Published in final edited form as:

J Psychoactive Drugs. 2014 ; 46(3): 178–187. doi:10.1080/02791072.2014.917750.

The Role of Alcohol Expectancies in Drinking Behavior Among Women With Alcohol Use Disorder and Comorbid Posttraumatic Stress Disorder

Eric R. Pedersen, Ph.D.^a, Ursula S. Myers, M.S.^b, Kendall C. Browne, Ph.D.^c, and Sonya B. Norman, Ph.D.^d

^aAssociate Behavioral Scientist, RAND Corporation, Santa Monica, CA 90407

^bGraduate Research Assistant, SDSU/UCSD Joint Doctoral Program in Clinical Psychology, San Diego, CA, 92120

^cPostdoctoral Fellow, Mental Illness Research, Education, and Clinical Center, VA Puget Sound Health Care System, Seattle, WA; Acting Instructor/Senior Fellow, Department of Psychiatry & Behavioral Sciences, University of Washington, Seattle, WA

^dDirector, PTSD Consultation Program, National Center for PTSD, White River Junction, VT; Associate Professor, VA Center of Excellence for Stress and Mental Health and UCSD School of Medicine, San Diego, CA

Abstract

Understanding how alcohol expectancies relate to alcohol use among individuals with concurrent alcohol use disorder (AUD) and Posttraumatic Stress Disorder (PTSD) is important to understanding and treating this comorbidity. This study examined the role of positive and negative alcohol expectancies and PTSD symptoms in drinking behavior in a comorbid female sample. Participants were women ($n = 33$; 56% Caucasian) seeking AUD and PTSD treatment in an outpatient community co-occurring disorders program. Hypotheses related to drinking days and alcohol problems outcomes were evaluated using negative binomial hierarchical regression. PTSD symptoms were associated with fewer reported days of alcohol-related problems. Negative expectancies related to negative changes in social behavior associated with drinking days and cognitive and motor impairment associated with problems. Both the general positive expectancies score and specific global positive change subscale were uniquely associated with drinking and alcohol-related problem days after controlling for PTSD symptom severity and negative expectancies scores. Results suggest that both negative and positive expectancies about alcohol's effects are important correlates of drinking behavior among women with AUD and PTSD, with positive expectancies playing a potentially more salient role on use and consequences than symptom severity and negative expectancies.

Keywords

alcohol; intimate partner violence; PTSD; expectancies

Posttraumatic Stress Disorder (PTSD) is an anxiety disorder marked by symptoms of re-experiencing, behavioral and emotional avoidance, and hyperarousal resulting from a traumatic event (e.g., military combat, interpersonal violence; American Psychiatric Association, 2000). Approximately 7% of the general population is estimated to meet lifetime criteria for PTSD, with higher prevalence rates among women (Kessler et al., 2005; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Exposure to traumatic events and PTSD diagnoses are both predictors of alcohol dependence among women (Sartor et al., 2010) and women with PTSD are at increased risk for comorbid alcohol use disorders (AUD) compared to women without PTSD (Kessler et al., 1995). Women with co-occurring AUD and PTSD can have worse psychiatric, medical, legal, and social problems than those with either disorder alone (Driessen et al., 2008; Najavits, Weiss, & Shaw, 1999; Norman et al., 2007; Ouimette & Brown, 2003).

Alcohol expectancies, or beliefs about how alcohol may affect one's behavior, have been implicated in the co-occurrence of PTSD and AUD (Hruska & Delahanty, 2012; Simpson, 2003; Vik, Islam-Zwart, & Ruge, 2008). Expectancy theory (Goldman, 1994; Goldman, Del Boca, & Darkes, 1999) attempts to explain why individuals drink alcohol, with conceptual factors related to beliefs that drinking alcohol will either lead to positive (e.g., alcohol will increase social interaction or relieve tension) or negative effects (e.g., alcohol use will cause one to feel guilty or lose motor coordination). Alcohol expectancies influence drinking behaviors such that positive expectancies generally associate with increased drinking, while negative expectancies associating with less drinking (Christiansen, Goldman, & Inn, 1982; Goldman et al., 1987; Jones, Corbin, & Fromme, 2001).

According to expectancy theory, if an individual believes that using alcohol will help alleviate negative affect (such as anxiety or depression), he or she may be more likely to use alcohol. Indeed, studies with individuals suffering from PTSD indicate that reduction of negative affect is often cited as a core reason for why individuals drink. For example, among veterans with PTSD, emotional numbing symptoms were associated with alcohol misuse (Bremner et al., 1996; Jakupcak et al., 2010), suggesting that alcohol may be used to regulate negative emotions, cope with symptoms, improve mood, and/or facilitate social connection (Cooper et al., 1995). Likewise, among a sample of female civilians and veterans with comorbid PTSD and alcohol dependence, Lehavot and colleagues (2013) found that reasons for drinking related to reducing negative affect were associated with amount of alcohol consumed on a typical occasion. This "self-medication hypothesis" also yielded support in samples of female survivors of intimate partner violence (IPV; e.g., sexual assault, domestic violence) (Kaysen et al., 2007; Watt et al., 2012) and adolescents (Dixon et al., 2009).

While reasons for drinking and expectancies are somewhat different constructs, it follows that an individual who drinks for the purpose of alleviating negative affect may also drink with the expectation that alcohol will reduce PTSD symptom severity (Jacobsen et al. 2001).

However, findings regarding the relationship between PTSD and positive alcohol expectancies have been inconsistent. Symptom-specific alcohol expectancies (e.g., “after a few drinks I would be less startled by things”) failed to mediate the relationship between PTSD symptoms and alcohol use among women, with alcohol expectancies contributing independently to drinking (Vik et al., 2008). Likewise, Simpson (2003) found women with histories of childhood sexual assault in substance abuse treatment reported no differences in positive alcohol expectancies (e.g., tension reduction, increased pleasure, and sexual facilitation) compared to those without traumatic histories. On the other hand, Ullman and colleagues (2006) found tension reduction expectancies to be higher among a community sample of women with sexual assault history with PTSD and alcohol problems than among those women who had PTSD only. A positive association between PTSD symptoms and alcohol consequences was also observed for female college students who reported high tension reduction expectancies (Hruska & Delahanty, 2012).

Though there is little research examining PTSD and negative alcohol expectancies (e.g., drinking may exacerbate symptoms of PTSD, drinking may lead to cognitive or physical impairment), there are a few studies to suggest that, unlike in studies with general population samples, individuals with PTSD may continue to drink despite expectations of negative effects. For example, Norman and colleagues (2008) found negative PTSD-related alcohol expectancies associated with a PTSD diagnosis and increased alcohol use in a sample of Vietnam veterans. In another study, alcohol expectancies related to increased arousal and aggression (e.g., “after a few drinks or using drugs it is easier to pick a fight”) associated with PTSD symptom severity among female victims of IPV (Peters et al., 2012). Unclear in the literature, however, is how positive expectancies may have a more salient effect over those of negative expectancies. That is, if individuals with PTSD drink despite expectancies that alcohol may exacerbate their symptoms, it is possible that positive expectancies are more salient and thus more important determinants of behavior.

Given the mixed findings regarding alcohol expectancies and PTSD, we designed the present study to further examine this relationship. Using a sample of female IPV survivors in treatment for AUDs, we examined the association of positive and negative expectancies on drinking behavior and alcohol-related consequences. Though the previous work in this area is mixed, research generally finds both positive and negative expectancies associate with drinking in this population. As a result, we employed a hierarchical design to examine the unique effects of both negative and positive expectancies on alcohol use and consequences in an effort to provide a more descriptive understanding of how both types of expectancies associate with alcohol use behavior. After first controlling for PTSD symptom severity, we explored how negative expectancies (e.g., negative social behavior, cognitive impairment) associated with drinking outcomes. We then explored if positive alcohol expectancies (e.g., making social situations easier, reducing tension) associated with use and resulting consequences over the effects of PTSD symptoms and negative expectancies. We included an examination of specific positive and negative expectancy facets to provide a more thorough description of the role of unique expectancies in drinking behavior in this population.

Method

Participants

Participants were 33 female IPV survivors recruited as part of a treatment outcome study investigating an integrated intervention for co-occurring PTSD and AUD. Potential participants were recruited from an outpatient psychiatry clinic, through newspaper advertisements, and flyers distributed to community agencies providing IPV services. Study inclusion criteria consisted of English-speaking, adult (at least 18 years old), female, at least one month out of the abusive relationship, and a current DSM-IV diagnosis of PTSD and alcohol abuse and/or dependence. Participants were excluded from the study if they demonstrated moderate or severe cognitive impairment (mini-mental state examination score of 18 or less), and/or had a history of psychosis or mania that was not managed by pharmacotherapy for the most recent 6-month period. Participants were diagnosed with an AUD using the Structured Clinical Interview for DSM-IV (SCID-IV; First et al., 2002) and with PTSD using the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) and the PTSD Checklist-Civilian (PCL-C; scores ≥ 50 ; based on Harrington & Newman, 2007; Lang & Stein, 2005). Twenty percent of participants met criteria for subthreshold PTSD using the CAPS; meaning they were positive for a Criterion A event and Criterion B re-experiencing, but did not meet full criteria for either Criterion C avoidance or Criterion D hyperarousal. However, given high PCL scores of 50 or more, these women were included in the study as meeting criteria for a PTSD diagnosis. Seventy-eight participants were screened for eligibility via telephone, 44 participants were consented, and 33 completed baseline assessments required for the present analysis. Average age was 41.85 ($SD = 10.27$) years. The women had been in an average of 2.77 ($SD = 2$) abusive relationships, with a median length of abuse in the relationship lasting 25.8 months (mean = 45.65; $SD = 52.14$). Women reported a median of 11.5 months (mean = 31.85; $SD = 53.36$) since their most recent abusive relationship. Forty-five percent of the sample completed the course of treatment. See Table 1 for further demographic information about the sample.

Procedures

Following full study consent, participants completed a baseline assessment battery. The present investigation utilized data collected as part of this initial assessment. This study protocol was executed in accordance with the standards approved by the local Human Subjects Review Board.

Measures

Measures were included to assess PTSD symptoms, alcohol use and problems, and alcohol expectancies. DSM-IV PTSD symptoms were assessed with the PTSD Checklist – Civilian (PCL-C; Weathers et al., 1993), a well-established self-report measure of PTSD symptoms with good reliability and validity (Wilkins, Lang, & Norman, 2011). The PCL-C is a brief, widely used self-report instrument to quantify PTSD symptoms. It consists of 17 items corresponding to PTSD diagnostic criteria. Respondents rated how much they were bothered by the specified problem on a 5-point scale (ranging from 1 [“not at all”] to 5 [“extremely”]) in response to stressful experiences. Reliability of the overall scale ($\alpha = 0.94$) and the PTSD

cluster subscales of re-experiencing ($\alpha = 0.91$), avoidance ($\alpha = 0.88$), and arousal ($\alpha = 0.82$) were adequate in the present study.

Amount of drinking and consequences related to alcohol were assessed with the Addiction Severity Index (ASI; McLellan et al., 1992), a 30–45 minute structured interview which assesses problem severity in seven areas commonly affected by substance use. In addition to assessing lifetime and current use of alcohol, history of alcohol abuse, and history of alcohol use disorder treatment, the ASI includes seven subscales: medical, employment, alcohol use, drug use, legal, social/family, and psychiatric. Individual item scores, severity ratings by the interviewers, and composite subscale scores can be calculated. The ASI has been shown to be reliable and valid across multiple populations (McLellan et al., 1985; 1992; Rosen Henson, Finney, & Moos, 2000). Outcome variables generated from the ASI included (1) *number of days of any alcohol use in the past 30 days* and (2) *number of days with consequences related to alcohol use* (“How many days in the past 30 have you been troubled or bothered by any alcohol problems?”).

Alcohol expectancies were measured using the 100-item Alcohol Expectancy Questionnaire-Adolescent version (AEQ-A; Christiansen et al., 1982), which assesses seven domains: Global Positive Change (e.g., drinking alcohol makes a person feel good and happy; $\alpha = 0.88$), Change in Social Behavior (e.g., alcoholic beverages make parties more fun; $\alpha = 0.75$), Improved Cognitive and Motor Function (e.g., people drive better after a few drinks of alcohol; $\alpha = 0.77$), Sexual Enhancement (e.g., people feel sexier after a few alcoholic drinks; $\alpha = 0.88$), Cognitive and Motor Impairment (e.g., people are apt [likely] to become careless after a few drinks of alcohol; $\alpha = 0.90$), Increased Arousal (e.g., it is easier to speak in front of a group of people after a few drinks of alcohol; $\alpha = 0.83$), and Relaxation and Tension Reduction (e.g., drinking alcohol makes people worry less; $\alpha = 0.87$). Participants rated each item on a scale from 1 “disagree strongly” to 5 “agree strongly.” The adolescent version was used because it assesses both positive ($\alpha = 0.96$) and negative ($\alpha = 0.67$) expectancies. The individual items on the AEQ-A are similar in content to the adult version, but the wording is more general in order to encompass questions for individuals that have little to no experience with alcohol, in addition to regular drinkers (Christiansen et al., 1982). The factor structure of the AEQ-A has been examined with college students and 17–19 year olds (young adults; Rather, 1990), and was used in this study to assess both positive and negative expectancies for alcohol, which are not included in other versions of the scale (Brown et al., 1999). Additionally, while briefer versions of the measure exist (AEQ-SF; Rather, 1990), the longer assessment of alcohol expectancies is recommended for treatment samples (Rather, 1990). We created positive and negative expectancy composites based on recommendations from prior work with the AEQ-A (positive: Global Positive Changes, Improved Cognitive and Motor Functioning, Sexual Enhancement, Increased Arousal, Tension Reduction, and positive items from Changes in Social Behavior; negative: Cognitive and Motor Impairment and negative items from Changes in Social Behavior) (Brown et al., 1999).

Results

Analytic Plan

Hypotheses were evaluated using negative binomial hierarchical regression (Hilbe, 2011). Data were analyzed using SPSS version 18. Drinking was evaluated with days drinking in the past 30 days from the ASI, while consequences were evaluated by the number of days experiencing alcohol problems in the past 30 days from the ASI. These outcome variables were better approximated by a negative binomial distribution. Participants were required to have an AUD diagnosis and have engaged in problematic alcohol and/or drug use in the 30 days prior to initiating outpatient treatment. Some participants came directly from detoxification or were several weeks into their treatment program and thus had 30+ days sobriety. We looked at how composite negative expectancy factors and composite positive expectancy factors contributed uniquely to the model of alcohol use and consequences over and above the effect of PTSD symptoms. We then examined how alcohol use and problems associated with specific positive and specific negative expectancy factors after controlling for the effects of PTSD symptoms. All analyses followed three steps: first the PCL was entered into a model for the outcome of PTSD symptoms, followed by the inclusion of negative expectancy factor(s), and lastly by the inclusion of positive expectancy factor(s). We did not include demographic information in analyses as this would under power our analyses. Still, we ran correlational analyses and did not find any significant correlations with age or ethnicity and alcohol outcomes. Correlations and means for all variables used in analyses can be found in Table 2.

Drinking Days

PCL entered on Step 1 yielded a log likelihood ratio of $X^2(1) = 0.16$, $p = 0.688$, indicating that PCL scores did not contribute significantly drinking days. At Step 2, the negative expectancy factor yielded a log likelihood ratio of $X^2(2) = 4.33$, $p = 0.115$. The overall model at Step 2 was non-significant. At Step 3, positive expectancies uniquely contributed to the model of drinking after controlling for PCL scores and negative expectancies, $\beta = 1.67$ ($SE = 0.55$; $X(3) = 14.64$, $p = 0.002$). Greater agreement that alcohol would lead to positive effects was associated with greater frequency of drinking.

We next evaluated the impact of the specific negative and positive expectancies on drinking days (Table 3). After controlling for PCL scores, the negative items entered collectively contributed to the model, $X^2(3) = 8.49$, $p = 0.037$, and both Cognitive and Motor Impairment and Changes in Social Behaviors ($p = 0.05$) uniquely associated with drinking such that greater agreement that alcohol would lead to negative effects was associated with greater frequency of drinking. On Step 3, the positive factors collectively contributed to the model, $X^2(9) = 46.97$, $p = 0.000$; however, only Global Positive Change positively associated with drinking. The negative expectancy factors reduced to non-significance once positive expectancies were entered into the model ($p = 0.99$ and 0.66 for Cognitive and Motor Impairment and Changes in Social Behaviors, respectively).

Days Experienced Alcohol-related Problems

The model on Step 1 for alcohol-related problems was significant when PCL scores were entered, log likelihood ratio $X^2(1) = 4.29$, $p = 0.038$. The model on Step 2 was significant, $X^2(2) = 11.27$, $p = 0.004$, with negative expectancies uniquely and positively contributing to the model, but PCL scores no longer uniquely associated with consequences, $\beta = 0.02$, Wald Chi-Square $= (1 \text{ df}) 1.56$, $p = 0.212$. The model on Step 3 was also significant, $X^2(3) = 18.76$, $p = 0.000$, with positive expectancies uniquely contributing to the model. The effect for negative expectancies reduced to non-significance, $\beta = -0.10$, Wald Chi-Square $= (1 \text{ df}) 0.10$, $p = 0.921$.

We next evaluated the association of specific negative and positive expectancies with alcohol-related consequences (Table 3). After controlling for PCL scores, the negative items on Step 2 contributed to the model, $X(3) = 11.32$, $p = 0.010$. Specifically, Cognitive and Motor Impairment uniquely associated with problems such that greater agreement that alcohol would lead to negative effects was associated with greater frequency of alcohol problems. On Step 3, the positive factors collectively contributed to the model, $X^2(9) = 37.27$, $p = 0.000$, with Global Positive Change uniquely and positively associating with drinking. The negative expectancy factor of Cognitive and Motor Impairment reduced to non-significance once positive expectancies were entered into the model, $p = 0.55$.

Discussion

The present study explored the differential impact of PTSD symptoms and alcohol expectancies on drinking behavior and resulting consequences among a comorbid treatment sample of female victims of IPV. After controlling for PTSD symptoms, negative alcohol expectancies were associated with drinking behavior and consequences. Specifically, expected negative changes in social behavior (e.g., drinking makes a bad impression on others) were associated with more drinking, and expected cognitive and motor impairment (e.g., people are more likely to do something they do not want to do) were associated with more drinking and consequences. While these findings may seem counterintuitive to expectancy theory (i.e., individuals with negative expectancies may drink less to avoid these negative effects), previous work with PTSD samples has also found a positive relationship between negative expectancies and alcohol use (Norman et al., 2008; Peters et al., 2012). Expectancies conceptualized as negative may not be viewed as such by an individual with PTSD; indeed, negative expectancies may interact with PTSD symptoms to serve a functional role. For example, having cognitive and motor impairment that makes one look unapproachable may interact with PTSD numbing symptoms (e.g., detachment from others) to keep others at a distance during social situations involving drinking. Likewise, negative attention from others (i.e., changes in social behavior [negative] such as “people become harder to get along with after they have a few drinks of alcohol”) may also serve to keep others at a distance or as a means to justify their disassociation with others. Indeed, other work has found PTSD-specific alcohol-related expectancies related to numbing (e.g., “After a few drinks it would be easier to feel all of my feelings, both good and bad”) were the only expectancies associated with drinking consequences (Vik et al., 2008). Unfortunately, negative social behavior and impairment can have real implications for repeated incidents of

IPV. Efforts can be made in treatment to help individuals understand the connection between alcohol and IPV to avoid future victimization.

Those struggling with PTSD may have positive expectancies that supersede those of the expected negative effects. In our study, positive alcohol expectancies were associated with drinking behavior and consequences after controlling for PTSD symptoms and negative expectancies. Global positive effects (e.g., drinking alcohol makes a person feel good, drinking makes a person feel less alone) was the only facet of positive expectancies that was associated with use and consequences. Individuals with PTSD may determine that the positive effects they experience from drinking outweigh the negative ones. That is, even though alcohol makes one have a bad impression on others and leads one to stumble and think less clearly, it also is a powerful agent that makes global positive transformations (e.g., “drinking alcohol makes it easier to be with others and, in general, makes the world seem like a nicer place”) that may outweigh these negative effects. Interestingly, tension reduction expectancies were not associated with drinking or consequences after controlling for PTSD symptoms, negative expectancies, and the other positive expectancy facets. This suggests that female IPV victims may be drinking less so to diminish a negative experience (e.g., drinking to relieve tension, stress, or worry) but rather to invoke a global positive experience (e.g., improve mood and feel less lonely). Indeed, increasing pleasure is a leading correlate of drinking among women with PTSD (Simpson et al., 2003). Learning alternative strategies to achieve these positive experiences may be attractive to traumatized women with PTSD and AUD as targets of intervention. Focus on skills to achieve these may be helpful strategies to engage women in PTSD and/or AUD treatment.

Interestingly, PTSD symptom severity did not associate with drinking days and symptoms had a negative relationship with consequences. It is possible that PTSD symptom severity may have inadvertently sheltered women from consequences related to alcohol use. For example, higher avoidance and/or isolation may have prevented women from attending social situations where alcohol was present, and thus experiencing the social, family, or legal problems associated with use outside the home. Indeed, alcohol is often involved during incidents of IPV (Foran & O’Leary, 2008) and women who have experienced IPV are at risk for more drinking and consequences post-trauma (Bedard-Gilligan, Kaysen, Desai, & Lee, 2011). However, this study was cross-sectional and we did not assess location of drinking (i.e., home versus in social situations). Future longitudinal work is needed to examine more closely the connection between PTSD symptoms, expectancies, drinking behavior, and proximal factors (e.g., location, alone versus in crowds). Promising recent research has already begun to look at proximal factors and symptom expression related to alcohol use during daily diary assessments (Kaysen et al., 2013).

Limitations include the use of cross-sectional self-report data and a small sample size that may have resulted in our analyses being underpowered. For example, we did not evaluate expectancies as moderators of the relationship between alcohol use and problems and the specific symptom clusters of PTSD. This was primarily due to the limitation that many of the participants, though in treatment for substance use problems, were not actively drinking as they were in treatment at study entry. This may have affected the results, such as why PTSD symptoms and alcohol use were not significantly associated. Examining the effect of

current alcohol use on expectancies would provide further information into the relationship between PTSD symptoms and alcohol expectancies. Participants were involved in treatment for both alcohol and other drug use and we may be missing relationships related to other substance use patterns within the sample. Though negative binomial regression can be appropriate for small samples such as ours, our estimates may be biased (Aban, Cutter, & Mayinga, 2008; Yang, Hardin, Addy, & Vuong, 2007). However, there are advantages of this analytic approach over ordinary least squares regression when data are skewed to the degree they are here (Hilbe, 2008). Still, the results should be viewed as preliminary and further work with larger samples that incorporates other drug expectancies is encouraged. In addition, we examined frequency of drinking days and days experienced problems and did not assess potentially more severe alcohol outcomes such as quantity of drinks consumed per occasion or severity of consequences. Given the small scope of the study we were not able to conduct fidelity ratings (e.g., inter-rater reliability of the ASI). Finally, we were underpowered to provide a more in-depth look at the specific clusters of PTSD (i.e., re-experiencing, behavioral and emotional avoidance, hyperarousal); thus future work can provide more insight into how these symptom clusters interact with specific positive and negative alcohol expectancy facets to associate with PTSD symptoms and drinking behavior.

In sum, findings support the idea that alcohol expectancies are an important factor when considering drinking behavior in comorbid populations with PTSD. Due to the strong connection between expectancies and behavior, some research suggests challenging one's expectancies through intervention may assist in reducing drinking levels (Darkes & Goldman, 1993, 1998; Fromme, Kivlahan, & Marlatt, 1986; Marlatt & Rohsenow, 1980; Wood et al., 2007). Among a highly co-morbid population, targeting expectancies about alcohol's positive effects may be more salient for coping with situational triggers (i.e., drinking to get through social situations) as opposed to PTSD symptom management. Examining the impact of targeting these expectancies during interventions with trauma-exposed populations is an important topic for further clinical research.

Acknowledgments

FUNDING

Funded by grant K23 AA015707 by the National Institute of Alcohol Abuse and Addiction and support from the VA Center of Excellence for Stress and Mental Health to SBN.

References

- Aban IB, Cutter GR, Mavinga N. Inferences and power analysis concerning two negative binomial distributions with an application to MRI lesion counts data. *Computational Statistics and Data Analysis*. 2008; 53(3):820–833. [PubMed: 19177180]
- American Psychiatric Association. *Diagnostic criteria from DSM-IV-TR*. Washington, D.C.: American Psychiatric Association; 2000.
- Bedard-Gilligan M, Kaysen D, Desai S, Lee CM. Alcohol-involved assault: associations with posttrauma alcohol use, consequences, and expectancies. *Addictive Behaviors*. 2011; 36(11):1076–1082. [PubMed: 21813246]

- Bremner JD, Southwick SM, Darnell A, Charney DS. Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. *American Journal of Psychiatry*. 1996; 153(3):369–375. [PubMed: 8610824]
- Brown SA, Tate SR, Vik PW, Haas AL, Aarons GA. Modeling of alcohol use mediates the effect of family history of alcoholism on adolescent alcohol expectancies. *Experimental and Clinical Psychopharmacology*. 1999; 7(1):20–27. [PubMed: 10036606]
- Christiansen BA, Goldman MS, Inn A. Development of alcohol-related expectancies in adolescents: Separating pharmacological from social-learning influences. *Journal of Consulting and Clinical Psychology*. 1982; 50(3):336–344. [PubMed: 7096736]
- Cooper ML, Frone MR, Russell M, Mudar P. Drinking to regulate positive and negative emotions: a motivational model of alcohol use. *Journal of Personality and Social Psychology*. 1995; 69(5):990–1005. [PubMed: 7473043]
- Darkes J, Goldman MS. Expectancy challenge and drinking reduction: experimental evidence for a mediational process. *Journal of Consulting and Clinical Psychology*. 1993; 61(2):344–353. [PubMed: 8473588]
- Darkes J, Goldman MS. Expectancy challenge and drinking reduction: Process and structure in the alcohol expectancy network. *Experimental and Clinical Psychopharmacology*. 1998; 6(1):64–76. [PubMed: 9526147]
- Dixon LJ, Leen-Feldner EW, Ham LS, Feldner MT, Lewis SF. Alcohol use motives among traumatic event-exposed, treatment-seeking adolescents: Associations with posttraumatic stress. *Addictive Behaviors*. 2009; 34(12):1065–1068. [PubMed: 19632052]
- Driessen M, Schulte S, Luedecke C, Schaefer I, Sutmann F, et al. Trauma and PTSD in patients with Alcohol, Drug, or Dual Dependence: A multi-center study. *Alcoholism: Clinical and Experimental Research*. 2008; 32(3):481–488.
- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JWB. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP). New York: Biometrics Research, New York State Psychiatric Institute; 2002.
- Foran HM, O’Leary KD. Alcohol and intimate partner violence: A metaanalytic review. *Clinical Psychology Review*. 2008; 28(7):1222–1234. [PubMed: 18550239]
- Fromme K, Kivlahan DR, Alan Marlatt G. Alcohol expectancies, risk identification, and secondary prevention with problem drinkers. *Advances in Behaviour Research and Therapy*. 1986; 8(4):237–251.
- Goldman MS. The alcohol expectancy concept: Application to assessment, prevention, and treatment of alcohol abuse. *Applied and Preventive Psychology*. 1994; 3(3):131–144.
- Goldman, MS.; Brown, SA.; Christiansen, BA.; Blane, H.; Leonard, K. Expectancy theory: Thinking about drinking. In: Blane, HT.; Leonard, KE., editors. *Psychological-Theories of Drinking and Alcoholism*. New York: Guilford Press; 1987.
- Goldman, MS.; Del Boca, FK.; Darkes, J. Alcohol expectancy theory: The application of cognitive neuroscience. In: Leonard, KE.; Blane, HT., editors. *Psychological Theories of Drinking and Alcoholism*. New York: Guildford Press; 1999.
- Harrington T, Newman E. Evaluating post-traumatic stress disorder among treatment engaged substance abusing women. *Addictive Behaviors*. 2007; 32(12):2788–2798. [PubMed: 17507172]
- Hilbe, JM. *Negative binomial regression*. Cambridge University Press; 2011.
- Hruska B, Delahanty DL. Application of the stressor vulnerability model to posttraumatic stress disorder (PTSD) and alcohol-related problems in an undergraduate population. *Psychology of Addictive Behaviors*. 2012; 26(4):734–746. [PubMed: 22390335]
- Jacobsen LK, Southwick SM, Kosten TR. Substance use disorders in patients with posttraumatic stress disorder: a review of the literature. *American Journal of Psychiatry*. 2001; 158(8):1184–1190. [PubMed: 11481147]
- Jacobson IG, Ryan MAK, Hooper TI, Smith TC, Amoroso PJ, Boyko EJ, Gackstetter GD, Wells TS, Bell NS. Alcohol use and alcohol-related problems before and after military combat deployment. *JAMA: The Journal of the American Medical Association*. 2008; 300(6):663–675. [PubMed: 18698065]

- Jakupcak M, Tull MT, McDermott MJ, Kaysen D, Hunt S, Simpson T. PTSD symptom clusters in relationship to alcohol misuse among Iraq and Afghanistan war veterans seeking post-deployment VA health care. *Addictive Behaviors*. 2010; 35(9):840–843. [PubMed: 20471180]
- Jones BT, Corbin W, Fromme K. A review of expectancy theory and alcohol consumption. *Addiction*. 2001; 96(1):57–72. [PubMed: 11177520]
- Kaysen D, Atkins DC, Simpson TL, Stappenbeck CA, Blayney JA, Lee CM, Larimer ME. Proximal relationships between PTSD symptoms and drinking among female college students: Results from a daily monitoring study. *Psychology of Addictive Behaviors*. 2014; 28(1):62–73. [PubMed: 23915369]
- Kaysen D, Dillworth TM, Simpson T, Waldrop A, Larimer ME, Resick PA. Domestic violence and alcohol use: Trauma-related symptoms and motives for drinking. *Addictive Behaviors*. 2007; 32(6):1272–1283. [PubMed: 17098370]
- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*. 2005; 62(6):593–602. [PubMed: 15939837]
- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*. 1995; 52(12):1048–1060. [PubMed: 7492257]
- Lang AJ, Stein MB. An abbreviated PTSD checklist for use as a screening instrument in primary care. *Behaviour Research and Therapy*. 2005; 43(5):585–594. [PubMed: 15865914]
- Lehavot K, Stappenbeck CA, Luterek JA, Kaysen D, Simpson TL. Gender differences in relationships among PTSD severity, drinking motives, and alcohol use in a comorbid Alcohol Dependence and PTSD sample. *Psychology of Addictive Behaviors*. 2013; 28(1):42–52. [PubMed: 23647151]
- Marlatt, GA.; Rohsenow, DJ. Cognitive processes in alcohol use: Expectancy and the balanced placebo design. In: Mello, NK., editor. *Advances in Substance Abuse Vol. 1*. Greenwich, Connecticut: JAI Press; 1980.
- McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, Pettinati H, Argeriou M. The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*. 1992; 9(3): 199–213. [PubMed: 1334156]
- McLellan AT, Luborsky L, Cacciola J, Griffith JE, Evans F, et al. New data from the Addiction Severity Index: Reliability and validity in three centers. *Journal of Nervous and Mental Disease*. 1985; 173(7):412–423. [PubMed: 4009158]
- Mills KL, Teesson M, Ross J, Peters L. Trauma, PTSD, and substance use disorders: Findings from the Australian National Survey of Mental Health and Well-Being. *American Journal of Psychiatry*. 2006; 163(4):652–658. [PubMed: 16585440]
- Najavits LM, Weiss RD, Shaw SR. A clinical profile of women with PTSD and substance dependence. *Psychology of Addictive Behaviors*. 1999; 13(2):98–104.
- Norman SB, Tate SR, Anderson KG, Brown SA. Do trauma history and PTSD symptoms influence addiction relapse context? *Drug and Alcohol Dependence*. 2007; 90(1):89–96. [PubMed: 17459611]
- Norman SB, Inaba RK, Smith TL, Brown SA. Development of the PTSD-alcohol expectancy questionnaire. *Addictive Behaviors*. 2008; 33:841–847. [PubMed: 18261858]
- Ouimette, PE.; Brown, PJ. Trauma and substance abuse: Causes, consequences, and treatment of comorbid disorders. Washington DC: American Psychological Association; 2003.
- Peters EN, Khodkaryan E, Sullivan TP. Associations between expectancies of alcohol and drug use, severity of partner violence, and Posttraumatic Stress among women. *Journal of Interpersonal Violence*. 2012; 27(11):2108–2127. [PubMed: 22258078]
- Rather BC. Using the Alcohol Expectancy Questionnaire-Adolescent Form to predict college drinking: long versus short forms. *Addictive Behaviors*. 1990; 15(6):567–572. [PubMed: 2075854]
- Resnick HS, Kilpatrick DG, Dansky BS, Saunders BE, Best CL. Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology*. 1993; 61(6):984–991. [PubMed: 8113499]

- Rosen CS, Henson BR, Finney JW, Moos RH. Consistency of self-administered and interview-based Addiction Severity Index composite scores. *Addiction*. 2000; 95(3):419–425. [PubMed: 10795362]
- Sartor CE, McCutcheon VV, Pommer NE, Nelson EC, Grant JD, et al. Common genetic and environmental contributions to post-traumatic stress disorder and alcohol dependence in young women. *Psychological Medicine*. 2010; 41(7):1497–1505. [PubMed: 21054919]
- Simpson TL. Childhood sexual abuse, PTSD, and the functional roles of alcohol use among women drinkers. *Substance Use & Misuse*. 2003; 38(2):249–270. [PubMed: 12625430]
- Stewart, SH.; Ouimette, P.; Brown, PJ. Gender and the comorbidity of PTSD with substance use disorders. In: Kimerling, R.; Ouimette, P.; Wolfe, J., editors. *Gender and PTSD*. New York: Guilford Press; 2002.
- Ullman SE, Filipas HH, Townsend SM, Starzynski LL. Correlates of comorbid PTSD and drinking problems among sexual assault survivors. *Addictive Behaviors*. 2006; 31(1):128–132. [PubMed: 15899554]
- Vik PW, Islam-Zwart KA, Ruge L. Application of the PTSD-alcohol expectancy questionnaire (P-AEQ) to sexually assaulted college women. *Addiction Research & Theory*. 16(2008)(6):585–594.
- Watt MH, Ranby KW, Meade CS, Sikkema KJ, MacFarlane JC, et al. Posttraumatic stress disorder symptoms mediate the relationship between traumatic experiences and drinking behavior among women attending alcohol-serving venues in a South African township. *Journal of Studies on Alcohol and Drugs*. 2012; 73(4):549–558. [PubMed: 22630793]
- Weathers, FW.; Litz, BT.; Herman, DS.; Huska, JA.; Keane, TM. *The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility*. Boston: National Center for PTSD; 1993.
- Wilkins KC, Lang AJ, Norman SB. Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. *Depression and Anxiety*. 2011; 28(7):596–606. [PubMed: 21681864]
- Wood MD, Capone C, Laforge R, Erickson DJ, Brand NH. Brief motivational intervention and alcohol expectancy challenge with heavy drinking college students: A randomized factorial study. *Addictive Behaviors*. 2007; 32(11):2509–2528. [PubMed: 17658696]
- Yang Z, Hardin JW, Addy CL, Vuong QH. Testing approaches for overdispersion in poisson regression versus the generalized poisson model. *Biometrical Journal*. 2007; 49(4):565–584. [PubMed: 17638291]

Table 1**Demographic Characteristics (N =33)**

	N	%
<i>Ethnicity</i>		
Caucasian	24	55.8
African-American	5	11.6
Hispanic	11	32.6
<i>Education Level</i>		
Did not complete High School (8–11 years)	8	24.2
High School (12 years)	10	30.3
College (13–17 years)	15	45.4
<i>Current Employment</i>		
Full-time	9	27.3
Part-time	9	27.3
Retired/Disabled	6	18.2
Unemployed	9	27.3
<i>Pre-Treatment Environment (past 30 days)</i>		
Unconstrained	29	85.2
Alcohol/Drug Treatment	1	2.9
Medical Treatment	1	2.9
Other- unspecified	3	8.8
<i>DSM-IV Axis I Mental Health Diagnosis</i>		
PTSD	26	76.5
Sub-threshold PTSD	7	20.6
Depression	23	79.3
Mania	13	51.7
Anxiety	15	46.4
<i>Alcohol and Substance Use</i>		
Lifetime AUD	33	100.0
Current AUD	27	67.5
Lifetime SUD	19	47.5
Current SUD	19	47.5
<i>Borderline Personality Traits</i>		
No	20	65.0
<i>Abuse</i>		
Physical Abuse	22	84.6
Emotional Abuse	25	96.2
Sexual Abuse	12	50

Note. PTSD = Posttraumatic Stress Disorder; AUD = Alcohol Use Disorder; borderline personality traits assessed with the McLean Screening for Borderline Personality Disorder (Zanarini et al., 2003)

Table 2

Means and correlations of variables used in analyses

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Drinking days ¹	–												
2 Days experienced alcohol problems ²	0.59**	–											
3 PCL score	–0.05	0.21	–										
4 AEQ ³ negative expectancies	0.06	0.22	0.10	–									
5 AEQ ³ positive expectancies	0.22	0.36*	0.31	0.61**	–								
6 Cognitive and Motor Impairment	–0.05	0.21	0.18	0.96**	0.65**	–							
7 Changes in Social Behavior (negative)	0.30	–0.08	–0.34	–0.25	–0.39*	–0.49**	–						
8 Global Positive Change	0.32	0.45**	0.30	0.51**	0.92**	0.58**	–0.48**	–					
9 Improved Cognitive and Motor Abilities	–0.06	0.29	0.37*	0.23	0.71**	0.36*	–0.57**	0.69**	–				
10 Sexual Enhancement	0.22	0.28	0.24	0.69**	0.90**	0.69**	–0.28	0.78**	0.48**	–			
11 Increased Arousal	0.01	0.20	0.13	0.71**	0.83**	0.71**	–0.28	0.67**	0.54**	0.74**	–		
12 Relaxation and Tension Reduction	0.17	0.31	0.13	0.59**	0.83**	0.60**	–0.27	0.70**	0.46**	0.72**	0.71**	–	
13 Changes in Social Behavior (positive)	0.27	0.27	0.36*	0.49**	0.87**	0.47**	–0.15	0.73**	0.43*	0.88**	0.68**	0.67**	–
Mean	6.95	4.61	56.16	3.75	3.36	4.08	2.69	3.20	2.19	3.70	3.90	3.91	3.42
Standard Deviation	10.12	8.70	15.70	0.42	0.65	0.62	0.55	0.81	0.72	0.89	0.75	0.65	0.86

Note:

* $p < .05$,** $p < .01$ ¹ Number of days of any alcohol use in the past 30 days² Number of days with consequences related to alcohol use in the past 30 days³ Alcohol Expectancy Questionnaire

Table 3

Negative binomial regression analyses

	Parameter Estimate	Standard Error	Wald's Chi-Square	p-value
Drinking Days¹				
<i>Step 1. PTSD symptoms</i>				
PCL ²	−0.01	0.01	0.16	0.688
<i>Step 2. Negative expectancies</i>				
Cognitive and Motor Impairment	1.18	0.61	3.75	0.053
Changes in Social Behavior (negative)	1.32	0.50	6.94	0.008
<i>Step 3. Positive expectancies</i>				
Global Positive Change	2.33	0.66	12.42	0.000
Improved Cognitive and Motor Abilities	−0.88	0.54	2.73	0.099
Sexual Enhancement	0.81	0.61	1.76	0.184
Increased Arousal	−0.36	0.53	0.46	0.496
Relaxation and Tension Reduction	−1.35	0.84	2.57	0.109
Changes in Social Behavior (positive)	1.38	0.79	3.09	0.079
Days Experienced Alcohol Problems³				
<i>Step 1. PTSD symptoms</i>				
PCL	−0.52	0.98	4.21	0.04
<i>Step 2. Negative expectancies</i>				
Cognitive and Motor Impairment	1.26	0.56	5.09	0.024
Changes in Social Behavior (negative)	−0.09	0.67	0.02	0.892
<i>Step 3. Positive expectancies</i>				
Global Positive Change	3.81	1.25	9.29	0.002
Improved Cognitive and Motor Abilities	−0.33	0.77	0.19	0.665
Sexual Enhancement	−0.70	0.72	0.94	0.332
Increased Arousal	−1.24	0.72	2.97	0.085
Relaxation and Tension Reduction	0.54	0.77	0.49	0.486
Changes in Social Behavior (positive)	−0.64	1.06	0.36	0.548

Note: Parameter estimates are unstandardized. Values reported at each step represent findings at that step.

¹ Number of days of any alcohol use in the past 30 days

² Posttraumatic Stress Disorder Checklist

³ Number of days with consequences related to alcohol use in the past 30 days