	-.37**	-
Means	46.2	29.1	28.3	4.1	11.1
SD	15.9	7.6	9.98	2.6	15.7

Note. Note. 1.PBS-CC = Protective Behavioral Strategies-Controlled Consumption, 2. PBS-SHR = Protective Behavioral Strategies-Serious Harm Reduction; 3. CSS = College stress, 4. Alcohol Use Disorder Identification Test-Consumption, 5. Rutgers Alcohol Problem Index.

* < .05; ** $p < .01$; *** $p < .001$.

Hazardous Alcohol Consumption

A significant main effect of PBS-CC ($\beta = -.52, t = -6.89, p < .001$) emerged, but the main effect of college stress was not significant ($\beta = .02, t = .31, p = .75$). However, there was a significant interaction, such that the main effect of PBS-CC was qualified by the PBS-CC \times college stress interaction ($\beta = .24, t = 2.82, p = .01$). As suggested by Aiken, West, and Pitts (2003), simple slopes tests were used to probe this interaction. This interaction is presented in Figure 1. These simple slopes tests revealed a significant negative association between PBS-CC and hazardous alcohol use with both low and high levels of CSS ($\beta = -.73, t = -7.07, p < .001$). The inverse relationship between hazardous drinking and PBS-CC use was strengthened for those with lower levels of college student stress ($\beta = -.03, t = -.35, p = .727$).

Table 2

Regressions of Alcohol-Related Negative Outcomes on College Stress and Protective Behavioral Strategies

	Hazardous Alcohol Consumption			Alcohol-Related Negative Consequences		
	R^2	ΔR^2	β	R^2	ΔR^2	β
<i>Step 1</i>						
CSS	.17***	.17***	.02	.18***	.18***	.24***
PBS-CC			-.52***			.02
PBS-SHR			.24***			-.38***
<i>Step 2</i>	.21**	.04**		.26***	.08***	
CSS x PBS-CC			.24**			.02
CSS x PBS-SHR			-.29**			-.31***

Note. CSS = College stress, PBS-CC = Protective Behavioral Strategies-Controlled Consumption, PBS-SHR = Protective Behavioral Strategies-Serious Harm Reduction; 1 = Alcohol Use Disorder Identification Test-Consumption, 2 = Rutgers Alcohol Problem Index.

* < .05**, p < .01; ***p < .001.

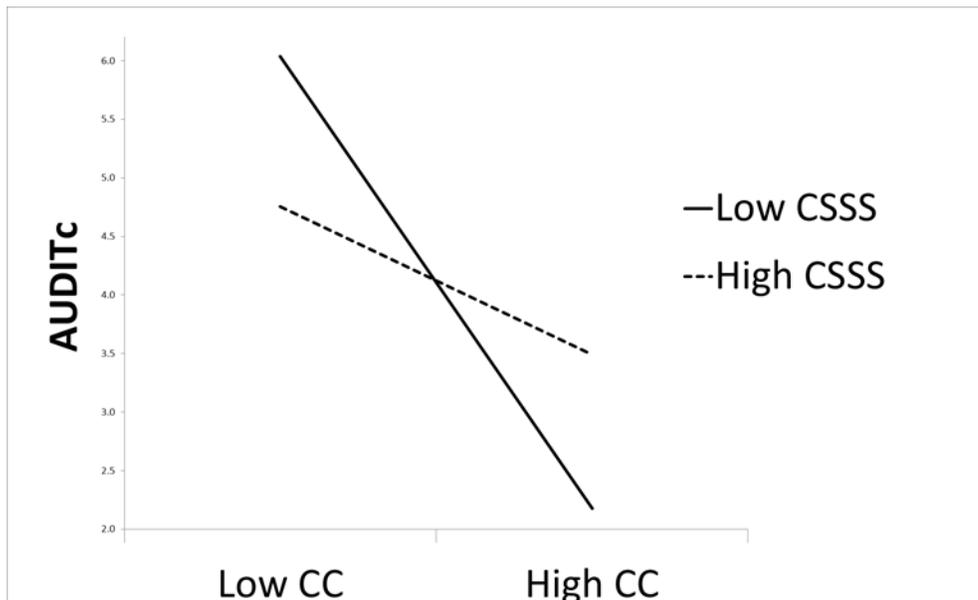


Figure 1. Predicted values for alcohol consumption illustrating the interaction of college stress and controlled consumption.

A significant main effect for PBS-SHR ($\beta = .24, t = 3.10, p = .002$) emerged, and there was a significant interaction such that the main effect of PBS-SHR was qualified by the PBS-SHR \times college stress interaction ($\beta = -.29, t = 3.31, p = .001$). The predicted values for this interaction are presented in Table 1. As suggested by Aiken, West, and Pitts (2003), simple slopes tests were used to probe this interaction. A graph of the interaction is presented in Figure 2. The simple slopes tests revealed a significant positive association between PBS-SHR and hazardous alcohol use was strengthened at lower levels of college stress ($\beta = .44, t = 4.55, p < .001$).

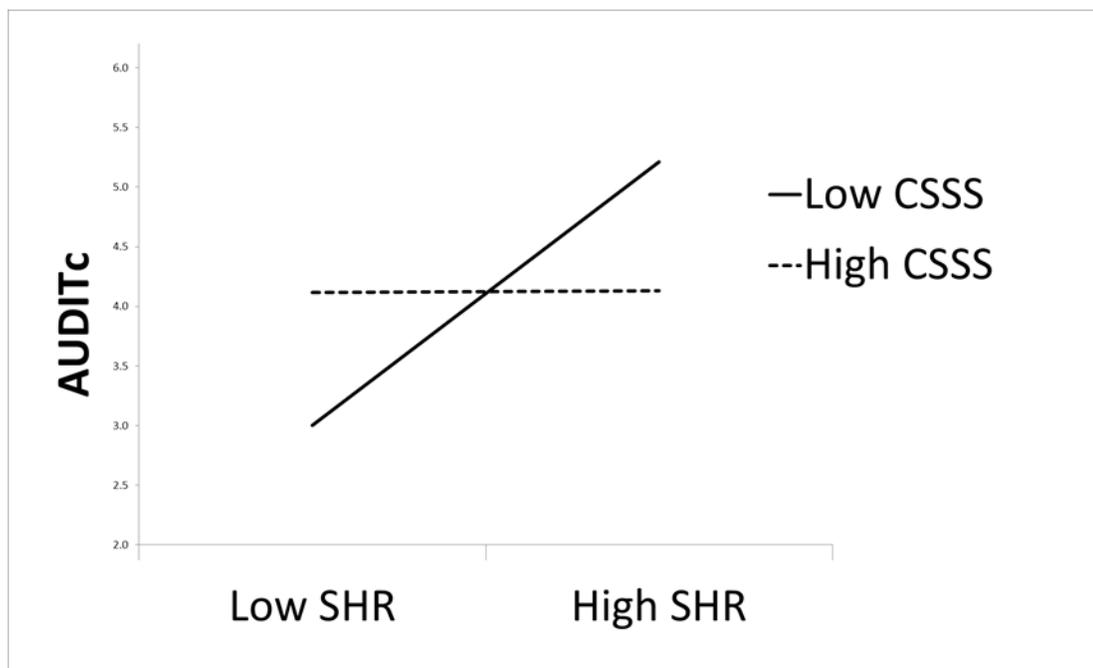


Figure 2. Predicted values for alcohol consumption illustrating the interaction of college stress and serious harm reduction.

Alcohol-related Negative Consequences

There were significant main effects for PBS-SHR ($\beta = -.38, t = -4.85, p < .001$) and college stress ($\beta = .24, t = 4.05, p < .001$) on alcohol-related negative consequences. However, there was not a significant main effect of PBS-CC ($\beta = .02, t = .21, p = .831$). There was a significant interaction, such that the main effect of PBS-SHR was qualified by the PBS-SHR \times college stress interaction ($\beta = -.31, t = 3.66, p < .001$). The predicted values for this interaction are presented in Table 2. As suggested by Aiken, West, and Pitts (2003), simple slopes tests were used to probe this interaction. A graph of the interaction is presented in Figure 3. The simple slopes tests revealed a significant negative association between PBS-SHR and alcohol-related negative consequences that was strengthened when participants reported high levels of college stress ($\beta = -.70, t = -6.21, p < .001$).

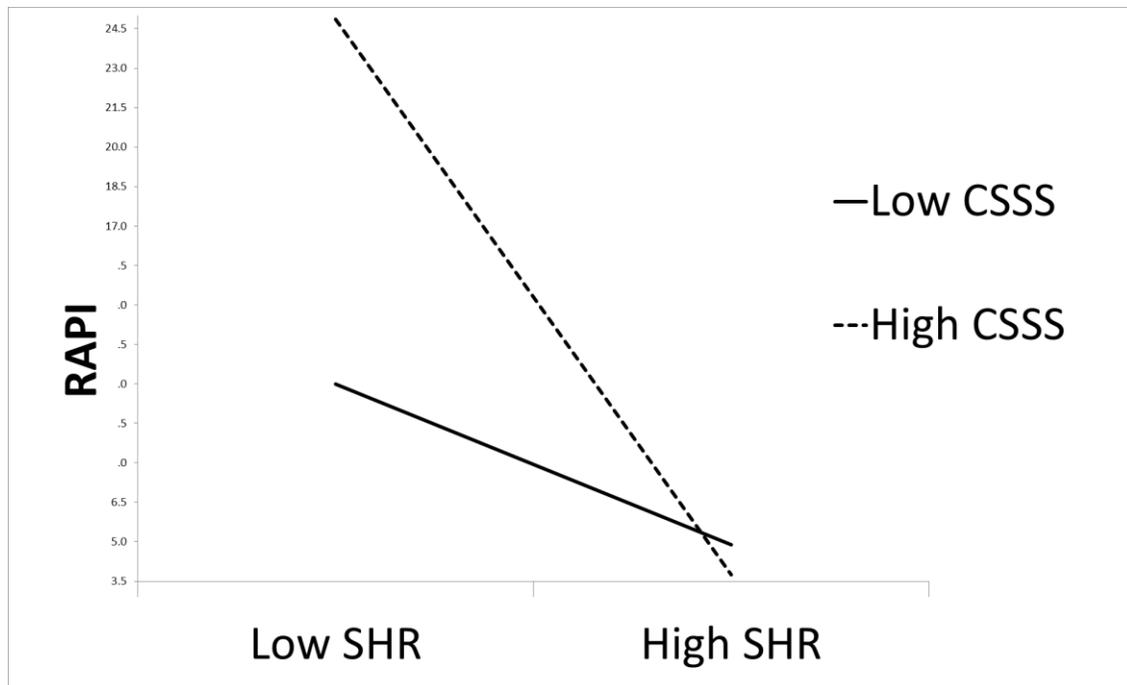


Figure 3. Predicted values for alcohol-related negative consequences illustrating the interaction of college stress and serious harm reduction.

Discussion

The purpose of this study was to explore the degree to which college stress moderated the relationship that PBS subtypes had with hazardous alcohol use and alcohol-related negative consequences. Consistent with previous research (e.g., Villarosa et al., 2014b), PBS-CC use was associated with decreased hazardous alcohol use and alcohol-related negative consequences, and PBS-SHR was associated with decreased alcohol-related negative consequences. Increased college stress was associated with decreased use of PBS-CC and PBS-SHR. Further, greater college stress was associated with increased hazardous alcohol consumption and alcohol-related negative consequences. This is similar to Kenny and LaBrie's (2013) findings that mental health problems were associated with consuming more alcohol, which was associated with a decreased likelihood of PBS use and increased likelihood of alcohol-related negative consequences.

As predicted, we found that college stress moderated the relationships PBS-CC and PBS-SHR had with hazardous alcohol use. Specifically, we found that both low and high PBS-CC use was associated with less hazardous alcohol use, and that this association was the strongest when college stress was low. Previous research showed that, among college students with mental health problems, those who reported PBS-CC also reported less alcohol consumption (Villarosa et al., 2018; Villarosa et al., 2014b). This finding supports the value of using PBS-CC when concerned about hazardous drinking. However, high use of PBS-SHR was associated with more hazardous alcohol use and this association was the strongest when college stress was low. These findings are inconsistent with those of Walters, Roudsari, Vader, and Harris (2007) who found that using less PBS-SHR was associated with more heavy drinking. The finding of the present study may be because PBS-SHR strategies do not specifically focus on alcohol consumption, but on other strategies such as having a designated driver, drinking with friends, and leaving with friends (Madson et al., 2013). Subsequently, students experiencing low stress who use more

PBS-SHR may believe they can consume more alcohol while still staying safe due to their implementation of PBS-SHR. Thus, these students may be employing more PBS-SHR strategies and consuming more alcohol, yet experiencing fewer alcohol-related negative consequences due to the PBS-SHR use. It could also be the case that students experiencing lower stress may drink more frequently or drink in more social situations, while higher stress students may only drink to cope with stress in more isolated environments. However, this needs to be investigated further.

The hypothesis that college stress would not moderate the relationship between PBS-CC and alcohol-related negative consequences was supported. This finding is consistent with those of DeMartini and colleagues (2013) that PBS-CC is related to alcohol consumption but not alcohol-related negative consequences. Specifically, college students may use more PBS-SHR strategies than PBS-CC in relation to mitigating alcohol-related negative consequences (DeMartini et al., 2013). As expected, we found that increased use of PBS-SHR was related to decreased alcohol-related negative consequences and this association was strongest when college stress was high. This finding supports previous research that PBS, especially PBS-SHR, are particularly important in reducing alcohol-related negative consequences for those experiencing mental distress (Kenney & LaBrie, 2009; LaBrie et al., 2009; Villarosa et al., 2018; Villarosa et al., 2014b).

These results have implications for prevention and intervention efforts on college campuses. First, given that most students likely experience college related stress, it is important that educational efforts discuss the connection between stress, hazardous drinking, and alcohol-related negative consequences as well as the potential protective value of PBS use. Further, screening events such as mental health or college stress screening could also assess alcohol use, providing feedback about the links between stress and hazardous alcohol use. Finally, brief

motivational interventions for alcohol use on college campuses could assess for college-related stress and drinking to cope to integrate this feedback when discussing overall alcohol use. This feedback could inform discussions about how stress, hazardous alcohol use, and alcohol-related negative consequences are related as well as motives to drink and PBS use to better inform safe drinking decisions. Further, this information could lead to discussions on how to manage stress effectively in a healthy manner.

Although these results are promising, they should be interpreted within the study limitations. One limitation is the cross-sectional design. Stress fluctuates over time, such that stress at the beginning of the semester may be different when midterms or finals are occurring, and this study only captured stress at one point in the year. Another limitation is this study focused on general college stress and not specific stressors within the college context. The specific stressors experienced may impact how the stressor impacts students' behaviors. Finally, regional differences in alcohol consumption may limit generalization of the findings.

Future research should examine the relationship between PBS use and specific stressors on hazardous drinking and alcohol-related negative consequences to expand upon these findings related to general college stress. Some specific stressors to examine could include stress related to academics, minority status, sexual orientation, ethnicity and race, finances, and religiosity. For example, examining the links between alcohol outcomes, PBS, and stressors such as racial and gender discrimination among specific groups may help inform culturally congruent prevention and intervention approaches (Cottonham, 2018; Cottonham, Madson, Nicholson, & Mohn, 2017). Another future direction could examine how the moderating effects of college stress are also moderated by gender, as males and females may experience and cope with stress in different ways. Given the likelihood that students with higher stress may drink alcohol to cope, it would

be beneficial to explore drinking motives and expectancies related to stress and alcohol outcomes (Ham, Zamboanga, Bacon, & Garcia, 2009). Finally, given the fluctuations in stress throughout the course of an academic year, use of diary designs may be valuable to capture the temporal, causal relationships between stress, PBS, and alcohol-related outcomes.

In conclusion, these findings extend the PBS literature by providing evidence for the value of PBS subtypes in relation to hazardous drinking and alcohol-related negative consequences. Further, this study provided evidence as to how college student stress might attenuate these relationships. Thus, these findings highlight the importance of further investigating the role of college stress in relation to safe and hazardous drinking and provide evidence for the protective role of PBS for college students experiencing stress and consuming alcohol.

References

- Andersson, C., Johnsson, K. O., Berglund, M., & Öjehagen, A. (2009). Stress and hazardous alcohol use: Associations with early dropout from university. *Scandinavian Journal of Public Health, 37*, 713-719. doi:10.1177/1403494809344359
- Armeli, S., Dranoff, E., Tennen, H., Austad, C. S., Fallahi, C. R., Raskin, S., & ... Pearlson, G. (2014). A longitudinal study of the effects of coping motives, negative affect and drinking level on drinking problems among college students. *Anxiety, Stress & Coping: An International Journal, 27*, 527-541. doi:10.1080/10615806.2014.895821
- Arnett, J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties*. New York, NY: Oxford University Press.
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Montiero, M. G. (2001). *The Alcohol Use Disorders Identification Test: Guidelines for use in primary care*. World Health Organization: Department of Mental Health and Substance Dependence. Retrieved from: http://www.talkingalcohol.com/files/pdfs/WHO_audit.pdf
- Borsari, B., Murphy, J. G., & Barnett, N. P. (2007). Predictors of alcohol use during the first year of college: Implications for prevention. *Addictive Behaviors, 32*, 2062-2086. doi:10.1016/j.addbeh.2007.01.017
- Coccia, C., & Darling, C. A. (2016). Having the time of their life: College student stress, dating and satisfaction with life. *Stress and Health: Journal of the International Society for the Investigation of Stress, 32*, 28-35. doi:10.1002/smi.2575
- Cosby, M. L. (2012). Alcohol, drugs, and sexual risk taking: A study of stress, social support, and Black & White college students. *Dissertation Abstracts International, 74*

- Cottonham, D. F. (2018). Gendered racism and risky sexual behavior among African American college women: A moderated mediation study of psychological distress, alcohol use, safe sex practices, and alcohol protective behavioral strategies. *Dissertation Abstracts International*, 79,
- Cottonham, D. P., Madson, M. B., Nicholson, B. C., & Mohn, R. S. (2017). Harmful alcohol use and alcohol-related sex expectancies as predictors of risky sex among african american female college drinkers. *Journal Of Ethnicity In Substance Abuse*, 1-12.
doi:10.1080/15332640.2016.1255580
- Darlington, R. B., & Hayes, A. F. (2017). *Regression analysis and linear models: Concepts, applications, and implementation*. New York, NY: Guilford.
- Dawson, D. A., Grant, B. F., & Ruan, W. J. (2005). The association between stress and drinking: modifying effects of gender and vulnerability. *Alcohol and Alcoholism*, 40, 453-460.
- DeMartini, K. S., Palmer, R. S., Leeman, R. F., Corbin, W. R., Toll, B. A., Fucito, L. M., & O'Malley, S. S. (2013). Drinking less and drinking smarter: Direct and indirect protective strategies in young adults. *Psychology of Addictive Behaviors*, 27, 615-626.
doi:10.1037/a0030475
- Dermody, S. S., Cheong, J., & Manuck, S. (2013). An evaluation of the stress-negative affect model in explaining alcohol use: The role of components of negative affect and coping style. *Substance Use & Misuse*, 48, 297-308. doi:10.3109/10826084.2012.761713
- Earleywine, M., LaBrie, J. W., & Pedersen, E. R. (2008). A brief Rutgers Alcohol Problem Index with less potential for bias. *Addictive Behaviors*, 33, 1249-1253.
doi:10.1016/j.addbeh.2008.05.006

- Feldt, R. C. (2008). Development of a brief measure of college stress: The college student stress scale. *Psychological reports, 102*, 855-860.
- Feldt, R. C., & Koch, C. (2011). Reliability and construct validity of the college student stress scale. *Psychological reports, 108*, 660-666.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology, 51*, 115.
- Gold, N. J. (2016). Family distress, first-generation college status, and financial stress as predictors of alcohol use in college students seeking mental health treatment. *Dissertation Abstracts International, 76*.
- Ham, L. S., & Hope, D. A. (2003). College students and problematic drinking: A review of the literature. *Clinical Psychology Review, 23*, 719-759. doi:10.1016/S0272-7358(03)00071-0
- Ham, L. S., Zamboanga, B. L., Bacon, A. K., & Garcia, T. A. (2009). Drinking motives as mediators of social anxiety and hazardous drinking among college students. *Cognitive Behaviour Therapy, 38*, 133-145.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E. & Miech, R. A. (2016). *Monitoring the Future national survey results on drug use, 1975–2015: Volume 2, College students and adults ages 19–55*. Ann Arbor: Institute for Social Research, The University of Michigan. Available at <http://monitoringthefuture.org/pubs.html#monographs>
- Kenney, S. R., & LaBrie, J. W. (2013). Use of protective behavioral strategies and reduced alcohol risk: Examining the moderating effects of mental health, gender, and race. *Psychology of Addictive Behaviors, 27*, 997-1009. doi:10.1037/a0033262

- Kokotailo, P. K., Egan, J., Gangnon, R., Brown, D., Mundt, M., & Fleming, M. (2004). Validity of the alcohol use disorders identification test in college students. *Alcoholism: Clinical and Experimental Research, 28*, 914-920.
- LaBrie, J. W., Kenney, S. R., Lac, A., Garcia, J. A., & Ferraiolo, P. (2009). Mental and social health impacts the use of protective behavioral strategies in reducing risky drinking and alcohol consequences. *Journal of College Student Development, 50*, 35-49.
doi:10.1353/csd.0.0050
- LaBrie, J. W., Kenney, S. R., & Lac, A. (2010). The use of protective behavioral strategies is related to reduced risk in heavy drinking college students with poorer mental and physical health. *Journal of Drug Education, 40*, 361-378. doi:10.2190/DE.40.4.c
- Landry, A. S., Moorer, K. D., Madson, M. B., & Zeigler-Hill, V. (2014). Protective Behavioral Strategies and Alcohol Use Outcomes Among College Women Drinkers: Does Disordered Eating and Race Moderate This Association? *Journal of Drug Education, 44*, 95-115.
- Linden-Carmichael, A. N., Braitman, A. L., & Henson, J. M. (2015). Protective behavioral strategies as a mediator between depressive symptom fluctuation and alcohol consumption: A longitudinal examination among college students. *Journal of Studies on Alcohol and Drugs, 76*, 80-88. doi:10.15288/jsad.2015.76.80
- Madson, M. B., Arnau, R. C., & Lambert, S. J. (2013). Development and psychometric evaluation of the Revised Protective Behavioral Strategies Scale. *Psychological Assessment, 25*, 556-567. doi:10.1037/a0031788

- Martinez, J. A., Sher, K. J., & Wood, P. K. (2008). Is heavy drinking really associated with attrition from college? The alcohol-attrition paradox. *Psychology of Addictive Behaviors*, 22, 450-456. doi:10.1037/0893-164X.22.3.450
- Napper, L. E., LaBrie, J. W., & Hummer, J. F. (2015). Anxiety and the use of alcohol-related protective behavioral strategies. *Journal of College Counseling*, 18, 21-36. doi:10.1002/j.2161-1882.2015.00066.x
- National Institute on Alcohol Abuse and Alcoholism (2015). *Drinking levels defined*. Retrieved from <https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking>
- Park, C. L., Armeli, S., & Tennen, H. (2004). The daily stress and coping process and alcohol use among college students. *Journal of Studies on Alcohol*, 65, 126-135.
- Patrick, M. E., Lee, C. M., & Larimer, M. E. (2011). Drinking motives, protective behavioral strategies, and experienced consequences: Identifying students at risk. *Addictive Behaviors*, 36, 270-273. doi:10.1016/j.addbeh.2010.11.007
- Pearson, M. R., Kite, B. A., & Henson, J. M. (2013). Predictive effects of good self-control and poor regulation on alcohol-related outcomes: Do protective behavioral strategies mediate? *Psychology of Addictive Behaviors*, 27, 81.
- Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53, 801-813.

- Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction, 88*, 791-804.
- Sinha, R. (2008). Chronic stress, drug use, and vulnerability to addiction. *Annals of the New York Academy of Sciences, 1141*, 105-130.
- Villarosa, M. C., Messer, M. A., Madson, M. B., & Zeigler-Hill, V. (2018). Depressive symptoms and drinking outcomes: The mediating role of drinking motives and protective behavioral strategies among college students. *Substance Use and Misuse, 53*, 143-153.
- Villarosa, M. C., Madson, M. B., Zeigler-Hill, V., Noble J. J., & Mohn, R. S. (2014a). Social anxiety and drinking behaviors among college students: The mediating effects of drinking motives. *Psychology of Addictive Behaviors, 28*, 710-718.
- Villarosa, M. C., Moorer, K. D., Madson, M. B., Zeigler-Hill, V & Noble, J. J. (2014b). Social anxiety and negative alcohol-related consequences among college drinkers: Do protective behavioral strategies mediate the association? *Psychology of Addictive Behaviors, 28*, 887-892.
- Walters, S. T., Roudsari, B. S., Vader, A. M., & Harris, T. R. (2007). Correlates of protective behavior utilization among heavy-drinking college students. *Addictive behaviors, 32*, 2633-2644.
- White, A., & Hingson, R. (2013). The burden of alcohol use: Excessive alcohol consumption and related consequences among college students. *Alcohol Research: Current Reviews, 35*, 201-218.

- Wong, J. S., Cheung, E. T., Chan, K. C., Ma, K. M., & Tang, S. W. (2006). Web-based survey of depression, anxiety and stress in first-year tertiary education students in Hong Kong. *Australian and New Zealand Journal of Psychiatry, 40*, 777-782. doi:10.1111/j.1440-1614.2006.01883.x
- Woolman, E. O., Becker, M. M., & Klanecky, A. K. (2015). PTSD symptoms mediate academic stress and drinking to cope in college students. *Journal of Drug Education, 45*, 96-112. Doi:10.1177/0047237915607282
- Zamboanga, B. L., Horton, N. J., Tyler, K. M., O'Riordan, S. S., Calvert, B. D., & McCollum, E. C. (2007). The utility of the AUDIT in screening for drinking game involvement among female college students. *Journal of Adolescent Health, 40*, 359-361.

Appendix



INSTITUTIONAL REVIEW BOARD

118 College Drive #5147 | Hattiesburg, MS 39406-0001

Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 17022103

PROJECT TITLE: The Moderating Effects of College Student Stress on the Relationship Protective Behavioral Strategies has with harmful Alcohol Consumption and Negative Consequences

PROJECT TYPE: New Project

RESEARCHER(S): Bobbi Lee

COLLEGE/DIVISION: College of Education and Psychology

DEPARTMENT: Psychology

FUNDING AGENCY/SPONSOR: N/A

IRB COMMITTEE ACTION: Exempt Review Approval

PERIOD OF APPROVAL: 02/22/2017 to 02/21/2018

Lawrence A. Hosman, Ph.D.
Institutional Review Board