Alcohol expectancies in persons with severe mental illness and posttraumatic stress disorder

Pallavi Nishith1, Kim T. Mueser2* and Gary A. Morse1

Abstract: Background: Persons with a severe mental illness (SMI) report high rates of trauma, posttraumatic stress disorder (PTSD), and alcohol use disorder. OBJECTIVE: The aim of the study was to compare alcohol use expectancies between persons with an SMI and PTSD with an alcohol use disorder, to similar individuals with no alcohol use disorder.

Methods: Nine persons with SMI, PTSD, and alcohol use disorder were compared to 12 persons with SMI, PTSD, and no alcohol use disorder on their alcohol use expectancies using the Alcohol Effect Expectancy Questionnaire (AEEQ).

Results: The multivariate F-test for a one-way multivariate analysis of variance was statistically significant, indicating differences between the two groups on the AEEQ subscales. Univariate tests revealed that compared to persons with no alcohol use disorder, those with alcohol use disorder had significantly higher scores on all the AEEQ subscales except the relaxation and tension reduction subscale.

Conclusions: The results suggest that alcohol use disorder in individuals with SMI and PTSD may be related to efforts to cope with specific PTSD symptom clusters, such as feelings of numbness and avoidance. The findings have implications for treating alcohol use disorder and PTSD in the SMI population, by targeting coping skills such as emotional regulation as an alternative to alcohol use.

ABOUT THE AUTHOR
The first author, Pallavi Nishith, Ph.D, has a primary appointment as Staff Psychologist at Places for People, a community mental health center in Saint Louis, MO. In this role, she utilizes Cognitive Behavior Therapy (CBT) models to provide therapy for PTSD in persons with a severe mental illness (SMI). There is evidence that PTSD, in the SMI, contributes to increased vulnerability to alcohol and drug use disorder. However, the specific mechanisms underlying this association are unclear. Assessment of expectancies for alcohol and drug use in persons with SMI and PTSD could provide a potential target for interventions addressing comorbid PTSD and alcohol use disorder in this population. This study compared alcohol use expectancies in persons with SMI, PTSD, and alcohol use disorder to similar individuals with PTSD but no history of alcohol use disorder. Findings could be integrated, into existing CBT models, to provide targeted therapy for this dually diagnosed population of persons with SMI.

PUBLISHER'S Note
© 2019 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.
The lifetime prevalence of trauma exposure among people with a serious mental illness (SMI) is high (Grubaugh, Zinzow, Paul, Egede, & Frueh, 2011). Specifically, rates of trauma exposure in psychiatric inpatients have been found to range from 53% to 100% (Goodman, Dutton, & Harris, 1997; McFarlane, Bookless, & Air, 2001; Shaw, McFarlane, Bookless, & Air, 2002), while about 90% of people with SMI report having experienced at least one traumatic event, most of whom have been multiply traumatized (Goodman et al., 1997; Mueser et al., 1998). Consistent with the high rate of trauma in persons with SMI, high rates of posttraumatic stress disorder (PTSD) have also been reported in this population, with most estimates of current PTSD ranging from 29% to 43% (Grubaugh et al., 2011; Mueser, Rosenberg, Goodman, & Trumbetta, 2002). These rates are much higher than the estimated 8–12% lifetime prevalence of PTSD in the general population (Breslau, Davis, Andreski, & Peterson, 1991; Kessler et al., 2014; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Kilpatrick et al., 2013; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993).

There is also abundant evidence that persons with SMI have high rates of alcohol and drug use disorders compared to the general population. Approximately 40–50% of persons with SMI have lifetime substance use disorder (Maslin et al., 2001; Mueser et al., 1990; Volkow, 2009; Weaver et al., 2003) vs. only 15% in the general population (Kessler et al., 1997; Petrakis, Rosenheck, & Desai, 2011; Regier et al., 1990). This raises the question of whether the increased rates of PTSD in persons with SMI may account for some of the higher prevalence of substance use disorder in this population. Substantial evidence shows that PTSD is associated with an increased rate of alcohol and drug use disorder in both the general population (Bonin, Norton, Asmundson, Dicurzio, & Pidlubney, 2000; Breslau, Davis, & Schultz, 2003; Lipschitz et al., 2003; Villagonzalo et al., 2011) and the SMI population (Brady, Rierdan, Penk, Losardo, & Meschede, 2003; Ford & Furnier, 2007; Mueser et al., 2004; Rosenberg, Lu, Mueser, Jankowski, & Cournos, 2007). Furthermore, across both the general and SMI populations, there is evidence that PTSD contributes to increased vulnerability to alcohol and drug use disorder (Chilcoat & Breslau, 1998; Cusack, Herring, & Steadman, 2013).

Although PTSD appears to contribute to alcohol and drug use problems, the specific mechanisms underlying the association are unclear. Expectancies for the effects of substances have been posited as etiological factors in the development of substance use disorder (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Cox & Klinger, 1988). Expectancies reflect the degree to which individuals expect a substance to produce a variety of general and specific effects. These expectancies are in turn hypothesized to influence decisions regarding the use of substances, and have been found to be related to a history of substance use disorder in the general population (Brown, Christiansen, & Goldman, 1987; Goldman, 1994).

Research has shown that both a history of trauma (Corbin, Bernat, Calhoun, McNair, & Seals, 2003; Jester, Steinberg, Heitzeg, & Zucker, 2015; Peters, Khondkaryan, & Sullivan, 2012), as well as PTSD (Schaumberg et al., 2015) predict positive PTSD-related alcohol expectancies (Himmerich & Orcutt, 2019; McDevitt-Murphy, Luciano, Tripp, & Eddinger, 2017; Pederson, Myers, Browne, & Norman, 2014). In particular, relaxation and tension reduction expectancies are related to alcohol use behaviors (Peters et al., 2012; Simpson, 2003; Vlk, Islam-Zwart, & Ruge, 2008). It is suggested that alcohol use expectancies may serve as targets for interventions to reduce alcohol use behaviors in persons with PTSD (Himmerich & Orcutt, 2019; Peters et al., 2012).

In a study of expectancies in psychiatric outpatients, Nishith, Mueser, Srsic, and Beck (1997) showed that outpatients with SMI and history of comorbid alcohol use disorder reported greater expectancies for using alcohol than did patients with no such history. Substance-specific expectancies in schizophrenia were reported by Mueser, Nishith et al. (1995), where alcohol expectancies were related to alcohol use disorders but not drug use disorders. Assessment of expectancies for
alcohol use in persons with SMI and PTSD could provide a potential target for interventions addressing comorbid PTSD and alcohol use disorder in this population (Thornton, Baker, Johnson, & Lewin, 2012). The goal of this study was to compare alcohol use expectancies in persons with SMI, PTSD and alcohol use disorder to similar individuals with PTSD but no history of alcohol use disorder.

1. Method
This study was conducted at an urban community mental health center serving a diverse range of persons with SMI. All research procedures were approved by the local Institutional Review Board and all participants provided signed informed consent for the study.

1.1. Participants
The sample comprised persons with an SMI who met diagnostic criteria for PTSD, with or without alcohol use disorder. The only exclusion criteria for participating in the study were: organic brain conditions, currently suicidal or homicidal, or unable or not legally able to provide informed consent.

We recruited 21 participants for the study based on referrals from intake and community support teams for the treatment of PTSD. Participants had a mean age of 42.3 years. Seven participants (33%) were male and 14 (67%) were female; 7 (33%) were Caucasian and 14 (66%) were African-American; 13 participants were single, 1 was married, and 7 divorced or separated; 8 had less than high school level of education, 7 (33%) had graduated from high school, 5 had some college, and 1 had a college degree. Regarding income, 7 participants (33%) were earning (from social security income and/or other supplemental income) less than $500/month, 12 were earning between $500 and $1000 per month, and 2 were earning between $1000 and $1500 per month. Chart diagnoses were used to establish primary SMI diagnoses. One participant had a diagnosis of schizophrenia, four had schizoaffective disorder, five had bipolar disorder, nine had major depression, four had an anxiety disorder, and one had dissociative disorder.

1.2. Instruments
Clinical interviews based on the DSM-IV-TR (American Psychiatric Association, 2000) were conducted to confirm PTSD in all participants and to evaluate the history of substance use disorder. In addition to PTSD and SMI diagnoses, 9 participants (43%) had a history of alcohol use disorder and 12 (57%) did not. Among the 9 participants with an alcohol use disorder, 8 also had a history of a drug use disorder, whereas among the 12 participants with no alcohol use disorder, 9 also had a history of a drug use disorder.

Alcohol expectancies were assessed with the Alcohol Effect Expectancy Questionnaire (AEEQ; Brown et al., 1987). The AEEQ contains 68 items describing the common effects of alcohol. Respondents are asked to agree or disagree with each item according to their own current thoughts, feelings, and beliefs about alcohol. The AEEQ contains six subscales that measure global positive change, sexual enhancement, physical and social pleasure, increased social assertiveness, relaxation and tension reduction, and arousal and aggression. The scales have high internal consistency and test-retest reliabilities and have been found to distinguish between patterns of non-use and varying degrees of use in the general and psychiatric populations (Mueser, Nishith et al., 1995).

1.3. Procedures
Clinicians at the agency were informed about the nature of the study, asked to identify individuals who might be eligible for the study and to briefly describe the study to potential participants. Interested individuals were referred to meet with a member of the research team, who explained the study procedures, obtained informed consent, and then administered the PTSD assessment to confirm eligibility for the study. Participants who had a lifetime diagnosis of PTSD were then assessed for substance use disorder and administered the AEEQ. Participants were paid $15 for completing the assessments.
2. Results
A one-way multivariate analysis of variance (MANOVA) was conducted to compare the participants with an alcohol use disorder to those without such as disorder on the AEEQ subscales. The multivariate test was significant, multivariate $F(6,14) = 5.14, p < .01$, indicating that the profile of AEEQ subscales differed significantly between the two groups. Univariate tests showed that participants with PTSD and alcohol use disorder had significantly higher alcohol expectancy scores than those with no alcohol use disorder on most of AEEQ subscales, including global positive changes [$F(1,20) = 10.81, p < .004$], enhanced sexual performance [$F(1,20) = 5.08, p < .04$], physical and social pleasure [$F(1,20) = 10.09, p < .005$], increased social assertiveness [$F(1,20) = 8.89, p < .008$], and arousal and power [$F(1,20) = 14.30, p < .001$]. The only AEEQ subscale that did not differ significantly between the two groups was the relaxation and tension reduction subscale (see Table 1).

3. Discussion
Participants with SMI and co-occurring PTSD and a history of alcohol use disorder endorsed significantly more positive expectancies for the effects of alcohol on five of the six subscales of the AEEQ than participants with PTSD and SMI, but no history of alcohol use disorder. These findings are generally consistent with extensive research in the general population linking positive alcohol expectancies to both a history of alcohol use problems and future drinking problems (Leigh & Stacy, 2004; Maisto, Corey, & Bradizza, 1999; Park & Grant, 2005), and more limited research demonstrating associations between alcohol expectancies and SUD in persons with SMI (Mueser, Nishith, et al., 1995). However, considering the unique population studied here, persons with SMI and PTSD, and the high level of distress associated with PTSD (Mueser et al., 2004), these expectancies could reflect beliefs about the ameliorating effects of alcohol on PTSD symptoms. Research on combat veterans using the PTSD Alcohol Expectancy Questionnaire (Norman, Inaba, Smith, & Brown, 2008) has shown alcohol expectancies to moderate the relationship between PTSD severity and hazardous drinking (McDevitt-Murphy et al., 2017), suggesting that similar mechanisms may contribute to alcohol problems among persons with SMI and PTSD.

Difficulties in emotional regulation have been hypothesized to mediate the relationship between PTSD symptoms and alcohol use, and consequences in college students (Radomski & Read, 2016; Tripp, McDevitt-Murphy, Avery, & Bracken, 2015) and inner-city females. In particular, poor emotional regulation has been found to explain the relationship between PTSD avoidance/numbing symptoms and alcohol dependence in inner-city females (Goldstein, Bradley, Ressler, & Powers, 2006). Table 1. Means and Standard Deviations for Alcohol Effects Expectancy Scale (AEEQ) Subscales for Participants with a History of Alcohol Use Disorder and Participants without an Alcohol Use Disorder

| AEEQ Scale                        | Mean      | SD       |
|-----------------------------------|-----------|----------|
| Global Positive Changes           | PTSD with Alcohol Use Disorder | 13.33    | 8.82*    |
|                                   | PTSD without Alcohol Use Disorder | 3.75    | 4.35    |
| Enhanced Sexual Performance       | PTSD with Alcohol Use Disorder | 3.89    | 3.18*    |
|                                   | PTSD without Alcohol Use Disorder | 1.33    | 2.01    |
| Physical and Social Pleasure      | PTSD with Alcohol Use Disorder | 6.44    | 3.21*    |
|                                   | PTSD without Alcohol Use Disorder | 2.42    | 2.61    |
| Increased Social Assertiveness    | PTSD with Alcohol Use Disorder | 6.44    | 3.61*    |
|                                   | PTSD without Alcohol Use Disorder | 2.08    | 3.09    |
| Relaxation & Tension Reduction    | PTSD with Alcohol Use Disorder | 5.22    | 3.53    |
|                                   | PTSD without Alcohol Use Disorder | 2.50    | 3.12    |
| Arousal & Power                   | PTSD with Alcohol Use Disorder | 5.89    | 2.67*    |
|                                   | PTSD without Alcohol Use Disorder | 1.92    | 2.15    |

*p < .05
In the present study, co-occurring alcohol use disorder in persons with SMI and PTSD was associated with stronger expectancies for positive effects of alcohol on global changes, as well as positive effects on social and sexual behavior, arousal and power, and the experience of pleasure—aspects of functioning that are especially impaired by numbing and avoidance symptoms. The findings suggest that persons with SMI and PTSD who use alcohol as a stimulant to cope with or counteract the effects of these symptoms on their social and sexual lives, and their capacity for pleasure, may be particularly prone to developing alcohol use problems. Consistent with the possibility of using alcohol to stimulate interpersonal and pleasurable experiences affected by prominent numbing and avoidance symptoms, the only subscale of the AEEQ that was not related to lifetime history of alcohol use disorder was expectancies for relaxation and tension reduction, or expectancies for de-activating rather than activating effects of alcohol.

The present study extends previous research on the associations between alcohol expectancies and alcohol use disorder in people with SMI by demonstrating that persons with SMI and PTSD who have more positive expectancies for the effects of alcohol are significantly more likely to have alcohol use problems than similar persons with PTSD and less positive expectancies for the effects of alcohol. A particularly intriguing finding was that compared to people with SMI, PTSD, but no alcohol use disorder, people who also had co-occurring alcohol use disorder endorsed more positive expectancies for the effects of alcohol on increasing social and sexual behavior, and the experience of power and pleasure, but not for the effects on reducing tension and promoting relaxation. The findings raise the question of whether alcohol use and related problems in individuals with SMI and PTSD may be related to efforts to cope with specific symptom clusters of PTSD, such as feelings of numbness and avoidance. If replicated, the findings could have important implications for interventions targeting alcohol use disorder and PTSD and the SMI population, such as the teaching of more effective coping or emotional management strategies as alternatives to alcohol use.

**Funding**
The authors received no direct funding for this research.

**Author details**
Pallavi Nishith1
E-mail: pnishith@placesforpeople.org
Kim T. Mue ser1
E-mail: mueser@bu.edu
ORCID ID: http://orcid.org/0000-0002-1482-8314
Gary A. Morse1
E-mail: gmmorse@placesforpeople.org

1 Places for People: A human Approach to Mental Health Healing, St. Louis, MO, USA.
2 Center for Psychiatric Rehabilitation, Boston University, Boston, MA, USA.

**correction**
This article has been republished with minor changes. These changes do not impact the academic content of the article.

**Citation information**
Cite this article as: Alcohol expectancies in persons with severe mental illness and posttraumatic stress disorder, Pallavi Nishith, Kim T. Mueser & Gary A. Morse, Cogent Medicine (2019), 6: 1635805.

**References**
American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders text revision (DSM-IV-TR) (4th ed.). Washington, DC: Author.
Bonin, M. F., Norton, G. R., Asmundson, G. J., Dicurzio, S., & Pidulnkey, S. (2000). Drinking away the hurt: The nature and prevalence of PTSD in substance abuse patients attending a community-based treatment program. Journal of Behavior Therapy and Experimental Psychiatry, 31, 55–66.
Brady, S., Rierdan, J., Penk, W., Losard, M., & Meschede, T. (2003). Post-traumatic stress disorder in adults with serious mental illness and substance abuse. Journal of Trauma and Dissociation, 4, 77–90. doi:10.1300/J229v04n04_06
Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. Archives of General Psychiatry, 48, 216–222. Breslau, N., Davis, G. C., & Schultz, L. R. (2003). Posttraumatic stress disorder and the incidence of nicotine, alcohol, and other drug disorders in persons who have experienced trauma. Archives of General Psychiatry, 60, 289–294.
Brown, S. A., Christiansen, B. A., & Goldman, M. S. (1987). The alcohol expectancy questionnaire: An instrument for the assessment of adolescent and adult expectancies. Journal of Studies in Alcohol, 48, 483–491. doi:10.15288/jsa.1987.48.483
Chilcoat, H. D., & Breslau, N. (1998). Posttraumatic stress disorder and drug disorders: Testing causal pathways. Archives of General Psychiatry, 55, 913–917.
Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R., & Mudar, P. (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. Journal of Abnormal Psychology, 101, 139–152.
Corbin, W. R., Bernat, J. A., Calhoun, K. S., McNair, L. D., & Seals, K. L. (2001). The role of alcohol expectancies and alcohol consumption among sexually victimized and nonvictimized college women. Journal of Interpersonal Violence. doi:10.1177/088626001016004002
Cox, M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology, 97*, 168–180.

Cusack, K. J., Herring, A. H., & Steadman, H. J. (2013). PTSD as a mediator between lifetime sexual abuse and substance use among jail diversion participants. *Psychiatric Services, 64*, 776–781. doi:10.1176/appi.ps.000052012

Ford, J. D., & Furnier, D. (2007). Psychological trauma and posttraumatic stress disorder among women in community mental health aftercare following psychiatric intensive care. *Journal of Traumatic Intensive Care, 3*, 27–34. doi:10.1175/j1422664070001094

Goldman, M. S. (1994). The alcohol expectancy concept: Applications to assessment, prevention, and treatment of alcohol abuse. *Applied Prevention in Psychology, 3*, 131–144. doi:10.1016/S0996-1849(05)80006-6

Goldstein, B., Bradley, B., Ressler, K. J., & Powers, A. (2017). Associations between posttraumatic stress disorder, emotion dysregulation, and alcohol dependence symptoms among inner-city females. *Journal of Clinical Psychology, 73*(3), 319–330. doi:10.1002/jclp.22332

Goodman, L. A., Dutton, M. A., & Harris, M. (1997). The relationship between violence dimensions and symptom severity among homeless, mentally ill women. *Journal of Traumatic Stress, 10*, 51–70.

Grubaugh, A. L., Zinzow, H. M., Paul, L., Egede, L. E., & Goodman, L. A., Dutton, M. A., & Harris, M. (1998). Trauma and posttraumatic stress disorder in severe mental illness: A critical review. *Clinical Psychology Review, 31*, 883–899. doi:10.1016/j.cpr.2011.04.003

Himnerich, S., & Orcutt, H. (2019). Alcohol expectancies and distress tolerance: Potential mechanisms in the relationship between posttraumatic stress and alcohol use. *Personality and Individual Differences, 137*, 39–44. doi:10.1016/j.paid.2018.08.004

Jester, J. M., Steinberg, D. B., Heitgez, M. M., & Zucker, R. A. (2015). Coping expectancies, not enhancement expectancies, mediate trauma experience effects on problem alcohol use: A prospective study from childhood to adolescence. *Journal of Studies on Alcohol and Drugs, 76*(5), 781–789. doi:10.15288/josad.2015.76.781

Kessler, R. C., Crum, R. M., Warner, L. A., Nelson, C. B., Schulenberg, J., & Anthony, J. C. (1997). Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Archives of General Psychiatry, 54*, 313–321.

Kessler, R. C., Rose, S., Koenen, K. C., Karam, E. G., Stang, P. E., Stein, D. J., ... Carmen Viana, M. (2014). How well can post-traumatic stress disorder be predicted from pre-trauma risk factors? An exploratory study in the WHO World Mental Health Surveys. *World Psychiatry, 13*, 265–274. doi:10.1002/wps.20150

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048–1060.

Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyses, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-5 criteria. *Journal of Traumatic Stress, 26*, 537–547.

Leigh, B. C., & Stacy, A. W. (2006). Alcohol expectancies and drinking motives in different age groups. *Addiction, 99*, 215–227.

Liptzin, D. S., Rasmussen, A. M., Anyan, W., Gueorguieva, R., Billingslea, E. M., Cromwell, P. F., & Southwick, S. M. (2003). Posttraumatic stress disorder and substance use in inner-city adolescent girls.

Maisto, S. A., Corey, K. B., & Bradizza, C. M. (1999). Social learning theory. In K. E. Leonard & H. T. Blane (Eds.), *Psychological Theories of Drinking and Alcoholism* (pp. 106–163). New York: Guilford Press.

Maslin, J., Graham, H. L., Cawley, M. A. C., Birchwood, M., Georgiou, G., McGovern, D., ... Orford, J. (2001). Combined severe mental health and substance use problems: What are the training and support needs of staff working with this client group? *Journal of Mental Health, 10*, 131–140. doi:10.1080/09638230124400

McDevitt-Murphy, M. E., Luciano, M. T., Tripp, J. C., & Eddinger, J. E. (2017). Drinking motives and PTSD-related alcohol expectancies among combat veterans. *Addictive Behaviors, 64*, 217–222. doi:10.1016/j.addbeh.2016.06.029

McFarlane, A. C., Bookless, C., & Air, T. (2001). Posttraumatic stress disorder in a general psychiatric inpatient population. *Journal of Consulting and Clinical Psychology, 66*, 493–499.

Mueser, K. T., Goodman, L. A., Trumbetta, S. L., Rosenfield, D. G., Rosas, M. O., ... Foy, D. W. (1998). Trauma and posttraumatic stress disorder in severe mental illness. *Journal of Consulting and Clinical Psychology, 66*, 493–499.

Mueser, K. T., Nishith, P., Tracy, J. I., DeGirolamo, J., & Molinara, M. (1999). Expectations and motives for substance use in Schizophrenia. *Schizophrenia Bulletin, 25*(3), 367–377. doi:10.1093/schbul/25.3.367

Mueser, K. T., Rosenberg, S. D., Goodman, L. A., & Trumbetta, S. L. (2002). Trauma, PTSD, and the course of schizophrenia: An interactive model. *Schizophrenia Research, 53*, 123–143.

Mueser, K. T., Salyers, M. P., Rosenberg, S. D., Goodman, L. A., Essock, S. M., Osher, F. C., ... Butterfield, M. I.; the 5 site Health and Risk Study Research Committee. (2004). Interpersonal trauma and posttraumatic stress disorder in patients with severe mental illness: Demographic, clinical, and health correlates. *Schizophrenia Bulletin, 30*(1), 45–57. doi:10.1093/oxfordjournals.schbul.a007067

Mueser, K. T., Yarnold, P. R., Levinson, D. F., Singh, H., Bellock, A. S., Kee, K., ... Yodalam, K. G. (1990). Prevalence of substance abuse in schizophrenia: Demographic and clinical correlates. *Schizophrenia Bulletin, 16*, 31–56. doi:10.1093/schbul/16.1.31

Nishith, P., Mueser, K. T., Srisc, C. S., & Beck, A. T. (1997). Expectations and motives for alcohol use in a psychiatric outpatient population. *Journal of Nervous and Mental Disease, 185*(10), 622–626.

Norman, S. B., Inaba, R. K., Smith, T. L., & Brown, S. A. (2001). Development of the PTSD-alcohol expectancy questionnaire. *Addictive Behaviors, 33*, 841–847. doi:10.1016/j.addbeh.2008.01.003

Park, C. L., & Grant, C. (2005). Determinants of positive and negative consequences of alcohol consumption in college students: Alcohol use, gender, and physiological characteristics. *Addictive Behaviors, 30*, 755–765. doi:10.1016/j.addbeh.2004.08.021

Pederson, E. R., Myers, U. S., Browne, K. C., & Norman, S. B. (2014). The role of alcohol expectancies in drinking behavior among women with alcohol use disorder and comorbid posttraumatic stress disorder. *Journal of Psychoactive Drugs, 46*(3), 178–187. doi:10.1080/02791072.2014.917750

Peters, E. N., Khondkarayn, E., & Sullivan, T. P. (2012). Associations between expectancies of alcohol and drug use, severity of partner violence, and...
posttraumatic stress among women. *Journal of Interpersonal Violence.* doi:10.1177/0886260511432151

Petras, I. L., Rosenheck, R., & Desai, R. (2011). Substance use comorbidity among veterans with posttraumatic stress disorder and other psychiatric illness. *American Journal on Addictions*, 20, 185–189. doi:10.1177/0886260511432151

Radomski, S. A., & Read, J. P. (2016). Mechanistic role of emotion regulation in the PTSD and Alcohol Association. *Traumatology*, 22(2), 113–121. doi:10.1037/trm0000068

Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: Results from the Epidemiologic Catchment Area (ECA) study. *Journal of the American Medical Association*, 264, 2511–2518.

Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., Saunders, B. E., & Best, C. E. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology*, 61, 984–991.

Rosenberg, S. D., Lu, W., Mueser, K. T., Jankowski, M. K., & Cournos, F. (2007). Correlates of adverse childhood events in adults with schizophrenia spectrum disorders. *Psychiatric Services*, 58, 243–253. doi:10.1176/ps.2007.58.2.245

Schaumberg, K., Vinci, C., Raiker, J. S., Moto, N., Jackson, M., Whalen, D., ... Coffey, S. F. (2015). PTSD-related alcohol expectancies and impulsivity interact to predict alcohol use severity in a substance dependent sample with PTSD. *Addictive Behaviors*, 41, 41–45. doi:10.1016/j.addbeh.2014.09.022

Shaw, K., McFarlane, A. C., Bookless, C., & Air, T. (2002). The aetiology of postpsychotic post-traumatic stress disorder following a psychotic episode. *Journal of Traumatic Stress*, 15, 39–47. doi:10.1023/A:1014331211311

Simpson, T. L. (2003). Childhood sexual abuse, PTSD, and the functional roles of alcohol use among women drinkers. *Substance Use and Misuse*, 38(2), 249–270.

Thornton, L. K., Baker, A. L., Johnson, M. P., & Lewin, T. J. (2012). Attitudes and perceptions towards substances among people with mental disorders: A systematic review. *Acta Psychiatria Scandinavica*, 126, 2. doi:10.1111/j.1600-0447.2012.01861.x

Tripp, J. C., McDevitt-Murphy, M. E., Avery, M. L., & Bracken, K. L. (2015). PTSD symptoms, emotion dysregulation, and alcohol-related consequences among college students with a trauma history. *Journal of Dual Diagnosis*, 11(2), 107–117. doi:10.1080/15504263.2015.1025013

Vik, P. W., Islam-Zwart, K. A., & Ruge, L. N. (2008). Application of the PTSD-alcohol expectancy questionnaire (P-AEQ) to sexually assaulted college women. *Addiction Research & Theory*, 16(6), 585–594. doi:10.1080/16066350701867273

Villagonzalo, K.-A., Dodd, S., Ng, F., Mihaly, S., Langbein, A., & Berk, M. (2011). The relationship between substance use and posttraumatic stress disorder in a methadone maintenance treatment program. *Comprehensive Psychiatry*, 52, 562–566. doi:10.1016/j.comppsych.2010.10.001

Volkow, N. (2009). Substance use disorders in schizophrenia – Clinical implications of comorbidity. *Schizophrenia Bulletin*, 35, 499–72. doi:10.1093/schbul/sbp016

Weaver, T., Madden, P., Charles, V., Stimson, G., Renton, A., Tyer, P., ... Ford, C. (2003). Comorbidity of substance misuse and mental illness in community mental health and substance misuse services. *British Journal of Psychiatry*, 183, 304–313.
