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Posttraumatic stress severity is associated with coping motives for alcohol use among in-patient and community recruited adolescents

Renee M. Cloutier¹, Keke L. Schuler¹, Nathan Kearns¹, Camilo J. Ruggero¹, Sarah F. Lewis², and Heidemarie Blumenthal¹

¹Department of Psychology, University of North Texas, Denton, TX, United States of America

²Center for Research, Assessment, and Treatment Efficacy (CReATE); Asheville, NC

Abstract

Background and Objectives: A growing body of work suggests individuals with more severe post-traumatic stress symptoms (PTSS) are at higher risk for developing problematic alcohol use outcomes. Extending work from the adult literature, the present study was the first to examine the extent to which PTSS is related to drinking motives for alcohol use in both clinical and non-clinical samples of adolescents.

Design: Hierarchical regression analyses were used to predict coping motives for alcohol use from PTSS, above and beyond demographic variables, alcohol use frequency, and other alcohol use motives.

Methods: Trauma-exposed adolescents before entering treatment (Sample 1 $n = 41$) and recruited from the local community (Sample 2 $n = 55$) self-reported on PTSS and alcohol use motives.

Results: PTSS positively predicted coping motives for alcohol use after controlling for age, gender, and alcohol use frequency.

Conclusions: The current study highlights the need to consider both PTSS severity, as well as underlying cognitive mechanisms (e.g., motives), to better understand the etiology of problematic alcohol use among trauma-exposed youth. Future work focused on clarifying the trajectory of alcohol use motives and problems as a function of PTSS is needed.

Keywords

post-traumatic stress; alcohol use; adolescence; coping; motives

Correspondence concerning this article should be addressed to Renee M. Cloutier (ReneeCloutier@my.unt.edu) or Dr. Heidemarie Blumenthal (Heidemarie.Blumenthal@unt.edu), University of North Texas, Department of Psychology, Teen Stress and Alcohol Research Laboratory, 1155 Union Circle #311280, Denton, TX 76203, United States of America. Phone: (940) 565-4716.

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Data Availability Statement: The data that support the findings of this study are available from the corresponding authors, [RMC or HB], upon reasonable request.

Introduction

Trauma exposure is remarkably common, with estimates indicating 62–68% of adolescents from the community and 75% of high-risk samples (e.g., adolescents receiving substance use treatment) experience at least one traumatic event before 18 years of age (Copeland, Keeler, Angold, & Costello, 2007; Deykin & Buka, 1997; McLaughlin et al., 2013). Although only a small percentage of trauma exposed individuals from the community go on to develop posttraumatic stress disorder (PTSD; 11.5–21.5%), a significant proportion continue to experience symptomatic responses (e.g., Alisic et al., 2014; Foa, Johnson, Feeny, & Treadwell, 2001). An extensive adult and adolescent literature underscores additional risk associated with traumatic event exposure and posttraumatic stress symptoms (PTSS), including elevated depression, anxiety and panic problems, risk-related substance use (e.g., binge drinking), and alcohol use problems in particular (Kar & Bastia, 2006; Oosterhoff, Kaplow, & Layne, 2016; Pietrzak, Goldstein, Southwick, & Grant, 2011; Read et al., 2012). In contrast to adolescents in the community, a disproportionately greater number of adolescents in treatment for alcohol use disorder or other substances also meet criteria for lifetime (29.6%) and current (19.2%) PTSD diagnoses (Deykin & Buka, 1997). Indeed, both PTSD and higher PTSS levels have been consistently linked to more frequent alcohol use, alcohol-related problems, and the diagnosis of an alcohol use disorder across adult and adolescent samples (Blumenthal et al., 2008; Debell et al., 2014; Read et al., 2012).

Evidence that trauma-exposed individuals may use alcohol as a means of coping with PTSS is presented across several studies of trauma-exposed adults with and without a PTSD diagnosis (e.g., battered women, veterans; Kaysen et al., 2007; Simpson et al., 2014; Stewart, 1996). For example, during intake interviews with military veterans, 85.3% of participants retrospectively reported that as their PTSS increased, so did their frequency of substance use; 61.8% reported that a decrease in PTSS was followed by a decrease in substance use (Back et al., 2014). Conversely, only 11.4% reported that a decrease in their substance use preceded a decrease in PTSS (Back et al., 2014). Additionally, findings from multiple cross-sectional studies with adults indicate that coping motives (i.e., drinking to alleviate negative affect) partially account for the relation between PTSS and markers of alcohol-related problems such as heavy episodic drinking and problems with relationships/important areas of life (Kaysen et al., 2007, Lehavot, Stappenbeck, Luterek, Kaysen, & Simpson, 2014; Ullman, Relyea, Peter-Hagene, & Vasquez, 2013). Support also is found in studies assessing daily and momentary PTSS and alcohol use. For example, in a daily assessment of PTSS and alcohol use among adults with co-occurring PTSD and alcohol use disorder diagnoses, PTSS severity was positively associated with both same-day and next-day alcohol use (Simpson et al., 2014). Despite this growing body of evidence, the majority of the work examining these relations has been conducted with adults, many of whom already meet criteria for PTSD, alcohol use disorder, or both.

Understanding the link between PTSS and alcohol use during *adolescence* is of particular concern for at least three reasons. Most notably, this distinct period is marked by (a) high rates of trauma exposure (e.g., up to 68%; Copeland et al., 2007; McLaughlin et al., 2013), (b) forming of initial beliefs about alcohol (Schell et al., 2005), and (c) elevated risk for more rapid transitions to problematic alcohol use compared to adults (Deas et al., 2000).

Further, theoretical and empirical work demonstrates that adolescence is a unique period of development, meaning that processes underlying trauma- and substance-related pathology among adults might not exist or function in the same manner among adolescents. Indeed, simple “downward extension” of adult models to younger populations without empirical testing can be misleading (Blumenthal et al., 2008; Cicchetti & Rogosch, 2002). For example, implied within the Self-Medication model (i.e., alcohol is consumed to alleviate negative affect caused by PTSD) is that users have had a sufficient number of pairings between negative affect and relief from that negative affect following alcohol use in order to be motivated to use alcohol for coping purposes (Khantzian, 1997). Yet, by virtue of their age and legal status, adolescents typically have a more limited alcohol use history (i.e., fewer opportunities for pairings), as well as dangerous binge-drinking tendencies whenever consumption opportunities do arise (Miller, Naimi, Brewer, & Jones, 2007). The infrequent alcohol use more typical of non-clinical adolescent populations is predominately associated with environmental features (e.g., peers) and as a reaction to those environmental features (e.g., drinking to conform with peers; Teunissen et al., 2012). Thus, PTSS may not relate to coping motives among adolescents because they have yet to formulate *any* primary motives or, alternatively, because externally-based motives (e.g., conformity, social) are still predominant (Cooper, 1994). In contrast, PTSS may serve to expedite the process through which adolescents begin to use alcohol for coping purposes by increasing the number and severity of negative affect events that are paired with relief following alcohol consumption.

The limited work conducted with adolescents provides preliminary support for the contention that trauma-exposed youth also may use alcohol as a means of coping with their trauma histories. For example, Topper, Castellanos-Ryan, Mackie, and Conrod (2011) found that adolescents (13–15 years) who were bullied at baseline reported greater rates of coping related alcohol use at a one year follow-up, which in turn accounted for greater alcohol problems. Another study on adolescents (14–17 years) who were in the welfare system and had a history of child maltreatment found that anxiety symptoms were associated with greater alcohol problems for those reporting higher coping motives for alcohol use (Goldstein, Vilhena-Churchill, Stewart, & Wekerle, 2012). Dixon and colleagues (2009) reported that PTSS were positively related to frequency of coping motives, but not conformity, social, or enhancement motives, providing initial support for the specific relation between PTSS and coping-motivated drinking among adolescents entered into a residential treatment program. However, these findings do not provide a complete picture regarding the association between PTSS and coping motives across samples. More specifically, the studies of community adolescents (e.g., Topper et al., 2011) were not specifically focused on PTSS. Further, the few studies that did examine PTSS had notable methodological limitations, either (a) only included youth exposed to a specific type of trauma (e.g., maltreatment/neglect; Goldstein et al., 2012) or (b) included youths already in a treatment programs, where large proportion also presented with a substance use disorder (e.g., Dixon et al., 2009).

Notably, a recent study of community-recruited adolescents found that tension-reduction alcohol expectancies significantly mediated the relation between trauma exposure and alcohol use frequency, suggesting that the increased alcohol use observed among trauma-exposed youth is related to the expectation that alcohol will reduce negative affect

(Blumenthal, Leen-Feldner, Knapp, Badour, & Boals, 2015). However, *expecting* alcohol to reduce tension does not necessarily mean that is *why* an adolescent chooses to use alcohol, and *trauma exposure* does not necessarily lead to PTSS (Cronin, 1997; Foa et al., 2001; Kuntsche, Knibbe, Gmel, & Engels, 2005). There remains a need to examine the relation between PTSS and coping related alcohol use across the spectrum of PTSS severity, particularly among adolescents *before* meeting clinical criteria for alcohol or stress-related diagnoses. Importantly, examining these relations across at-risk adolescent samples allows for the consideration of theorized etiological processes while also limiting potential confounding effects of concurrent clinical conditions (e.g., Zvolensky, Lejuez, Stuart, & Curtin, 2001). Clearly delineating these theoretical processes will, in turn, help inform meaningful intervention-and prevention-oriented programming efforts (Blumenthal et al., 2008; Clark, Lesnick, & Hegedus, 1997; Stewart, 1996).

Together, the aim of the current project was to replicate and extend prior findings linking PTSS and coping related alcohol use motives among adolescents. Drawing from existing work, PTSS severity was hypothesized to positively relate to coping, but not conformity, social, or enhancement alcohol use motives in a sample of youth entering residential treatment (Sample 1) and recruited from the community (Sample 2). Sample 1 was chosen to replicate existing work with adolescents in treatment (e.g., Dixon et al., 2013) while Sample 2 was chosen as an extension of the existing literature. Specifically, Sample 2 was recruited from the community to cross-validate results (e.g., ensure that findings were not confounded by the effects of pre-existing, related factors). Finally, the association between PTSS and coping motives was expected to be robust to the inclusion of demographic (i.e., chronological age, alcohol use frequency; Kuntsche et al., 2005; 2006; Tolin & Foa, 2006) and theoretical (e.g., days since trauma; other use motives) covariates. Of note, within the drinking motives literature, approaches for handling the anticipated shared variance across subscales varies widely (e.g., Cooper et al., 2016; Kuntsche et al. 2005). As such, we elected to run two sets of regression models to provide estimates that focus solely on covariates related to the specific construct (e.g., PTSS and coping motives), as well as constructs pertain to the broader topic of drinking motives, specificity (e.g., PTSS and coping motives, controlling for all other drinking motives).

Method

Data for this study were drawn from two samples: adolescents entering residential treatment program and adolescents recruited from the community. Details about the participants and methods specific to each sample are described below and in Table 1. Prior to collecting data from both samples, approval was obtained from the University of Arkansas Institutional Review Board. Verbal and written informed parental consent for child participation as well as written adolescent assent were obtained prior to enrolling participants.

Participants

Sample 1—Sample 1 ($n = 44$) was drawn from an ongoing assessment of a group based residential treatment program for adolescents (ages 9–19). Of the 594 adolescents approached for participation, 384 agreed to participate (64.6%). Of those who agreed, 196

had usable Time 1 data – the most common reasons for unusable data were: participant refusal, program error (e.g., missed the window for pre-treatment assessment), and researcher error (e.g., technological errors when uploading data from tablets to computers). Of those with usable data, cases were selected for the current analyses if they were less than 18 years of age, met *DSM-IV-TR* criteria for trauma exposure (American Psychiatric Association, 2000), reported current alcohol use, and had complete data on the primary measures. Excluding youth who were 18 years or older ($n = 1$), non-trauma exposed ($n = 103$), and/or were not current drinkers ($n = 115$) from the larger sample¹, resulted in a final sample of 44 adolescents aged 13–17 years.

Participants were assessed at entry to the program (i.e. prior to intervention), presenting with a variety of internalizing and externalizing forms of psychopathology. Adolescents entered treatment via community-based referrals or self-referrals from the program website. Program staff approached parents of potential participants to obtain parental consent and adolescent assent. Parents provided participant demographic (e.g., age, gender) and their own education and income for descriptive purposes. Adolescent participants completed all primary measures with computerized self-report measures. Participants and parents completed self-report indices in a quiet, private place with trained research personnel on hand to answer any questions. Finally, participants were compensated with a lottery enrollment where they could win \$50 or \$100.

Sample 2—Sample 2 ($n = 56$) was drawn from a larger study examining adolescent health behaviours among community youth ages 12–17 years.² As part of the larger study, eligibility criteria included age 12–17 years, consumption of at least one standard alcoholic beverage in the past 6 months, not currently pregnant (girls only) or actively suicidal, and ability to provide written informed consent/assent; participants included in the current analyses also needed to endorse at least one *DSM-IV* Criteria A1 defined traumatic experience (APA, 2000). Of the 688 adolescents and/or guardians who contacted the laboratory and were informed about the study, 73 adolescents and/or guardians declined (e.g., sibling not eligible, no time, not comfortable with materials), 16 did not fall within the required age range, 392 reported never having consumed a standard alcoholic beverage, 60 had not consumed a full beverage in the past 6 months, and 51 met eligibility criteria but did not attend scheduled appointments (at least three times before no further attempts were made). Of the 88 eligible adolescents who participated in the laboratory appointment, 31 reported no lifetime *DSM-IV* defined traumatic events, and 5 did not complete the primary interviews, resulting in a final sample of 56 participants aged 12–17 years to serve as a community comparison sample to those in Sample 1 who were currently seeking treatment.

Adolescents completed the self-report assessments in a private space with a trained researcher on hand to answer questions, followed by a series of laboratory tasks not relevant to the current study (e.g., voluntary hyperventilation). Parents accompanying their child to the laboratory visit also were asked to report on their own education and income for

¹-Exclusion categories were not mutually exclusive

²-Data are drawn from the same dataset used by Blumenthal, Leen-Feldner, Knapp, Badour, and Boals, (2015). Here, we directly examine PTSS (c.f., trauma exposure) and alcohol motives (c.f., expectancies) among only trauma exposed participants (c.f., trauma exposed and non-exposed).

descriptive purposes (66.7% of sample). Finally, participants were debriefed and compensated \$40 and \$5 for adolescents and parents, respectively.

Please see Table 1 for additional descriptives on Samples 1 and 2, including the percentage of youth meeting ‘clinical cut-offs’ on the *Youth Self Report* internalizing and externalizing subscales (i.e., T-score ≥ 70 ; Achenbach & Rescorla, 2001).

Measures

Post-Traumatic Stress Symptoms (PTSS).—Self-reported trauma exposure and PTSD symptoms were assessed with the computer (Sample 1) or the interview (Sample 2) version of the *Child PTSD Symptom Scale* (CPSS; Foa et al., 2001). Across both samples and versions, the trauma had to have been experienced by the participant and the participants had to endorse fear, helplessness, or horror in response to the index trauma (i.e., Criterion A). Sample 1 described their most distressing lifetime event, then rated the severity of their symptoms from the past two weeks. Symptoms were rated across 17 items on a 0 (“*Not at All*”) to 3 (“*5+ times per week/Almost Always*”) scale and summed to create a total score with a possible range of 0–51. Higher scores indicate greater severity of symptoms, with a score of 15 suggesting possible PTSD diagnosis (Nixon et al., 2013). For Sample 2, trained interviewers administered the *Anxiety Disorders Interview Schedule for DSM-IV: Child Version* (Silverman & Albano, 1996) to index traumatic event exposure, including direct inquiries about experiencing eight specific events (e.g., physical or sexual assault), as well as any other upsetting events not listed. Affirmative responses were probed to determine whether significant threat and emotional response were present. The most distressing event identified by the youth and researcher (e.g., meeting DSM-IV-TR criteria) was then assessed for lifetime PTSS with the CPSS interview (Foa et al., 2001). In contrast to Sample 1, symptoms were assessed as present (coded 1) or absent (coded 0), then summed to create a total score with a possible range of 0–17. Additional interference ratings allowed for the ascertainment of possible lifetime PTSD as defined by the DSM-IV-TR (for exclusionary purposes only).

The CPSS is a sensitive and widely used measure of PTSS validated for use in youth with and without a clinical diagnosis of PTSD (Foa et al., 2001; Nixon et al., 2013). The CPSS also has adequate test-retest reliability among youth with recent and distal trauma exposures (Foa et al., 2001; Nixon et al., 2013). The CPSS evidenced adequate internal consistency in both Sample 1 (e.g., current Cronbach’s $\alpha = .92$) and Sample 2 (e.g., Cronbach’s $\alpha = .81$).

Alcohol use motives.—Both samples completed the *Drinking Motives Questionnaire–Revised* (DMQ-R; Cooper, 1994) to assess motives for alcohol use. This 20-item self-report measure is rated on a Likert-type scale indicating how often participants use alcohol for the listed reason ranging from 1 (*almost never/never*) to 5 (*almost always/always*). The measure includes five questions reflecting each of the four alcohol use motives categories: coping (“to relax”, “to forget your worries”, “because you feel more self-confident or sure of yourself”, “because it helps when you feel depressed or nervous”, “to cheer up when you’re in a bad mood”), conformity (“because your friends pressure you to drink”, “so that others won’t kid you about not drinking”, “to fit in with a group you like”, “to be liked”, “so you

won't feel left out"), social ("because it helps you enjoy a party", "to be sociable", "because it makes social gatherings more fun", "because it improves parties and celebrations", "to celebrate a special occasion with friends"), and enhancement (e.g., "because you like the feeling", "because it's exciting", "to get drunk", "because it's fun", "because it gives you a pleasant feeling"). Subscale scores have each been shown to uniquely and prospectively predict different alcohol-related outcomes (e.g., frequency, drinking contexts, problems; Cooper, 1994; Kuntsche et al., 2005; 2006). All subscales evidenced adequate internal reliabilities in Sample 1 (coping: $\alpha = .88$; conformity: $\alpha = .89$; social: $\alpha = .93$; enhancement: $\alpha = .90$) and Sample 2 (coping: $\alpha = .77$; conformity: $\alpha = .89$; social: $\alpha = .88$; enhancement: $\alpha = .90$).

Covariates—Age, number of drinking days, and number of days since trauma were selected as potential demographic covariates. Age for Sample 1 was reported by parents during intake, and by adolescents on a demographic questionnaire in Sample 2. In Sample 1, total number of drinking days within the preceding 30 days (i.e., 30-day alcohol use frequency) was assessed using a single, open-ended-item from the *Youth Risk Behavior Survey* (Center for Disease Control and Prevention, 2006): "During the past month (30 days), on how many days did you have at least drink of alcohol?". Self-generated responses ranged from 0 to 30. If a non-numeric response was provided, clear responses (e.g., 'None' = 0, 'Everyday' = 30) were recoded into numeric values and unclear responses (e.g., 'Yes') were treated as missing. In Sample 2, total number of drinking days within the preceding six-months was assessed with a *Timeline Followback* interview (Sobell & Sobell, 1996). During the *Timeline Followback*, the interviewer obtains daily drinking estimates that are summed to create a continuous estimate of the total number of drinking days (i.e., days consumed at least one full standard alcoholic beverage) in the past six-months. In Sample 1 and Sample 2, time since trauma was asked as part of the *CPSS*, following the assessment of the index trauma. Specifically, participants were asked what their most distressing event was, then asked to report the length of time since the event. As an open-response format, participants were able to report the duration of time in days, weeks, or years – all responses were recoded into days.

Data Analytic Plan

In Sample 1 there were two cases missing data on PTSS (4.5%), and one case missing data on time since trauma (2.3%). All available cases were used for each analysis resulting in slightly different sample sizes (n 's = 36 – 42) in the preliminary analyses depending on the variable of interest and are described in Table Notes. Because Little's MCAR test indicated the data were Missing Completely at Random [$\chi^2 = 6.85$, ($df = 7$, $p = .445$)] and the percent of missingness present in the variables selected for the regression models fell below accepted thresholds (e.g., 8–10%; Widaman, 2006), listwise deletion was used on the final regression analyses (Final $n = 41$). In Sample 2, one case (1.7% of sample) had missing data on the PTSS – because PTSS was the primary predictor of interest, the overall percent of missingness fell below accepted thresholds, and Little's MCAR test indicated the data were Missing Completely at Random [$\chi^2 = 8.62$, ($df = 5$, $p = .125$)], listwise deletion was used on all analyses resulting in a final sample of 55.

Identical analyses were conducted across samples with the exception that Sample 1 included 30-day alcohol use frequency and Sample 2 included six-month alcohol use frequency as a covariate. To facilitate comparisons across samples, the results are summarized in the same sections and tables. First, zero-order Pearson correlations were conducted to examine bivariate relations among primary variables (see Table 2). An online calculator from Lee and Preacher (2013) was used to test the equality of statistically significant correlation coefficients between PTSS and each of the drinking motives subscales (Steiger, 1980). Second, hierarchical linear regression analyses were conducted to test the main hypothesis that PTSS would predict coping motives for alcohol use above and beyond relevant covariates. Two regression models were conducted for each sample – the first models included demographic covariates only and are summarized in text. The second, more conservative models also controlled for other alcohol use motives (presented in Table 3).

Results

Preliminary Analyses

Sample 1—Adolescents in Sample 1 endorsed a mean PTSS severity of 16.76 ($SD = 13.48$) with 50.0% meeting the cut off for possible PTSD diagnosis. Adolescents drank an average of 5.4 ($SD = 8.4$) days out of the past 30 days. Zero-order correlations indicated PTSS was positively correlated with Coping ($p < .001$) and Conformity ($p = .012$) motives, but not Social ($p = .090$) or Enhancement ($p = .142$) motives. Tests comparing the equality of correlation coefficients (Lee & Preacher, 2013) indicated that the correlation between PTSS and Coping motives was stronger than the correlations between PTSS and Social ($p = .045$) or Enhancement ($p = .029$) motives, but similar in magnitude to the correlations between PTSS and Conformity ($p = .123$) motives. In terms of potential covariates, Coping motives were positively associated with alcohol frequency ($p < .001$) and negatively associated with days since trauma ($p = .022$) but not associated with age ($p = .280$).

Sample 2—Adolescents in Sample 2 endorsed a mean PTSS severity of 4.7 ($SD = 3.9$) with four cases meeting the cut off for possible PTSD diagnosis. Adolescents drank an average of 2.1 ($SD = 2.7$) days out of the past 30 days and 7.8 ($SD = 12.3$) days out of the past six months. Zero-order correlations indicated that PTSS was positively related to Coping motives ($p = .057$), negatively related to Social motives ($p = .039$), and unrelated to Conformity ($p = .409$) and Enhancement ($p = .102$) motives. Similar to Sample 1, Coping motives were positively associated with alcohol frequency ($p = .013$) and not statistically related to age ($p = .510$). However, unlike Sample 1, Coping motives was not related to days since trauma ($p = .435$).

Primary Analyses

Sample 1—In the first regression, demographic covariates (age, 30-day alcohol use frequency, time since trauma) were entered in step one followed by PTSS total scores in step two. The overall model accounted for 64.9% total variance in Coping motives for alcohol use and was statistically significant ($F[4, 40] = 16.66, p < .001$). Covariates accounted for 45.5% variance and PTSS contributed 19.4% unique variance to Coping motives. The second regression included demographic covariates as well as Conformity, Social, and

Enhancement motives in step one followed by PTSS in step two. Again, the overall model was statistically significant ($F[7, 40] = 14.29, p < .001$) accounting for 75.2% variance in total and PTSS remained a significant predictor (Please see Table 3 for predictor level data)³.

Sample 2—In the first regression, age, six-month alcohol use frequency, and time since trauma were entered into step one, followed by PTSS total scores in step two. The overall model accounted for 18.9% total variance in Coping motives for alcohol use and was statistically significant ($F[4, 50] = 2.80, p = .030$). At the predictor level, PTSS accounted for 6.8% variance and was statistically significant ($p = .046$). The second regression also included Conformity, Social, and Enhancement motives with the demographic covariates in step one, and PTSS included in step two. Overall, this model was statistically significant ($F[7, 47] = 5.94, p < .001$), accounting for 46.9% variance in total and PTSS remained a significant predictor (Please see Table 3 for predictor level data).

Discussion

The present study was the first to examine the extent to which PTSS are related to coping motives for alcohol use among adolescents from both community and clinical settings. As hypothesized, across both samples PTSS was positively related to coping, but not social or enhancement alcohol use motives. In the clinical sample only, PTSS also were correlated with conformity motives, and alcohol use frequency was related to both coping motives and PTSS severity. Together, the current findings speak to the role of PTSS in coping-related drinking motives among adolescents with a *range* of responses to DSM-IV-defined traumatic events.

In both samples PTSS positively related to coping motives for alcohol use. Even after conducting a conservative test of the effects that included both demographic variables and other motives as covariates, PTSS remained a significant predictor. Further, the size of the PTSS effect in the community sample ($r = .26$) was nearly half that of the clinical sample ($r = .58$) in the preliminary analyses. This consistency highlights the relevance of PTSS in the development of coping motives even when youth are not currently expressing clinical PTSD or alcohol use disorder symptom levels. Of note, the adolescents entering treatment reported more frequent alcohol use than those from the community. Further, in the treatment seeking sample, 30-day alcohol use frequency was positively associated with all alcohol use motives, but evidenced the strongest association with coping motives. This provides some support for the idea that while increased frequency of alcohol use may lead to an increased level of alcohol use motives *overall*, specific risk factors, such as PTSS, may uniquely predict processes related to the development of alcohol problems (i.e., via negative reinforcement motives).

These findings replicate and extend previous work examining the association between PTSS and alcohol motives. To date, most studies included adult samples (e.g., Ullman et al., 2013)

³.Because PTSS was positively associated with conformity motives at the zero order level ($r = .38$), similar post-hoc regression analyses were conducted examining PTSS as a predictor above and beyond other covariates. The overall model was statistically significant ($F[7, 33] = 2.958, p = .016$) and PTSS remained a unique predictor ($R^2 = .09, p = .04$).

with only one reporting on adolescents (i.e., Dixon et al., 2009). Collectively, findings indicate that more severe PTSS following trauma are positively associated with coping motives for alcohol use across clinical and non-clinical samples, despite purposeful and meaningful variations in age, degree of alcohol use experience, and severity of other psychological and behavioural problems. The current data also support the contention that coping motives may precede – and, therefore, play a key role in – the development of subsequent alcohol use problems (Kuntsche et al., 2005; Topper et al., 2011). This is important, as empirical work indicates that earlier trauma exposure and more frequent alcohol use rates may place adolescents at particular risk for “telescoped” development of (i.e., faster progression to) alcohol problems as compared to adults or non-trauma exposed adolescents (e.g., Behrendt et al., 2010; Berenson, Wiemann, & McCombs, 2001). As adolescent alcohol use is often considered normative, it may be important for clinicians working with trauma-exposed youths to assess and target early reports of coping-related alcohol use as a means of preventing the development of problematic drinking behaviors.

Across almost all analyses, PTSS were uniquely related to coping motives. However, in the clinical sample PTSS also were positively correlated with conformity motives and in the community sample PTSS was negatively related to social motives. Although the PTSS-social motives effect was no longer statistically significant in the regression ($R^2 = .01$), the PTSS-conformity motives effect remained statistically significant when covariates were included in the model ($R^2 = .09$). Though the association between PTSS and conformity motives was unexpected, it is possible that in clinical populations PTSS leads to alcohol use for negative reinforcement motives more broadly. This association is generally consistent with the idea that, after controlling for use frequency, conformity motives are often associated with use related problems (Cooper, 1994). Nevertheless, these findings contradict several studies among adults (e.g., Vujanovic, Marshall-Berenz, & Zvolensky, 2011) and the one study conducted with another clinical population of adolescent alcohol users (Dixon et al., 2009) which have failed to identify associations between PTSS and conformity drinking motives. Future research is needed to resolve these discrepant findings.

Limitations and Future Research Directions

Importantly, while the analyses included adolescents with a range of trauma symptoms and alcohol use histories, both projects used cross-sectional designs and neither included an assessment of alcohol-related problems (e.g., Read et al., 2012). Thus, future adolescent work including each piece of the theoretical model (i.e., PTSS, coping motives, alcohol problems) in a longitudinal design is needed to parse apart the temporal sequencing of these processes. Experimental designs in particular could be used to isolate individual and situational risk factors as well as provide clearer targets for intervention (Kraemer, Yesavage, Taylor, & Kupfer, 2000), such as social support and rumination (Bokszczanin, 2007; Guay, Nachar, Lavoie, Marchand, & O'Connor, 2017; Szabo, Warnecke, Newton, & Valentine, 2017). Future work should also consider antecedent individual factors, such as coping styles and physiological stress reactivity before trauma exposure (e.g., disengagement coping; Gil, 2005; Pineles et al., 2013), although assessment of these constructs prior to trauma may be impractical given the nature of these experiences (i.e. often unexpected).

Although findings generally supported our hypotheses and are consistent with the literature, it is important to note that, like previous studies in this area, the sample sizes of the current project were relatively small (Sample 1 $n = 41$; Sample 2 $n = 55$). Post-hoc power analyses conducted with G*Power (Erdfelder, Faul, & Buchner, 1996) – with power ($1 - \beta$) set at 0.80 and $\alpha = .05$ for size of a single regression coefficient in a fixed linear multiple regression model – suggested that a slight increase in sample size for Sample 1 (required $N = 46$) and Sample 2 (required $N = 59$) would be needed to adequately detect unique effects for PTSS in a multiple regression. While statistically underpowered, the fact that effects were detected across two specialized adolescent populations (i.e., treatment-seeking and community-recruited) suggests that this may be a promising avenue for larger, more resource intensive investigations in the future.

Interpretation of these findings should be considered in light of additional limitations. First, despite the use of clinical and community samples being a notable methodological strength, both samples were relatively small and demographically homogenous (e.g., 80% Caucasian). Future work utilizing more diverse sampling strategies is needed (Weiss et al., 2017). Second, PTSS was assessed with different versions of the CPSS in Sample 1 (e.g., on a computer) and Sample 2 (e.g., interview format). On the one hand, the psychometric properties have been demonstrated for both versions (e.g., Foa et al., 2001), so the consistency of the results across samples provides greater confidence that the associations are not contingent on modes of measurement. On the other hand, these subtle differences limit the extent to which direct comparisons of the results might be drawn. Where possible, multi-modal assessments of PTSS within and across samples could be used to address possible invariance related to measurement. Third, the current study was underpowered to examine the role of gender (Kuntsche et al., 2006), specific symptom clusters (Ruggero et al., 2013), trauma type (Rosenkranz, Muller, & Henderson, 2012), or frequency of exposure (Brown & Shillington, 2017). Work designed to examine these and other key factors (e.g., depression; sleep disturbance; Meyer, McDonald, Douglas, & Scott, 2012; Vandrey, Babson, Herrmann, & Bonn-Miller, 2014) will be required to better understand the nature and boundaries of these relations. Lastly, the current project was conducted prior to the introduction of the *DSM-5* (American Psychiatric Association, 2013); thus, conceptual replication, particularly in terms of addressing the role of specific symptom clusters (e.g., Ruggero et al., 2013) is required.

Conclusions

Despite these limitations, the current study is a unique extension to the extant literature and represents an important step in understanding the role of coping motivated alcohol use among trauma exposed youth. The current findings speak to the role of PTSS in coping-related drinking motives among adolescents with a range of responses to various traumatic events. This elevation in coping-related drinking motives may account for the later development of alcohol problems observed in this population. Together, existing data and the current findings highlight coping motives as an important target of future research aimed at understanding the etiology of co-occurring trauma- and alcohol-related disorders. Indeed, assessing the trajectory of coping related alcohol use as a function of PTSS may help inform developmentally-sensitive intervention and prevention efforts.

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References

- Achenbach TM, & Rescorla LA (2001). Manual for the ASEBA School-Age Forms & Profiles. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- Alisic E, Zalta AK, Van Wesel F, Larsen SE, Hafstad GS, Hassanpour K, & Smid GE (2014). Rates of post-traumatic stress disorder in trauma-exposed children and adolescents: meta-analysis. *The British Journal of Psychiatry*, 204, 335–340. doi:10.1192/bjp.bp.113.131227 [PubMed: 24785767]
- American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th edition Text Revision). Washington, DC: Author.
- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Back SE, Killeen TK, Teer AP, Hartwell EE, Federline A, Beylotte F, & Cox E (2014). Substance use disorders and PTSD: An exploratory study of treatment preferences among military veterans. *Addictive Behaviors*, 39, 369–373. doi:10.1016/j.addbeh.2013.09.017 [PubMed: 24199930]
- Behrendt S, Beesdo-Baum K, Zimmermann P, Höfler M, Perkonig A, Bühringer G, ... & Wittchen HU (2010). The role of mental disorders in the risk and speed of transition to alcohol use disorders among community youth. *Psychological Medicine*, 41, 1073–1085. doi:10.1017/s0033291710001418 [PubMed: 20663258]
- Berenson AB, Wiemann CM, & McCombs S (2001). Exposure to violence and associated health-risk behaviors among adolescent girls. *Archives of Pediatrics & Adolescent Medicine*, 155, 1238–1242. doi:10.1001/archpedi.155.11.1238 [PubMed: 11695933]
- Blumenthal H, Blanchard L, Feldner MT, Babson KA, Leen-Feldner EW, & Dixon L (2008). Traumatic event exposure, posttraumatic stress, and substance use among youth: A critical review of the empirical literature. *Current Psychiatry Reviews*, 4, 228–254. doi: 10.2174/157340008786576562
- Blumenthal H, Leen-Feldner EW, Knapp AA, Badour CL, & Boals A (2015). Traumatic event exposure and alcohol use expectancies among adolescents. *Journal of Child & Adolescent Substance Abuse*, 24, 337–343. doi:10.1080/1067828x.2013.839407
- Bokszczanin A (2008). Parental support, family conflict, and overprotectiveness: Predicting PTSD symptom levels of adolescents 28 months after a natural disaster. *Anxiety, Stress, & Coping*, 21, 325–335. doi:10.1080/10615800801950584
- Brown SM, & Shillington AM (2017). Childhood adversity and the risk of substance use and delinquency: The role of protective adult relationships. *Child Abuse & Neglect*, 63, 211–221. doi: 10.1016/j.chiabu.2016.11.006 [PubMed: 27884507]
- Centers for Disease Control and Prevention (CDC; 2006). Youth Risk Behavior Surveillance – United States, 2005. Morbidity and Mortality Weekly Report. 55 Retrieved from <http://www.cdc.gov/mmwr/PDF/SS/SS5505.pdf>
- Cicchetti D, & Rogosch FA (2002). A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology*, 70, 6. doi:10.1037/0022-006x.70.1.6 [PubMed: 11860057]
- Clark DB, Lesnick L, & Hegedus AM (1997). Traumas and other adverse life events in adolescents with alcohol abuse and dependence. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36, 1744–1751. doi:10.1097/00004583-199712000-00023 [PubMed: 9401336]
- Cooper ML (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, 6, 117–128. doi:10.1037/1040-3590.6.2.117
- Copeland WE, Keeler G, Angold A, & Costello EJ (2007). Traumatic events and posttraumatic stress in childhood. *Archives of General Psychiatry*, 64, 577–584. doi:10.1001/archpsyc.64.5.577 [PubMed: 17485609]

- Cronin C (1997). Reasons for drinking versus outcome expectancies in the prediction of college student drinking. *Substance Use & Misuse*, 32, 1287–1311. doi:10.3109/10826089709039379 [PubMed: 9286001]
- Deas D, Riggs P, Langenbucher J, Goldman M, & Brown S (2000). Adolescents are not adults: Developmental considerations in alcohol users. *Alcoholism: Clinical and Experimental Research*, 24, 232–237. doi:10.1097/00000374-200002000-00015
- Debell F, Fear NT, Head M, Batt-Rawden S, Greenberg N, Wessely S, & Goodwin L (2014). A systematic review of the comorbidity between PTSD and alcohol misuse. *Social Psychiatry and Psychiatric Epidemiology*, 49, 1401–1425. doi:10.1007/s00127-014-0855-7 [PubMed: 24643298]
- Deykin EY, & Buka SL (1997). Prevalence and risk factors for posttraumatic stress disorder among chemically dependent adolescents. *The American Journal of Psychiatry*, 154, 752. doi:10.1176/ajp.154.6.752 [PubMed: 9167501]
- Dixon LJ, Leen-Feldner EW, Ham LS, Feldner MT, & Lewis SF (2009). Alcohol use motives among traumatic event-exposed, treatment-seeking adolescents: Associations with posttraumatic stress. *Addictive Behaviors*, 34, 1065–1068. doi:10.1016/j.addbeh.2009.06.008 [PubMed: 19632052]
- Foa EB, Johnson KM, Feeny NC, & Treadwell KR (2001). The child PTSD symptom scale: A preliminary examination of its psychometric properties. *Journal of Clinical Child & Adolescent Psychology*, 30, 376–384. doi:10.1207/s15374424jccp3003_9
- Gil S (2005). Coping style in predicting posttraumatic stress disorder among Israeli students. *Anxiety, Stress, and Coping*, 18, 351–359. doi:10.1080/10615800500392732
- Goldstein AL, Vilhena-Churchill N, Stewart SH, & Wekerle C (2012). Coping motives as moderators of the relationship between emotional distress and alcohol problems in a sample of adolescents involved with child welfare. *Advances in Mental Health*, 11, 67–75. doi:10.5172/jamh.2012.11.1.67
- Guay S, Nachar N, Lavoie ME, Marchand A, & O'Connor KP (2017). The buffering power of overt socially supportive and unsupportive behaviors from the significant other on posttraumatic stress disorder individuals' emotional state. *Anxiety, Stress, & Coping*, 30, 52–65. doi: 10.1080/10615806.2016.1194400
- Henson RK (2000). Demystifying parametric analyses: Illustrating canonical correlation analysis as the multivariate general linear model. *Multiple Linear Regression Viewpoints*, 26(1), 11–19.
- Kar N, & Bastia BK (2006). Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. *Clinical Practice and Epidemiology in Mental Health*, 2 https://doi.org/10.1186/1745-0179-2-17
- Kaysen D, Dillworth TM, Simpson T, Waldrop A, Larimer ME, & Resick PA (2007). Domestic violence and alcohol use: Trauma-related symptoms and motives for drinking. *Addictive Behaviors*, 32, 1272–1283. doi: 10.1016/j.addbeh.2006.09.007 [PubMed: 17098370]
- Khantzian EJ (1997). The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harvard Review of Psychiatry*, 4, 231–244. Available at: <http://dx.doi.org/10.3109/10673229709030550> [PubMed: 9385000]
- Kraemer HC, Yesavage JA, Taylor JL, & Kupfer D (2000). How can we learn about developmental processes from cross-sectional studies, or can we? *American Journal of Psychiatry*, 157(2), 163–171. Available at: <http://ajp.psychiatryonline.org/doi/full/10.1176/appi.ajp.157.2.163> [PubMed: 10671382]
- Kuntsche E, Knibbe R, Gmel G, & Engels R (2005). Why do young people drink? A review of drinking motives. *Clinical Psychology Review*, 25, 841–861. <http://dx.doi.org/10.1016/j.cpr.2005.06.002> [PubMed: 16095785]
- Kuntsche E, Knibbe R, Gmel G, & Engels R (2006). Who drinks and why? A review of socio-demographic, personality, and contextual issues behind the drinking motives in young people. *Addictive Behaviors*, 31, 1844–1857. <http://dx.doi.org/10.1016/j.addbeh.2005.12.028> [PubMed: 16460883]
- Lee IA, & Preacher KJ (2013, 9). Calculation for the test of the difference between two dependent correlations with one variable in common [Computer software]. Available from <http://quantpsy.org>.

- Lehavot K, Stappenbeck CA, Luterek JA, Kaysen D, & Simpson TL (2014). Gender differences in relationships among PTSD severity, drinking motives, and alcohol use in a comorbid alcohol dependence and PTSD sample. *Psychology of Addictive Behaviors*, 28, 42–52. doi: 10.1037/a0032266 [PubMed: 23647151]
- Lewis SF (2013). Examining changes in substance use and conduct problems among treatment-seeking adolescents. *Child and Adolescent Mental Health* 18, 33–38. <https://doi.org/10.1111/j.1475-3588.2012.00657.x>
- McLaughlin KA, Koenen KC, Hill ED, Petukhova M, Sampson NA, Zaslavsky AM, & Kessler RC (2013). Trauma exposure and posttraumatic stress disorder in a national sample of adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 52, 815–830. <https://doi.org/10.1016/j.jaac.2013.05.011> [PubMed: 23880492]
- Meyer TD, McDonald JL, Douglas JL, & Scott J (2012). Do patients with bipolar disorder drink alcohol for different reasons when depressed, manic or euthymic? *Journal of Affective Disorders*, 136, 926–932. <http://dx.doi.org/10.1016/j.jad.2011.09.005> [PubMed: 21967890]
- Miller JW, Naimi TS, Brewer RD, & Jones SE (2007). Binge drinking and associated health risk behaviors among high school students. *Pediatrics*, 119, 76–85. <https://doi.org/10.1542/peds.2006-1517> [PubMed: 17200273]
- Nixon RD, Meiser-Stedman R, Dalgleish T, Yule W, Clark DM, Perrin S, & Smith P (2013). The child PTSD symptom scale: An update and replication of its psychometric properties. *Psychological Assessment*, 25, 1025 <https://doi.org/10.1037/a0033324> [PubMed: 23815109]
- Oosterhoff B, Kaplow JB, & Layne CM (2016). Trajectories of binge drinking differentially mediate associations between adolescent violence exposure and subsequent adjustment in young adulthood. *Translational Issues in Psychological Science*, 2, 371 <https://doi.org/10.1037/tps0000092>
- Park CL, Frazier P, Tennen H, Mills MA, & Tomich P (2013). Prospective risk factors for subsequent exposure to potentially traumatic events. *Anxiety, Stress, & Coping*, 26, 254–269. <https://doi.org/10.1080/10615806.2012.671302>
- Pietrzak RH, Goldstein RB, Southwick SM, & Grant BF (2011). Prevalence and Axis I comorbidity of full and partial posttraumatic stress disorder in the United States: results from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Anxiety Disorders*, 25, 456–465. <https://doi.org/10.1016/j.janxdis.2010.11.010> [PubMed: 21168991]
- Pineles SL, Rasmussen AM, Yehuda R, Lasko NB, Macklin ML, Pitman R, & Orr SP (2013). Predicting emotional responses to potentially traumatic events from pre-exposure waking cortisol levels: A longitudinal study of police and firefighters. *Anxiety, Stress, & Coping*, 26, 241–253. <https://doi.org/10.1080/10615806.2012.672976>
- Read JP, Colder CR, Merrill JE, Ouimette P, White J, & Swartout A (2012). Trauma and posttraumatic stress symptoms predict alcohol and other drug consequence trajectories in the first year of college. *Journal of Consulting and Clinical Psychology*, 80, 426 <https://doi.org/10.1037/a0028210> [PubMed: 22545739]
- Rosenkranz SE, Muller RT, & Henderson JL (2012). Psychological maltreatment in relation to substance use problem severity among youth. *Child Abuse & Neglect*, 36, 438–448. <https://doi.org/10.1016/j.chiabu.2012.01.005> [PubMed: 22622223]
- Ruggero CJ, Kotov R, Callahan JL, Kilmer JN, Luft BJ, & Bromet EJ (2013). PTSD symptom dimensions and their relationship to functioning in World Trade Center responders. *Psychiatry Research*, 210, 1049–1055. <http://dx.doi.org/10.1016/j.psychres.2013.08.052> [PubMed: 24064462]
- Salloum A, Carter P, Burch B, Garfinkel A, & Overstreet S (2011). Impact of exposure to community violence, Hurricane Katrina, and Hurricane Gustav on posttraumatic stress and depressive symptoms among school age children. *Anxiety, Stress, & Coping*, 24, 27–42. <https://doi.org/10.1080/10615801003703193>
- Silverman WK, & Albano AM (1996). *The Anxiety Disorders Interview Schedule for DSM-IV: Child and parent versions*. San Antonio, TX: Psychological Corporation.
- Simpson TL, Stappenbeck CA, Luterek JA, Lehavot K, & Kaysen DL (2014). Drinking motives moderate daily relationships between PTSD symptoms and alcohol use. *Journal of Abnormal Psychology*, 123, 237–247. <http://dx.doi.org/10.1037/a0035193> [PubMed: 24661174]

- Sobell LC, & Sobell MB (1996). Timeline Followback (TLFB) for alcohol. Toronto, Ontario, Canada: Addiction Research Foundation.
- Steiger JH (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87, 245–251.
- Stewart SH (1996). Alcohol abuse in individuals exposed to trauma: A critical review. *Psychological Bulletin*, 120, 83–112. <https://doi.org/10.1037/0033-2909.120.1.83> [PubMed: 8711018]
- Szabo YZ, Warnecke AJ, Newton TL, & Valentine JC (2017). Rumination and posttraumatic stress symptoms in trauma-exposed adults: A systematic review and meta-analysis. *Anxiety, Stress, & Coping*, 1–19. <https://doi.org/10.1080/10615806.2017.1313835>
- Tolin DF, & Foa EB (2006). Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin*, 132, 959 <https://doi.org/10.1037/0033-2909.132.6.959> [PubMed: 17073529]
- Topper LR, Castellanos-Ryan N, Mackie C, & Conrod PJ (2011). Adolescent bullying victimisation and alcohol-related problem behaviour mediated by coping drinking motives over a 12-month period. *Addictive Behaviors*, 36, 6–13. <https://doi.org/10.1016/j.addbeh.2010.08.016> [PubMed: 20869813]
- Teunissen HA, Spijkerman R, Prinstein MJ, Cohen GL, Engels RC, & Scholte RH (2012). Adolescents' conformity to their peers' pro-alcohol and anti-alcohol norms: The power of popularity. *Alcoholism: Clinical and Experimental Research*, 36, 1257–1267. <https://doi.org/10.1111/j.1530-0277.2011.01728.x>
- Ullman SE, Relyea M, Peter-Hagene L, & Vasquez AL (2013). Trauma histories, substance use coping, PTSD, and problem substance use among sexual assault victims. *Addictive Behaviors*, 38, 2219–2223. <http://dx.doi.org/10.1016/j.addbeh.2013.01.027> [PubMed: 23501138]
- Vandrey R, Babson KA, Herrmann ES, & Bonn-Miller MO (2014). Interactions between disordered sleep, post-traumatic stress disorder, and substance use disorders. *International Review of Psychiatry*, 26, 237–247. <https://doi.org/10.3109/09540261.2014.901300> [PubMed: 24892898]
- Vujanovic AA, Marshall-Berenz EC, & Zvolensky MJ (2011). Posttraumatic stress and alcohol use motives: A test of the incremental and mediating role of distress tolerance. *Journal of Cognitive Psychotherapy*, 25(2), 130. [PubMed: 22072844]
- Weiss NH, Johnson CD, Contractor A, Peasant C, Swan SC, & Sullivan TP (2017). Racial/ethnic differences moderate associations of coping strategies and posttraumatic stress disorder symptom clusters among women experiencing partner violence: A multigroup path analysis. *Anxiety, Stress, & Coping*, 30, 347–363. <https://doi.org/10.1080/10615806.2016.1228900>
- Widaman KF (2006). III. Missing data: What to do with or without them. *Monographs of the Society for Research in Child Development*, 71(3), 42–64.
- Zvolensky MJ, Lejuez CW, Stuart GL, & Curtin JJ (2001). Experimental psychopathology in psychological science. *Review of General Psychology*, 5, 371–381. <http://dx.doi.org/10.1037/1089-2680.5.4.371>

Table 1.

Sample Demographics

Variable	Sample 1 (<i>N</i> = 41)	Sample 2 (<i>N</i> = 55)
Age <i>M</i> (<i>SD</i>)	15.8 (1.1)	15.6 (1.3)
Gender %	<i>a</i>	
Female	70.3%	45.5%
Male	29.7%	54.5%
Race/Ethnicity (%)	<i>a</i>	
Hispanic	1.6%	10.9%
Non-Hispanic White	82.8%	74.5%
African American	3.1%	3.6%
Asian	3.1%	1.8%
Native American/Alaskan	1.6%	0.0%
Other/Multiple	3.1%	3.6%
Number of Trauma Types <i>M</i> (<i>SD</i>)		1.9 (1.4)
Trauma Type		
Sick/Hurt	11.4%	18.2%
Witness Death/Injury	25.0%	20.0%
Accident/Fire	6.8%	14.5%
Natural Disaster	4.5%	10.9%
Robbed/Attacked	2.3%	5.4%
Sexual Assault/Touched	25.0%	16.4%
Sexual Assault/Touched Other	0%	0%
Physical Assault/Domestic Abuse	13.6%	7.3%
Abandoned/Kidnapped	2.3%	0%
Other	9.1%	7.3%
Days Since Event	832.12 (1192.4)	1608.3 (1310.8)
PTSD Diagnosis	55.8%	7.3%
Parent Income (Median)	\$100,000 ^{<i>a</i>}	\$43,500 ^{<i>b</i>}
YSR Internalizing	30.6%	16.4%
YSR Externalizing	23.6%	16.4%
DMQ-Coping <i>M</i> (<i>SD</i>)	11.42 (5.8)	11.02 (5.2)
DMQ-Social <i>M</i> (<i>SD</i>)	12.3 (6.3)	15.0 (5.8)
DMQ-Conformity <i>M</i> (<i>SD</i>)	7.0 (3.6)	7.6 (3.7)
DMQ-Enhance <i>M</i> (<i>SD</i>)	13.7 (6.34)	15.6 (6.3)

Note. YSR: Youth Self Report - % meeting clinical cutoffs (Achenbach & Rescorla, 2001); DMQ: Drinking Motives Questionnaire subscale sum

^{*a*}
n = 37

^{*b*}
n = 32

Table 2.

Bivariate Relations Among Drinking Motives, PTSS, and Demographics

Variable	1	2	3	4	5	6	7	8	9
1. Coping	-	.18	.36**	.49**	.26	.091	-.166	.33*	-.11
2. Conformity	.38**	-	.12	-.10	.11	-.10	-.08	.04	.07
3. Social	.56**	.46**	-	.71**	-.28*	.26	.35**	.31*	.15
4. Enhancement	.67**	.32*	.65**	-	-.22	.26	.22	.21	.01
5. PTSS Total	.58**	.38*	.27	.23	-	.11	-.39**	-.04	-.10
6. Chronological Age	.17	.10	.36**	.34*	.09	-	.08	.04	.30*
7. Gender (male) ^a	-.18	-.01	-.17	.05	-.25	.02	-	-.06	.05
8. Alc. Frequency	.67**	.41*	.43**	.56**	.21	.24	-.07	-	-.16
9. Time Since Trauma	-.35*	-.13	-.23	-.31*	-.22	-.06	.39* ^b	-.30*	-

Note. Correlations for Sample 1 are presented below the diagonal ($N = 42$); Correlations for Sample 2 are presented above the diagonal ($N = 55$). PTSS Total: Post-Traumatic Stress Symptom total score.
 Alc. Frequency: total number of drinking days in preceding 30 days (Sample 1) or six-months (Sample 2).

^a Females=0, males=1; thus positive correlations reflect higher scores among males and negative correlations higher scores among females; missing gender data resulted in $n = 37$ for Sample 1 on all pairwise correlations

^b $n = 36$

* $p < .05$

** $p < .01$

Table 3.

Hierarchical Multiple Regression Analyses Predicting DMQ-Coping Motives

Variable	R^2	β	r_s^2	p
<u>Sample 1 (Treatment Sample)</u>				
Step 1	.61			< .001
Age		-.09	0.01	.361
Alc. Frequency	.42		0.58	.001
Time Since Trauma		-.01	0.14	.888
Conformity		-.14	0.17	.194
Social	.21		0.41	.120
Enhancement	.26		0.57	.054
Step 2	.15			
PTSS		.43	0.46	<.001
<u>Sample 2 (Community Sample)</u>				
Step 1	.35			.001
Age		-.06	0.02	.601
Alc. Frequency	.22		0.22	.062
Time Since Trauma		-.04	0.02	.757
Conformity	.18		0.07	.119
Social	.00		0.25	.998
Enhancement	.56		0.46	.001
Step 2	.12			
PTSS		.37	0.13	.002

Note. Sample 1 $n = 41$; Sample 2 $n = 55$. β = standardized beta. r_s^2 = squared structure coefficient. DMQ: Drinking Motives Questionnaire.