Historical trauma and substance use among American Indian people with current substance use problems

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Abstract

Objective: In the United States, American Indian and Alaska Native (AI/AN) people suffer health inequities associated with alcohol and other drug use and also experience historical trauma symptoms resulting from colonization. Research suggests that historical trauma may be associated with substance use among AI/ANs.

Method: As part of a Community Based Participatory Research project with tribal partners from a rural AI reservation, our team collected cross-sectional survey data from 198 tribal members who self-identified as having substance use problems. We examined associations between historical trauma thoughts, historical trauma symptoms, and substance use outcomes. We also examined historical trauma symptoms, current trauma symptoms, awareness of systemic discrimination, and ethnic identity as moderators of the associations between historical trauma thoughts and substance use variables.

Results: Historical trauma thoughts, controlling for symptoms, were associated with greater abstinent days, fewer heavy alcohol use days, fewer drinks per drinking day, and fewer drug use days; historical trauma symptoms, controlling for thoughts, were associated only with fewer abstinent days. Moderation analyses showed that historical trauma thoughts were associated with better substance use outcomes when historical trauma symptoms were low, current trauma symptoms were low, awareness of systemic discrimination was high, and ethnic identity was high.

Conclusion: When distressing trauma symptoms are low, historical trauma thoughts may act as a protective factor or as a marker for other factors associated with better substance use outcomes.

Keywords

American Indian; Historical Trauma; Discrimination; Ethnic Identity; Substance Use

Although American Indian and Alaska Native (AI/AN) people experience high rates of abstinence (Cunningham et al., 2016; Spicer et al., 2003; Rieckmann et al., 2012), health inequities associated with alcohol and drug use remain a public health concern in many AI/AN communities. Population-based survey data from the National Survey on Drug Use and Health (NSDUH) show that AI/ANs have the highest prevalence of current and lifetime

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alcohol abstinence among all racial/ethnic groups in the United States (Cunningham et al., 2016), as well as disproportionately high rates of substance use disorders (SUDs; Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). Substance use is associated with other health inequities affecting AI/AN communities, such as greater rates of type 2 diabetes (Tann et al., 2007), liver disease (Centers for Disease Control [CDC], 2018), and premature death from alcohol-related causes (Indian Health Service [IHS], 2018; Singh et al., 2017). While research is needed to understand risk and protective factors associated with substance use among AI/AN individuals, it is important to situate this research within the social, historical, and cultural context that gave rise to health inequities in many AI/AN communities.

Health inequities in AI/AN communities are attributed, in part, to inequities in the social determinants of health, systemic racism and discrimination, and historical and contemporary experiences of trauma (Probst & Ajmal, 2019; Whitesell et al., 2013). While risk factors associated with poor health outcomes are prevalent in many AI/AN communities, there also is evidence of protective factors associated with better outcomes, such as cultural connectedness, traditional spirituality, family connectedness, and supportive community environment (Burnette & Figley, 2016; Henson et al., 2017). Walters et al. (2002) proposed the Indigenist Stress-Coping Model to conceptualize the impact of risk factors (e.g., discrimination, traumatic life events, unresolved grief and mourning) and protective factors (e.g., ethnic identity, traditional practices, and family/community support) on physical health, mental health, and substance use outcomes among AI/AN people. This model provides a useful framework for studying the complex relationships between trauma, resilience, and substance use in AI/AN communities. It also incorporates the impact of collective experiences, such as historical trauma, on individual-level health outcomes (Walters et al., 2002).

Historical Trauma

Descendants of historically oppressed groups can experience psychological and physical health problems, often called a historical trauma response, associated with the intergenerational transmission of trauma experienced by their ancestors (Brave Heart, 2003; Brave Heart & DeBruyn, 1998; Brave Heart et al., 2011; Evans-Campbell, 2008). The historical trauma response manifests in feelings of grief, anger, depression, and anxiety when thinking of historical losses and collective trauma experiences (Duran et al., 1998; Kestenberg, 1982). For AI/AN peoples, historical trauma results from brutal colonization practices that included genocide and racist governmental policies of forced assimilation and removal of people from traditional lands (Brave Heart, 1998; Evans-Campbell, 2008). Government-operated boarding schools, which punished AI/AN youths for speaking their language or engaging with their traditional culture, and a history of broken treaties also contribute to the history of trauma inflicted on AI/AN peoples (Brave Heart, 1998; Bombay et al., 2014; Evans-Campbell, 2008). These events have had long-lasting consequences spanning generations of AI/ANs who might not have experienced the traumatic events firsthand (Brave Heart & DeBruyn, 1998, Evans-Campbell, 2008).

American Indian scholars and community members alike contend that understanding historical trauma is key to addressing health inequities in AI/AN communities (Warne & Lajimodiere, 2015; Skewes & Blume, 2019). However, until recently, research progress in the area was limited by lack of a valid and reliable assessment instrument to measure historical trauma. Whitbeck and colleagues (2004b) addressed this need by working with AI elders to develop a measure to assess the frequency of thoughts about historical losses (e.g., loss of our family ties because of boarding schools, loss of respect by our children and grandchildren for Elders) as well as the symptoms that accompany these thoughts (e.g., feelings of shame when thinking about these losses, feeling isolated or distant from other people when thinking about these losses). The resulting Historical Loss Scale (HLS) and the Historical Loss Associated Symptoms Scale (HLASS; Whitbeck et al., 2004b) allow researchers to empirically examine both historical trauma thoughts and symptoms and have been used frequently in health research with AI/ANs (see review by Gone et al., 2019). The ability to assess historical trauma with these validated instruments represents important progress in health equity research, as it is hypothesized that health inequities in AI/AN communities are rooted in experiences of historical trauma and rapid cultural changes brought about by colonization (Brave Heart & DeBruyn, 1998, Evans-Campbell, 2008; Walters et al. 2002).

Studies using these historical trauma scales with AI/ANs have found that greater frequency of historical trauma thoughts was significantly associated with greater historical loss symptoms (Whitbeck et al., 2004a), depressive symptoms (Walls & Whitbeck, 2011), suicidal ideation (Brockie et al., 2015), and substance use (Brockie et al., 2015; Pokhrel & Herzog, 2014; Soto et al., 2015; Wiechelt et al., 2012; Whitbeck et al., 2004a). Historical trauma thoughts are thought to increase risk for substance use problems through drinking or using other drugs to cope with unresolved grief and anger (Myhra, 2011; Whitbeck et al., 2004a). This assertion is partially supported by research with AI/ANs showing that greater HLS scores were associated with an increased risk for using alcohol and illicit drugs in the past 30 days as well as meeting criteria for a current SUD (Wiechelt et al., 2012), greater alcohol use among women (Whitbeck et al., 2004a), and increased smoking among adolescents (Soto et al., 2015). Previous qualitative research found that AI key informants perceived historical trauma as a causal factor driving SUD and other health inequities in AI/AN communities (Skewes & Blume, 2019).

The scale assessing historical trauma thoughts (HLS) has been used more frequently in research with AI/ANs than the scale assessing historical trauma symptoms (HLASS), although some studies have used both scales (see Gone et al., 2019 for a review). When examining historical trauma thoughts and symptoms separately, historical trauma symptoms were positively associated with posttraumatic stress disorder (PTSD) symptoms when controlling for thoughts (Ehlers et al., 2013). Ehlers and colleagues (2013) also found that, while historical trauma thoughts were associated with greater substance dependence, this relationship was no longer significant when controlling for symptoms. Wiechelt et al. (2012) reported similar findings, in that historical trauma symptoms were associated with greater substance use and lower family cohesion, whereas historical trauma thoughts were associated with greater family cohesion and were not associated with substance use. These findings suggest that historical trauma thoughts and symptoms as measured by the HLS and

HLASS may be differentially associated with substance use variables and should be examined independently.

Current Trauma

In addition to historical trauma, the Indigenist Stress-Coping Model (Walters et al., 2002) also considers the influence of current trauma symptoms on health behaviors and outcomes. Current or contemporary trauma experiences are disproportionately high among AI/ANs and represent a significant public health concern. It is estimated that four out of five AI/ANs over the age of 18 have experienced violence in their lifetime (Rosay, 2016). Among women, AI/ANs have the highest rates of violent victimization of all racial groups (Evans-Campbell, 2008). These traumatic experiences include violent physical injury, intimate partner violence, and sexual violence, with women reporting higher rates of lifetime violence compared to men (84.3% vs. 81.6%; Rosay, 2016). Trauma experiences, in turn, are associated with greater PTSD symptoms among AI/AN populations (Deters et al., 2006). The lifetime prevalence of PTSD among AI/AN people is more than twice that of White populations in the United States (16%−24% vs. 4.8%−6.4%; Aronson et al., 2016; Blanco et al., 2013; Brockie et al., 2015). Additionally, one study found that AI/AN people with a history of trauma were more likely to be diagnosed with co-occurring PTSD and SUD than non-Hispanic Whites with similar traumatic experiences (Emerson et al., 2017).

It is important to note that rates of violence and current trauma exposure among AI/ANs cannot be separated from the context of colonization and historical trauma. Some historically traumatic events, such as forced removal of AI/AN children from their families and placement in boarding schools where sexual and physical abuse were common, are thought to interact with contemporary trauma experiences to influence the health and well-being of survivors' descendants (e.g., Bombay et al., 2014). It has been suggested that historical trauma may exacerbate harm from contemporary traumatic events by amplifying their significance (Evans-Campbell, 2008), through present-day narratives that increase distress (Mohatt et al., 2014), and by disrupting protective cultural and spiritual practices (Walters et al., 2011). Despite the burden of these traumatic experiences, AI/AN communities have survived deliberate efforts to eradicate their people and cultures, and demonstrate powerful resilience through their survival.

Discrimination

Racial discrimination, or the collective mistreatment, oppression, and victimization of a marginalized racial or ethnic group, is conceptualized as a collective race-based stressor associated with poor health and well-being among ethnic minority populations (American Psychological Association [APA], 2016; Ong et al., 2009; Vines et al., 2017). Racial discrimination is prevalent, with approximately 34% of AI/ANs, 23% of Blacks, 19% of Hispanics, and 11% of Asians experiencing an act of discrimination at least once a day (APA, 2016). Discrimination can act as both chronic (e.g., being treated with less respect or receiving poorer service) and acute (e.g., harassment from police or coworkers) stressors for minority populations. Stress from discrimination is associated with increased risk of developing physical and mental health problems and with poorer psychosocial functioning

and well-being (Faro & Pereira, 2011; McEwen & Gianaros, 2010; Spence et al., 2016; Vines et al., 2017).

Discrimination is associated with substance use among ethnic minorities. In a prospective panel study, Gibbons and colleagues (2004) found that perceived discrimination predicted increased substance use among Black parents and their children. Epidemiological research with diverse ethnic minority groups supports the link between discrimination and substance use (Tran et al., 2010). In response to discrimination, individuals may use alcohol and drugs to cope with anxiety and depression, negative thoughts about their perceived worth, feelings of inadequacy, and alienation (Borrell et al., 2007; Carter et al., 2017; Gibbons et al., 2004; Locust, 1988; Whitbeck et al., 2001). Moreover, experiences of everyday discrimination are associated with greater risk of developing a SUD among racial/ethnic minorities (Lo et al., 2012). Among AI/AN people, discrimination is significantly associated with greater historical loss symptoms, greater anxiety and depression symptoms, SUDs, and high blood pressure (Dickerson et al., 2019; Galliher et al., 2011; Spence et al., 2016; Walls & Whitbeck, 2011; Whitbeck et al., 2001; Whitbeck et al., 2002). In a qualitative interview study, AI respondents identified discrimination as a key contributor to SUDs among reservation residents (Skewes & Blume, 2019).

Ethnic Identity

Ethnic identity is conceptualized as the quality and strength of connection with one's ethnic group (Phinney & Ong, 2007) and has been studied as a protective factor for health behaviors among ethnic minority youth (e.g., Marsiglia et al., 2004; Rivas-Drake et al., 2014; Soto et al., 2015). Among AI/ANs, development of a strong, positive ethnic identity has been posited as an important protective factor with regard to substance use outcomes. In a qualitative interview study, AI key informants identified lack of cultural identity as a risk factor for substance use, and also emphasized a strong sense of AI identity as key to SUD recovery (Skewes et al., 2019). In a focus group study with 70 AI youth, parents, service providers, and community members, adult participants discussed AI/AN identity as protective against alcohol and drug use, and disconnection from culture was identified as a key risk factor by all participant groups (Brown et al., 2016). Positive associations between ethnic identity and well-being, resilience, and positive psychosocial functioning among AI/ANs have been supported in the literature (Jones & Galliher, 2007; Markstrom et al., 2011; Wexler, 2009). Also, ethnic identity and enculturation are included in the Indigenist Stress-Coping Model (Walters et al., 2002) as cultural buffers/protective factors. However, studies testing the associations between ethnic identity and substance involvement with AI/AN samples have yielded mixed results.

Despite the belief among many AI/ANs that ethnic identity is central to well-being and resilience, research findings regarding ethnic identity and substance use have been mixed. Studies with AI/AN adolescents have found that ethnic identity was associated with more antidrug attitudes (Kulis et al., 2002), but was not significantly associated with alcohol use (Bates et al., 1997). Among ANs, greater ethnic identity was associated with less frequent use of drugs and alcohol to cope with life stressors, and a greater reliance on using religion and spirituality to cope (Wolsko et al., 2007). One study with AI adults similarly found that

ethnic identity was negatively associated with substance dependence (Whitbeck et al., 2004a). However, other research has found positive associations between ethnic identity and depression, suicide, and substance use among AI/ANs (Albright & LaFromboise, 2010; LaFromboise et al., 2010; LaFromboise et al., 2006). Research with AI youth by Soto and colleagues (2015) found that ethnic identity may appear to be both a protective factor and a risk factor, depending on other variables included in the model. In particular, they found that historical trauma mediated the association between ethnic identity and smoking among AI youth, with ethnic identity directly associated with reduced smoking but indirectly associated with greater tobacco use through greater awareness of historical trauma (Soto et al., 2015).

Ethnic identity among AI/ANs has been affected by the history of colonization, as colonizers imposed European values and beliefs while suppressing AI/AN cultural traditions and identities. This complicated history has nuanced implications for the experience of ethnic identity formation and reclamation, with further implications for health behaviors including substance use. Strong ethnic identity has been shown to be associated with hypothesized risk factors (e.g., stressful life events) as well as protective factors (e.g., spirituality) among AI/ANs (Soto et al., 2015; Yu & Stiffman, 2007), and also is related to social determinants of health (e.g., discrimination, neighborhood composition) associated with substance use (Rivas-Drake et al., 2014). Associations between ethnic identity and substance use also may depend on gender (Jones & Galliher, 2007), type of substance use (Unger et al., 2020), aspect of ethnic identity assessed (Rivas-Drake et al., 2014), and other variables. Although strongly emphasized by communities as key to understanding health inequities (Brown et al., 2016; Skewes et al., 2019), research on ethnic identity and substance use among AI/AN adults is limited.

Current Study

While many AI/ANs did not directly experience historically traumatic events, previous traumatic experiences continue to affect AI/AN people and communities (Myhra, 2011; SAMHSA; Wiechelt et al., 2012; Whitbeck et al., 2004a). Research suggests that historical trauma thoughts and symptoms may be associated with substance use in different ways (Elhers et al., 2013; Walls & Whitbeck, 2011). Therefore, the first aim of this study was to examine the relationships between historical trauma thoughts (HT thoughts) and historical trauma symptoms (HT symptoms) with substance use in the previous 90 days (e.g., percent abstinent days, percent heavy alcohol use days, drinks per drinking day, and percent drug use days). Although research on historical trauma and substance use has been conducted with community samples (e.g., Myhra, 2011; Soto et al., 2015; Wiechelt et al., 2012; Whitbeck et al., 2004a) and reservation samples of AI/ANs (e.g., Brockie et al., 2015; Ehlers et al., 2013; Walls & Whitbeck, 2011), our study is the first to examine associations between historical trauma and substance use in a community sample of reservation-dwelling AIs with current substance use problems. Based on previous research (e.g., Ehlers et al., 2013), we hypothesized that: 1a) controlling for HT symptoms, HT thoughts would be associated with greater percent days abstinent and less alcohol and drug use; and 1b) controlling for HT thoughts, HT symptoms would be associated with lower percent days abstinent and greater alcohol and drug use.

Historical trauma has been shown to affect responses to current stressors (e.g., John-Henderson & Ginty, 2020) and may interact with other variables such as contemporary trauma, discrimination, and ethnic identity (Aronson et al., 2016; Ehlers et al., 2013; Evans-Campbell, 2008; Walls & Whitbeck, 2011; Walters et al., 2002; Whitbeck et al., 2004a). Therefore, the second aim of this study was to examine interactions between HT thoughts, trauma symptoms (i.e., HT symptoms, PTSD symptoms), discrimination, and ethnic identity in models predicting substance use. We hypothesized that: 2a) when HT thoughts and trauma symptoms were high, the interaction between these variables would be associated with lower percent days abstinent and greater substance use; 2b) when HT thoughts and discrimination were high, the interaction between these variables would be associated with lower percent days abstinent and greater substance use; and 2c) when HT thoughts and ethnic identity were high, the interaction between these variables would be associated with greater percent days abstinent and lower levels of substance use. Despite previous mixed findings, we hypothesized that ethnic identity would be protective in this sample because it is conceptualized as a protective factor in the Indigenist Stress-Coping Model (Walters et al., 2002), and also was emphasized as an important protective factor by our community partners.

Method

Participants

Participants were 198 AI adults from one reservation who self-identified as having a current substance use problem. Ages ranged from 18–65 years ($M = 37.36$, $SD = 11.81$) and included women ($n = 103$, 52%) and men ($n = 95$, 48%). Education attainment included some college/college degree (12.70%), 12th grade/GED (34%) and no high school diploma (50.2%). Median income was $190.50 per month. Participant characteristics are shown in Table 1.

Measures

Substance Use.—The Timeline Followback (TLFB; Sobell & Sobell, 1992) was used to assess substance use behavior in the previous 90 days. The TLFB is considered a gold standard self-report assessment tool, as it provides valid and reliable estimates of substance use (Robinson et al., 2014; Sobell & Sobell, 1992). Trained academic and community research team members met one-on-one with participants to administer the TLFB in interview format. Participants were shown a calendar of the previous 90 days and asked to recollect their alcohol and drug use on each day during that period. Percent days abstinent from alcohol and drugs, percent heavy alcohol use days, drinks per drinking day, and percent drug use days were calculated from the TLFB data and used as outcome variables in the subsequent analyses. Heavy alcohol use was defined as 4 or more drinks for women and 5 or more drinks for men in one sitting.

Historical Trauma Thoughts and Associated Symptoms.—Historical trauma thoughts were measured using the Historical Loss Scale (HLS; Whitbeck et al., 2004b) and historical trauma symptoms were measured with the Historical Loss Associated Symptoms Scale (HLASS; Whitbeck et al., 2004b). The HLS consists of 12 items that assess the

frequency of thoughts about traumatic losses experienced by AI/AN people, including the loss of land, language, traditional ways, and life through government relocation policies. Participants were instructed to indicate how often they think about each historical loss from 1 (*Several times a day*) to 6 (*Never*). Items were reverse scored, then summed to yield a total score for historical losses, with higher scores indicating greater historical trauma thoughts. The HLS showed good internal consistency in the present sample ($\alpha = 0.92$).

The HLASS is a 12-item companion measure to the HLS that assesses symptoms associated with historical loss thoughts. Items on the HLASS include feelings of sadness, fear, depression, anger, loss of concentration, isolation, disrupted sleep, distrust, and attempts to avoid historical trauma thoughts. Participants were asked to indicate how often they experienced these symptoms when thinking of the historical losses assessed with the HLS from 1 (*Never*) to 6 (*Always*). Items were summed to yield a total score, with higher scores indicating greater historical trauma symptoms. The HLASS demonstrated good internal consistency in the present sample ($\alpha = 0.89$). Both the HLS and HLASS have been used to measure historical trauma in other research with AI/AN samples, with past studies finding participants diagnosed with SUD reporting greater HLS and HLASS scores than those without a SUD (Ehlers et al., 2013).

Awareness of Systemic Discrimination.—The Measure of Indigenous Racism Experiences (MIRE; Paradies & Cunningham, 2008) is an instrument developed to measure perceived racial discrimination in Indigenous populations. This measure was modified to specify that the racism experienced was associated with being an AI person. The three-item systemic discrimination subscale was used in this study (sample item: "There is hardly ever anything good about American Indian people in the media"). Items were scored on a scale of 1 *(Strongly disagree)* to 5 (*Strongly agree*). The mean of the item responses was calculated and used in analyses to represent awareness of systemic discrimination. This subscale demonstrated good internal consistency in the present sample ($\alpha = 0.84$).

Posttraumatic Stress Disorder Symptoms.—The Post-Traumatic Checklist (PCL-5; Weathers et al., 2013) is a 20-item instrument used to measure the presence and severity of PTSD symptoms as specified by the *DSM-5*. Participants were asked to rate how much they have been bothered by PTSD symptoms over the past month on a scale from 0 (*Not at all*) to 4 (*Extremely*), with item responses summed to yield a total score. A score of 31 or more suggests that a person may meet diagnostic criteria for a PTSD diagnosis. Although the PCL-5 has not been validated in AI populations, it demonstrated excellent internal consistency with the current sample ($\alpha = 0.97$). Although the PCL-5 was originally developed with White participants from wealthy countries, it has demonstrated validity with low income and culturally diverse populations (Verhey et al., 2018).

Ethnic Identity.—The Multi-group Ethnic Identity Measure (MEIM; Phinney & Ong, 2007) is a 14-item measure that assesses feelings of belonging, pride, and positive attitudes toward one's ethnic group. Although the MEIM was originally developed with adolescents (Phinney, 1992), it has been used successfully with adult populations from diverse ethnic groups (e.g., Avery et al., 2007; Skewes & Blume, 2015). This version of the MEIM has two subscales, ethnic identity search ("I think a lot about how my life will be affected by my

ethnic group membership") and affirmation, belonging, and commitment ("I have a lot of pride in my ethnic group"). Participants were asked to indicate how strongly they agree with each statement about their ethnic group, rated from 1 (*Strongly disagree*) to 4 (*Strongly agree*). There have been mixed findings regarding the replication of these two factors (Phinney & Ong, 2007), therefore we used the overall ethnic identity score in the analyses. The mean of the items was calculated, with higher values indicating greater ethnic identity. The MEIM demonstrated good internal consistency in the present sample ($\alpha = 0.91$).

Procedure

Data for the present study came from the Substance Use and Resilience Project, a Community Based Participatory Research (CBPR) project conducted in partnership with an AI reservation in the Northern Plains. The project aimed to: 1) build trusting relationships between academic and community co-researchers, 2) understand substance use and associated health inequities on the reservation, and 3) develop a culturally grounded intervention to facilitate SUD recovery among tribal members. Over the past six years, our team has conducted a series of mixed methods studies to understand tribal members' beliefs about SUD risk and protection, as well as preferred recovery strategies (see Skewes et al., 2019; 2020 for detailed study methods and preliminary findings). Qualitative findings from earlier phases of the project informed the development of the Substance Use and Recovery Survey, which was used to gather data for the present manuscript.

The Substance Use and Recovery Survey was developed collaboratively by the project's Community Advisory Board (CAB) and academic research partners, who worked together to interpret findings from earlier key informant interviews and design the survey instrument in light of these findings. The final survey was approved by the CAB and the tribal Institutional Review Board (IRB) prior to submission to the university's IRB, which also approved the survey questions and methods. This cross-sectional survey aimed to examine hypothesized relationships between community-identified risk and protective factors and substance use among tribal members with a self-identified alcohol or drug use problem. Our partnership aimed to cast a wide net by recruiting participants who identified as having "a substance use problem," as the community wished to be as inclusive as possible.

The first eight participants were recruited through an announcement made at the on-reservation SUD treatment clinic, with subsequent recruitment taking place through word of mouth (see Skewes et al., 2020 for detailed information about the recruitment process and lessons learned). Participants were scheduled to meet individually with a research team member for data collection at the local tribal college library. After a thorough discussion with the research team member about the study's aims, methods, and community involvement, participants provided written informed consent and were offered refreshments. Providing food was recommended as a cultural custom, and also helped to address hunger and allowed participants to focus on the survey questions. Participants then were given the option of completing the paper-and-pencil survey measures on their own or in interview format to address possible issues with low literacy. The TLFB was administered in interview format for all participants. Each data collection session took approximately two hours per person. After completing the survey, participants were compensated with a $50 gift card and

received a list of mental health and SUD treatment resources available in the community. This manuscript and all other research products resulting from the project were approved by the CAB and tribal IRB prior to publication.

Data Analysis

Descriptive statistics and bivariate correlations were calculated for all study variables and hierarchical linear regressions were conducted using SPSS version 26.0. Separate analyses were conducted for each TLFB substance use variable (percent days abstinent [abstinent days], percent heavy alcohol use days [heavy alcohol use days], percent drug use days [drug use days], and drinks per drinking day). Prior to analysis, the data were screened for skewness, kurtosis, and multivariate outliers. Heavy alcohol use days and drug use days were positively skewed and were square root transformed to approximate the normal distribution. Missing data were minimal, ranging from 0% to 4.1% across study measures. Six participants who were missing TLFB interviews due to researcher error were excluded from analyses, resulting in a final sample of 192 participants for most analyses (all except those using the drinks per drinking day variable). Regarding drinking days, six multivariate outliers also were eliminated, resulting in a final sample of 186 for analyses using drinks per drinking days as the outcome variable.

To examine whether HT thoughts and HT symptoms were differentially associated with substance use, separate hierarchical linear regressions were conducted for each substance use outcome variable calculated from the TLFB data (i.e., abstinent days, heavy alcohol use days, drinks per drinking day, and drug use days). We controlled for HT thoughts or HT symptoms when the other variable was the predictor. All analyses controlled for age and gender; we did not include other demographic variables as covariates as they were not associated with the substance use variables. We then used the Hayes (2018) PROCESS macro (version 3.4) for SPSS to test whether HT thoughts interacted with HT symptoms, PTSD symptoms, systemic discrimination, and ethnic identity in moderation models predicting substance use. HT thoughts and all potential moderating variables were mean centered. Significant interactions between HT thoughts and either HT symptoms, PTSD symptoms, systemic discrimination, or ethnic identity were considered to be an indication of moderation. Significant moderation models were further examined by probing slopes at low (−1 SD), moderate (mean), and high (+1 SD) values for all continuous predictor and moderator variables (Preacher et al., 2006).

Results

Participants reported abstaining from any substance use on over half of the days in the 90-day assessment period, with a mean of 53.96% days abstinent ($SD = 39.57$, $Md = 67$). When asked about illicit drug use, 38.4% reported abstinence on all 90 days, with 64.7% reporting drug use on fewer than 30 days. Regarding alcohol use, 26.9% reported abstinence on all 90 days, and 48% reported 60 or more abstinent days. Substances used during the assessment period included marijuana ($M_{days} = 38.20$, $SD = 34.43$, $Md = 25$), alcohol/beer ($M_{days} = 26.44$, $SD = 28.20$, $Md = 12$), methamphetamine ($M_{days} = 26.03$, $SD = 26.59$, $Md = 17$), and prescription pills not as prescribed ($M_{days} = 3.39$, $SD = 15.80$, $Md = 0$). Participants reported

consuming 11–12 drinks per drinking day ($M = 11.92$, $SD = 9.60$, $Md = 11.46$). Historical trauma thoughts were positively associated with HT symptoms ($r = .44$, $p < .01$), ethnic identity ($r = .16$, $p < .05$), and PTSD symptoms ($r = .23$, $p < .01$), and negatively associated with heavy alcohol use days ($r = -.15$, $p < .05$). Historical trauma symptoms were positively associated with systemic discrimination ($r = .26$, $p < .01$) and with PTSD symptoms ($r = .49$, $p < .01$), but were not associated with substance use indicators in bivariate models. Table 2 shows the descriptive statistics and bivariate correlations for all study variables.

With regard to the hierarchical linear regression analyses examining associations between HT thoughts, HT symptoms, and substance use variables (see Table 3), Hypothesis 1a was supported and Hypothesis 1b was partially supported. When controlling for age, gender and HT symptoms, HT thoughts were significantly associated with greater abstinent days ($\beta = 0.57$, $p < .01$) and fewer heavy alcohol use days ($\beta = -0.05$, $p < .05$), drinks per drinking day ($\beta = -0.12$, $p < .05$), and drug use days ($\beta = -0.05$, $p < .05$). When controlling for age, gender, and HT thoughts, HT symptoms were associated with fewer abstinent days ($\beta = -1.01$, $p < .01$) but were not associated with any other substance use variables.

Moderation Analyses

Trauma Symptoms.—The interaction between HT thoughts and HT symptoms was significant in the model using heavy alcohol use days as the outcome variable ($\beta = 0.04$, $t = 1.78$, $p < .05$, $R^2 = 0.02$; see Figure 1). At low levels of HT symptoms, HT thoughts were associated with fewer heavy alcohol use days, but this association was attenuated when HT symptoms were high. The interaction between HT thoughts and PTSD symptoms also was significantly associated with heavy alcohol use days ($\beta = 0.01$, $t = 1.66$, $p < .05$, $R^2 = 0.01$; Figure 2) and with drinks per drinking day ($\beta = 0.06$, $t = 1.81$, $p < .05$, $R^2 = 0.02$; Figure 3). When PTSD symptoms were low, HT thoughts were associated with fewer heavy alcohol use days and drinks per drinking day. These findings provide partial support for Hypothesis 2a, in that the interaction between HT thoughts and trauma symptoms was associated with greater alcohol use but was not associated with drug use or abstinent days.

Discrimination.—The interactions between HT thoughts and systemic discrimination were significant in the models using abstinent days ($\beta = 0.40$, $t = 2.53$, $p < .01$, $R^2 = 0.03$; Figure 4), drinking days ($\beta = -0.10$, $t = -1.95$, $p < .05$ $R^2 = 0.03$; Figure 5), and drug use days ($\beta = -0.03$, $t = -1.94$, $p < .05$, $R^2 = 0.02$; Figure 6) as the outcome variables. Contrary to Hypothesis 2b, at high levels of systemic discrimination, HT thoughts were significantly associated with greater abstinent days, fewer drinks per drinking day, and fewer drug use days. The interaction was not significant when heavy alcohol use days was the outcome variable.

Ethnic Identity.—Hypothesis 2c was partially supported. The interaction between HT thoughts and ethnic identity was only significant in the model predicting drug use days ($\beta = -0.06$, $t = -1.65$, $p < .05$, $R^2 = 0.03$; Figure 7). At high levels of ethnic identity, HT thoughts were associated with fewer drug use days but were not associated with other substance use variables.

Discussion

The present research aimed to: 1) explore the relationships between HT thoughts, HT symptoms, and substance use variables; and 2) test whether HT symptoms, PTSD symptoms, discrimination, and ethnic identity moderated associations between HT thoughts and substance use. Historical trauma thoughts, but not symptoms, appeared to be protective in the current study. We found that HT thoughts, controlling for HT symptoms, were significantly associated with more abstinent days, fewer heavy alcohol use days, fewer drinks per drinking day, and fewer drug use days. Historical trauma symptoms, controlling for HT thoughts, were associated only with fewer abstinent days. Regarding the interaction between HT thoughts and HT symptoms, HT thoughts were associated with fewer heavy drinking days when HT symptoms were low or at mean levels. The greatest heavy drinking was found for participants scoring low in both HT thoughts and HT symptoms, whereas the lowest heavy drinking was found for those scoring high in HT thoughts and low in HT symptoms. A similar pattern was found with the interaction between HT thoughts and PTSD symptoms in the models predicting heavy drinking days and drinks per drinking day—the negative association between HT thoughts and drinking was stronger when PTSD symptoms were low. Awareness of historical losses appeared protective when distress (historical or current) was low, but not when distress was high. Historical trauma thoughts may serve as a marker for cultural embeddedness, a protective factor with regard to substance use (Galliher et al., 2011; Whitbeck et al., 2002).

The theory of rumination and reminiscence offers a possible explanation for the associations found between historical trauma and substance use. This theory proposes that reminiscence, the active or passive recollection of past events, is an important activity associated with well-being (Cappeliez & O'Rourke, 2006). However, maladaptive rumination, a process of uncontrollable, intrusive, and repetitive thoughts, is associated with poor outcomes (Brinker & Dozois, 2009). It may be that AI people who reminisce about their collective history through a lens of resilience, although aware of the losses their people have suffered, are able to find strength in their culture and community that protects them. Those who ruminate about historical losses, however, may experience more symptoms consistent with the historical trauma response. Further research is needed to understand not only the frequency with which participants think about historical losses, but the ways in which they interpret and find meaning in those thoughts.

There was a significant interaction between HT thoughts and systemic discrimination in the model predicting percent days abstinent. Contrary to our hypotheses, participants with high HT thoughts and high awareness of systemic discrimination reported the greatest percent days abstinent. The same pattern was found in the models predicting drinks per drinking day and percent drug use days—when awareness of systemic discrimination was high, HT thoughts were associated with fewer drinks per drinking day and fewer drug use days. Awareness of the larger systems that gave rise to health inequities may be associated with other protective factors, such as increased self-compassion or cultural connectedness. Research suggests that participating in cultural events can both increase awareness of historical losses (Soto et al., 2015) and buffer against negative effects of discrimination (Galliher et al., 2011; Whitbeck et al., 2002). Future research is needed to understand

whether and how becoming aware of these and other social determinants of health affect substance use outcomes among AI people.

Finally, there was a significant interaction between HT thoughts and ethnic identity in the model predicting percent drug use days, but not other substance use variables. Historical trauma thoughts appear protective with regard to drug use when ethnic identity is high. Research suggests that ethnic identity is linked to historical trauma, in that many AI people learn about historically traumatic events when they are developing their ethnic identity (Soto et al., 2015; Whitbeck et al., 2009). Additionally, AIs who have a strong ethnic identity may attend more cultural events, which could raise awareness of historical losses related to the loss of language, culture, and traditions (Whitbeck et al., 2009). Research shows that participation in cultural events can strengthen connection to one's ethnic identity (Schweigman et al., 2011), foster resilience (LaFromboise et al., 2006), and have long-term positive effects on health behaviors (Kulis et al., 2002). The finding that high HT thoughts and high ethnic identity were associated with fewer drug use days but not associated with alcohol use variables suggests that alcohol and drug use may mean different things to AI people. There is evidence of alcohol-specific stereotypes affecting drinking among AI/AN people (e.g., Gonzalez & Skewes, 2016). In previous qualitative research, some participants reported that alcohol was a part of their AI identity, but none described drug use as part of AI identity (Skewes et al., 2019).

Strengths, Limitations, and Future Directions

Strengths of this research include our community partnership and commitment to CBPR principles, the examination of HT thoughts and HT symptoms using established measures, and the focus on understanding HT among AI adults with self-identified substance use problems. Previous studies on HT and substance use have been conducted with adolescents (e.g., Soto et al, 2015; Whitbeck et al., 2009) and with AI/AN adults without substance use problems (e.g., Ehlers et al., 2013; Wiechelt et al., 2012). This study is the first, to our knowledge, to examine associations between HT and substance use among a community sample of reservation-dwelling AI adults with current substance use problems. We also assessed variables selected by our community partners and supported by previous qualitative research as potentially important predictors of substance use, including current trauma, discrimination, and ethnic identity.

One limitation of this study was the word-of-mouth recruitment strategy. The present sample may not be representative of AIs with substance use problems in this community. Moreover, the cross-sectional design limits the ability to understand directionality of associations between variables. Prospective research is needed to examine how HT thoughts, symptoms, discrimination, and ethnic identity change over time and predict future substance use. Additional research also is needed to determine when and how HT thoughts may be protective with regard to health outcomes. Rigorous qualitative studies would help elucidate the ways in which AI/AN people interpret and find meaning in HT thoughts, and how they cope with HT symptoms. Such studies may inform refinements of the HT construct itself as well as its measurement.

Another limitation is that the measures used in this study have not been validated in this particular population. For example, the instrument used to assess ethnic identity was validated with adolescents (Roberts et al., 1999), although it has since been used with adults (e.g., Avery et al., 2007; Skewes & Blume, 2015). The other measures used in this research also have not been validated in this population. However, we selected the instruments collaboratively with our community partners, who felt they represented the constructs of interest well. They also demonstrated good internal consistency in the present sample. Future research is needed to validate these instruments with AI participants.

The present study also was limited by the sample size and homogeneity of the sample. Findings from this study may not generalize to other reservations, tribal groups, or to people from urban areas. Additional research is needed to understand whether historical trauma is a useful construct for predicting substance use and other health outcomes in diverse AI/AN populations. A larger sample also would allow researchers to examine risk and protective factors associated with use of different substances (e.g., alcohol, methamphetamine, opiates, marijuana) separately. Moreover, the present sample included only participants who self-identified as having a current substance use problem. The associations observed in this study may not generalize to samples of AIs with diagnosed SUD, those without current substance use problems, those in long-term secure recovery, or current or lifelong abstainers.

Conclusion

In this CBPR project conducted in partnership with an AI reservation community, we examined substance use and hypothesized risk and protective factors, including historical trauma, from a sample of 198 tribal members who self-identified as having a current substance use problem. Historical trauma thoughts were significantly associated with greater percent days abstinent, fewer percent days of heavy alcohol use, and fewer percent drug use days, but were not associated with drinks per drinking day. Historical trauma symptoms, in turn, were negatively associated with percent days abstinent, but were not associated with any other substance use variables. Historical trauma thoughts interacted with other variables and appeared to be protective, specifically, at low levels of HT symptoms, low levels of PTSD symptoms, high levels of systemic discrimination awareness, and high levels of ethnic identity. Historical trauma thoughts may serve as a marker for other protective factors associated with better substance use outcomes among AI/ANs (e.g., cultural connection and involvement) and reflect better functioning when distressing trauma symptoms are low. Future research is needed to expand knowledge about historical trauma and its role in health inequities among AI/AN people.

Acknowledgments

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Public Health Significance:

This study reports findings from a community-based participatory research project with a sample of reservation-dwelling American Indian adults with current substance use problems. Findings indicate that thoughts about historically traumatic events are associated with better substance use outcomes when trauma symptoms are low, awareness of systemic discrimination is high, and ethnic identity is high. This study highlights the importance of examining historical trauma thoughts and associated symptoms in health research with American Indians.
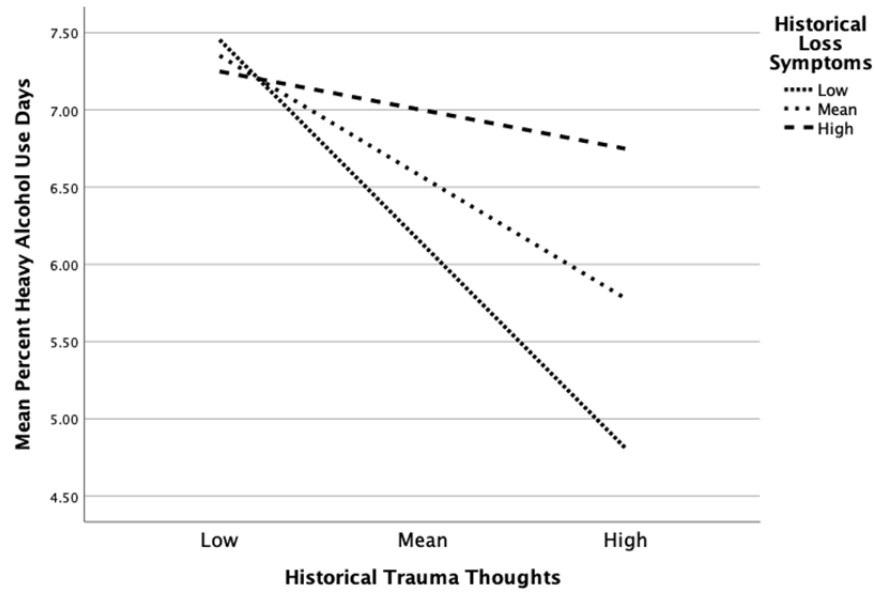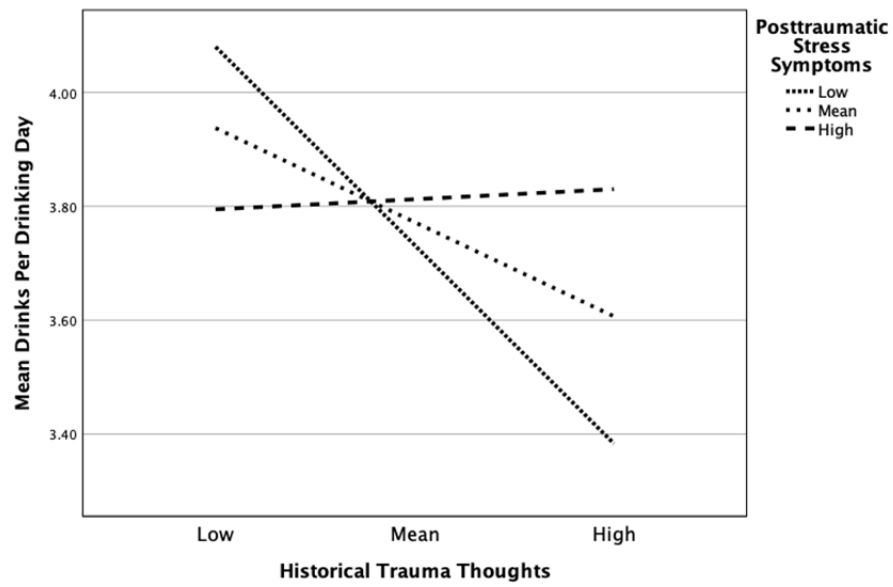
Figure 1.
The overall model for HT thoughts→heavy alcohol use days moderated by HT symptoms was significant, $F(5,185) = 2.65$, $p < .05$, $R^2 = 0.07$. When HT symptoms were low ($\beta = -0.08$, $t = -2.94$, $p < .001$, CI [−0.13, −0.03]) or at mean ($\beta = -0.05$, $t = -2.22$, p < .05, CI [−0.09, −0.005]) levels, the interaction between HT symptoms and HT thoughts was associated with fewer heavy alcohol use days.
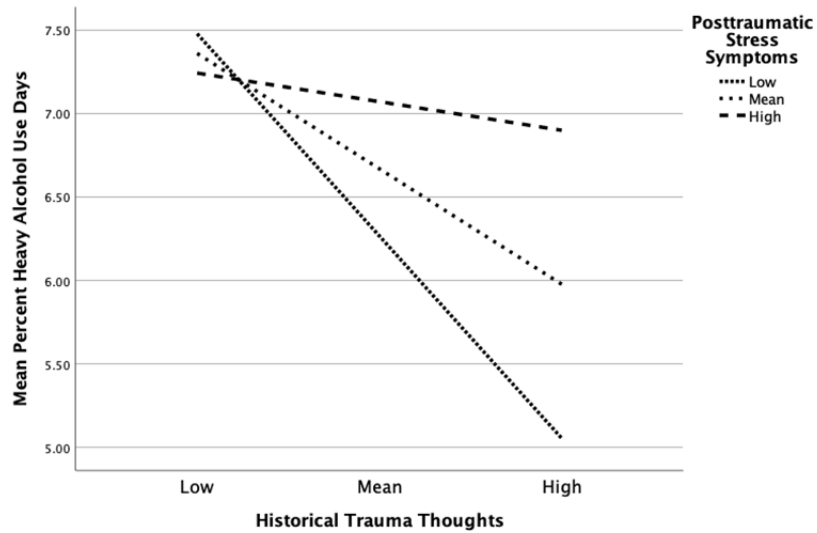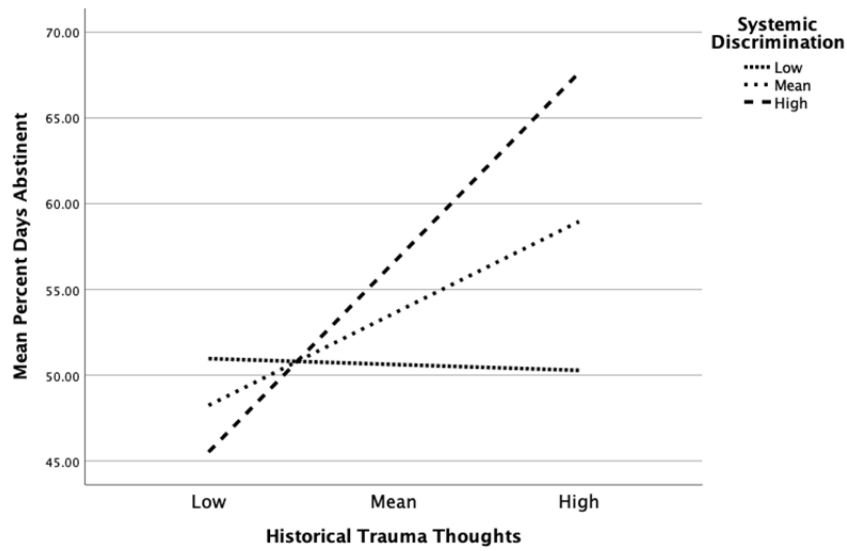
Figure 2.
The overall model for HT thoughts→heavy alcohol use days moderated by PTSD was significant, $F(5,185) = 2.57$, $p < .05$, $R^2 = 0.07$. When PTSD symptoms were low ($\beta = -0.07$, $t = -2.76$, $p < .05$, CI [−0.13, −0.02]) or at mean ($\beta = -0.04$, $t = -2.10$, p < .05, CI [−0.08, −0.003]) levels, the interaction between PTSD and HT thoughts was associated with fewer heavy alcohol use days.
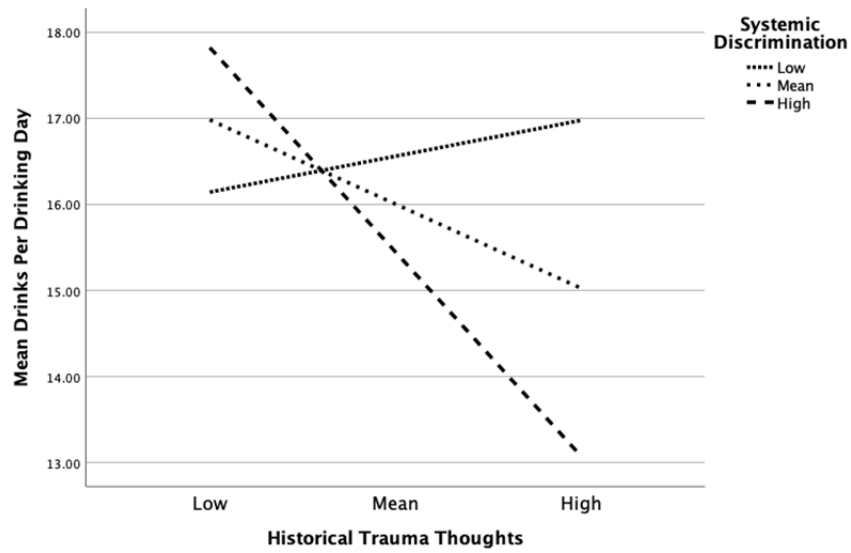
Figure 3.

The overall model for HT thoughts→drinks per drinking day moderated by PTSD was significant, $F(5,180) = 3.01$, $p < .01$, $R^2 = 0.10$. When PTSD symptoms were low ($\beta = -0.02$, $t = -2.22$, $p < .05$, CI [−0.04, −0.002]), the interaction between PTSD and HT thoughts was associated with fewer drinks per drinking day.

Figure 4.

The overall model for HT thoughts→abstinent days moderated by systemic discrimination was significant, $F(5,185) = 2.47$, $p < .05$, $R^2 = 0.06$. When systemic discrimination scores were high ($\beta = 0.67$, $t = 3.02$, $p < .001$, CI [0.23, 1.10]), the interaction between systemic discrimination and HT thoughts was associated with greater abstinent days.
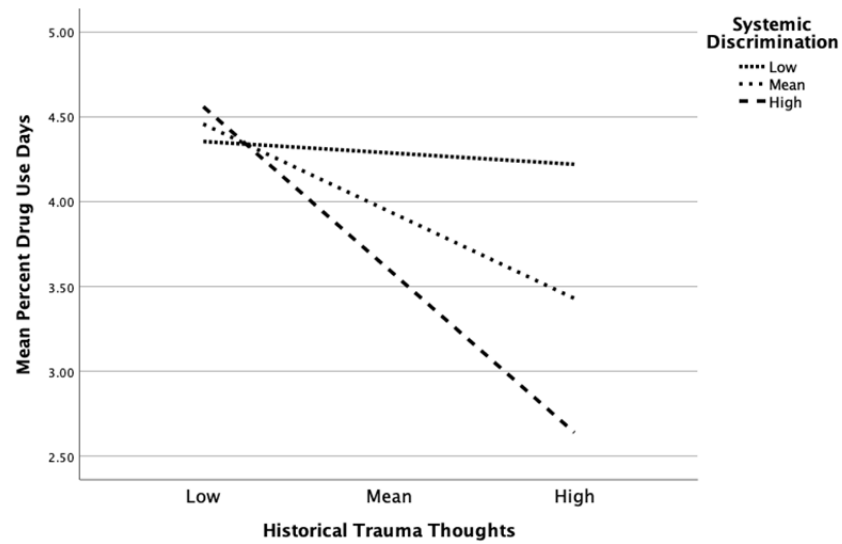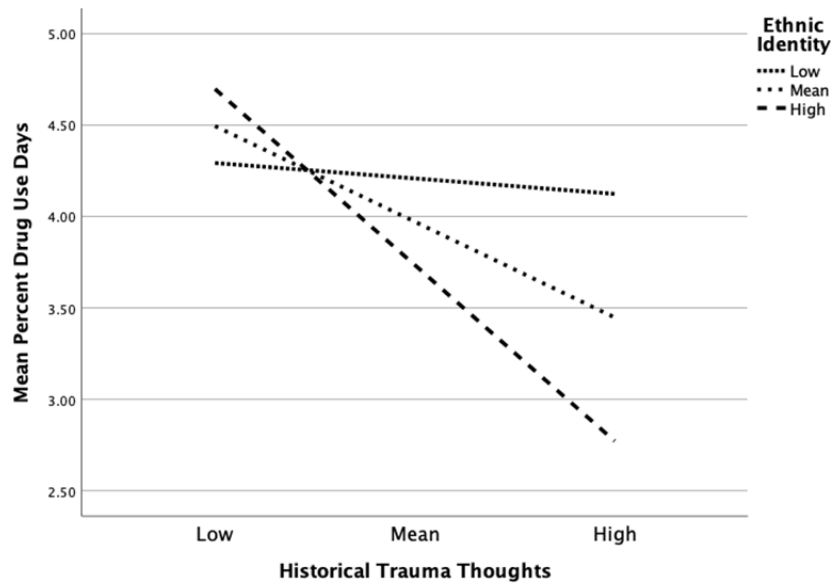
Figure 5.

The overall model for HT thoughts→drinks per drinking day moderated by systemic discrimination was significant, $F(5,180) = 2.27$, $p < .05$, $R^2 = 0.08$. When systemic discrimination scores were high ($\beta = -0.15$, $t = -2.15$, $p < .05$, CI [−0.28, −0.01]), the interaction between systemic discrimination and HT thoughts was associated with fewer drinks per drinking day.

Figure 6.

The overall model for HT thoughts→drug use days moderated by systemic discrimination was significant, $F(5,185) = 2.30$, $p < .05$, $R^2 = 0.06$. When systemic discrimination scores were high ($\beta = -0.06$, $t = -2.15$, $p < .05$, CI [−0.28, −0.01]), the interaction between systemic discrimination and HT thoughts was associated with fewer drug use days.

Figure 7.
The overall model for HT thoughts→drug use days moderated by ethnic identity was significant, $F(5,185) = 2.05$, $p < .05$, $R^2 = 0.05$. When ethnic identity scores were high ($\beta = -0.06$, $t = -2.33$, $p < .05$, CI [−0.11, −0.009]), the interaction between ethnic identity and HT thoughts was associated with fewer drug use days.

Table 1.

Participant Characteristics (*N* = 198)

Characteristics	Values
Women, *n* (%)	103 (52)
Age in years, mean (*SD*), range	37 (11.79), 18–65
Education, *n* (%)	
Education not reported	7 (3.1)
Some high school	99 (50.2)
High school graduate/GED	67 (34)
Some college/college degree	25 (12.7)
Monthly Income, *n* (%)	
No income reported	50 (25.3)
$0	67 (34.3)
$1–500	26 (13.1)
$500–$1,000	30 (14.6)
$1,000–$2,000	10 (5.1)
>$2,000	15 (7.5)
Abstinent days in the past 90 days, *n* (%)	
90–60 days	95 (48)
59–30 days	26 (13.1)
1–29 days	30 (15.2)
0 days	41 (20.7)
Heavy Alcohol use days in the past 90 days, *n* (%)	
90–60 days	23 (11.6)
59–30 days	18 (9.1)
1–29 days	97 (49.0)
0 days	54 (27.3)
Drinks Per Drinking Day, *n* (%) (n = 186)	
51–60 drinks	1 (0.4)
41–50 drinks	4 (2.0)
31–40 drinks	7 (4.0)
21–30 drinks	27 (14.5)
11–20 drinks	47 (25.3)
1–10 drinks	50 (26.9)
0 drinks	50 (26.9)
Drug use days in the past 90 days, *n* (%)	
90–60 days	51 (25.8)
59–30 days	13 (6.6)
1–29 days	52 (26.3)
0 days	76 (38.4)

Table 2.

Study Descriptive Statistics and Bivariate Correlations

Variable	α	1	2	3	4	5	6	7	8	9
1. HT Thoughts	0.95	1								
2. HT Symptoms	0.92	.44[**]	1							
3. PDA	–	.13	−.14	1						
4. PHAUD	–	−.15[*]	.01	−.09	1					
5. DDD	–	−.11	−.06	−.13	.39[**]	1				
6. PDUD	–	−.12	.07	−.72[**]	−.07	.13	1			
7. Ethnic Identity	0.91	.16[*]	.07	−.01	.01	−.17	−.11	1		
8. Discrimination	0.84	.12	.26[**]	.08	−.11	−.05	.10	.20[**]	1	
9. PTSD	0.97	.23[**]	.49[**]	−.10	.03	−.05	.19[**]	−.01	.26[**]	1
	M	40.17	26.59	53.96	66.34	11.92	31.36	3.05	3.38	23.84
	Median	38	26	67	100	9.6	7.5	3	3.33	21
	SD	16.28	12.76	39.57	45.54	11.56	39.56	0.51	0.85	18.87
	Range	66	44	100	54	100	100	3.33	6	76

Note.

[**] $p < .01$

[*] $p < .05$.

HT thoughts = historical trauma thoughts, HT symptoms = historical trauma symptoms, PDA = percent days abstinent, PHAUD = percent heavy alcohol use days, DDD = drinks per drinking day, PDUD = percent drug use days, and PTSD = posttraumatic stress disorder symptoms.

Table 3.

Associations of Historical Trauma Thoughts and Symptoms with Substance Use

			Historical Trauma Thoughts			
Variable	β	SE	t	R^2	p	95% CI
PDA	0.57	0.19	3.08	0.05	.002 [**]	[0.21, 0.94]
PHAUD	−0.05	0.02	−2.33	0.03	.021 [*]	[−0.09, −0.01]
DDD	−0.12	0.06	−2.28	0.03	.024 [*]	[−0.23, −0.02]
PDUD	−0.05	0.02	−2.52	0.03	.012 [*]	[−0.09, −0.01]

			Historical Trauma Symptoms			
Variable	β	SE	t	R^2	p	95% CI
PDA	−1.01	0.34	−2.96	0.04	.003 [**]	[−1.69, − 0.34]
PHAUD	0.05	0.04	1.35	0.009	.178	[−0.02, 0.13]
DDD	0.005	0.01	0.39	0.001	.696	[−0.21, 0.03]
PDUD	0.07	0.04	2.00	0.002	.056	[−0.09, 0.01]

Note.

[**] $p < .01$

[*] $p < .05$.

PDA = percent days abstinent, PHAUD = percent heavy alcohol use days, DDD = drinks per drinking day, and PDUD = percent drug use days. Age and gender were entered as covariates in all analyses. Analyses using HT thoughts as the predictor controlled for HT symptoms, and analyses using HT symptoms as the predictor controlled for HT thoughts.