Published in final edited form as:

Addict Behav. 2019 March ; 90: 210–216. doi:10.1016/j.addbeh.2018.11.002.

The role of drinking motives and perceived controllability of events in the association between college women's sexual assault victimization and binge drinking

Jacqueline Woerner^a, Jessica L. Schleider^b, Cassie Overstreet^c, Dawn W. Foster^d, Ananda B. Amstadter^c, and Carolyn E. Sartor^a

^aYale University School of Medicine, 389 Whitney Ave, New Haven, CT

^bStony Brook University, Psychology B Building, Stony Brook, NY

^cVirginia Institute for Psychiatric and Behavioral Genetics, Virginia Commonwealth University, 800 E Leigh, Richmond, VA

^dYale University School of Medicine, 34 Park St, New Haven, CT

Abstract

Women with a history of sexual assault are at elevated risk for engaging in binge drinking. The aims of the current study are to investigate two types of drinking motives (coping and social) that potentially underlie the sexual assault-binge drinking link in a sample of female college drinkers ($N = 691$; 37.6% sexual assault prevalence), and to determine the extent to which the relationships between sexual assault history and each type of drinking motive depend on women's assumptions about the controllability of events. Conditional process analysis results indicated that women who experienced sexual assault (vs. those who did not) were more likely to report both coping and social drinking motives, which in turn, were both positively associated with increased binge drinking. Consistent with our hypothesis, results showed the relationship between sexual assault history and coping drinking motives was moderated by perceived controllability of events. Specifically, sexual assault victims reported high coping motives regardless of controllability of events. Nonvictims only reported high coping motives when their perceived controllability of events was low – comparable to coping motives of victims. This integrative approach affords a more comprehensive understanding of the context in which college women's binge drinking occurs, and offers insight into processes that could be targeted in interventions.

Keywords

binge drinking; sexual assault; drinking motives; controllability of events

Correspondence concerning this article should be sent to Jacqueline Woerner, Ph.D., Division of Prevention and Community, Department of Psychiatry, Yale University School of Medicine, 389 Whitney Ave, New Haven, CT, 06511, Phone 203.789.7645, Fax 203.562.6355 or jacqueline.woerner@yale.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Declarations of interest: none

1. Introduction

Extensive research has shown that women who have experienced sexual assault are at increased likelihood of engaging in risky drinking behavior, including binge drinking (Behnken et al., 2010; Ullman et al., 2005). Binge drinking, defined as alcohol consumption that brings blood alcohol concentration (BAC) levels to 0.08 g/dL (National Institute on Alcohol Abuse and Alcoholism, 2015), approximately four drinks for women and five for men, has been identified as the most common and deadly pattern of alcohol use (Centers for Disease Control and Prevention, 2012; Stahre et al., 2014). Indeed, binge drinking is linked to numerous health issues, including alcohol poisoning, memory and learning problems, car crashes, and violent behavior (CDC, 2012; Wechsler et al., 1994). Accordingly, it is critical to identify potential processes by which sexual assault increases the likelihood of binge drinking in order to develop effective prevention and intervention strategies. It is particularly important to understand these associations among college students, for whom binge drinking is extremely common, risky, and perceived as a normative aspect of the social environment (Courtney & Polich, 2009; Wechsler et al., 2004). We evaluate these pathways among women specifically, due to higher rates of sexual assault among women (Elliot, Mok, & Briere, 2004), as well as gender differences in sexual assault experiences and subsequent health outcomes.

One informative approach to understanding the link between sexual assault and binge drinking is assessing motivations for drinking, and the conditions under which these motives are most likely to be present (Cooper et al., 1995; Cox & Klinger, 1998; Hasking et al., 2011). Two of the most commonly endorsed motives for drinking are to cope with negative affect and to facilitate social interaction (Cooper 1994; Cooper et al., 1995; Kuntsche et al., 2005); however, the relevance of each type may differ by individual level factors, such as perceptions about the controllability of events. These perceptions may be especially influential for women who have experienced sexual assault, given that sexual assault involves loss of control which may alter assumptions about the world (Janoff-Bulman, 1989; Lilly, Howell, & Garahm-Bermann, 2015). The aims of the current study are to investigate two types of drinking motives (coping and social) that may underlie the sexual assault-binge drinking link, and to determine the extent to which the relationships between sexual assault and drinking motives depend on perceived controllability of events. This integrative approach will afford a more comprehensive understanding of the context in which college women's binge drinking occurs, and may offer insight into processes that could be appropriate targets for intervention.

1.1 Drinking motives

According to the motivational model of alcohol use (Cooper et al., 1995; Cox & Klinger, 1998), drinking is a strategic behavior defined by the different underlying functions it may serve; as such, these motivational processes are associated with unique patterns of antecedents. Although there are a range of potential motives for using alcohol, the goal of the current study is to identify and test two specific, parallel pathways: drinking to cope and drinking to facilitate social interaction. Both of these drinking motives are frequently

reported (Cooper et al., 1995; Kuntsche et al., 2005), and are particularly relevant in the context of sexual assault. Indeed, sexual assault is positively related to both coping and social drinking motives (Grayson & Nolen-Hoeksema, 2005; Lindgren et al., 2012). However, the reasons for these associations may differ, necessitating research that evaluates the circumstances under which each is relevant. Regarding coping motives, alcohol use may represent a strategy for victims of sexual assault to regulate negative affect and reduce distress associated with the assault (Miranda et al., 2002; Ullman et al., 2005) – consistent with the self-medication hypothesis (Jones, Corbin, & Fromme, 2001; Rutledge & Scher, 2001). Few studies have explored associations between sexual assault and social drinking motives. However, given that a hallmark feature of sexual assault is the disruption of interpersonal functioning (Cloitre, Scarvalone, & Difede, 1997; DiLillo, 2001), victims may be motivated to engage in behaviors such as drinking that promote social interaction. Consistent with the premise that drinking to cope versus to socialize represent distinct, but not necessarily mutually exclusive pathways to binge drinking following sexual assault, it is imperative to identify factors that may increase the likelihood of these respective motives.

1.2. Perceived controllability of events

Although there are numerous factors that potentially contribute to variation in the association between sexual assault and different drinking motives, one pertinent factor to consider is beliefs about the controllability of events. Perceived control, defined as “a belief an individual holds about the nature of control over situational factors and events” (Weems & Silverman, 2006, p. 117), has been identified as a key factor in appraisals of and reactions to stressful events (Cheng & Cheung, 2005). Lower perceived control over emotions and behaviors has shown cross-sectional and longitudinal associations with distress and poor health outcomes (Gallagher, Bentley, & Barlow, 2014; Rothbaum, Weisz, & Snyder, 1982; Weisz, Francis, & Bearman, 2010). To date, research on perceived control in relation to health outcomes has often considered control with reference to a specific target, such as one’s personal actions or emotional responses when faced with adverse events (e.g., Gallagher et al., 2014; Weisz, et al., 2010). Further, most relevant research focuses on individuals’ perceived control over negative events exclusively (Bollini, Walker, Hamann, & Kestler, 2004; Brown & Siegel, 1988; Fontaine, Manstead, & Wagner, 1993). Relevant to the current study, research by Frazier and colleagues (2003, 2004) has shown that sexual assault survivors’ perceived past, present, and future control over their trauma is predictive of their distress. Assumptions about whether life circumstances are globally controllable, on the other hand, may reflect a more generalized belief about the controllability of their environment—regardless of the valence of these events. Domain-general controllability beliefs have been examined in the context of emotional health outcomes (e.g., anxiety and depressive symptoms; Gallagher et al., 2014), but their impact on health behaviors such as alcohol use remain largely unexplored.

There is reason to believe that a domain-general assumption that the world is uncontrollable may relate to coping drinking motives—particularly for women with a history of sexual assault whose experiences may lead to the belief that life events cannot be controlled. Based on links between low perceived control and avoidant coping (Roussi, Miller, & Shoda, 2000), this assumption may increase women’s motivation to engage in avoidant coping

behaviors (e.g., binge drinking) to manage distress related to their sexual assault. Given the strong theoretical and empirical evidence for links between perceived control and coping, there is reason to believe that the impact of controllability of events is specific to drinking to cope as opposed to drinking to facilitate social interaction.

1.3. The current study

The aim of the current research is to assess the link between sexual assault and binge drinking among female college drinkers, in which motives and controllability of events are simultaneously considered. We hypothesize that women with a history of sexual assault will be more likely to engage in binge drinking. We further expect that both coping and social drinking motives will help account for this association, such that women who experienced sexual assault (vs. did not) more highly endorse both motives, and in turn, an increased likelihood of binge drinking. Finally, we hypothesize that perceived controllability of events moderates the association between sexual assault and coping drinking motives. That is, a history of sexual assault is more strongly related to coping drinking motives for women reporting low (vs. high) perceived controllability of events. We predict that this moderation effect is specific to coping drinking motives, and does not extend to social drinking motives. The full hypothesized model is depicted in Figure 1.

2. Materials and Methods

2.1. Participants

Participants were a subset of a sample of 1422 undergraduate students (73% female) recruited from a large university. Given our interest in understanding links between sexual assault and binge drinking among young women, the sample was limited to female participants between ages 18 and 25 years ($M=19.59$, $SD=1.67$) who reported consuming alcohol at least once (74% reported use). Data were excluded from an additional 42 participants for missing data on the variables in our conceptual model or not meeting quality control standards (i.e., minimum survey completion time deemed acceptable, long strings of missing data). Thus, the total sample size for analyses was 681. Sample description information is provided in Table 1.

2.2. Procedures

Participants were recruited through SONA, a university-based research participation system that students can access if enrolled in a psychology course. Individuals were invited to participate in a web-based survey of stress, personality, and mental health, and met eligibility criteria if they were 18 years of age or older and capable of providing informed consent. Participants were provided with a description of the study and procedures and electronically provided informed consent. Participants were compensated with one research credit that could be applied toward an eligible course.

2.3. Measures

2.3.1. Demographics.—Participants' race, ethnicity, sex, age, relationship status, and sexual orientation were queried.

2.3.2. Sexual assault.—Lifetime history of sexual assault was assessed using the Life Events Checklist (Gray, Litz, Hsu, & Lombardo, 2004) and was coded dichotomously as present (1) or absent (0). Endorsement of experiencing either of the following events qualified for a history of sexual assault: 1) sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm), 2) any other unwanted or uncomfortable sexual experience. This definition takes into account the fact that there is variation in the severity of unwanted sexual experiences, and is consistent with how prior research has coded items from this measure (Conley et al., 2017; Hassija & Gray, 2013; Hawn et al., 2018).

2.3.3. Controllability of events.—Controllability of events was assessed with the 5-item controllability of events subscale from the World Assumption Questionnaire (Kaler, 2009). This subscale has demonstrated satisfactory temporal stability, internal consistency, and construct validity in prior research (Kaler, 2009). Participants rated their agreement with each statement on a scale from *strongly agree* (1) to *strongly disagree* (6). Items (e.g., “I have a great deal of control over what will happen to me in my life.”) were summed with higher scores (ranging from 5 to 30) indicating more perceived control ($\alpha=.68$).

2.3.4. Drinking motives.—Coping and social drinking motives were assessed with the Drinking Motives Questionnaire (Cooper, 1994). Both coping (e.g., “To forget your worries.”) and social (e.g., “To be sociable.”) drinking motives were assessed with 5 items with response options ranging from *almost never/never* (1) to *almost always/always* (5). Items were summed (with a possible range of 5 to 25) to create each subscale (coping, $\alpha=.82$; social, $\alpha=.92$).

2.3.5. Binge drinking.—Participants reported how many drinks they typically consumed in a given occasion over the past semester. As stated previously, participants who reported they had never used alcohol were excluded from analyses. Consistent with NIAAA’s (2015) definition of women’s binge drinking, women who endorsed drinking 4 or more drinks on a typical drinking day were categorized as binge drinkers, with the remaining women categorized as non-binge drinkers. As such, binge drinking status was reflective of participants’ *typical* drinking habits, not lifetime history of any binge drinking.

2.4. Analytic approach

As standard practice, if a participant’s responses were missing more than 20% of the items for a given measure, the participant’s score for that measure was excluded from analysis. If a participant’s responses were missing 20% or fewer items on a measure, the mean of responses to available items was imputed (mean-scored) for missing values.

The proposed model was evaluated in stages prior to assessing the full model using the PROCESS macro for SPSS (Hayes 2012; 2013). First, two separate moderation analyses were conducted to examine the extent to which controllability of events moderated the association between sexual assault and coping (Figure 1a) and social (Figure 1b) drinking motives, respectively. We tested the hypothesis that controllability of events would moderate the association between sexual assault and coping drinking motives, such that a history of

sexual assault would relate more strongly to coping drinking motives for women reporting lower (versus higher) perceived controllability of events. We expected that this moderation effect would be specific to coping drinking motives, and not extend to social drinking motives. We also predicted that higher levels of coping and social drinking motives would both relate to increased likelihood of binge drinking.

The full model was examined using conditional process analysis, only including interactions that were significant in the prior stage of analysis (Figure 1c). We used logistic regression to assess the links between continuous independent and explanatory variables and the dichotomous binge drinking outcome. Significance was determined through 95% bias-corrected confidence intervals based on 5,000 bootstrapped samples. Confidence intervals not containing zero are statistically significant (at $p < .05$).

3. Results

3.1. Preliminary analyses

Consistent with our expectations, experiencing sexual assault (37.6% of the sample) was significantly related to increased likelihood of binge drinking, $\chi^2(1)=11.65$, $p=.001$. 60.5% of women with a history of sexual assault and 47.1% without reported binge drinking as their typical pattern of drinking. As shown in Table 2, ANOVA results revealed that experiencing sexual assault was associated with higher coping ($p<.001$) and social ($p=.012$) drinking motives but not with controllability of events ($p=.054$). Likewise, binge drinking (reported by 52.1%) was associated with higher coping ($p<.001$) and social drinking motives ($p<.001$), but not controllability of events ($p=.212$). Pearson's correlations indicated that coping and social drinking motives were positively associated ($r=.55$, $p<.001$), and higher coping ($r=-.11$, $p=.004$) motives were associated with lower perceived controllability of events, but social motives ($r=-.05$, $p=.159$) were not associated with controllability of events.

3.2. Primary analyses

We tested whether controllability of events moderated links between sexual assault history (i.e., experiencing vs. not experiencing) and coping and social drinking motives, respectively, with two separate moderation analyses (see Table 3). For coping motives specified as the dependent variable, the interaction between sexual assault and controllability of events was significant ($p=.029$), consistent with our hypothesis. However, the pattern of these results differed slightly from our expectations. The association between sexual assault and coping motives was positive and significant at average (effect=1.19, $SE=.32$, $p<.001$, 95% CI [.56,1.83]) and high (+1 SD; effect=1.88, $SE=.46$, $p<.001$, 95% CI [.99,2.78]) levels of controllability of events, but was not significant at low (-1 SD; effect=.51, $SE=.44$, $p=.256$, 95% CI [-.37,1.38]) levels. To clarify this pattern, as depicted in Figure 2, sexual assault victims reported high coping motives regardless of controllability of events. By contrast, nonvictims only reported high coping motives (comparable to those of victims) when their perceived controllability of events was low. Next, for social drinking motives, the interaction between sexual assault and perceived controllability of events was not significant ($p=.229$). This suggests that this moderation effect might be specific to coping motives,

consistent with our theory-based expectation. Based on these results, controllability of events was specified as a moderator of the sexual assault-coping motives association, and not the sexual assault-social motives association for the full model.

The full model (Figure 1c) was assessed using conditional process analysis. Supporting our hypothesis, the effect of experiencing (vs. not experiencing) sexual assault on coping drinking motives was moderated by perceived controllability of events ($p=.029$; see Table 4 for full model results). Higher coping drinking motives were significantly associated with increased binge drinking likelihood. The conditional indirect association between sexual assault and increased binge drinking via coping was significant for women reporting average (mean; effect=.08, $SE=.04$, 95% CI [.02,.18]) and high (+1 SD; effect=.12 $SE=.06$, 95% CI [.03,.27]) perceived controllability, but was not significant for women reporting low (−1 SD; effect=.03 $SE=.04$, 95% CI [−.02,.14]) perceived controllability. The index of moderated indirect effects, a parameter indicating whether conditional indirect effects estimated at different values of the moderator significantly differed from each other (Hayes, 2015), was significant for the indirect association through coping drinking motives, index=.01, $SE=.01$, 95% CI [.001,.03].

Consistent with our hypothesis, experiencing (vs. not experiencing) sexual assault was positively associated with social motives ($p=.012$), and social motives were in turn significantly associated with the likelihood of binge drinking ($p<.001$). The indirect effect of sexual assault on binge drinking via social motives was significant, effect=.14., $SE=.06$, 95% CI [.04,.27]. The combination of coping and social drinking motives pathways (i.e., both motives, sexual assault, controllability of events) explained adequate variance in binge drinking: Cox and Snell $R^2=.15$; Nagelkerke $R^2=.21$.

4. Discussion

Binge drinking among young women is a serious and costly public health issue, and it is essential to identify specific processes that may increase its likelihood. Results of this study provide additional evidence for the association between sexual assault and binge drinking among young women, and suggest that both coping and social drinking motives may account in part for this association. Women who experienced sexual assault reported higher coping and social drinking motives, and were more likely to engage in binge drinking, compared to women who did not experience sexual assault. These results are consistent with the motivational model of alcohol use (Cooper et al., 1995; Cox & Klinger) which suggests that drinking is a strategic behavior defined by the different underlying functions it may serve. Furthermore, our examination of perceived controllability of events revealed circumstances under which these drinking motives relate to women's binge drinking.

Consistent with our hypothesis, results suggested that the moderating effects of perceived controllability of events may be specific to coping drinking motives. Although we expected that controllability of events would have a stronger effect for women with a history of sexual assault, we instead found a slightly different pattern of results. Among sexual assault victims, coping drinking motives were high regardless of perceived controllability of events.

For women without a history of sexual assault, coping motives were high and comparable to those of sexual assault victims only when perceived controllability of events as low.

As expected, the above moderation effect did not extend to social drinking motives. However, we are cautious to note that null hypothesis testing prohibits conclusions that an effect does not exist in the absence of a significant result. Although we found this pattern for coping drinking motives only, there are likely other beliefs and situational factors that enhance the association between sexual assault and social motives that were not evaluated here. Future research on possible pathways to binge drinking should consider other circumstances that increase the likelihood of both social and coping motives.

4.1. Implications for research and prevention

Results of this study have implications for research and prevention specific to college women's binge drinking. Although not the only women who regularly binge drink, women with a history of sexual assault constitute a high-risk group. Colleges are increasingly implementing campus-wide sexual assault prevention programming (Amar et al., 2014; Banyard, 2014), consistent with the notion that reducing sexual assault should be a primary prevention goal. However, for women who experience assault, there are still multiple viable strategies to reduce subsequent binge drinking. Results from the present study showed that coping drinking motives were high for victims regardless of perceived control. Thus, researchers should continue to explore conditions particularly relevant to women with a sexual assault history, such as specific motives (e.g., coping) and strategies, as these women may benefit from prevention and intervention strategies tailored to target specific individual difference and motivational factors. Among non-victims, coping drinking motives were high and comparable to those of victims, but only if their perceived control was low, suggesting that controllability of events might be particularly important factor to consider for women with no history of sexual assault

Past research has generally focused exclusively on coping motives for sexual assault victims; however, present results suggest that women with a sexual assault history may have multiple co-occurring drinking motives, including regulating negative affect and enhancing interpersonal connection. It is therefore important to consider multiple motives simultaneously to understand the circumstances under which each motive is relevant, and to inform interventions that target multiple pathways to binge drinking. For instance, interventions for sexual assault survivors delivered through peer support groups might address coping and social drinking motives simultaneously (e.g., teaching coping skills and offering social support). Thus, they may be especially promising in reducing odds of binge drinking.

4.2. Strengths, limitations, and future directions

There are several methodological and conceptual strengths of the current research. The large, racially diverse sample of female college drinkers allowed us to evaluate our hypotheses in a sample representative of the population in which sexual assault is prevalent, and binge drinking is normative, resulting in greater generalizability of results to female college students beyond this study. Additionally, we assessed women's *typical* binge

drinking which reflects a consistently risky pattern, as opposed to whether they *ever* reported binge drinking which may reflect experimentation or inconsistent use. This facilitates conclusions about the relevance of results to individuals who binge drink as their typical pattern, who are at higher risk for adverse health outcomes. Another strength is the integration of proximal, alcohol-specific motivational factors with more global individual-level factors, to elucidate the specific processes by which sexual assault relates to women's binge drinking.

Despite these strengths, there were several limitations which should be addressed in future research. The primary limitation is our inability to draw causal conclusions due to the cross-sectional design of the study; however, the current research proposes promising candidate models with a strong theoretical basis that can be tested in future longitudinal research. Further, the temporal stability of controllability of events is unclear. It is possible these beliefs change after sexual assault occurs and fluctuate as a function of environmental cues, suggesting that their relevance to drinking motives may depend on the recency of sexual assault. Future work examining these processes should include a detailed assessment of sexual assault that includes timing, severity, and duration of assaultive events. Relatedly, it may be useful to assess whether the sexual assault situation involved alcohol or other substance use, which has the potential to influence subsequent drinking motives and patterns. Extending this research to binge drinking pathways among men following trauma is also important. We also focused on two specific motivational pathways (i.e., coping and social motives) due to their specific relevance in the context of sexual assault; however, it's important to evaluate the effects of other terms of adversity and the circumstances under which other types of drinking motives might be relevant. Future research should also utilize alternative methodological approaches (e.g., experience sampling), to address limitations related to temporal stability by assessing relationships between different drinking motives and specific episodes of binge drinking and the degree to which these associations are dynamic over time.

4.3. Conclusions

In summary, it is evident that binge drinking among college women, particularly for women who experienced sexual assault, is a multi-determined outcome. Consistent with the motivational model of alcohol use, our results suggest that there are certain conditions under which different motives are more salient and impactful (Cooper et al., 1995; Cox & Klinger, 1998). As such, it is critical to identify the conditions under which they are most likely to be present and most influential. Results of the present research are informative for prevention efforts aimed at reducing binge drinking. However, future research is still needed to continue integrating coping and social drinking motives and factors that increase their respective likelihood, including but not limited to individual difference factors—such as perceived controllability of events.

Acknowledgments

This work was supported by NIAAA grants AA020179 and AA023239 (Amstadter) and AA023549 (Sartor).

References

- Amar AF, Strout TD, Simpson S, Cardiello M, & Beckford S (2014). Administrators' perceptions of college campus protocols, response, and student prevention efforts for sexual assault. *Violence and Victims*, 29, 579–593. [PubMed: 25199387]
- Banyard VL (2014). Improving college campus-based prevention of violence against women: A strategic plan for research built on multipronged practices and policies. *Trauma, Violence, & Abuse*, 15, 339–351.
- Behnken MP, Le YCL, Temple JR, & Berenson AB (2010). Forced sexual intercourse, suicidality, and binge drinking among adolescent girls. *Addictive Behaviors*, 35, 507–509. [PubMed: 20074862]
- Bollini AM, Walker EF, Hamann S, & Kestler L (2004). The influence of perceived control and locus of control on the cortisol and subjective responses to stress. *Biological Psychology*, 67, 245–260. [PubMed: 15294384]
- Brown JD, & Siegel JM (1988). Attributions for negative life events and depression: The role of perceived control. *Journal of Personality and Social Psychology*, 54, 316–322. [PubMed: 3346816]
- Centers for Disease Control and Prevention (CDC). (2012). Vital signs: binge drinking prevalence, frequency, and intensity among adults—United States, 2010. *MMWR. Morbidity and Mortality Weekly Report*, 61, 14–19. [PubMed: 22237031]
- Cheng C, & Cheung MWL (2005). Cognitive processes underlying coping flexibility: Differentiation and integration. *Journal of Personality*, 73, 859–886. [PubMed: 15958137]
- Cloitre M, Scarvalone P, & Difede J (1997). Posttraumatic stress disorder, self- and interpersonal dysfunction among sexually retraumatized women. *Journal of Traumatic Stress*, 10, 437–452. [PubMed: 9246651]
- Conley AH, Overstreet CM, Hawn SE, Kendler KS, Dick DM, & Amstadter AB (2017). Prevalence and predictors of sexual assault among a college sample. *Journal of American College Health*, 65, 41–49. [PubMed: 27628533]
- Cooper ML (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, 6, 117–128.
- Cooper ML, Frone MR, Russell M, & Mudar P (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology*, 69, 990–1005. [PubMed: 7473043]
- Courtney KE, & Polich J (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychological Bulletin*, 135, 142–156. [PubMed: 19210057]
- Cox WM, & Klinger E (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology*, 97, 168–180. [PubMed: 3290306]
- DiLillo D (2001). Interpersonal functioning among women reporting a history of childhood sexual abuse: Empirical findings and methodological issues. *Clinical Psychology Review*, 21, 553–576. [PubMed: 11413867]
- Elliott DM, Mok DS, & Briere J (2004). Adult sexual assault: Prevalence, symptomatology, and sex differences in the general population. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, 17(3), 203–211.
- Fontaine KR, Manstead AS, & Wagner H (1993). Optimism, perceived control over stress, and coping. *European Journal of Personality*, 7, 267–281.
- Frazier PA (2003). Perceived control and distress following sexual assault: A longitudinal test of a new model. *Journal of Personality and Social Psychology*, 84, 1257–1269. [PubMed: 12793588]
- Frazier P, Steward J, & Mortensen H (2004). Perceived control and adjustment to trauma: A comparison across events. *Journal of Social and Clinical Psychology*, 23, 303–324.
- Gallagher MW, Bentley K, & Barlow DH (2014). Perceived control and vulnerability to anxiety disorders: A meta-analytic review. *Cognitive Therapy and Research*, 38, 571–584.
- Gray MJ, Litz BT, Hsu JL, & Lombardo TW (2004). Psychometric properties of the life events checklist. *Assessment*, 11, 330–341. [PubMed: 15486169]

- Grayson CE, & Nolen- Hoeksema S (2005). Motives to drink as mediators between childhood sexual assault and alcohol problems in adult women. *Journal of Traumatic Stress*, 18, 137–145. [PubMed: 16281206]
- Hasking P, Lyvers M, & Carlopio C (2011). The relationship between coping strategies, alcohol expectancies, drinking motives and drinking behaviour. *Addictive Behaviors*, 36, 479–487. [PubMed: 21300441]
- Hassija CM, & Gray MJ (2013). Adaptive variants of controllability attributions among survivors of sexual assault. *International Journal of Cognitive Therapy*, 342–357.
- Hawn SE, Lind MJ, Conley A, Overstreet CM, Kendler KS, Dick DM, & Amstadter AB (2018). Effects of social support on the association between precollege sexual assault and college-onset victimization. *Journal of American College Health*, 1–9.
- Hayes AF (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling.
- Hayes AF (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Guilford Press.
- Hayes AF (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research*, 50, 1–22. [PubMed: 26609740]
- Janoff-Bulman R (1989). Assumptive worlds and the stress of traumatic events: Applications of the schema construct. *Social Cognition*, 7, 113–136.
- Jones BT, Corbin W, & Fromme K (2001). A review of expectancy theory and alcohol consumption. *Addiction*, 96, 57–72. [PubMed: 11177520]
- Kaler ME (2009). The World Assumptions Questionnaire: Development of a measure of the assumptive world. University of Minnesota.
- Kuntsche E, Knibbe R, Gmel G, & Engels R (2005). Why do young people drink? A review of drinking motives. *Clinical Psychology Review*, 25, 841–861. [PubMed: 16095785]
- Lilly MM, Valdez CE, & Graham-Bermann SA (2011). The mediating effect of world assumptions on the relationship between trauma exposure and depression. *Journal of Interpersonal Violence*, 26(12), 2499–2516. [PubMed: 20829232]
- Lindgren KP, Neighbors C, Blayney JA, Mullins PM, & Kaysen D (2012). Do drinking motives mediate the association between sexual assault and problem drinking? *Addictive Behaviors*, 37, 323–326. [PubMed: 22094169]
- Miranda R, Jr, Meyerson LA, Long PJ, Marx BP, & Simpson SM (2002). Sexual assault and alcohol use: Exploring the self-medication hypothesis. *Violence and Victims*, 17, 205–217. [PubMed: 12033555]
- National Institute on Alcohol Abuse and Alcoholism (2015). Drinking levels defined. Retrieved May 14, 2018 from <https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking>
- Rothbaum F, Weisz JR, & Snyder SS (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology*, 42, 5–37.
- Roussi P, Miller SM, & Shoda Y (2000). Discriminative facility in the face of threat: Relationship to psychological distress. *Psychology and Health*, 15, 21–33.
- Rutledge PC, & Sher KJ (2001). Heavy drinking from the freshman year into early young adulthood: the roles of stress, tension-reduction drinking motives, gender and personality. *Journal of Studies on Alcohol*, 62, 457–466. [PubMed: 11523533]
- Stahre M, Roeber J, Kanny D, Brewer RD, & Zhang X (2014). Peer reviewed: Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Preventing chronic disease*, 11.
- Ullman SE, Filipas HH, Townsend SM, & Starzynski LL (2005). Trauma exposure, posttraumatic stress disorder and problem drinking in sexual assault survivors. *Journal of Studies on Alcohol*, 66(5), 610–619. [PubMed: 16331846]
- Wechsler H, Dowdall G, & Moeykens MS (1994). of Binge Drinking in College. *Journal of the American Medical Association*, 272, 1672–1677. [PubMed: 7966895]

- Weems CF, & Silverman WK (2006). An integrative model of control: Implications for understanding emotion regulation and dysregulation in childhood anxiety. *Journal of Affective Disorders*, 91, 113–124. [PubMed: 16487599]
- Weisz JR, Francis SE, & Bearman SK (2010). Assessing secondary control and its association with youth depression symptoms. *Journal of Abnormal Child Psychology*, 38, 883–93. [PubMed: 20640503]

Highlights

- Women's sexual assault is associated with an increased likelihood of binge drinking
- Sexual assault is positively related to both coping and social drinking motives
- Coping and social drinking motives are associated with regular binge drinking
- Perceived control moderates the link between sexual assault and coping motives

Figure 1a-c.

Models tested in stages of analysis

- a) Moderating effect of controllability of events on the association between sexual assault and coping drinking motives
- b) Moderating effect of controllability of events on the association between sexual assault and social drinking motives
- c) Full model

Figure 2.
Moderating effect of controllability of events on the association between sexual assault and coping drinking motives

Table 1.Sample characteristics ($N = 681$)

	%
Race	
Black/African American	22.4%
Asian	12.5%
White/Caucasian	51.0%
Native American/American Indian	0.4%
Native Hawaiian/ Pacific Islander	0.4%
Multi-racial	7.5%
Other	5.7%
Ethnicity	
Hispanic/Latino	11.4%
Not Hispanic/Latino	88.6%
Sexual orientation	
Heterosexual	89.0%
Homosexual	1.6%
Bisexual	9.4%
Relationship status	
Not dating	37.2%
Casually dating	21.1%
Exclusively dating	39.1%
Married/engaged/life partner	2.7%
Past semester alcohol use frequency	
Less than once a month	20.7%
One to three times per month	43.5%
Once or twice per week	26.4%
Three or more times per week	9.3%

ANOVAs comparing sexual assault and binge drinking groups on levels of drinking motives and perceived controllability of events

Table 2.

	Sexual Assault			Binge Drinking		
	No sexual assault (<i>n</i> = 425) <i>M</i> (<i>SD</i>)	Sexual assault (<i>n</i> = 256) <i>M</i> (<i>SD</i>)	<i>F</i>	No binge drinking (<i>n</i> = 326) <i>M</i> (<i>SD</i>)	Binge drinking (<i>n</i> = 355) <i>M</i> (<i>SD</i>)	<i>p</i>
1. Controllability of events	19.28 (3.44)	18.73 (3.97)	3.71	19.26 (3.62)	18.91 (3.68)	1.56 .212
2. Coping drinking motives	8.68 (3.88)	9.92 (4.41)	14.64	7.92 (3.49)	10.28 (4.35)	59.95 <.001
3. Social drinking motives	13.88 (5.61)	14.97 (5.13)	6.40	12.16 (5.03)	16.24 (5.09)	110.52 <.001

Table 3.

Moderating effect of perceived controllability of events on the association between sexual assault and drinking motives

	<i>B (SE)</i>	<i>p</i>	95% CI: [LL, UL]
Model 1: Coping drinking motives			
Sexual assault	−2.40 (1.66)	.149	[−5.67, .86]
Controllability of events	−.20 (.05)	<.001	[−.31, −.08]
Sexual assault × Controllability of events	.19 (.09)	.029	[.02, .36]
Model 2: Social drinking motives			
Sexual assault	−1.58(2.22)	.478	[−5.94, 2.78]
Controllability of events	−.13 (.08)	.086	[−.28, .02]
Sexual assault × Controllability of events	.14 (.12)	.229	[−.09, .36]

Table 4.Results for full model evaluating pathways from sexual assault to binge drinking ($N = 681$)

	<i>B (SE)</i>	<i>p</i>	95% CI: [LL, UL]
Outcome: Coping drinking motives			
Intercept	12.47 (1.12)	< .001	[10.27, 14.68]
Sexual assault	-2.40 (1.66)	.149	[-5.67, .86]
Controllability of events	-.20 (.06)	< .001	[-.31, -.08]
Sexual assault $\times$ Controllability of events	.19 (.09)	.029	[.02, .36]
Outcome: Social drinking motives			
Intercept	8.68 (.20)	< .001	[8.29, 9.07]
Sexual assault	1.24 (.32)	< .001	[.60, 1.87]
Outcome: Binge drinking			
Intercept	-2.44 (.27)	< .001	[-2.98, -1.91]
Coping drinking motives	.06 (.03)	.012	[.01, .11]
Social drinking motives	.13 (.02)	< .001	[.09, .16]
Sexual assault	.41 (.17)	.017	[.07, .75]

Note. History of sexual assault is coded as 1, no history is coded as 0. Binge drinking is coded as 1, no binge drinking is coded as 0.