

Associations among Trauma, Posttraumatic Stress, and Hazardous Drinking in College Students: Considerations for Intervention

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Published online: 3 February 2015
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Abstract Students with trauma and posttraumatic stress are disproportionately at risk for heavy drinking and for alcohol-related consequences. Brief motivational interventions (BMIs) have been shown to reduce hazardous drinking in college students, and could serve as a first-line approach to reduce heavy drinking in students with trauma and posttraumatic stress (PTS). Yet the standard BMI format may not adequately address the factors that lead to hazardous drinking in these students. Here, we review the literature on PTS and hazardous drinking in college students, and highlight cognitive (self-efficacy, alcohol expectancies) and behavioral (coping strategies, emotion regulation skills, protective behaviors) factors that may link trauma and PTS to drinking risk. Incorporating these factors into standard BMIs in a collaborative way that enhances their personal relevance may enhance intervention efficacy and acceptability for these at-risk students.

Keywords Posttraumatic stress disorder · College students · Alcohol · Treatment · Brief motivational intervention

This article is part of the Topical Collection on *Alcohol*

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Overview

College students report rates of trauma and posttraumatic stress (PTS) comparable to those in community samples [1–4]. Heavy drinking and associated consequences are widespread among college students [5–7]. Recent research indicates that students with trauma and, in particular, with PTS are at elevated risk for such problematic drinking patterns [8, 9]. This is true not only for students with a diagnosable posttraumatic stress disorder, but for those experiencing sub-threshold clinical PTS symptoms as well. Interventions to reduce the hazardous drinking that disproportionately affects students with PTS are needed. Brief motivational interventions (BMIs) have strong empirical support for successfully reducing problem drinking in college students [10, 11] and thus may offer promise in targeting drinking risk in students with PTS. Typically, BMIs administered in the college context consist of one to two individual meetings that are approximately 50 min long [10]. These interventions use motivational interviewing as the counseling approach, and often include personalized feedback to promote less risky drinking.

Yet, this standard BMI content may not adequately address some of the unique factors that contribute to hazardous drinking in students with trauma and posttraumatic stress. Recent work [12•] has successfully used brief intervention to reduce problem drinking in veterans with posttraumatic stress by targeting factors that may be most relevant to their experiences and symptoms. Similar approaches may be beneficial in college settings. In this article, we review the association between trauma and posttraumatic stress and alcohol involvement in college students. We then suggest several promising, theoretically based modifications that might be incorporated into BMIs designed to reduce risk drinking in this high-risk population.

Alcohol Use and Misuse in College Students

Heavy drinking and its consequences are a widespread and well-known problem on college campuses [5, 6]. Such drinking can lead acutely to a number of significant and deleterious outcomes, including sexually transmitted diseases, vehicular accidents, and even death [5, 7, 13]. Further, those students whose drinking patterns persist are at risk for greater alcohol problems later in adulthood [14]. Not all college students are equally likely to engage in heavy drinking or to experience harmful alcohol consequences. A growing literature indicates that trauma exposure and associated posttraumatic stress are among the factors that may portend risk for problematic alcohol consumption in college students.

Trauma and Posttraumatic Stress in College Students

Approximately two out of three college students report trauma exposure [1, 2], a percentage consistent with rates reported in the general community [15]. The types of traumas that students report are significant by any standard. Sexual victimization is particularly common in this population [16, 17], but other types of traumatic events typically reported include the sudden death of a loved one, non-sexual assault, natural disasters, and motor vehicle accidents [2, 18–20]. High rates of combat trauma and alcohol use have been reported in student service members/veterans pursuing higher education under the GI-bill [21]. For some, trauma exposure can lead to symptoms of posttraumatic stress disorder (PTSD), a disorder characterized by traumatic intrusions, avoidance of trauma stimuli, alterations in mood and cognition, and hyper-arousal/reactivity [22, 23]. These symptoms are best understood as occurring along a spectrum of severity, rather than as a categorical symptom state [24–28]. As such, even symptom presentations that fall below conventional diagnostic cutoffs may be associated with significant distress and functional impairment [8•, 29–32]. Consistent with community prevalence rates [15], an estimated 8–9 % of college students meet the diagnostic criteria for PTSD [2, 3, 33], and an even larger number (15–30 %) show evidence of clinically significant but sub-diagnostic threshold posttraumatic stress symptoms [2]. In the present paper, we consider this broad range of clinically significant symptoms, which we refer to as posttraumatic stress, or PTS.

Posttraumatic Stress and Drinking Risk in Young Adults

Traumatic life events and the range of stress responses to them long have been linked to problem drinking in clinical samples [34], and an emerging literature has demonstrated this link to occur in college students as well [35]. In just the past few

years, data have emerged to show that college students with trauma exposure and PTS drink more and experience worse consequences than those without PTS [8•, 9, 36–38]. Importantly, the literature points to PTSD symptoms specifically—and not just having been exposed to trauma—as being most clearly associated with hazardous drinking [e.g., 8•]. Below, we review a sampling of this literature.

Concurrent Associations Studies examining concurrent relations between trauma and PTS and alcohol involvement in college samples find that trauma and PTS are associated with greater problematic drinking [8•, 38, 39–42]. Convergent with these findings are recent data that show students with PTSD place a greater value (demand) on alcohol than students without these symptoms, suggesting that alcohol may be especially salient and appealing to those struggling with PTSD [43]. Work conducted in our own lab also demonstrates significant risk for problem drinking among students with PTS [Radomski and Read, manuscript under review]. Specifically, those categorized through a structured diagnostic interview as having clinically significant PTS ($N=113$; $M=6.58$) report approximately 25 % more alcohol problems over the 30 days than those with trauma exposure but no PTS ($N=172$; $M=9.22$), and 50 % more than those with no trauma exposure at all ($N=182$; $M=14.38$).

Prospective Associations Prospective investigations of trauma, PTS, and drinking in college samples have been far fewer. Our recent study [8•] found that students who entered college with clinically significant posttraumatic stress went on to experience substantially more alcohol consequences than those without these symptoms over the course of that first college year. A small number of other longitudinal studies also offer evidence of a prospective influence of PTS on drinking in both the short [42] and the longer-term [45]. Yet, these and other studies suggest that the patterns of influence of PTSD on drinking are complex and may also be bidirectional; with one influencing the other over time [e.g., 41, 44•, 45]. Especially troubling are studies showing that for those with trauma and PTS, heavy drinking can lead directly to increased risk for trauma re-exposure [46] and perhaps also for a spiral of worsening PTS symptoms [47].

Considered in aggregate, the literature suggests that efforts to acutely address and reduce hazardous drinking in students with significant PTS clearly are needed. Interventions have been developed for PTS and problem drinking as they occur both independently and together [48–51]. The majority of these interventions are cognitive-behaviorally oriented, and focus on maladaptive cognitions and behavioral skills deficits that are presumed to contribute to symptom presentation. Typically, these multi-session interventions call for a substantial time commitment, and many require professional facilitation. Moreover, CBT-based interventions for PTS frequently are

exposure-based. None of these characteristics is practical for routine implementation in the college setting. Yet from these interventions and their emphasis on critical cognitions and behaviors, valuable insight can be derived regarding what components may be incorporated into a less intensive intervention approach, such as a brief motivational intervention.

Reducing Alcohol Misuse in College Students with Posttraumatic Stress: Implications for Brief Motivational Interventions

Brief motivational interventions (BMI) have shown efficacy in reducing alcohol misuse in college populations, and already are being used on many US campuses [52–55]. These interventions incorporate features of motivational interviewing [MI; 56], into a focused, time-limited intervention to target behavior change. Work in the late 1990s and early 2000s first documented the efficacy of BMIs, showing significant reductions in alcohol use and consequences as far out as 4 years [57, 58]. Since then, this approach has been implemented successfully across numerous populations, modalities, and settings [59–62]. Motivational interviewing fosters a collaborative, empathic, and non-judgmental approach to the exploration of options for change. In addition, there are specific techniques to prevent discord in the therapeutic relationship (e.g., emphasizing personal choice and control, eliciting personal motivations for change; [56, 63]). Thus, MI is well suited to a population that may be new to treatment and in considerable distress. Further, the one to two session format of BMI may be ideal for college students—a group typically reticent to engage in more formal and extensive treatment [64, 65].

The evidence for the efficacy of traditional, stand-alone BMIs to reduce problem drinking in persons with co-occurring mood/anxiety symptoms has been somewhat mixed [59, 66–72]. However, recent work implementing BMIs with veterans highlights the potential for such interventions to reduce harmful alcohol use in individuals with PTS [12, 73]. It also is interesting to note that in these studies, the BMI modified to target PTS-relevant factors not only yielded drinking reductions, but PTS reductions as well. Based on this, we assert that BMI may be a promising approach that could be used in the service of decreasing heavy drinking—and perhaps also PTSD symptoms—in students with PTS.

To date, only a few studies have implemented BMIs for college students with trauma histories and only one of these [76] has focused on students with posttraumatic stress and not only trauma exposure. Though small, this body of research does suggest that BMIs can result in improved drinking outcomes for college students. For example, Clinton-Sherrod et al. [74] examined differences in variations of a standard BMI (BMI only, BMI with feedback, feedback only) and an

assessment control among women with and without sexual trauma. Posttraumatic stress was not assessed. In this study, the BMI was associated with drinking reductions in both victimized and non-victimized women. However, findings revealed some differences across victimization groups in how this change occurred, as there was evidence of weaker effects of the feedback-only component of the intervention for women with sexual trauma. This suggested that there was something important about the motivational intervention itself for sexually victimized women. In considering the findings, these authors called for greater attention to specific components of BMI to better understand how these components may interact with trauma history. In a subsequent study, Brahm et al. [75] also found that a standard BMI appeared to result in short-term drinking reductions in women with sexual trauma (again, PTS was not examined). Similarly, authors suggested a need for increased focus on specific, trauma-relevant components of the intervention as in this study women with trauma histories did not show improvements in positive coping that were observed in women without sexual trauma.

To our knowledge, only one study to date has examined the impact of posttraumatic stress specifically on drinking outcomes following BMI. In their study, Monahan et al. [76] compared an in-person standard BMI, a computerized standard BMI, and an assessment-only condition in students with and without PTS. Encouragingly, decreases in drinking were observed in students with PTS, though the overall effect sizes of drinking reductions were smaller (d 's .13–.14) than what is typically observed in BMI interventions. Findings also showed that reductions in alcohol consequences occurred only for the PTS students who received an in-person BMI. In addition, for those who received assessment only, there was a trend for students with PTS to show worse drinking outcomes over time relative to the MI conditions. When considering their findings, the authors speculated that the success of the counselor-based intervention may have been due in part to the fact that within this format, the link between PTS and drinking could be explicitly addressed.

In sum, a nascent literature offers support for the application of brief motivational interventions to reduce drinking in those with trauma and PTS. However, these studies also highlight the potential utility of tailoring interventions to address some of the factors that may be especially important to students with these histories and clinical presentations. Fortunately, there is strong precedence for the adaptation of BMIs to enhance their efficacy or to make them more appropriate for specific populations [66, 77–79]. This research indicates that BMIs can be modified effectively to include population-relevant topics or components, without losing the essential features thought to be integral to their success. Further, in many cases, modified interventions show stronger effects on drinking outcomes than are typically seen in standard, unmodified BMIs (see [66, 80] for reviews). Therefore, it may be

practical to consider theoretically based modifications to standard BMIs that might enhance efficacy by making them more relevant and meaningful for students with trauma and post-traumatic stress.

Theorized Mechanisms for a Modified BMI

Two related and complementary theories suggest promising modifications to BMIs for students with co-morbid PTS and alcohol misuse. First, Social Learning Theory (SLT; [81]) emphasizes drinking as a learned behavior with affective as well as cognitive and behavioral antecedents. Second, Hobfoll's Conservation of Resources (CoR) theory [82] conceptualizes post-trauma adaptation as occurring through either a gain or loss of psychological resources. In cases where trauma leads to loss of these resources, the individual is rendered more vulnerable to additional loss and harmful outcomes (e.g., alcohol misuse). These theories, when taken in the context of the larger literature on effective treatments for PTS and problem drinking, offer several promising cognitive (self-efficacy, expectancies) and behavioral (coping, emotional regulation, protective behaviors) foci which we believe are important to address in a BMI for college students with PTS and alcohol misuse (see Table 1). We review each of these critical concepts, their theoretical underpinnings, and their potential relevance to a college-based BMI.

Cognitions

Self-efficacy Self-efficacy refers to the extent to which someone believes she/he is capable of successfully managing a challenging circumstance [83]. The self-efficacy construct is featured prominently in SLT as a mediating cognitive mechanism that links more distal psychosocial influences to alcohol outcomes. When applied to the link between traumatic stress symptoms and drinking, the extent to which someone believes herself/himself capable of managing trauma-related distress without alcohol likely will be an important determinant of drinking outcomes. Hobfoll also incorporates self-efficacy in his CoR theory, conceptualizing this characteristic as a personal resource that may be compromised in the wake of trauma. The empirical literature supports this theorized pathway, as trauma-exposed individuals show evidence of diminished self-efficacy across multiple domains, including substance use [40, 84, 85]. In our own lab, we have found that trauma and PTS may be uniquely associated with drinking-related self-efficacy [Read et al., unpublished data]. Specifically, using the Tension Reduction subscale from the Situational Confidence Questionnaire [86], we find that students with PTS report significantly lower self-efficacy for not drinking when they are in a negative mood, relative to those without trauma

or to those reporting trauma but without clinically significant PTSD symptoms. This pattern of findings suggests that students with PTS may be more vulnerable to using alcohol due to diminished self-efficacy. Self-efficacy already is targeted in the standard BMI format (supporting self-efficacy for behavior change is a core principle of MI). Yet, in light of both theory and data described here, a modified BMI for PTS may benefit by focusing on the specific connection between trauma/PTS and self-efficacy, possibly focusing on enhancing a sense of control and mastery that may have been diminished by trauma and its effects.

Expectancies These learned beliefs about alcohol's effects are posited in SLT to be a mechanistic pathway to problem drinking [87, 88]. Alcohol expectancy information addressed in standard BMI approaches has been linked to short-term reductions in alcohol use in college students without trauma [52]. However, expectancies which pertain to the amelioration of negative affect may be of particular relevance for understanding PTS and drinking. Indeed, expectancies are an important predictor of drinking among those with PTS [40] and expectancies pertaining to alcohol's ability to moderate or alleviate negative affect (e.g., tension reduction expectancies) are commonly held by those with trauma and posttraumatic stress [89, 90]. Moreover, specific expectations regarding the use of alcohol to relieve PTSD symptoms have been identified in PTS individuals [91, 92]. Accordingly, a focus on both tension reduction and PTSD-specific expectancies may be of benefit to a BMI for students with trauma and PTS as it would highlight affect regulation and affect management skills (e.g., urge surfing, relaxation/grounding, social skills) that may be useful for those who may otherwise look to drinking for symptom reduction.

Behaviors

Coping Coping has been identified as an important mechanistic variable in associations between posttraumatic stress and drinking [44, 93]. Coping also is a core component of many cognitive-behaviorally based interventions for PTS and for substance misuse, as the extent to which someone can manage distress may determine behavioral outcomes such as posttraumatic stress symptoms or substance misuse [118, 94]. The CoR model asserts that the experience of trauma and resulting posttraumatic stress may tax cognitive and emotional resources, leaving the individual less able to manage distress [82, 95]. Therefore, those with PTS may lack adequate coping skills, instead using alcohol to cope with their symptoms [96]. Consistent with this conceptualization are data showing that those with PTS show poorer coping relative to those without PTS [97]. In a college sample, Grasson [98] found that students with PTS reported significantly greater use of

Table 1 Cognitive and behavioral factors, mechanism of influence, theoretical and empirical support, and intervention utility

Factor	Description	Putative mechanism	Theoretical framework	Empirical support	Intervention utility
Cognitive					
Self-efficacy	Belief in oneself to manage a challenging circumstance	Trauma exposure diminishes self-efficacy and may reduce one's belief in his/her ability to manage trauma-related symptoms without alcohol, resulting in increased use.	SLT/CoR	[40] Hruska and Delahanty, 2012; [84] Ouimette et al., 2007; [85] Walsh et al., 2007	Target ability to manage a challenging circumstance without the use of alcohol. Enhance sense of control and mastery.
Alcohol expectancies	Learned beliefs about alcohol's effects	Those with posttraumatic stress have learned to expect that alcohol use will reduce tension and PTS symptoms, resulting in use of alcohol in this manner.	SLT	[40] Hruska and Delahanty, 2012; [91] Norman et al., 2008; [89] Ouimette et al., 1998; [90] Simpson, 2003; [92] Vik et al., 2008	Focus on tension reduction and PTS-specific expectancies.
Behavioral					
Coping strategies	Techniques to be implemented as a means to reduce stress in difficult situations	Trauma and PTS tax coping strategies leaving such individuals with poorer coping skills such as alcohol use.	CoR	[93] Cohn, et al., 2014; [97] Hruska et al., 2011; [99] Filipas and Ullman, 2006; [98] Grasson et al., 2012; [44] Kayesen et al., 2014; [100] O'Hare et al., 2010; [104] Read et al., in press; [101] Yeater et al., 2010	Introduce alcohol-free coping strategies (e.g., social support, relaxation, problem solving, assertiveness training).
Emotion regulation skills	Ability to modulate emotional responding in a way that is appropriate to the context and to long-term objectives	Those with PTS have poorer emotion regulation skills and thus are at increased risk for reliance on alcohol for emotion regulation purposes.	CoR	[109] Bornovalova et al., 2009; [108] McDermott et al., 2009; [110] Vujanovic et al., 2011; [106, 107] Weiss et al., 20012; 2013	Facilitate emotional awareness and understanding of emotions through psychoeducation. Elucidate link between emotions and alcohol use.
Protective behavioral strategies	Strategies aimed at reducing alcohol use and alcohol-related consequences	This behavioral resource may be depleted after trauma, resulting in problematic use.	CoR	[116] Johnson and Johnson, 2013; [117] LaBrie et al., 2009; [118] Labrie et al., 2010; [4] Ullman and Filipas, 2005	Educate about the utility of indirect strategies (e.g., having a designated driver) for safety and well-being, particularly social support.

SLT social learning theory, CoR Hobfoll's conservation of resources theory

maladaptive coping strategies (e.g., denial, substance use, self-blame) than students without PTS, regardless of trauma history. In another college sample, Read et al. found posttraumatic stress to be prospectively related to poorer coping over time [104]. Although coping did not mediate PTS-alcohol associations in this study, several other studies have found at least partial support for a mediational role of coping [99–101]. In addition to coping skills themselves, the motivation to drink in order to cope—specifically with PTS—may also be an important factor to consider [9, 102, 103]. Though not part of the standard BMI format, because of its significance for PTS-drinking, coping has been incorporated in recent BMIs designed to reduce drinking in veterans with posttraumatic stress [12, 104]. Therefore, college students with PTS may benefit from a component incorporated in a modified BMI focusing on coping without drinking. The incorporation of a coping component into BMI may also have diagnostic value, as a focused discussion about coping could help to identify whether the student is lacking alcohol-free coping strategies, lack motivation to implement them, or a combination of both.

Emotion Regulation Skills Emotion regulation (ER) refers to the ability to modulate emotional responding in a way that is appropriate to the context and to long-term objectives [105]. Emotion regulation is another personal resource that may be compromised following trauma, consistent with a CoR framework. Indeed, poor emotion regulation confers vulnerability for substance misuse, as those who cannot successfully manage negative emotions such as PTS symptoms may instead turn to substances. Emotion regulation deficits have been observed in those with trauma and posttraumatic stress who misuse substances [106, 107], and to reliably distinguish between substance-dependent individuals with and without PTS [108]. Research in non-college samples has offered support for a mechanistic role of emotion regulation in PTS-alcohol associations [109, 110]. Importantly, recent work with college students (Radomski and Read, under review) indicates that those with PTSD reported more difficulty in emotion regulation than those without trauma exposure and those with trauma exposure but without PTS. Moreover, difficulty in emotion regulation mediated the PTSD-alcohol association. Although focus on emotion regulation is not addressed in the standard college drinking BMI, ER has been integrated into other brief interventions with other populations [e.g., 111]. As a component of ER pertains to awareness and understanding of emotions [112], facilitating emotional awareness and the link between emotions and drinking, as well as on broader ER strategies may be a valuable addition to BMIs for college students with PTS.

Protective Behaviors Protective behaviors are any behavioral efforts to reduce heavy drinking and its associated

consequences [113–115]. These behaviors typically include approaches such as pacing drinking, avoiding high-risk drinking activities (e.g., drinking games), or pairing with a friend to protect against hazardous outcomes (e.g., assault, criminal victimization) and are consistent with the kinds of skills typically taught in CBT interventions for PTS and problem drinking. Yet though these behaviors have the potential to buffer against harmful drinking outcomes [116], some evidence suggests that these behaviors may be less effectively implemented in those with mental health problems [117, 118] and as such, this may be an important focus of intervention for these individuals. In particular, “indirect” protective behaviors that involve using others as a resource may be especially important for those with trauma and PTS, as the literature has pointed to the centrality of strong social support in post-trauma adaptation [119]. This literature also suggests that, consistent with a CoR conceptualization, those with PTS may have difficulty effectively employing social support resources in the wake of trauma [120]. Protective behaviors routinely are targeted in BMI, and could be readily modified to include a specific focus on effective utilization of social support (e.g., having a safe “buddy” to drink with). This may not only reduce drinking risk, but may also reduce risk for additional trauma exposure.

Conclusion

Students with trauma and posttraumatic stress drink more haz- ardously, encounter more significant consequences from their drinking, and are at risk for a number of other deleterious outcomes relative to students without these experiences and symptoms. This risk is evident across a range of posttraumatic stress symptom severity, not just diagnosable PTSD, and also pertains to both immediate and longer-term outcomes. In this paper, we have highlighted some of the important vulnerabilities that may contribute to drinking risk in students with PTS. These include maladaptive coping, lower self-efficacy for refusing alcohol when in a negative mood state, poorer emotion regulation, less engagement in protective behaviors, and greater expectations for alcohol’s self-medicating effects. Effective interventions are needed for this group of students. Alcohol-focused BMIs already are being delivered on many US college campuses and a small but growing literature has demonstrated that BMIs can be used to reduce heavy drinking and its consequences in college students with trauma histories [74, 75] and associated posttraumatic stress [76]. We posit that there is much more that can be done to target cognitive and behavioral factors most relevant to these individuals. Further, the modifications proposed here could be the first step in more elaborated interventions for heavy drinking students with PTS. For example, the modified BMI could also be further adapted to enhance treatment motivation in heavy drinking

students, with the hope that such intervention would facilitate engagement in more intensive treatments (e.g., Seeking Safety). Alternatively, a modified BMI could be offered as a complement to a standard PTS intervention (e.g., prolonged exposure, anxiety management, cognitive restructuring) so that alcohol risk could be diminished acutely even as more focused treatment for PTS continues. Finally, detailed analysis of in-session therapist and client behaviors and their link to subsequent outcomes [121, 122] will further enhance our understanding of how BMIs can facilitate change in a variety of target behaviors (alcohol use and consequences, protective behavioral strategies, treatment engagement). This kind of systematic and thoughtful evaluation will provide an improved understanding of which BMI components and in-session processes contribute to the reduction of problem drinking and perhaps also PTS. This ultimately will lead to knowledge about how brief interventions might be augmented to be optimally beneficial to and relevant for the many college students struggling with trauma and its negative effects.

Acknowledgments Jennifer Read's contribution to this manuscript was supported by the National Institute on Alcohol Abuse and Alcoholism Grant R01AA016564. Brian Borsari's contribution to this manuscript was supported by the National Institute on Alcohol Abuse and Alcoholism Grant R01-AA017427 and VISN1 Career Development Award V1CDA2012-18. The contents of this manuscript are those of the authors and do not necessarily represent the views of the National Institute on Alcohol Abuse and Alcoholism, the Department of Veterans Affairs, or the US Government.

Compliance with Ethics Guidelines

Conflict of Interest Jennifer P. Read declares that she has no conflict of interest.

Sharon Radomski declares that she has no conflict of interest.

Brian Borsari declares that he has no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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