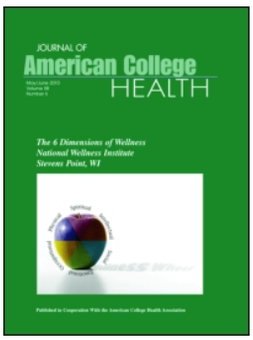

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BRIEF REPORT

Traumatic stress and alcohol-related disordered eating in a college sample

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ABSTRACT

Objective: The current study examined the association between posttraumatic stress symptoms and disordered eating behaviors related to alcohol consumption (i.e., "drunkorexia"). **Participants:** Participants were 478 undergraduate students at a university in the southeastern United States. **Method:** Participants completed online self-report questionnaires related to alcohol-related disordered eating and compensatory behaviors, posttraumatic stress symptoms, problematic drinking, and weight and shape concerns. **Results:** Results found that posttraumatic stress symptoms, body weight and shape concerns, and problematic drinking were independent predictors of alcohol-related disordered eating. **Conclusion:** These findings confirm previous research that symptoms of eating disorders and symptoms of problem drinking predict disordered eating patterns surrounding alcohol use and further indicate that trauma may play an important role in such behaviors. Results have implications for trauma-informed treatment for college students presenting with "drunkorexia."

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Alcohol; disordered eating; drunkorexia; trauma

Binge drinking in college is considered a major public health concern in the United States. A national survey shows that almost 60 percent of college students ages 18 – 22 consumed alcohol in the past 30 days,[1,2] and approximately 30 - 40% of college students participated in binge drinking, or consuming five or more drinks at one time, within the past two weeks.[2,3] Compared to their non-college-attending peers, college students report higher levels of alcohol use and more frequent alcohol use,[3] and they are also more at risk for an alcohol use disorder.[4]

Disordered eating is another prevalent mental health concern on college campuses. Research has shown that body dissatisfaction and perceptions of being overweight significantly increase between high school and the first year of college.[5] About 10-20% of female college students and 4-10% of male college students report disordered eating behaviors and attitudes,[6,7] and these statistics have been increasing over the past decade.[8] Over a third of college students have used unhealthy weight-control measures such as restrictive eating, laxatives or diet pills, vomiting, or chew-and-spit. [8] Approximately 2-3% of students reported being diagnosed or treated for anorexia nervosa or bulimia nervosa in the past year.[2]

The association between disordered eating and binge drinking has been noted in recent literature. While it has been well known that dieting severity is related to increased frequency of binge drinking episodes,[9,10] the term "drunkorexia" was recently coined by the media to describe the restriction of calories prior to drinking so more alcohol could be consumed without the individual gaining weight.[11] Subsequently, researchers have studied this behavioral pattern and discovered that compensatory behaviors associated with alcohol use are especially prevalent in college populations. 46% of college students reported changing their eating behavior in relation to alcohol consumption,[12] and almost 15% of college freshmen reported caloric restriction on days when they planned to binge drink.[13] Research shows that that the unhealthy weight control strategies such as exercise, calorie restriction, purging, or laxative use occur both before and after drinking episodes.[14]

While binge drinking alone is associated with a host of negative consequences,[15–17] combining restrictive eating patterns and alcohol use puts one at even more of a risk for negative alcohol-related consequences. Individuals focused on losing weight reported significantly higher rates of alcohol-related consequences, such as physical injury to self, doing something they regretted, and having forced sexual intercourse.[18] This positive correlation between caloric restriction and alcohol use and increased negative alcohol-related consequences may be related to the rapid rise in blood alcohol levels seen in individuals who drink a large quantity in a short amount of time or who drink without eating prior.[19] Sharp increases in blood alcohol level has been determined to be a risk factor for memory blackouts during drinking.[19] Thus, caloric restriction and binge drinking is a dangerous combination which can lead to blackouts and risky behavior.

Both disordered eating and problematic drinking are predictors of compensatory behaviors surrounding alcohol

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use.[20,21] Some college students use calorie restriction and other compensatory behaviors before, during, or after alcohol consumption to avoid weight gain,[13] and these individuals show elevated scores on other measures of eating disorders.[12] This suggests that alcohol-related compensatory behaviors for purposes of weight control may be related to underlying disordered eating pathology, such as pressures to conform to sociocultural body-image norms. On the other hand, some individuals report using restrictive eating behaviors to enhance the effects of alcohol,[13] and these individuals show elevated scores on measures of alcohol abuse.[12] For this subtype of students, "drunkorexia" may be another form of problematic drinking. The majority of students use alcohol-related compensatory behaviors to avoid weight gain, but about one-third did so to get intoxicated faster.[22]

Another potential predictor of alcohol-related disordered eating that has received less attention in the literature is trauma exposure and posttraumatic stress symptoms. Posttraumatic stress disorder (PTSD) is widely prevalent in college populations,[23,24] and is associated with increased drinking frequency as well as disordered eating.[24–26] Symptoms of posttraumatic stress explained more than half of the variance in alcohol abuse in a study of college students.[27] Studies show that a history of trauma predicts the onset of alcohol use disorders and high-risk drinking. [28–30] In addition, trauma tends to precede the development of eating disorders in patients with comorbid PTSD and anorexia,[25] and increased PTSD symptomology is correlated with increased eating disorder severity.[26,31]

Traumatic stress is also associated with emotion regulation,[32] avoidant coping,[33] and the desire for control,[34] which are all consistent with the dysfunctional behaviors seen in "drunkorexia." For example, emotion dysregulation has been found to predict compensatory behaviors surrounding alcohol use, particularly difficulties controlling impulsive behaviors and lack of emotional clarity.[21] Furthermore, behaviors such as caloric restriction before and during alcohol use appear consistent with avoidant coping and the self-medication hypothesis related to PTSD. As many as 20% of individuals with PTSD use substances to self-medicate,[35] and in college students, negative mood has been associated with increased levels of drinking and drinking to cope.[36] Finally, the desire to control caloric input when otherwise feeling out of control or overwhelmed may, too, relate to PTSD.[37]

While there is evidence in the extant literature that documents the associations among problematic drinking, disordered eating, and PTSD symptoms, there is limited research testing the potential link between alcohol-related disordered eating and PTSD symptoms in college students. The purpose of the present study was to test the association between PTSD symptoms and compensatory behaviors surrounding alcohol use while controlling for symptoms of eating disorders and symptoms of problem drinking. Based on a review of the prior research, it was hypothesized that PTSD symptoms would predict alcohol-related disordered eating, independent of symptoms of eating disorders and alcohol use disorders.

Methods

Participants

In 2017, participants were recruited from the introductory psychology classes at a large public university in the southeastern United States. This sample was chosen after a review of literature revealing that college students report elevated levels of disordered eating patterns and binge drinking.[3,38] Out of 1275 students enrolled in the course, 498 participants initiated the study and 478 completed the survey. Of the 478 participants included in analyses, 74.9% self-identified as female (n = 358) and 25.1% self-identified as male (n = 120). The average age of participants was 18.96 (SD = 1.113). Approximately 75% classified as freshmen standing with another 17% in sophomore standing and 7% in junior or senior standing. Due to an investigator error, racial and ethnic demographics were not obtained in the current study. However, other studies recruiting from the same class at this university reported mostly Caucasian participants (roughly 80%) followed by African American (roughly 15%), with small representation from Asian and "Other" racial categories.

Materials

Demographic form

This questionnaire included questions about participant age, biological sex, class standing, and height and weight (which was used to calculate body mass index (BMI)).

Posttraumatic Diagnostic Scale (PDS)

This self-report scale assesses trauma history and PTSD symptomology.[39] This scale includes a checklist of possible traumatic events (e.g., natural disaster, sexual assault, etc.) followed by questions corresponding to the DSM-IV symptoms of posttraumatic stress disorder.[39] Participants indicated whether they experience any of the events on the checklist (yes/no) and then chose the single event they perceived as "most traumatic." Participants then rated the severity of PTSD symptoms experienced in the past two weeks pertaining to the event they identified as most traumatic using a Likert-style scale from 1 (not at all) to 4 (3 or more times per week). Total scores range from 17 to 68 with higher scores reflecting greater levels of posttraumatic stress symptoms. This scale is widely used and has acceptable psychometric properties.[39] Cronbach's alpha coefficient for the total symptom score in this study was .94.

CAGE questionnaire

The CAGE questionnaire is a brief 4-item measure with yes/no questions designed to assess lifetime history of problematic drinking.[40] Questions correspond to the following topics: feeling the need to cut down, feeling annoyed by others criticizing one's drinking, feeling guilty about drinking levels, and needing a drink in the morning to curb a hangover. For the current study, each "yes" was counted to

Table 1. Means, standard deviations, and correlations among variables 1–7.

	1	2	3	4	5	6	7
1. CEBRACS (Weight Control)	–						
2. CEBRACS (Alcohol Effects)	.660**	–					
3. PDS	.207**	.269**	–				
4. CAGE	.293**	.343**	.214**	–			
5. Weight and Shape Concern	.322**	.270**	.286**	.215**	–		
6. BMI	−.002	.015*	.105*	−.025	.204**	–	
7. Biological sex	.173**	.133**	.127**	.142**	.224**	−.154**	–
Mean	**19.601**	**10.696**	**24.864**	**.773**	**3.610**	**24.305**	**.251**
Standard Deviation	8.044	5.489	9.937	1.070	1.605	4.624	.434

Note. The abbreviations listed above refer to the following measures: Compensatory Eating and Behaviors Related to Alcohol Consumption Scale (CEBRACS) – Weight Control subscale and Alcohol Effects subscale, Posttraumatic Diagnostic Scale (PDS), the CAGE questionnaire for problematic drinking, Body Mass Index (BMI).
*Correlation is significant at the .05 level ($p < .05$).
**Correlation is significant at the .01 level ($p < .01$).

create a composite score representing the number of symptoms of problematic alcohol use. Cronbach's alpha was .63.

Eating Disorder Diagnostic Scale (EDDS)

This scale measures a variety of disordered eating symptoms including binge features, binge frequency, and compensatory behaviors.[41] To reduce overlap with the measurement of compensatory behaviors relevant to drinking, only two questions on the EDDS were used for this study to capture well-known predictors of eating disorders: the extent to which personal evaluation has been influenced by weight and shape, respectively, over the last three months. These items were presented to participants with a Likert-style scale from 1 (not at all) to 6 (extremely). In the current study, an average of the two items was used.

Compensatory Eating Behaviors Related to Alcohol Consumption Scale (CEBRACS)

The CEBRACS assesses an individual's eating style and compensatory behaviors related to alcohol consumption over the past three months.[42] This self-report questionnaire is split into three sections – disordered weight-control behaviors that take place before drinking alcohol, while drinking alcohol, and after drinking alcohol – and measures four types of behavior: Alcohol Effects (i.e., restricting before or during alcohol use to enhance the effects of alcohol), Bulimia (i.e., purging behaviors before or after drinking alcohol), Diet and Exercise (i.e., dieting, drinking light beer, or exercising to compensate for alcohol-related calories), and Restriction (i.e., skipping meals to make up for the calories consumed in alcoholic beverages). The CEBRACS was found to have adequate internal consistency and construct validity.[42] In the present study, the Alcohol Effects subscale ($\alpha = .94$) was used as a measure of compensatory behaviors related to alcohol intoxication (AE). A composite score of the other three subscales ($\alpha = .92$) was used as a measure of compensatory behaviors regarding alcohol-related weight control (WC).

Procedure

Institutional Review Board (IRB) approval was gained prior to conducting the study. Participants completed an anonymous questionnaire about traumatic experiences and trauma symptoms, symptoms of problem drinking, body weight/shape concerns, and alcohol-related disordered eating and compensatory behaviors. Participants earned course credit for their participation. Participation was voluntary, and students could elect to fulfill the course requirement with other research studies or a separate assignment.

Data analysis

Bivariate correlational analyses were performed to measure the associations among predictor and criterion variables. Regression analyses were then used to test the independent contribution of PTSD symptoms on caloric restriction related to enhanced alcohol effects (AE) and disordered eating and compensatory behaviors related to alcohol-related weight control (WC), while controlling for biological sex, BMI (BMI), and factors related to eating disorders (i.e., overvaluation of shape and weight) and alcohol use disorder (i.e., symptoms of problem alcohol use).

Results

Descriptive statistics and correlation analyses are shown on Table 1. The average BMI was in the normal range (24.31; SD = 4.62), and body weight and shape concerns averaged 3.61 (SD = 1.60), which is in the middle of the 6-point scale (i.e., body shape and weight "somewhat" to "moderately" influenced self-judgement during the past 3 months). On average, participants marked less than 1 of the 4 CAGE items as "yes". Table 1 also provides the results of the bivariate correlations between the criterion variables (i.e., AE and WC) and each control and predictor variable (p's $<$ .05). AE scores were significantly positively related to all variables - WC scores, PTSD symptoms, problematic drinking, BMI, and biological sex. WC scores were significantly positively related to AE scores, PTSD symptoms, problematic drinking, weight and shape concerns and biological sex, but not significantly correlated with BMI.

In a linear regression model, the following variables were entered simultaneously to predict AE: biological sex, CAGE, and PDS. The overall regression model was statistically significant, $R = .40$, $F(3,448) = 28.18$, $p < .001$ and accounted for 16% of the variance in AE. The following variables were

Table 2. Hierarchical regression analysis for variables predicting calorie restriction related to enhanced alcohol effects (AE).

	Predictor	B	SE	β	t	p
CEBRACS (AE)	(Constant)	5.467	1.089		5.022	.000
	Biological Sex	.854	.549	.068	1.555	.121
	CAGE	1.457	.223	.292	6.528	.000
	PDS	.104	.024	.192	4.299	.000

Note. The abbreviations listed above refer to the following measures: Compensatory Eating and Behaviors Related to Alcohol Consumption Scale (CEBRACS) – Weight Control subscale and Alcohol Effects subscale, Posttraumatic Diagnostic Scale (PDS), the CAGE questionnaire for problematic drinking, Body Mass Index (BMI).

Table 3. Hierarchical regression analysis for variables predicting compensatory behaviors related to alcohol-related weight control (WC).

	Predictor	B	SE	β	t	p
CEBRACS (WC)	(Constant)	11.655	2.662		4.378	.000
	Biological Sex	1.644	.872	.088	1.886	.060
	BMI	−.101	.081	−.058	−1.245	.214
	Weight and Shape Concerns	1.285	.244	.275	5.673	.000
	PDS	.103	.038	.126	2.716	.007

Note. The abbreviations listed above refer to the following measures: Compensatory Eating and Behaviors Related to Alcohol Consumption Scale (CEBRACS) – Weight Control subscale and Alcohol Effects subscale, Posttraumatic Diagnostic Scale (PDS), the CAGE questionnaire for problematic drinking, Body Mass Index (BMI).

significant, independent predictors: CAGE ($p < .01$) and PDS ($p < .01$; see Table 2). Higher levels of PTSD symptoms and higher levels of problem drinking predicted the use of caloric restriction to enhance the effects of alcohol..

In a second linear regression model, the following variables were entered simultaneously to predict WC: biological sex, BMI, body and weight concerns, and PDS. The overall regression model was statistically significant, $R = .36$, $F(4,450) = 16.59$, $p < .001$, and accounted for 13% of the variance of WC. The following variables were significant, independent predictors: weight and shape concerns ($p < .01$) and PDS ($p < .01$; see Table 3). Higher levels of PTSD symptoms and elevated body shape and weight concerns predicted the use of alcohol-related compensatory behaviors related to weight control..

Discussion

The goal of the present study was to examine the association between trauma symptoms and alcohol-related disordered eating in a college population. Using a cross-sectional survey design, the results of the present study first demonstrated that PTSD symptoms predicted the use of caloric restriction to enhance the effects of alcohol, even after controlling for symptoms of problem drinking. College students suffering from trauma-related symptoms may use compensatory behaviors to enhance the effects of alcohol to cope with negative emotions related to trauma. The use of alcohol or substances to self-medicate or as an avoidant coping style is common in individuals with PTSD sympotomology,[35] and studies have shown that those with PTSD and avoidant coping styles were more likely to meet criteria for an alcohol use disorder.[43] Additionally, emotion dysregulation has been found to mediate the association between PTSD symptoms and alcohol-related consequences.[32] Substance use patients with comorbid PTSD report significantly more impulsive behaviors than those without PTSD,[44] which could explain why college students with elevated levels of traumatic stress would engage in "drunkorexia" and binge drinking, which has an elevated risk of blackouts and negative alcohol-related consequences.[18,19] Overall, there is strong evidence supporting the idea that restriction and other compensatory behaviors used to enhance the effects of alcohol may be a part of avoidant coping and self-medication of PTSD symptoms, however an alternative explanation is also plausible. The use of risky drinking behaviors may make individuals more likely to be exposed to trauma,[45] or it may increase the likelihood of the development of PTSD following a trauma exposure.[46] Future studies using longitudinal methods are needed to examine the direction of the relationship between PTSD symptoms and problematic alcohol use.

Results of the present study also demonstrated that PTSD symptoms predicted the use of purging, restriction, and other compensatory behaviors associated with alcohol-related weight control, even after controlling for the core feature of eating disorders – concern about body weight and shape. Students with traumatic stress symptoms may use these maladaptive strategies to offset caloric intake because they have inadequate coping mechanisms or other issues related to anxiety and control. Research has shown that PTSD is related to a variety of disordered eating patterns,[47] and problems with anxiety and control.[34,48] Thus, students may feel driven to compensate for alcohol consumption to maintain stability with weight and shape in the midst of emotional turmoil.

Results from the present study also support previous research that drunkorexia is related to features of both eating disorders and alcohol use disorders.[20,21] Symptoms of problematic drinking significantly predicted restriction prior to and during alcohol use to enhance the effects of alcohol in the current study, which suggests that the binge and heightened intoxication aspects of "drunkorexia" may be related to problematic drinking. In past research, participants who scored higher on problem drinking measures also scored high on "drunkorexia".[12] Furthermore, the core psychopathology of eating disorders – overvaluation of body shape and weight – significantly predicted restriction, purging, and other compensatory behaviors associated with weight control, which may correspond to the caloric concerns surrounding drinking. This is supported by findings that those who use alcohol-related compensatory behaviors for reasons of weight and shape control have higher disordered eating pathology.[12]

Understanding the connection between PTSD symptoms and compensatory behaviors surrounding alcohol use has important implications for college counseling centers and psychotherapy. Although "drunkorexia" is yet to be classified as a diagnosable mental health condition, it is a dangerous drinking style that is related to alcohol use disorder and is widely viewed as a subcategory of other specified eating and feeding disorders.[12,49] These findings underscore the importance of trauma assessments and the use of trauma-informed treatment approaches by college health professionals, both medical providers and mental health counselors, for students

exhibiting risky alcohol use and disordered eating behavior. Currently, most eating disorder therapies are based on Fairburn's transdiagnostic model of eating disorders and target overvaluation of shape and weight.[50] However, the current study lends support for a trauma-informed approach where trauma history is assessed in patients with disordered eating behaviors and binge drinking as it could be an important factor in treating "drunkorexia."

These results should be interpreted in light of the limitations of the study. This study utilized an undergraduate sample and assessed for PTSD symptoms, and therefore these results should not be generalized to populations with clinical levels of PTSD. Additionally, this study was conducted in a university setting in the southeastern United States using primarily first-year psychology students; since the current study used a relatively homogenous sample, results cannot be generalized to a more diversified population. Since participants did elect to participate in the study, there is the possibility that participants were drawn to this study because of certain characteristics they possess, and thus selection bias also may limit the generalizability of results. Future studies on trauma, problematic drinking, and "drunkorexia" should utilize more diverse populations and use longitudinal study designs to explore the causal relationship between alcohol-related disordered eating and posttraumatic stress symptoms.

Conclusion

Overall, this study sought to examine the associations between PTSD symptoms and "drunkorexia" in a college population. The results of the current study found that PTSD symptoms independently predicted alcohol-related disordered eating, beyond that explained by symptoms of eating disorders and alcohol use disorders. These findings support the association between trauma and "drunkorexia" and have implications for trauma-informed treatments. Future studies should analyze more diverse general populations and utilize longitudinal designs to examine the causal relationship between PTSD symptoms and problematic alcohol-related disordered eating.

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Conflict of interest disclosure

The authors report no conflicts of interest. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States of America and received approval from the Institutional Review Board of the University of Alabama.

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