

Examination of a Sex-Related Distress Self-Medication Drinking Model Following Sexual  
Victimization: Longitudinal and Event-Specific Studies

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**Abstract Page**

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Women ages 18-24 are at the highest risk for sexual victimization (SV), with more than 20% of women affected during college. The self-medication model of alcohol use, whereby drinking is negatively reinforced through the reduction of distress, is widely supported as a method by which women with a SV history cope. Women with a history of SV, compared to without, engage more frequently in pre-sex drinking—drinking before or during sexual activity, and report more problems related to sexuality. Sexual health variables such as sex-related distress (i.e., distress related to sexual behavior or sexuality) and sex-related drinking motives (i.e., drinking to cope with sex-related distress) might mediate the relationships between SV and pre-sex drinking and between SV and negative sexual consequences, representing unique pathways. This dissertation examines the sex-related self-medication model in first and second year college women using two methodologies among one umbrella sample. The first (N = 379) uses an online, longitudinal survey (baseline, six weeks, and twelve weeks) and path analysis. Adult

sexual assault (ASA) severity was indirectly associated with drinking to cope with sex-related distress through sex-related distress. In the same model, ASA severity was also indirectly associated with general drinking to cope through general distress. Thus, the sex-related self-medication model may function independently of the general self-medication model. In the second study, participants ( $n = 300$ ) reported on their most recent pre-sex drinking experience within the past six weeks or otherwise, sexual experience. Results suggested that ASA severity and trait sex-related distress are likely risk factors for engaging in sex-related distress self-medication at the event-specific level. Among those who engaged in pre-sex drinking, event-specific sex-related distress was indirectly associated with negative sexual consequences through sex-related drinking to cope. Event-specific sex-related distress was not associated with number of pre-sex drinks or level of subjective intoxication during sexual activity. Findings highlight the importance of negative sexual consequences as an outcome associated with the sex-related drinking to cope motive as opposed to drinking behavior per se. Investigation of the self-medication model as applied to managing sex-related distress may inform prevention and intervention work targeting adaptive coping and decision-making following ASA.

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## **Examination of a Sex-Related Distress Self-Medication Drinking Model Following Sexual Victimization: Longitudinal and Event-Specific Studies**

### **I. General introduction**

The annual economic burden of sexual victimization (SV) has been estimated at 921 billion dollars, which is higher than estimates for cardiovascular disease, cancer, diabetes, or for HIV/AIDS (Waechter & Ma, 2015). Another big-ticket public health concern, alcohol use disorders (AUD) cost society an approximated \$223 billion dollars (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011). Although rates of AUDs have historically been higher among men compared to women, the gap in prevalence between genders is closing (e.g., Grant et al., 2008). Furthermore, women significantly outnumber men in their number of sexual victimization experiences both during childhood (Afifi, Henriksen, Asmundson, & Sareen, 2012) and adulthood (Peterson, Voller, Polusny, & Murdoch, 2011). Longitudinal research finds a positive, predictive, relationship between SV and alcohol use (e.g., Bryan et al., 2016). Understanding why women's alcohol use/abuse risk increases following SV is an important public health concern and much support has been found for what has been termed the self-medication model (Miranda et al., 2002). This theory posits that alcohol use is reinforced and maintained through negative reinforcement as individuals attempt to decrease negative affect through drinking.

SV is also associated with experiencing sexual problems including sex-related distress, that is, distress associated with sexual activity or sexual stimuli (e.g., Kelley & Gidycz, 2019; Lemieux & Byers, 2008). Understanding of sex-related distress following SV is still limited and research on how women cope with such distress is scant. Given that women drink to cope with general distress (i.e. distress not necessarily associated with sexual activity) and consequently drink more and have more negative drinking consequences (Fossos, Kaysen, Neighbors,

Lindgren, & Hove, 2011), it is logical to examine whether they also drink to cope with sex-related distress. Furthermore, which unique outcomes (such as pre-sex drinking and negative sexual consequences) may be associated with this sex-related distress self-medication model are ripe for investigation. The current papers examine pathways through which SV is associated with pre-sex drinking and negative sexual consequences; unique factors may differentially underlie these sex-related variables compared to typical drinking behavior and consequences. This program of research tests the existence of a sex-related distress version of the self-medication model using longitudinal and event-specific methodologies examining between person relationships. If a model that simultaneously includes both the general and sex-related self-medication pathways, shows that women drink in accordance with a sex-related distress self-medication model, then future research could examine how the self-medication model functions regarding sex-related distress and even how intervention programs might integrate new research. Furthermore, by also examining these questions using event-specific data, insight may be gained not only as to how the sex-related distress self-medication model unfolds over long temporal epochs, but also within a single day.

### **Definitions**

It is important to clarify the terms used in the current paper referring to sexual trauma. The term SV is often used to refer to experiences that occurred both during childhood and adulthood (George et al., 2013) and will be used in the present paper in this way. SV includes unwanted sexual experiences that range from unwanted touching to forced rape (penetration of the mouth, vagina, and/or anus) and can occur from the use of a multitude of tactics including physical force, verbal coercion, or incapacitation (when the victim is unconscious or too incapacitated by drugs and/or alcohol to consent; Koss & Gidycz, 1985). The term childhood

sexual abuse (CSA) refers to experiences that occurred during childhood (Bernstein & Fink, 1998) and can include any type of SV behavior or tactic (e.g., force, verbal coercion). However, the age cut-off for CSA in the literature varies, ranging from age 14 (Ullman, Filipas, Townsend, & Starzynski, 2005) to age 18 (Finkelhor, Shattuck, Turner, & Hamby, 2014; Grayson & Nolen-Hoeksema, 2005; Smith, Smith, & Grekin, 2014). The term adult/adolescent sexual assault (ASA) refers to experiences that occurred during adulthood and/or adolescence and can also include any type of SV behavior or tactic.

## **II. Longitudinal Examination of a Sex-Related Distress Self-Medication Drinking Model Following Sexual Victimization**

### **Abstract**

Women ages 18-24 are at the highest risk for sexual victimization (SV), with more than 20% of women affected during their college years. The self-medication model of alcohol use, whereby alcohol use is negatively reinforced through the reduction of distress, is widely supported as a method by which women with a SV history cope. Compared to women without an SV history, women with a history of SV engage more frequently in pre-sex drinking—drinking before or during sexual activity, and report more problems related to sexuality. Sexual health variables such as sex-related distress (i.e., distress related to sexual behavior or sexuality) and sex-related drinking motives (i.e., drinking to cope with sex-related distress) might mediate the relationships between SV and pre-sex drinking and between SV and negative sexual consequences, representing unique pathways. The current study examines this sex-related self-medication model of alcohol use in first and second year college women (N = 379) using an online, longitudinal survey methodology (baseline, six weeks, and twelve weeks) and path analysis. ASA severity was indirectly associated with drinking motives to cope with sex-related distress through sex-related distress. In the same model, ASA severity was also indirectly associated with general drinking motives to cope through general distress. Results suggest that the sex-related self-medication model may function independently of the general self-medication model. However, more research is needed to understand which outcomes are associated with general and sex-related drinking motives to cope, and for whom and under which circumstances these outcomes occur. Findings from the current research might inform interventions at the individual and the university level.

## **Epidemiology of Sexual Victimization**

Women of college age (ages 18-24) experience the highest rates of sexual victimization (Koss, Gidycz, & Wisniewski, 1987); by the end of senior year, approximately 1 in 5 college women is sexually victimized (see Muehlenhard, Peterson, Humphreys, & Jozkowski, 2017, for a review). Furthermore, the first and second years of college are often characterized by heavy drinking and drinking problems (Hartzler & Fromme, 2003), and higher rates of SV compared to the latter two years (Humphrey & White, 2000). Experiencing interpersonal trauma, including a more severe SV history (e.g., completed penetration, multiple incidents) is associated with a multitude of negative sequelae including depression (Harris & Valentiner, 2002), anxiety, and post-traumatic stress (PTS; Classen, 2005; Messman-Moore, Brown, & Koelsch, 2005), and sexual difficulties (Kelly & Gidycz, 2019).

## **Pre-Sex Drinking and Negative Sexual Consequences**

Researchers have attempted to study the potentially maladaptive ways that women with a history of SV cope with these mental health problems, including using alcohol. Longitudinal and cross-sectional research suggests that SV is associated with increased quantity of alcohol use (e.g., Bryan et al., 2016; Lindgren, Neighbors, Blayney, Mullins, & Kaysen, 2012) and negative drinking consequences such as getting into fights, having a bad time, or missing school or work (Asberg et al., 2012; Grayson et al., 2005; Fossos et al., 2011; Lindgren et al., 2012; Smith et al., 2014; Ullman et al., 2005). Risky alcohol use and SV remain significant public health concerns among college women.

Less research has examined coping with sexual problems. Pre-sex drinking refers to drinking before or during sexual activity (Testa & Dermen, 1999). Indeed, SV history is also associated with frequent and heavy pre-sex drinking and with sexual difficulties such as sexual

dysfunction (Turchik & Hassija, 2014; Kelley & Gidycz, 2019). Just as research identifies differential correlates for drinking alone, at parties, or bars (e.g., Cooper, 1994), it is important that we identify and study the specific processes, such as pre-sex drinking, that occur related to sexual activity. Sexual activity can be understood as a unique context with distinctive predictors of sex-related alcohol use and negative sexual consequences. Women with SV histories are more likely to report drinking than other women the last time they had sex (Howard & Wang, 2005). However, scant research examines pre-sex drinking specifically, a high risk alcohol use behavior that is common on college campuses (Downing-Matibag & Geisinger, 2009; Lewis, Granato, Blayney, Lostutter, & Kilmer, 2011). Among casual sexual encounters on college campuses, 60 to 80% involve alcohol consumption (Downing-Matibag & Geisinger, 2009; Lewis et al., 2011). Pre-sex drinking is associated with sexual revictimization (Cooper, Frone, Russell, & Mudar, 1995; Ullman & Siegel, 1993) and sexual risk-taking (e.g., condom nonuse; Bailey, Fleming, Catalano, Haggerty, & Manhart, 2012; Hendershot, Stoner, George, & Norris, 2007). Limited research investigates pathways through which SV severity and these negative sexual outcomes – pre-sex drinking and negative sexual consequences – are associated (e.g., Bird, Gilmore, George, & Lewis, 2016).

### **Sex-Related Distress**

The role of general distress, i.e., distress not associated specifically with sexuality, is critical in the relationship between SV and drinking, including both typical drinking quantity (i.e., alcohol use not specifically prior to sexual activity; Kaysen et al., 2014; Stappenbeck, Hassija, Zimmerman, & Kaysen, 2015) and negative drinking consequences (Geisner, Larimer, & Neighbors, 2004). About half of women who experienced SV over a year ago report fear, anxiety, or depression within the past year (Siegel, Golding, Stein, Burnam, & Sorenson, 1990).

Following SV, women also experience a specific form of distress – sex-related distress, defined as distress associated with sexual activity or sexual stimuli (e.g., Katz, Gipson, & Turner, 1992; Kelley & Gidycz, 2019; Lemieux & Byers, 2008, Stephenson, Hughan, & Meston, 2012; Ullman & Siegel, 1993), – with worse outcomes if SV included penetration (Lemieux & Byers, 2008; Siegel et al., 1990). The learning model of sexual problems (Barlow, 1986; Becker, Skinner, Abel, & Cichon, 1986) suggests that through experiencing SV, women are conditioned to respond to assault-related reminders, such as sexual stimuli or contact, with negative emotions such as fear, shame, or guilt, which are forms of sex-related distress. As many as 38% of women who experienced SV report sex-related distress (Ullman & Siegel, 1993); and previous studies link sex-related distress to SV that occurred both in childhood (Rellini & Meston, 2007) and adulthood (Kelley & Gidycz, 2019). Furthermore, some women continue to experience sex-related distress within the last year when their SV occurred over a year ago (Siegel et al., 1990). The role of sex-related distress in pre-sex drinking and negative sexual consequences has yet to be investigated. SV severity may be associated with pre-sex drinking and negative sexual consequences through increased sex-related distress (Bigras, Godbout, & Briere, 2015; Hébert & Bergeron, 2007). This could be because women with SV histories may be motivated to drink before sex as a way to cope with their sex-related distress; and they may be drinking in such a way to cope with their sex-related distress that they experience more frequent negative sexual consequences.

### **Sex-Related Drinking to Cope as a Drinking Motive**

Research strongly supports the importance of drinking to cope, a drinking motive that is not specifically related to sexual activity, as a mediator in the relationship between SV and typical drinking quantity and consequences (Cooper et al., 1995; Fossos et al., 2011; Grayson &

Nolen-Hoeksema, 2005; Lindgren et al., 2012). Motivational models of drinking are based on the premise that different motives are associated with unique drinking antecedents and consequences (Cooper et al., 1995), and these assertions are supported by a strong body of research (e.g., Bird et al., 2016; Cooper et al., 1995; Kuntsche, Otten, & Labhart, 2015; Lindgren et al., 2012). Thus, it is logical to investigate different motives for pre-sex drinking than typical drinking behavior. Just as connections have been made between drinking to cope and typical drinking behavior and drinking consequences, we might then expect sex-related drinking to cope – a drinking motivation to decrease sex-related distress – to be related to pre-sex drinking and negative sexual consequences.

SV severity is indeed associated with increased sex-related drinking to cope in community women (Bird et al., 2019). No studies explicitly examine pre-sex drinking or negative sexual consequences and either general or sex-related drinking to cope motives. However, in adolescents and young adults undergoing substance use treatment, sex-related drinking to cope is associated with alcohol problems and heavy episodic drinking (Tubman, Wagner, & Langer, 2003). Among HIV positive men who have sex with men, sex-related drinking motives (a combination of sex-related drinking to cope and other sex-related drinking motives) are positively correlated with number of drinks per week and alcohol consequences (Kahler et al., 2015). Furthermore, in this same study, sex-related drinking motives are uniquely positively associated with the proportion of pre-sex drinking days over and above general drinking motives.

**Tying it all Together: Sex-Related Distress Self-Medication Drinking Models of Pre-Sex Drinking, and Negative Sexual Consequences**

Previous research indicates that SV severity is positively associated with sex-related drinking to cope (Bird et al., 2019). Additionally, a more severe SV history is associated with particularly poor mental health outcomes (Classen, 2005). Moreover, sex-related distress may mediate the relationship between SV severity and pre-sex drinking (see Figure 1 for hypothesized model) and between SV severity and negative sexual consequences (see Figure 2 for hypothesized model). Previous research suggests that both drinking behavior and drinking consequences increase as part of the self-medication model of alcohol use (Fossos et al., 2011; Geisner et al., 2004). Therefore, two models can be tested – a drinking behavior model examining pre-sex drinking and typical alcohol use, and a consequences model examining negative sexual consequences and general drinking consequences. For the drinking behavior model, sex-related drinking to cope may mediate the relationship between sex-related distress and pre-sex drinking: SV severity → sex-related distress → sex-related drinking to cope → pre-sex drinking. For the consequences model, sex-related drinking to cope may mediate the relationship between sex-related distress and negative sexual consequences: SV severity → sex-related distress → sex-related drinking to cope → negative sexual consequences.

Additionally, there is a body of research that examines the self-medication model with a focus on SV history (e.g., see Langdon et al., 2017, for a review), but does not distinguish sexual from non-sexual trauma exposure (e.g., Lehavot, Stappenbeck, Luterek, Kaysen, & Simpson, 2014). Previous research on the self-medication model of alcohol use has not examined sexual and non-sexual trauma history in the same model to examine any potential differences. Only one study that we are aware of has studied sexual outcomes comparing sexual and non-sexual currently most upsetting potentially traumatic event (Bird, Seehuus, Heiman, Davis, Norris, & George, 2018), finding that some outcomes (e.g., sexual inhibition) were indeed worse for those

whose currently most upsetting event was sexual in nature. Given the nature of the current study as an examination of the sex-related distress self-medication model, it is logical to test this pathway as it relates to sexual and non-sexual trauma in the same model.

### **Current Study**

This study uses longitudinal methodology to examine self-medication models specific to sex-related distress in association with sexual trauma history in first and second year college women. College women ages 18-24 were recruited to complete baseline measures online (Time 1) and completed similar follow-up surveys at 6-weeks (Time 2) and 3-months (Time 3). The primary aim of the proposed study is to investigate sex-related distress and sex-related drinking to cope as mediators in the relationship between SV history and pre-sex drinking and between SV history and negative sexual consequences, in accordance with previous research on the self-medication model of alcohol use. For the drinking behavior model, we hypothesize that CSA history will be associated with greater ASA severity, which will be associated with more sex-related distress at Time 1 (Hypothesis 1), which will predict increased sex-related drinking to cope at Time 2 (Hypothesis 2), which will result in more frequent pre-sex drinking at Time 3 (Hypothesis 3). For the consequences model, we expect that CSA history will be positively associated with ASA severity, which will be associated with more sex-related distress at Time 1 (Hypothesis 4), which will predict increased sex-related drinking to cope at Time 2 (Hypothesis 5), which will result in more frequent negative sexual consequences at Time 3 (Hypothesis 6). We expect to find these relationships while including the typical self-medication pathway in each model (general distress leads to drinking to cope, which leads to increased drinking quantity and drinking consequences) and controlling for the influence of all variables at previous time-points and for SV experienced during the study. Furthermore, we will explore the pathways from sexual

trauma history in relation to non-sexual trauma history to examine the specificity of a processes related to type of trauma history.

The only difference between the two models (except for the different outcome variables) is that in the drinking behavior model, sex-related and general drinking behavior variables are expected to predict each other, whereas in the consequences model, negative sexual consequences and drinking consequences are not. Alcohol use variables are likely to predict each other, even if one variable is context specific. That is, individuals who engage in more frequent pre-sex drinking are also likely to engage in increased drinking overall and vice versa. However, sexual and drinking consequences aren't as clearly linked theoretically, and there is less reason to expect they would predict each other.

## **Method**

### **Participants**

Three hundred and eighty three first and second year cisgender females from a large northwest university participated in the current study. Three hundred and seventy-nine provided data at Time 1, 301 (79% of those who provided data at Time 1) provided data at Time 2, and 280 (74% of those who provided data at Time 1) provided data at Time 3. Some participants who started a survey did not complete it: seventeen at Time 1, two at Time 2, and seven at Time 3. For the current study, four participants were excluded for not providing any data for the Time 1 survey (final  $n = 379$ ). Participants were eligible if they 1) identified as women and were assigned a female sex at birth, 2) were between the ages of 18 and 24, 3) had engaged in consensual oral, anal, and/or vaginal intercourse with a man at least once in the past 3 months, and 4) drank alcohol in the past three months. Women were included only if they reported engaging in sexual activity with men because women who only engage in sexual activity with

women may have different sexual and alcohol use experiences compared to women who engage in sexual activity with men (Trocki & Drabble, 2008). Participants were 18.81 years old on average ( $SD = .82$ ). The majority (69%) of participants were in their first year of college, lived with roommates and friends (84%), spoke English as their first language (78%), and identified as straight/heterosexual (86%). Forty-three percent were employed and 60% had a household yearly income (including their parents if they were claimed as a dependent) of \$61,000 or more. About half of participants were White (51%). Twenty-eight percent identified as Asian American/Pacific Islander, 12% were multiracial, .5% were Black/African American, .5% were American Indian/Alaska Native, 6% identified as “Other”, and 1% (3 participants) chose to not identify their race. Additionally, 9% of participants identified as Hispanic/Latina.

### **Procedure**

All study procedures were approved by the university’s IRB. Participants completed three surveys online at six-week intervals over the course of three months (baseline, 6-week follow-up, and 12-week follow-up). Participants were recruited through two methods for a study about “women’s alcohol use and sexual health”. Some were recruited through psychology courses using the university’s Psychology Subject Pool (PSS;  $n = 183$ ) and others were recruited through the university’s registrar ( $n = 196$ ). Participants were allowed two weeks to complete each survey after they were sent the initial invitation. Participants who were recruited through the PSS were given class extra credit for completing the first survey and were compensated with \$25 and \$30 Amazon.com gift cards for completing the second and third surveys, respectively. Participants who were recruited through the registrar were compensated with \$20, \$25, and \$30 Amazon.com gift cards for completing the first, second, and third surveys. Finally, for each survey that every participant completed, they were entered into a raffle to win a \$500 Visa gift

card. All participants were provided with referrals for treatment and support related to alcohol abuse, sexual victimization, and other topics.

## Measures

**Childhood Sexual Abuse.** Childhood sexual abuse was measured using a modified version of the Computer Assisted Maltreatment Inventory (CAMI; DiLillo et al., 2010) at Time 1. Participants were asked the first three questions of the childhood sexual abuse section of the CAMI, which assess sexual experiences prior to the age of 14 that occurred 1) with anyone against their will or when they did not want it to happen, 2) with an immediate family member or other relative (excluding voluntary peer-aged sexual play), or 3) with anyone who was more than 5 years older (excluding voluntary activities that occurred with a dating partner). Participants were coded as having a history of childhood sexual abuse if they answered “Yes” to at least one of these three questions. Sexual activity is operationalized using a list of specific behaviors.

**Adult Sexual Assault (ASA).** Adult sexual assault since the age of 14 was measured using the revised Sexual Experiences Survey at Time 1 (SES-R; Koss et al., 2008). Categories of unwanted sexual behavior included sexual contact (e.g., fondling) and attempted or completed oral, vaginal, or anal penetration. Perpetrator tactics included verbal coercion, intoxication, and force. Participants indicated the number of times each sexual act occurred by each tactic on 4-point frequency scales (0 = *Never*; 3 = *Three or more times*). ASA severity was calculated by computing a severity rank that represented a cross between the tactic and outcome (0 = No ASA, 1 = Sexual contact by verbal coercion, 2 = Sexual contact by intoxication, 3 = Sexual contact by force, 4 = Attempted or completed rape by verbal coercion, 5 = Attempted or completed rape by intoxication, 6 = Attempted or completed rape by physical force) by the frequency with which each combination occurred (Davis et al., 2014) and then summing those products. This resulted

in a possible range of ASA severity from 0 to 63.

ASA was also measured at Times 2 and 3 asking about the past six weeks. Instead of scoring the SES-R as a measure of severity, participants were categorized dichotomously (Yes ASA/No ASA). They were counted affirmatively if they endorsed any item.

**Non-Sexual Trauma History.** At Time 1, The Life Events Checklist for DSM-5 (Gray, Litz, Hsu, & Lombardo, 2004; Weathers, Blake, Schnurr, Kaloupek, Marx, & Keane, 2013), a measure of exposure to potentially traumatic events, was utilized in the present study to examine lifetime exposure to fourteen potentially traumatic events that were not sex-related (e.g., natural disaster, combat exposure, physical assault). Participants are asked to indicate whether they have experienced these events directly, witnessed them, learned about them, or encountered them as part of their job. For the present analyses, a total potential trauma exposure score was calculated as the sum of the types of trauma participants endorsed experiencing directly (“happened to me”).

**Sex-Related Distress.** Sex-related distress was measured using the Fear/Avoidance subscale of the Traumatic Sexualization Survey (Matorin & Lynn, 1998). At Time 1, in accordance with the validated measure, no timeframe was given. Participants were asked to “Please indicate how often each item is true for you.” At Time 2, participants were asked to report on the past six weeks. The subscale consists of sixteen items (e.g., “I am uncomfortable being sexual”). To thoroughly convey how sex-related distress was measured, the full list of items is provided<sup>1</sup>. Response options range from 0 = *Never* to 4 = *Almost Always* and a total score was created by averaging the items (Time 1  $\alpha = .91$ ; Time 2  $\alpha = .92$ ).

**General Distress.** General distress was measured using the 18-item Brief Symptom Inventory (BSI-18; Derogatis, 2000). Time 1 asked about the past seven days including today in

accordance with the original validated measure and Time 2 asked about the past six weeks. The BSI-18 consists of eighteen items describing various symptoms of distress (e.g., “Nervousness or shakiness inside”, “Feelings of worthlessness”). Response options range from 0 = *Not at all* to 3 = *Extremely* and a total score was created by summing the items (Time 1  $\alpha = .93$ ; Time 2  $\alpha = .95$ ). Response options in the validated measure ranged from 0 = *Not at all* to 4 = *Extremely* (i.e. a five point scale), but due to an oversight in the current study, a four-point scale was used. The scale includes a question about thoughts of suicide. If participants endorsed any thoughts of suicide they were shown a pop-up that provided mental health resources including crisis line phone numbers.

**General Drinking Motives.** General drinking motives were measured using the Drinking Motives Questionnaire – Revised (Cooper, 1994). Participants are asked to rate the extent to which they drink alcohol for various reasons. At Time 1 they were asked to “Please rate how often you drink for each of the following reasons” without a timeframe given in accordance with the original validated measure. At Time 2, participants were asked about the past six weeks. Using 4-point frequency scales (1 = *Almost never*; 4 = *Almost always*), five items assessed motives to cope with negative emotions (Time 1  $\alpha = .82$ ; Time 2  $\alpha = .87$ ; e.g., “To forget your worries”). Items were averaged.

**Sex-Related Drinking Motives.** Sex-related drinking motives were measured using items that were based on the original Drinking Motives Questionnaire (Cooper, 1994; Bird et al., 2019). At Time 1 they were asked to “Please rate how often you drink for each of the following reasons” without a timeframe given in accordance with the Drinking Motives Questionnaire. At Time 2, participants were asked about the past six weeks. Using 4-point frequency scales (1 = *Almost never*; 4 = *Almost always*), four items assessed motives to drink to cope with sex-related

distress (Time 1  $\alpha = .89$ ; Time 2  $\alpha = .91$ ): “To feel less depressed about sexual activity,” “To forget your worries about sexual activity,” “To help you forget your problems related to sexual activity,” and “To feel less upset about sexual activity.” Items were averaged.

**Pre-Sex Drinking Behavior.** Pre-sex drinking behavior was measured using a date calendar with modified instructions from the Timeline Followback (TLFB; Sobell, Brown, & Sobell, 1996). At all three time points, only those who indicated that they had engaged in sexual activity over the past six weeks completed this measure. Participants were provided instructions modified from the original TLFB and were then shown an interactive calendar for the past six weeks. Participants were first asked to indicate on which days they engaged in sexual activity. Sexual activity was defined as any type of sexual activity that involved more than kissing. For participants who reported that they drank prior to sexual activity in the last six weeks, they were then shown only those days that they selected and they were asked to choose the days on which they drank before engaging in sexual activity. The number of days in which participants engaged in sexual activity was summed as were the number of days they drank prior to engaging in sexual activity. Finally, a ratio of number of pre-sex drinking days to total sexual activity days was created such that participants’ scores ranged from 0 to 1. This scoring system was used in order to account for differing rates of sexual activity.

**General Drinking Behavior.** General drinking behavior was assessed using the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). For Time 1, participants were asked how many standard drinks were typically consumed each day of their average week in the past 30 days and these were summed to calculate average drinks per week. For Times 2 and 3, participants were asked about the past six weeks. Then, this sum was divided by their typical

number of drinking days in a week. Participants who indicated that they did not drink alcohol in the past 30 days (Time 1) or six weeks (Times 2 and 3) were coded as having had zero drinks.

**Negative Sexual Consequences.** Negative sexual consequences were measured using nine items gathered from multiple sources. Participants completed questions about positive sexual consequences as well, but they are not included in the current study. Some items were modified versions of items used by Vasilenko, Lefkowitz, and Maggs (2012; e.g., “I felt guilty”, “I worried someone would judge me negatively”). Others were added based on expert input (NIAAA R01 AA016281; PI: W. H. George; e.g., “I felt in a worse mood” and “I worried it would be bad for our relationship”). Participants answered how frequently the consequence occurred over the past six weeks for all three time points. Response options ranged from 0 = *Never* to 3 = *Always*. Chronbach’s alpha was acceptable (Time 1  $\alpha = .83$ ; Time 2  $\alpha = .87$ ; Time 3  $\alpha = .83$ ). Items were summed such that scores range from 0 to 33.

**Drinking Consequences.** Negative drinking consequences were measured using the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). Participants reported the frequency with which twenty-three drinking consequences occurred within the past year for Time 1, and within the past six weeks for Times 2 and 3. Response options were 0 = 0, 1 = 1-2 times, 2 = 3-5 times, 3 = 5 or more times. At Times 2 and 3, participants who reported no alcohol use over the past six weeks were scored as 0. Scores were summed for a possible range of 0 to 69 and participants were included if they reported an answer for twenty out of the twenty-three items. Chronbach’s alpha was acceptable (Time 1  $\alpha = .91$ ; Time 2  $\alpha = .93$ ; Time 3  $\alpha = .92$ ).

### **Data Analytic Plan**

Data were entered online using Qualtrics and subsequently downloaded for analysis using SPSS Version 21 and RStudio (Team, 2016). Path analysis using RStudio (Team, 2016)

was used to test the hypotheses. To assess model fit, chi-square, root mean square error of approximation (RMSEA), comparative fit index (CFI), and standard root mean square residual (SRMR) will be used. Good model fit was indicated with a non-significant chi-square, RMSEA values less than .06, CFI values greater than .90, and SRMR values less than .06 (Kline, 2016). The models were examined using 1000 bootstrap resamples.

### **Power and Sample Size**

We ran a simulation of a portion of the proposed model using R (Lai & Kelley, 2011) to determine appropriate sample size needed to reach power of .80. We simulated the indirect effect of sex-related drinking motives between sex-related distress and pre-sex drinking accounting for the effects of general drinking motives and typical drinking. It was found that a sample size of 325 would provide adequate power to find the desired relationships if they are present.

## **Results**

### **Descriptive Statistics**

Correlations were examined between all primary study variables for the behavior model (pre-sex drinking and typical drinking outcomes; Table 1) and the consequences model (negative sexual consequences and drinking consequences outcomes; Table 3). Means, standard deviations, and ranges are also included for all variables. Approximately 14.2%, or 52 women reported CSA. Two hundred and thirty-five women (63.0%) reported a history of ASA at Time 1, 52 women (17.8%) reported ASA at Time 2, and 58 women (21.2%) reported ASA at Time 3. Two hundred and thirty-two women (62.5%) indicated that they had experienced at least one non-sexual potentially traumatic event in their lifetime.

Examination of missingness patterns showed that recruitment type (registrar vs. subject pool) was associated with different rates of retention and therefore was included in the model as

an auxiliary variable. Those recruited through the registrar had higher retention rates compared to those recruited through the subject pool. Additionally, mean differences in key study variables were examined and it was found that ASA severity was significantly higher in the group of participants who were recruited through the registrar ( $M = 13.8$ ;  $SD = 14.88$ ) compared to the subject pool ( $M = 8.4$ ;  $SD = 12.62$ ),  $t(371) = 3.77$ ;  $p < .05$ . General distress was significantly lower among participants who were missing ( $M = 10.32$ ;  $SD = 8.44$ ) compared to those who were not ( $M = 11.60$ ;  $SD = 10.10$ ) on drinking to cope with sex-related distress at Time 2,  $t(364) = 1.04$ ;  $p < .05$ . No other mean differences in ASA severity, general distress, or sex-related distress were found between those who were and were not missing on either drinking motive variable at Time 2 or any outcome variables (i.e., pre-sex drinking, typical drinking, negative sexual consequences, and drinking consequences) at Time 3.

### **Path Analysis Predicting Pre-Sex Drinking and General Drinking**

The hypothesized model was a good fit for the data,  $\chi^2(78) = 147.76$ ,  $p = .00$ , RMSEA = .05, CFI = .94, and SRMR = .056. The chi-square test was significant but larger sample sizes, such as that used in the current study, can produce a significant chi-square even when the model is a good fit (Bentler & Bonett, 1980). Residuals were examined to determine the necessity of additional paths. Because no high residuals were found between theoretically important relationships, and because the model fit was adequate, no additional regression paths were added. Variables measured at each time point were allowed to freely correlate with each other (except for CSA and ASA severity). Primary results did not differ between models that controlled for ASA experienced at Times 2 and 3 and those that did not. However, the models that did not include ASA experienced at Times 2 and 3 were not a good fit for the data. Correlations between variables at the same time point are reported in Table 2.

The standardized coefficients for the paths are presented in Figure 3. Hypothesis 1 was supported. CSA was positively associated with sex-related distress at Time 1 through ASA severity,  $\beta = .05, p < .05$ . Hypothesis 2 was also supported. Sex-related distress at Time 1 was positively associated with sex-related drinking to cope at Time 2,  $\beta = .24, p < .05$ . However, Hypothesis 3 was not supported. Sex-related drinking to cope at Time 2 was not significantly associated with more frequent pre-sex drinking at Time 3,  $\beta = .08, ns$ .

The full indirect path from CSA  $\rightarrow$  ASA severity  $\rightarrow$  sex-related distress  $\rightarrow$  sex-related drinking to cope at Time 2  $\rightarrow$  pre-sex drinking at Time 3 was not significant,  $\beta = .00, ns$ . However, additional indirect effects were examined. The indirect path from CSA  $\rightarrow$  ASA severity  $\rightarrow$  sex-related distress was significant,  $\beta = .05, p < .05$ . Although variables were related through bivariate regressions, the indirect pathway from CSA  $\rightarrow$  ASA severity  $\rightarrow$  sex-related distress  $\rightarrow$  sex-related drinking to cope at Time 2 was not significant,  $\beta = .01, ns$ . However, the indirect path from ASA severity  $\rightarrow$  sex-related distress  $\rightarrow$  sex-related drinking to cope at Time 2 was significant,  $\beta = .06, p < .05$ . Additionally, the indirect pathway from CSA  $\rightarrow$  ASA severity  $\rightarrow$  general distress was significant,  $\beta = .05, p < .01$  as was the indirect pathway from CSA  $\rightarrow$  ASA severity  $\rightarrow$  general distress  $\rightarrow$  general drinking to cope at Time 2,  $\beta = .01, p < .05$ . Additionally, the indirect path from ASA severity  $\rightarrow$  general distress  $\rightarrow$  general drinking to cope at Time 2 was significant,  $\beta = .04, p < .01$ . Finally, the indirect pathway from non-sexual trauma  $\rightarrow$  general distress  $\rightarrow$  general drinking to cope at Time 2 was significant,  $\beta = .04, p < .01$ .

ASA at Time 2 was positively associated with sex-related drinking to cope at Time 2 but was not associated with typical drinking, general drinking to cope, or pre-sex drinking at Time 2. It was also not associated with either outcome at Time 3 (typical drinking and pre-sex drinking).

ASA at Time 3 was negatively associated with pre-sex drinking at Time 3 but not associated with typical drinking at Time 3.

### **Path Analysis Predicting Negative Sexual and Alcohol Consequences**

The hypothesized model was a good fit for the data,  $\chi^2(82) = 117.48, p = .01$ , RMSEA = .03, CFI = .98, and SRMR = .05. The chi-square test was significant but larger sample sizes, such as that used in the current study, can produce a significant chi-square even when the model is a good fit (Bentler & Bonett, 1980). Residuals were examined to determine the necessity of additional paths. Because no high residuals were found between theoretically important relationships, and because the model fit was adequate, no additional regression paths were added. Variables measured at each time point were allowed to freely correlate with each other (except for CSA and ASA severity). Recruitment type was included as an auxiliary variable. Primary results did not differ between models that controlled for ASA experienced at Times 2 and 3 and those that did not. However, the models that did not include ASA experienced at Times 2 and 3 were not a good fit for the data. Correlations between variables at the same time point are reported in Table 4.

The standardized coefficients for the paths are presented in Figure 4. Hypothesis 4 was supported. CSA history was positively associated with ASA severity, which was positively associated with sex-related distress at Time 1 through an indirect effect,  $\beta = .05, p < .05$ . Hypothesis 5 was also supported. Sex-related distress at Time 1 was positively associated with sex-related drinking to cope at Time 2,  $\beta = .21, p < .05$ . Hypothesis 6 was not supported. Sex-related drinking to cope at Time 2 was not associated with negative sexual consequences at Time 3,  $\beta = .02, ns$ .

The indirect path from CSA → ASA severity → sex-related distress → sex-related drinking to cope at Time 2 → negative sexual consequences at Time 3 was not significant,  $\beta = .01$ , *ns*. However, additional indirect effects were examined. The indirect pathway from CSA → ASA severity → general distress was significant,  $\beta = .05$ ,  $p < .01$ . Although variables were related through bivariate regressions, the indirect pathway from CSA → ASA severity → sex-related distress → sex-related drinking to cope at Time 2 was not significant,  $\beta = .01$ , *ns*. However, the indirect path from ASA severity → sex-related distress → sex-related drinking to cope at Time 2 was significant,  $\beta = .06$ ,  $p = .05$ . The indirect pathway from CSA → ASA severity → general distress → general drinking to cope at Time 2 was not significant,  $\beta = .01$ , *ns*. However, the path from ASA severity → general distress → general drinking to cope at Time 2 was,  $\beta = .03$ ,  $p < .05$ . Finally, the indirect pathway from non-sexual trauma → general distress → general drinking motives to cope at Time 2 was significant,  $\beta = .03$ ,  $p < .05$ .

ASA at Time 2 was positively associated with drinking consequences, sex-related drinking to cope, and negative sexual consequences at Time 2 but was not associated with general drinking to cope at Time 2. It was positively associated with negative sexual consequences at Time 3 but not drinking consequences at Time 3. ASA at Time 3 was not associated with either drinking consequences or negative sexual consequences at Time 3.

### **Discussion**

Even though the full hypothesized indirect pathways from CSA to pre-sex drinking and CSA to negative sexual consequences were not supported, the current study still provides support for a sex-related distress self-medication model that may function independent of a general distress self-medication model. Indeed, ASA was associated with sex-related drinking to cope through sex-related distress in both models. These pathways were found in models that also

included a significant pathway from ASA to general distress to general drinking to cope and a pathway from non-sexual trauma to general distress to general drinking to cope. Recent, albeit limited, research supports the independence of sex-related drinking to cope and general drinking to cope (Bird et al., 2017; Kahler et al., 2015). Although sex-related drinking motives, including sex-related drinking to cope, have been examined in recent research, this is the first study to test an explicit self-medication model (e.g., one that actually includes sex-related distress). Multiple explanations could be given for why the indirect paths starting at CSA through general and sex-related drinking to cope were not significant. More recent experiences of SV (i.e., those experienced after the age of 14) may have more impact on sex-related distress and/or motivation to drink to cope. Furthermore, the dichotomous measurement of CSA may not provide enough power to detect an indirect path, even though a bivariate regression between CSA and ASA severity was found. Additionally, it is possible that this path was not driven by CSA once ASA was accounted for.

Sex-related drinking to cope was not associated with negative sexual consequences. Negative sexual consequences were not measured in relation to alcohol use. Some past research has examined “sex-related alcohol negative consequences” (Lewis, Rees, Logan, Kaysen, & Kilmer, 2010), measuring risky sexual activity due to alcohol use. Our measure covers a broader number of negative sexual experiences (e.g., negative emotions and interpersonal concerns following sexual activity) and focuses more on measuring the quality of the sexual experience as opposed to risky behavior. It is possible that in this potential sex-related self-medication model of alcohol use, that the theoretically appropriate sexual consequences variable would be more clearly tied to alcohol use. Future research might examine this possibility.

Sex-related drinking to cope also did not predict pre-sex drinking, but general drinking to cope did not predict typical drinking behavior either. No previous research that we are aware of has examined the relationships between general distress, general drinking to cope, and drinking behavior or consequences using longitudinal methodology. It is possible that the relationships between drinking motives and drinking outcomes over time are more complex than is typically discussed. Additionally, some research suggests that general drinking to cope functions as a moderator between general distress and drinking outcomes (Smith et al., 2014). Perhaps a better question would be *for whom* does sex-related drinking to cope lead to increases in pre-sex drinking. For example, perhaps only those who endorse sex-related alcohol expectancies (e.g., that alcohol decreases sexual inhibition) are likely to engage in pre-sex drinking when endorsing sex-related drinking to cope (Leigh, 1990). Furthermore, most research on the mediation effect of general drinking to cope on SV and drinking outcomes has focused on drinking consequences (e.g., Lindgren et al., 2012; Ullman et al., 2005), with fewer studies focusing on drinking behavior as the outcome (e.g., Fossos et al., 2011). Consequences, related to both general drinking and sexual activity, may be more consistently linked to the self-medication model. That is, drinking motives to cope may change decision-making resulting in more negative consequences, but not necessarily increase the quantity consumed per se. For example, experiencing distress and attempting to cope with it through drinking could lead to drinking at inopportune times when distress is high, such as when individuals should be fulfilling obligations. This may apply to the sex-related distress self-medication model as well. Experiencing sex-related distress and drinking in an effort to decrease it may result in choosing sexual partners who are, for unknown reasons as of yet, associated with increased negative sexual consequences. Sex-related drinking to cope could also be associated with lower levels of

communication and assertiveness about sexual desires and needs. Finally, it is possible, of course, that sex-related drinking to cope does not lead to increases in pre-sex drinking and other variables should be examined in future research.

In both models, recent ASA (dichotomously measured) at Times 2 and 3 was associated with some but not all variables that were tested. Patterns in the findings are somewhat unclear and future research should continue to examine the proximal relationships of ASA with alcohol use and sexual health. This inconsistency could be because the regressions are included in large models. It is possible that the bivariate relationships would show more consistent patterns. Additionally, the ASA variables included any type of ASA experience and perhaps more significant relationships would be found for certain types of ASA (e.g., alcohol involved) compared to others. Unexpectedly, ASA at Time 3 was negatively associated with pre-sex drinking at Time 3. Having had an ASA experience in the past six weeks was associated with a lower frequency of pre-sex drinking compared to those who did not experience ASA in the past six weeks. ASA was not associated with pre-sex drinking at any other time point in the model. We would not expect that all women who experience ASA increase their pre-sex drinking. Some may of course actually decrease their drinking in an effort to protect themselves as their perception of potential revictimization increases (Orchowski, Creech, Reddy, Copezza, & Ratcliff, 2012). Future research may consider the recency of ASA when examining alcohol use patterns and consequences.

In both models, non-sexual trauma was not associated with sex-related distress, and thus, was not associated with the sex-related self-medication model. Although previous research does find sexual difficulties following non-sexual traumatic events (Breyer et al., 2016; Seehuus, Clifton, & Rellini, 2015), the current study suggests that the sex-related distress self-medication

model may be more closely related to SV history as opposed to non-sexual trauma. As would be expected, non-sexual trauma was indirectly associated with general drinking to cope through general distress while the same indirect path starting with ASA severity was also significant. This finding lends additional support to the hypothesis that the sex-related distress and general distress self-medication models may be similar but distinct processes.

### **Limitations**

There are noteworthy study limitations. One limitation to be considered is the existence of missing data. Full information maximum likelihood was used to account for missing data and missingness was examined among primary variables in each model (Hallgren & Witkiewitz, 2013). Additionally, retention rates were similar to those found in other longitudinal studies involving drinkers (e.g., Lindgren et al., 2012). There is no reason to believe that data are missing not largely at random. Only one difference was found between those who were missing on a variable and those who were not - general distress was significantly *lower* among participants who were missing compared to those who were not on drinking to cope with sex-related distress at Time 2. Given that the group missing had lower distress and not higher, there is less concern for the potential that individuals did not complete items due to increased distress. However, it is possible that missingness, or the method to account for missingness, still influenced the models in some capacity. The relatively short time frame used in the current study could be a limitation. The current time frame was chosen, in part, because previous research supported participants' ability to retrospectively report on alcohol use and sexual behavior within similar time-periods (Simpson, Xie, Blum, & Tucker, 2011). However, it is possible that a longer or different time frame would be more appropriate to test the current hypotheses. Additionally, this study examined between person relationships. Different results may be found if variables are

examined ideographically within person. Different time frames were used to examine variables in Time 1 compared to Times 2 and 3. This was done in an attempt to keep the validated time frames when possible, but could have influenced the results given that the variables were measured differently across time points. Even though ASA at Times 2 and 3 were expected to be associated with the other variables within those time-points using regression (e.g., ASA at Time 2 and sex-related distress at Time 2), ASA at Times 2 and 3 were measured at the same time as the other variables. That is, all variables at Time 2 asked about experiences in the past six weeks. In order to account for ASA occurring during the study, regressions needed to be added as opposed to correlations, and theory would support the potential for a directional relationship (Bryan et al., 2016). However, this is not a true prospective analysis. Future research would ideally examine experiences prior to and after a SV.

Even though the sample size is relatively large compared to other similar studies (Grayson et al., 2005), the sample size may still have been too small to detect all existing relationships, particularly given the complexities of the models. Indeed, the simulation conducted to determine the necessary sample size modeled only a small portion of the hypothesized model. Ideally, future research would examine even larger samples when studying models of this complexity. Finally, due to study design decisions, some groups of women were excluded, including those with no recent sexual or drinking experience. This limits the generalizability of our findings but initial results are still beneficial to understanding the many women who fit our inclusion criteria.

### **Implications**

Little is known about whether increases in sex-related distress or sex-related drinking motives following SV are secondary to typical treatment targets such as general psychological

distress. The present research suggests that these targets may be distinct. It continues to be unknown whether sex-related distress or sex-related drinking motives would improve with usual treatment of general distress or general drinking motives. Limited research suggests that interventions may need to uniquely target sexual concerns (e.g., distressing and unwanted thoughts and feelings about sex) as separate from PTSD symptoms in order to see recovery of sexual concerns (O'Driscoll & Flanagan, 2015). This study provides support for the continued examination of these clinical questions.

Given the high rates of alcohol use (Humphrey & White, 2000) and SV (Koss et al., 1987) in the first years of college, research on women during this time will inform intervention and prevention efforts, which could be especially important for influencing longer term post-college drinking patterns. Evidence-based protocols such as the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, 1999; Fachini, Aliane, Martinez, & Furtado, 2012) may be enhanced by the inclusion of psychoeducation on sex-related drinking motives. Individual therapists treating SV sequelae might benefit from these findings, which might inform treatment planning and improved assessment of sex-related distress and sex-related drinking motives.

## **Conclusions**

The present study is a longitudinal simultaneous examination of both the traditional self-medication model of alcohol use following SV and a novel sex-related distress self-medication model. Broadly, findings support the existence of a unique pathway to a drinking motive to cope with sex-related distress. Findings also suggest the necessity of more longitudinal research on the self-medication model and for the examination of different outcome variables associated with the general and sex-related pathways. Also examined for the first time is the comparison of non-

sexual trauma and sexual trauma in the same model as a predictor of the self-medication model. Support was shown for both types of trauma predicting the general self-medication model but that the sex-related distress self-medication model may be more strongly associated with SV history compared to non-sexual trauma. Future research should continue to examine sex-related distress that follows SV and the various adaptive and maladaptive ways that women cope with such difficulties.

Table 1.

*Correlations, Means, Standard Deviations, and Ranges of All Variables Included in the Drinking Behavior Model*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. NST (T1)	--	.19**	.22**	.01	.12	.28**	.14**	.05	.04	.10	-.00	-.03	-.07	-.04	-.02	-.05	-.12
2. CSA (T1)	--	--	.23**	-.03	.05	.15**	.07	.04	-.00	-.03	.02	-.03	-.01	-.06	-.09	-.05	-.10
3. ASA (T1)	--	--	--	.17**	.14*	.31**	.26**	.22**	.14*	.28**	.24**	.16*	.15*	.07	.13*	.17**	.04
4. ASA (T2)	--	--	--	--	.36**	.09	.12*	.19**	.19**	.18**	.34**	.24**	.33**	.16*	.21**	.22**	.12
5. ASA (T3)	--	--	--	--	--	.15*	.12*	.15*	.13*	.05	.11	-.01	.10	.20**	.13*	.09	.15**
6. General Distress (T1)	--	--	--	--	--	--	.27**	.32**	.36**	.20**	.23**	-.09	-.16	-.08	-.06	-.02	-.09
7. Sex Distress (T1)	--	--	--	--	--	--	--	.15**	.17**	.20**	.33**	.11	.04	.05	.03	.10	.05
8. Drink Cope (T1)	--	--	--	--	--	--	--	--	.68**	.39**	.38**	.15**	.19**	.15*	.17**	.18**	.13*
9. Drink Cope (T2)	--	--	--	--	--	--	--	--	--	.34**	.49**	.15*	.19**	.14**	.15**	.21**	.11
10. Drink Sex Cope (T1)	--	--	--	--	--	--	--	--	--	--	.46**	.19**	.15*	.03	.03	.09	.03
11. Drink Sex Cope (T2)	--	--	--	--	--	--	--	--	--	--	--	.23**	.25**	.13	.13*	.22**	.13*
12. Pre-Sex Ratio (T1)	--	--	--	--	--	--	--	--	--	--	--	--	.55**	.42**	.48**	.43**	.34**
13. Pre-Sex Ratio (T2)	--	--	--	--	--	--	--	--	--	--	--	--	--	.50**	.46**	.52**	.46**
14. Pre-Sex Ratio (T3)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.43**	.49**	.58**

15. Weekly Drinks (T1)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.78**	.60**
16. Weekly Drinks (T2)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.65**
17. Weekly Drinks (T3)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Range	0-14	0/1	0-63	0/1	0/1	0-54	0-4	1-4	1-4	1-4	1-4	0-1	0-1	0-1	--	--	--	--	
Mean	1.16	--	11.21	--	--	11.31	.46	2.10	2.01	1.16	1.24	.30	.29	.24	6.78	6.51	5.25		
SD	1.26	--	14.08	--	--	9.76	.49	.93	.97	.50	.61	.35	.36	.34	7.41	7.86	6.87		
# Yes	232	52	235	52	58														
% Yes	62.5	14.2	63.0	17.8	21.2														
N	371	366	373	292	273	366	370	372	290	372	290	318	227	201	366	294	267	Not	

*e: \**

$p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ . NST = Non-sexual trauma; CSA = Childhood sexual abuse; ASA = Adult sexual assault.

Table 2.

*Correlation between variables within time points for the drinking behavior model.*

<b>Correlated Variables</b>	<b><i>r</i></b>
<b>Time 1</b>	
ASA Severity X Non-Sexual Trauma	.21***
General Distress X Sex-Related Distress	.21***
General Distress X Drink to Cope	.28***
General Distress X Pre-Sex Drinking	.05
General Distress X Sex-Related Drink to Cope	.13*
General Distress X Typical Drinking	-.10*
Sex-Related Drink to Cope X Pre-Sex Drinking	.02
Sex-Related Drink to Cope X Drink to Cope	.35***
Drink to Cope X Pre-Sex Drinking	.06
Drink to Cope X Typical Drinking	.14**
Sex-Related Drink to Cope X Sex-Related Distress	.11^
Typical Drinking X Pre-Sex Drinking	.02
Typical Drinking X Sex-Related Distress	-.00
Typical Drinking X Sex-Related Drink to Cope	.00
Sex-Related Distress X Drink to Cope	.09
Sex-Related Distress X Pre-Sex Drinking	.22*
<b>Time 2</b>	

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Drink to Cope X Sex-Related Drink to Cope	.31*
Typical Drinking X Pre-Sex Drinking	-.02
Typical Drinking X Drink to Cope	.16*
Sex-Related Drink to Cope X Pre-Sex Drinking	.02
Typical Drinking X Sex-Related Drink to Cope	.12
Drink to Cope X Pre-Sex Drinking	.11

**Time 3**

*Note:* \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*

Typical Drinking X Pre-Sex Drinking	.01
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$p < .001$ . ASA = Adult sexual assault.

Table 3.

*Correlations, Means, Standard Deviations, and Ranges of All Variables Included in the Consequences Model*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. NST (T1)	--	.19**	.22**	.01	.12	.28**	.14**	.05	.04	.10	-.00	.13*	.10	.15*	.18**	.03	.06
2. CSA (T1)	--	--	.23**	-.03	.05	.15**	.07	.04	-.00	-.03	.02	.12*	.03	.08	.04	-.04	.02
3. ASA (T1)	--	--	--	.17**	.14*	.31**	.26**	.22**	.14*	.28**	.24**	.33**	.24**	.19**	.35**	.14*	.03
4. ASA (T2)	--	--	--	--	.36**	.09	.12*	.19**	.19**	.18**	.34**	.22**	.44**	.17*	.16**	.33**	.21**
5. ASA (T3)	--	--	--	--	--	.15*	.12*	.15*	.13*	.05	.11	.14*	.25**	.30**	.15*	.05	.20**
6. General Distress (T1)	--	--	--	--	--	--	.27**	.32**	.36**	.20**	.23**	.31**	.26**	.27**	.21**	.15*	.13*
7. Sex Distress (T1)	--	--	--	--	--	--	--	.15**	.17**	.20**	.33**	.41**	.30**	.21**	.17**	.08	.07
8. Drink Cope (T1)	--	--	--	--	--	--	--	--	.68**	.39**	.38**	.26**	.31**	.14*	.38**	.20**	.28**
9. Drink Cope (T2)	--	--	--	--	--	--	--	--	--	.34**	.49**	.30**	.45**	.25**	.34**	.43**	.29**
10. Drink Sex Cope (T1)	--	--	--	--	--	--	--	--	--	--	.46**	.29**	.25**	.18**	.29**	.21**	.13*
11. Drink Sex Cope (T2)	--	--	--	--	--	--	--	--	--	--	--	.36**	.57**	.24**	.24**	.48**	.32**
12. Sex Consequ (T1)	--	--	--	--	--	--	--	--	--	--	--	--	.55**	.46**	.29**	.20**	.17*
13. Sex Consequ (T2)	--	--	--	--	--	--	--	--	--	--	--	--	--	.50**	.34**	.46**	.28*
14. Sex Consequ (T3)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.07	.16*	.27**

15. Drink Consequ (T1)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.50**	.42**
16. Drink Consequ (T2)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.46**
17. Drink Consequ (T3)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Range	0-14	0/1	0-63	0/1	0/1	0-54	0-4	1-4	1-4	1-4	1-4	0-33	0-33	0-33	0-69	0-69	0-69
Mean	1.16	--	11.21	--	--	11.31	.46	2.10	2.01	1.16	1.24	.40	.33	.25	8.17	3.83	2.42
SD	1.26	--	14.08	--	--	9.76	.49	.93	.97	.50	.61	.47	.49	.37	9.03	6.90	5.15
No/Yes	13/366		52/314		58/314												
N	371	366	373	292	273	366	370	372	290	372	290	349	255	225	372	289	262

*Note:* \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ . NST = Non-sexual trauma; CSA = Childhood sexual abuse; ASA = Adult sexual assault.

Table 4.

*Correlation between variables within time points for the consequences model.*

<b>Correlated Variables</b>	<b><i>r</i></b>
<b>Time 1</b>	
ASA Severity X Non-Sexual Trauma	.19**
General Distress X Sex-Related Distress	.20***
General Distress X Drink to Cope	.28***
General Distress X Sex Consequences	.06
General Distress X Sex-Related Drink to Cope	.12*
General Distress X Drinking Consequences	.11
Sex-Related Drink to Cope X Sex Consequences	-.01
Sex-Related Drink to Cope X Drink to Cope	.36***
Drink to Cope X Sex Consequences	.01
Drink to Cope X Drinking Consequences	.22*
Sex-Related Drink to Cope X Sex-Related Distress	.12*
Drinking Consequences X Sex Consequences	.32**
Drinking Consequences X Sex-Related Distress	.12
Drinking Consequences X Sex-Related Drink to Cope	.11
Sex-Related Distress X Drink to Cope	.09
Sex-Related Distress X Sex Consequences	.26**

**Time 2**

Drink to Cope X Sex-Related Drink to Cope	.35
Drinking Consequences X Sex Consequences	.68***
Drinking Consequences X Drink to Cope	.35*
Sex-Related Drink to Cope X Sex Consequences	.15
Drinking Consequences X Sex-Related Drink to Cope	.26
Drink to Cope X Sex Consequences	.27

**Time 3**

Drinking Consequences X Sex Consequences	.64***
--	--------

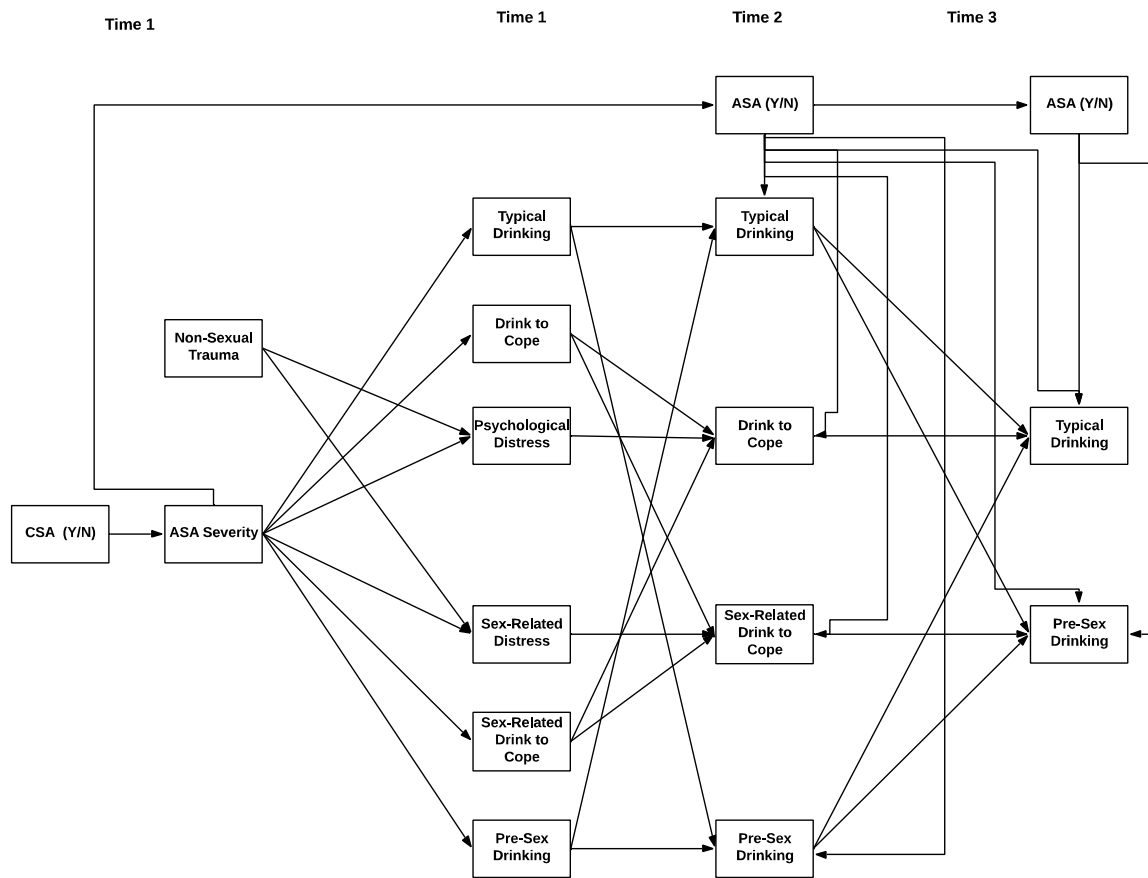
---

*Note:* \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ . ASA = Adult sexual assault.

Figure 1.

*Conceptual path model predicting typical drinking behavior and pre-sex drinking.*

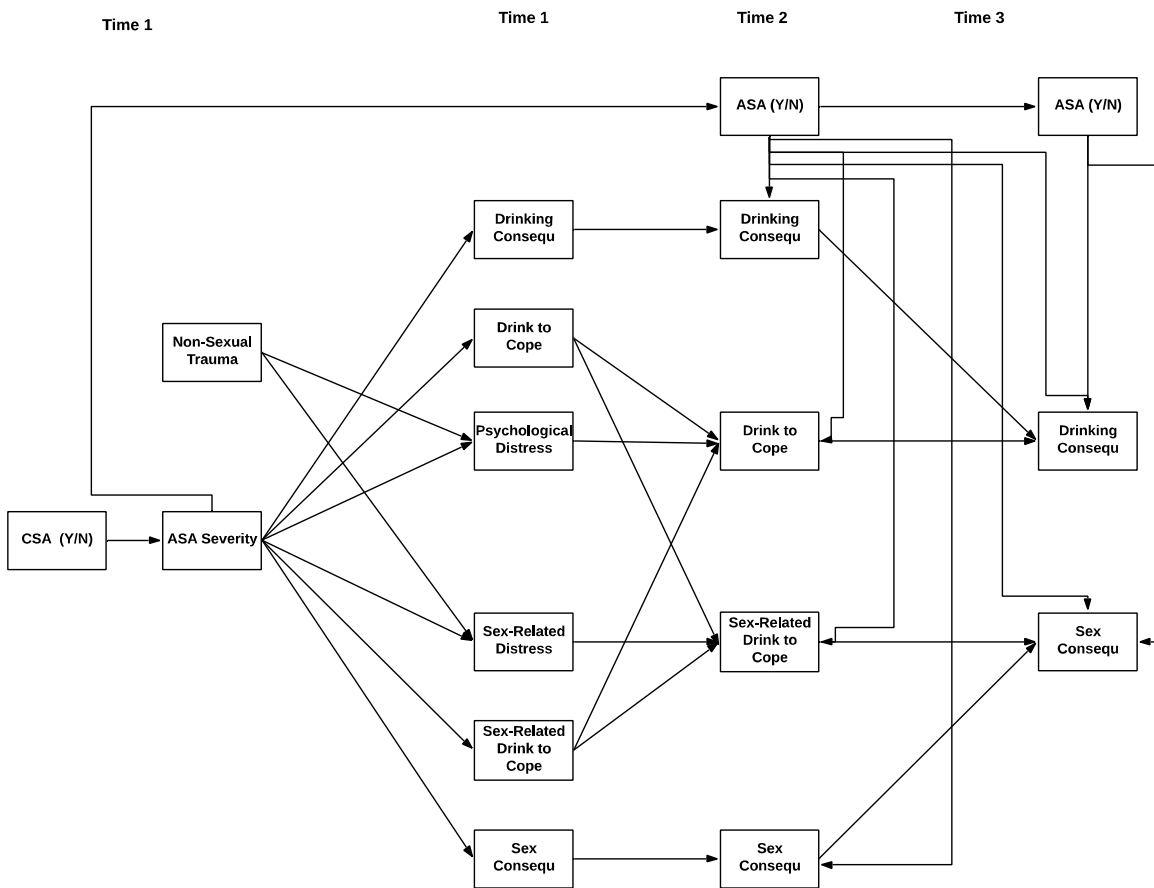
*Shows all examined regression paths.*



*Note:* CSA = Childhood sexual abuse; ASA = Adult sexual assault.

Figure 2.

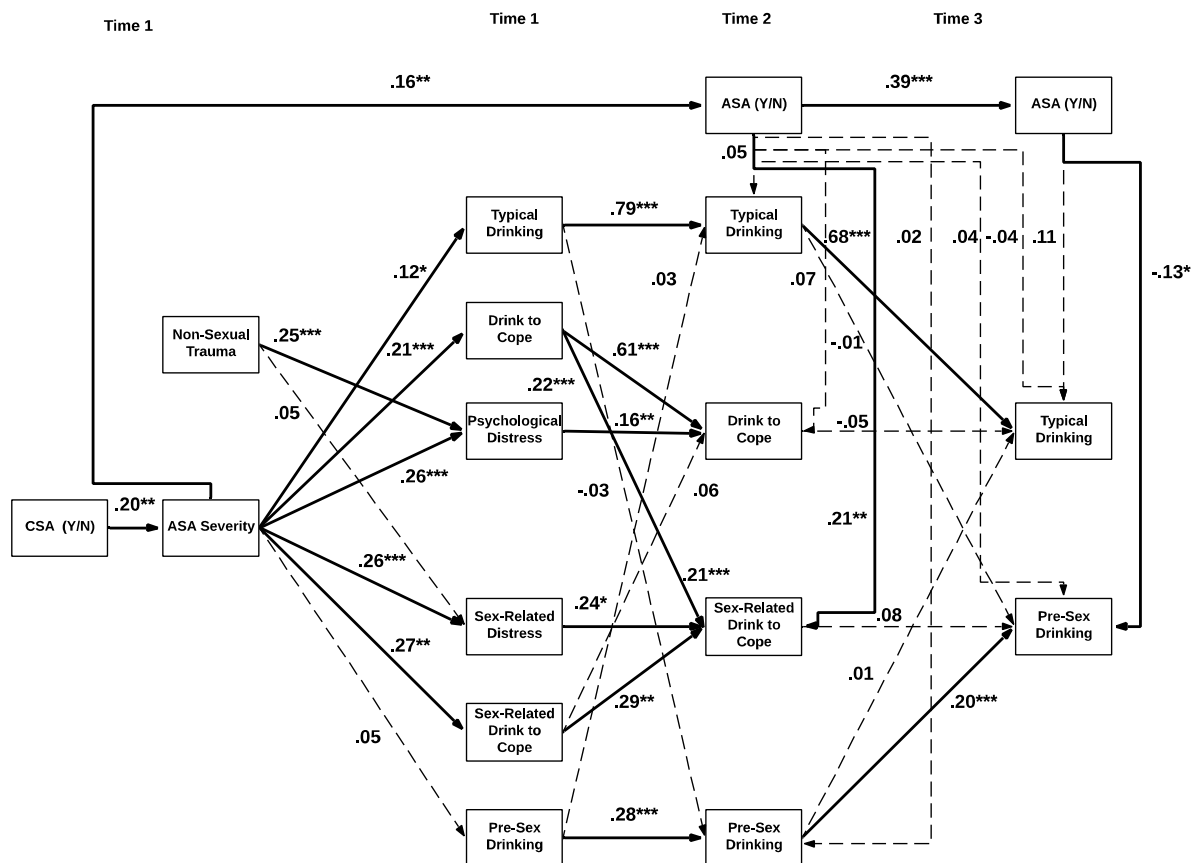
Conceptual path model predicting drinking and sex consequences. Shows all examined regression paths.



Note: CSA = Childhood sexual abuse; ASA = Adult sexual assault.

Figure 3.

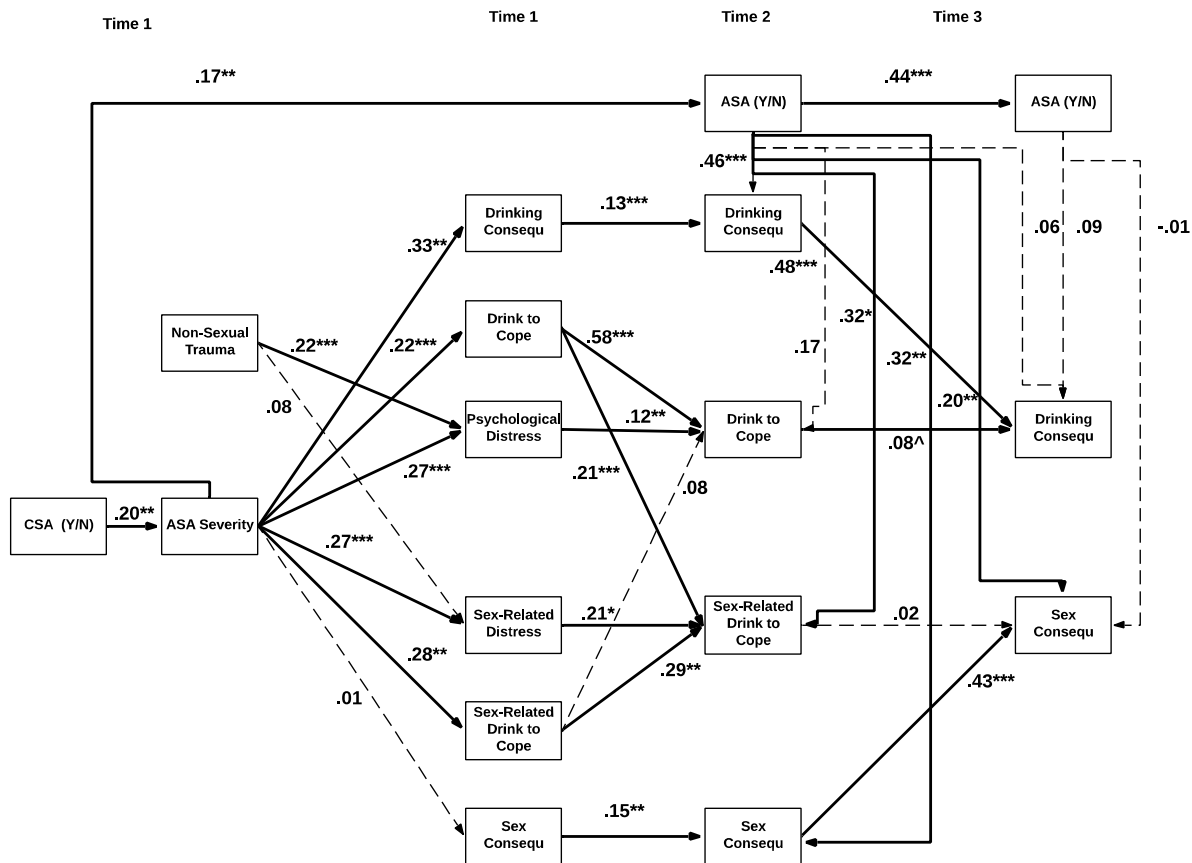
Final path model predicting typical drinking behavior and pre-sex drinking. Shows all examined regression paths.



Note: \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ . CSA = Childhood sexual abuse; ASA = Adult sexual assault.

Figure 4.

Final path model predicting drinking consequences and sex consequences. Shows all examined regression paths.



Note: \*  $p < .05$ ; \*\*  $p < .01$ , \*\*\*  $p < .001$ , ^  $p = .05$ . Note: CSA = Childhood sexual abuse; ASA = Adult sexual assault.

## Footnotes

<sup>1</sup>All items included in the Traumatic Sexualization Survey – Fear/Avoidance subscale: I avoid being sexually intimate, I avoid sexual activity, I avoid physical contact, I am afraid of sex, I prefer nonsexual relationships over sexual relationships, I do not want to be physical with other people, When I start to become acquainted with someone, I hope the relationship doesn't become sexual, I am uncomfortable being sexual, I try hard to avoid physical relationships, I strongly dislike sexual contact, I am afraid of acting sexual, I would rather not have physical relationships, I am disgusted by sex, I think sex is dirty, I enjoy nonphysical relationships more than physical relationships, My relationships with people I date do not involve sexual activity.

### **III. Longitudinal versus Event-Specific Test of the Sex-Related Distress Self-Medication Drinking Model**

The previous paper examined the sex-related self-medication model in parallel with the general self-medication model using a longitudinal methodology in first and second year sexually active drinking college women. The sex-related model was supported overall as a unique process that is associated with severity of ASA history independent of the general drinking to cope model. However, key hypotheses were not supported. Namely, the only outcome that was associated with one of the drinking to cope motives (general or sex-related) was drinking consequences, which was associated with the general drinking to cope motive. This robust model both supports and contradicts prior research on the general self-medication model, calling for continued basic research on this much-studied model of alcohol use. Given that the sex-related self-medication model was not subsumed within the general self-medication model, future research should continue to examine this process. The next paper is a continuation of the examination of the sex-related self-medication model at a different level of analysis: a specific event. The sample was drawn from the same study and analyses utilize data from the baseline assessment only, whereas the first paper utilized data from all three time-points. Participants reported on their most recent pre-sex drinking experience within the past six weeks and if they did not engage in pre-sex drinking, they reported on their most recent sexual experience. If we are to understand the sex-related self-medication model, it is important that we study the proximal relationships between variables within a specific event and study which distal factors play a role, given that this is where the behavior is occurring. Relationships between variables may be different in the event-specific compared to the longitudinal analysis given that the time

frame between variables is substantially different and associations that occur at one level may or may not be seen at the other.

#### **IV. Examination of an Event-Specific Sex-Related Distress Self-Medication Drinking**

##### **Model: Associations with Sexual Victimization History**

### Abstract

Rates of adult sexual assault (ASA) on college campuses perpetrated against women remain high. Many of these women experience negative emotions surrounding sexual activity, or sex-related distress, related to their ASA experiences. Research on how they navigate sexual activity and cope with this distress is sorely needed to prevent and intervene on risky behaviors. Some of these women drink to cope with sex-related distress and this may lead to increased pre-sex drinking and more negative sexual consequences. No research has examined this sex-related distress self-medication model of alcohol use at the event-specific level, which would provide information on how behavior may unfold within a day. The current study asked first and second year college women ( $n = 300$ ) about their most recent pre-sex drinking experience within the past six weeks or sexual experience if they did not engage in pre-sex drinking. Type of relationship to sexual partner was included as a covariate in all analyses. Results suggested that ASA severity and trait sex-related distress are likely risk factors for engaging in sex-related distress self-medication at the event-specific level. Furthermore, among those who engaged in pre-sex drinking, event-specific sex-related distress was indirectly associated with negative sexual consequences through the sex-related drinking to cope motive. Event-specific sex-related distress was not associated with number of pre-sex drinks or level of subjective intoxication during sexual activity. This study provides support for the sex-related distress self-medication model at the event-specific level and suggests the importance of negative sexual consequences as an outcome associated with the sex-related drinking to cope motive as opposed to increased drinking behavior per se. Future research can gather a larger behavioral sample and investigate in more detail for whom and in which circumstances sex-related distress, the sex-related drinking to cope motive, and negative sexual consequences occur.

## **Sexual Victimization Prevalence**

About 18% of adult women experience rape (Tjaden & Thoennes, 2006) and estimates of adult sexual assault (ASA) suggest that as many as 75% of women have experienced some form of victimization since the age of 14 (Abbey, Parkhill, & Koss, 2005). Women of college age (ages 18-24) experience the highest rates of ASA (Koss, Gidycz, & Wisniewski, 1987); by the end of senior year, approximately 1 in 5 college women is sexually victimized (see Muehlenhard, Peterson, Humphreys, & Jozkowski, 2017, for a review). Women with a history of childhood and adult sexual victimization (SV) are at risk for increased mental health difficulties compared to women without a SV history (e.g., Hillberg, Hamilton-Giachritsis, & Dixon, 2011; Pinsky, Shepard, Bird, Gilmore, Norris, Davis, & George, 2016; Weaver, 2009). Furthermore, SV severity (e.g., experiencing more than one incidence of SV) is positively associated with worse mental health and adjustment outcomes (see Classen et al., 2005 for a review). For example, SV severity is associated with depression (e.g., Harris & Valentiner, 2002), anxiety, and post-traumatic stress disorder (e.g., Classen, 2005; Messman-Moore, Brown, & Koelsch, 2005).

## **SV and Sex-Related Distress**

Having a history of SV is also associated with sexual difficulties including problems with achieving sexual arousal (e.g., Gilmore et al., 2010; Lewis et al., 2010), relationship difficulties (Collibee & Furman, 2014; Fairweather & Kinder, 2013), and specifically sex-related distress, which is defined as distress associated with sexuality and/or sexual activity (Easton, Cooney, O'leary, Zhang, & Hua, 2011; Kelley & Gidycz, 2019; Stephenson, Hugan, & Meston, 2012; Ullman & Siegel, 1993). Furthermore, those with a more severe SV history are even more likely to experience sex-related distress (Lemieux & Byers, 2008; Siegel et al., 1990). The learning model of sexual problems (Barlow, 1986; Becker, Skinner, Abel, & Cichon, 1986) suggests that

through experiencing SV, women are conditioned to respond to assault-related reminders, such as sexual stimuli or contact, with negative emotions such as fear, shame, or guilt, which are forms of sex-related distress. As many as 38% of women who experienced a SV report sex-related distress (Ullman & Siegel, 1993). Furthermore, some women continue to experience sex-related distress within the last year when their SV occurred over a year ago (Siegel et al., 1990).

### **Sex-Related Distress Self-Medication Model of Alcohol Use**

How women with a history of SV cope with sex-related distress may include risky or maladaptive behaviors, such as alcohol use, and may lead to increased likelihood of having negative or unfulfilling sexual experiences – i.e. negative sexual consequences. Indeed, ASA severity is associated with greater endorsement of the sex-related drinking to cope motive (Bird et al., 2019). Also, having an ASA history is associated with frequent and heavy pre-sex drinking – i.e., drinking before or during sexual activity (Testa & Dermen, 1999). It is possible that women with a history of SV (especially if it is more severe) engage in a sex-related distress self-medication process through alcohol use, parallel to the well-supported self-medication model of general alcohol use (Miranda, Meyerson, Long, Marx, & Simpson, 2002). This theory posits that alcohol use is reinforced and maintained through negative reinforcement as individuals attempt to decrease negative affect through drinking. Research indicates that drinking to cope with distress is associated with increased drinking quantity (Bryan et al., 2015; Lindgren, Neighbors, Blayney, Mullins, & Kaysen, 2012) and increased negative drinking consequences (e.g., getting into fights, having a bad time, or missing school or work; Asberg et al., 2012; Grayson et al., 2005; Fossos, Kaysen, Neighbors, Lindgren, & Hove, 2011; Lindgren et al., 2012; Smith et al., 2014; Ullman et al., 2005). Thus, similarly to the general self-medication model, the sex-related

self-medication model of alcohol use may lead to increased likelihood of engaging in pre-sex drinking, number of pre-sex drinks, and negative sexual consequences.

Previous research from the same sample examined here tested the possibility of this sex-related distress self-medication model using longitudinal methodology (Bird et al., *in preparation*). Participants completed surveys at baseline (Time 1), six weeks post baseline (Time 2), and twelve weeks post baseline (Time 3). Although the full pathway from childhood sexual abuse (CSA) to ASA severity to sex-related distress to the sex-related drinking to cope motive to pre-sex drinking or negative sexual consequences was not fully supported, results did support the existence of a pathway from ASA severity to the sex-related drinking cope motive through sex-related distress. In the same model, indirect pathways were found from ASA severity to general distress (i.e. distress not necessarily associated specifically with sexual activity) to the general drinking to cope motive and from non-sexual trauma history to general distress to the general drinking to cope motive. This supports the independent contribution of this sex-related self-medication model and suggests that this coping pathway may be more closely associated with a SV history compared to a non-sexual trauma history. However, the sex-related drinking to cope motive was not associated with pre-sex drinking frequency or negative sexual consequences using this longitudinal methodology, suggesting that further research is needed to understand outcomes associated with this drinking motive and the potential that links to outcomes are mediated by sex-related distress. The general drinking to cope motive was positively associated with drinking consequences but not increased drinking quantity per se, highlighting the potential importance of negative sexual consequences in the sex-related self-medication model as well.

### **The Importance of Event-Specific Analysis**

Theory suggests that distal and proximal factors influence the drinking to cope motive (Cooper et al., 1995). Researchers have identified the importance of studying the self-medication model at multiple levels of analysis (Ehrenberg, Armeli, Howland, & Tennen, 2016). However, few studies examine variables related to the drinking to cope motive at the event-specific level, focusing more on cross-sectional, and fewer on longitudinal methodologies. Those that do study event-level or event-specific processes have found support for the self-medication model of alcohol use (e.g., Arbeau, Kuiken, & Wild, 2011; Cohn, Hagman, Moore, Mitchell, & Ehlke, 2014; Ehrenberg et al., 2016; Kaysen et al., 2014; O'Hara et al., 2014). For example, college students exhibit greater endorsement of the drink to cope motive on days they experience high negative affect (Arbeau et al., 2011). Also, college students who report higher mean levels of an episode-specific drink to cope motive consume increased alcohol on drinking days (O'Hara et al., 2014). Additionally, negative affect mediates the relationship between posttraumatic stress symptoms and same-day drinking in female rape victims (Cohn et al., 2014), which implies that women may be engaging in drinking to cope with negative emotions.

Ultimately, the self-medication model predicts drinking behavior and consequences at the event, or proximal, level. Although the sex-related distress self-medication model was not fully supported using longitudinal analyses (Bird et al., *in preparation*), the hypothesized pathway - sex-related distress → sex-related drinking to cope motive → sex-related drinking outcomes - may function more clearly at the proximal level. Longitudinal research treats distress, drinking motives, and drinking behavior as somewhat stable, trait-like constructs that change slowly over time, and does not provide any information about how these experiences unfold within a day. Furthermore, in order to understand the sex-related distress self-medication model at the event-specific level, it is important to consider background or trait variables that could influence this

coping process. The sex-related distress self-medication model may function similarly for all individuals who experience sex-related distress, but for these college students, a more severe ASA history and trait sex-related distress may be two predictors that increase the likelihood of experiencing sex-related distress and, thus, engaging in this coping model on any given day.

### **The Construct of Pre-Sex Drinking**

It is important that pre-sex drinking be measured carefully. That is, without careful assessment, the construct could be characterized either as pre-sex drinking or as sexual activity following alcohol use. For the purposes of testing the sex-related distress self-medication model, it is imperative that information be gathered that speaks to the proposal that drinking is specifically occurring prior to sexual activity, that women are drinking in anticipation of potential sexual activity. Furthermore, characterization of both drinking behavior prior to sexual activity (number of hours spent drinking and number of hours prior to sexual activity that drinking terminated) and subjective intoxication during sexual activity are also important for establishing proximity of this behavior to sexual activity within a single day.

### **Current Study**

The current study examines sex-related distress, the sex-related drinking to cope motive, and sexual outcomes that are event-specific, while also investigating the role of ASA severity and trait sex-related distress. College women, particularly as they transition into college, are at increased risk for experiencing ASA and engaging in problematic alcohol use (Gibson & Vassalotti, 2017; Muehlenhard et al., 2017). Therefore, they are the focus of the current study. Participants answered questions about the most recent day in the past six weeks they engaged in pre-sex drinking or sexual activity (if they did not engage in pre-sex drinking). The most recent event was chosen to minimize retrospective recall bias. We hypothesize that ASA severity and

trait sex-related distress will be associated with increased event-specific sex-related distress (H1). We also hypothesize that ASA severity and trait sex-related distress will positively predict likelihood of engaging in pre-sex drinking (H2) and that ASA severity will predict event-specific negative sexual consequences (H3). Among individuals who engaged in pre-sex drinking, we predict that ASA severity will positively predict number of pre-sex drinks (H4) and subjective level of intoxication during sexual activity (H5). Also among those who engaged in pre-sex drinking, we predict a mediation model supporting a sexual distress-specific self-medication pathway. Specifically, the event-specific sex-related drinking to cope motive will mediate the relationships between event-specific sex-related distress and pre-sex drinking outcomes including number of pre-sex drinks (H6a), subjective level of intoxication during sexual activity (H6b), and negative sexual consequences (H6c). Hypotheses will be tested controlling for relationship to sexual partner given that committed relationships can be protective against mental health difficulties (Vanassche, Swicegood, & Matthijs, 2013), and alcohol use (Fleming, Lee, Rhew, Ramirez, Abdallah, & Fairlie, 2018) thus potentially impacting experiences of sex-related distress, endorsement of the sex-related drinking to cope motive, and drinking behavior. In addition to descriptive analyses summarizing the study variables, information will be provided characterizing the length of time spent drinking prior to sexual activity, length of time prior to sexual activity that drinking stopped, perceived likelihood of engaging in sexual activity prior to drinking and once drinking had begun, and relationship to their sexual partner.

## **Method**

### **Participants**

Three hundred and eighty-three first and second year cisgender females from a large northwest university participated in the current study. They were eligible for the study if they 1)

identified as women and were assigned a female sex at birth, 2) were between the ages of 18 and 24, 3) had engaged in consensual oral, anal, and/or vaginal intercourse with a man at least once in the past 3 months, and 4) drank alcohol in the past three months. Women were included only if they reported engaging in sexual activity with men because women who only engage in sexual activity with women may have different sexual and alcohol use experiences compared to women who engage in sexual activity with men (Trocki & Drabble, 2008). Four participants were excluded due to not providing any data after consenting to participate. Seventy-nine participants were excluded from the current analysis due to missing variables (for example, they were excluded if they did not engage in sexual activity over the past six weeks; final  $n = 300$ ). Participants were 18.85 years old on average ( $SD = .85$ ). The majority (66%) of participants were in their first year of college, lived with roommates and friends (83%), spoke English as their first language (79%), and identified as straight/heterosexual (86%). Forty-six percent were employed and 62% had a household yearly income (including their parents if they were claimed as a dependent) of \$61,000 or more. About half of participants were White (54%). Twenty-six percent identified as Asian American/Pacific Islander, 13% were multiracial, .7% were Black/African American, .7% were American Indian/Alaska Native, 6% identified as “Other”, and 1% (3 participants) chose to not identify their race. Additionally, 10% of participants identified as Hispanic/Latina.

### **Procedure**

All study procedures were approved by the university’s IRB. Participants completed an online survey as part of a larger study. They could use any device to complete the survey but were encouraged to do so in a private location. After giving informed consent, they were provided access to the survey via email and were given approximately two weeks to complete it.

In addition to questions regarding their background (i.e. demographics and SV history), participants answered questions about the most recent day in the last six weeks they engaged in pre-sex drinking. If they endorsed no pre-sex drinking in the past six weeks, participants answered questions about the most recent day they engaged in sexual activity in the last six weeks. Participants were recruited through two methods for a study about “women’s alcohol use and sexual health”. Some were recruited through psychology courses using the university’s Psychology Subject Pool (PSS;  $n = 142$ ) and others were recruited through the university’s registrar ( $n = 158$ ). Participants were allowed two weeks to complete the survey after they gave informed consent. Participants who were recruited through the PSS were given class extra credit for completing the survey and participants who were recruited through the registrar were compensated with a \$20 Amazon.com gift card. As part of the larger study, participants completed follow-up surveys. For each survey that participants completed, they were entered into a raffle to win a \$500 Visa gift card. All participants were provided with referrals for treatment and support related to alcohol abuse, sexual victimization, and other topics.

## **Measures**

**Adult Sexual Assault (ASA).** Adult sexual assault since the age of 14 was measured using the revised Sexual Experiences Survey at Time 1 (SES-R; Koss et al., 2008). Categories of unwanted sexual behavior included sexual contact (e.g., fondling) and attempted or completed oral, vaginal, or anal penetration. Perpetrator tactics included verbal coercion, intoxication, and force. Participants indicated the number of times each sexual act occurred by each tactic on 4-point frequency scales (0 = *Never*; 3 = *Three or more times*). ASA severity was calculated by multiplying a severity rank that represented a cross between the tactic and outcome (0 = No ASA, 1 = Sexual contact by verbal coercion, 2 = Sexual contact by intoxication, 3 = Sexual

contact by force, 4 = Attempted or completed rape by verbal coercion, 5 = Attempted or completed rape by intoxication, 6 = Attempted or completed rape by physical force) by the frequency with which each combination occurred (Davis et al., 2014) and then summing those products. This resulted in a possible range of ASA severity from 0 to 63.

**Trait Sex-Related Distress.** Sex-related distress was measured using the Fear/Avoidance subscale of the Traumatic Sexualization Survey (Matorin & Lynn, 1998). Participants were asked to “Please indicate how often each item is true for you.” The subscale consists of sixteen items (e.g., “I avoid sexual activity”, “I am disgusted by sex”, and “I am uncomfortable being sexual”). Response options range from 0 = *Never* to 4 = *Almost Always* and a total score was created by averaging the items ( $\alpha = .90$ ).

**Event-Specific Sex-Related Distress.** Event-specific sex-related distress was measured using a modified version of the Fear/Avoidance subscale of the Traumatic Sexualization Survey (Matorin & Lynn, 1998) for all participants. The subscale typically consists of sixteen items, but eleven were included in this measure. Five were not included given the inappropriateness of use at the event-specific (e.g., My relationships with people I date do not involve sexual activity). Items were edited from the original version to be in the past tense (e.g., “I *was* disgusted by sex” and “I *was* uncomfortable being sexual”). Response options range from 1 = *Agree* to 5 = *Disagree* and a total score was created by averaging the items with a potential range of 1 to 5 ( $\alpha = .97$ ).

**Event-Specific Negative Sexual Consequences.** Negative sexual consequences were measured using eleven items gathered from multiple sources. Participants completed questions about positive sexual consequences as well, but they are not included in the current study. Most items were modified versions of items used by Vasilenko, Lefkowitz, and Maggs (2012; e.g., “I

worried about getting pregnant”, “I felt guilty”, “I experienced pain or discomfort in my vagina from penetration (of a penis, fingers, or object)”, “I worried someone would judge me negatively”). Others were added based on expert input (NIAAA R01 AA016281; PI: W. H. George; e.g., “I felt in a worse mood” and “I worried it would be bad for our relationship”). Participants answered whether the consequence occurred (Yes/No) that day. Chronbach’s alpha was acceptable ( $\alpha = .73$ ). Items were summed such that scores range from 0 to 11.

**Relationship with Sexual Partner.** Participants were asked about the nature of the relationship with their sexual partner and whether they had engaged in sexual activity with them before (Yes/No). Relationship options were provided and included options such as “Hook-up” and “Exclusive sex partner”. Two categories were created. The first included those who reported that their sexual partner was a “boyfriend” or “exclusive sex partner.” A second category included all other labels, which suggested a lower level of commitment.

**Participants Who Endorsed Pre-Sex Drinking.**

***Event-Specific Sex-Related Drinking to Cope Motive.*** Participants who reported engaging in pre-sex drinking were asked about the sex-related drinking to cope motive. This was measured using items that were based on the original Drinking Motives Questionnaire (Cooper, 1994; Bird et al., 2019). Participants are asked to rate the extent to which they drank alcohol for various reasons. Four items were used and response options were 0 = *No*, 1 = *Somewhat*, 2 = *Definitely* ( $\alpha = .91$ ): “To feel less depressed about sexual activity,” “To forget your worries about sexual activity,” “To help you forget your problems related to sexual activity,” and “To feel less upset about sexual activity.” Items were averaged resulting in a potential range of 0 to 2.

***Event-Specific Pre-Sex Drinking Behavior.*** Participants who reported engaging in pre-sex drinking were asked, “How many standard drinks did you have before engaging in sexual

activity?” They were provided with information about sizes of standard drinks. A drop-down menu ranged from “0” to “25 or more” in half drink increments.

***Timing of Pre-Sex Drinking.*** Participants who reported engaging in pre-sex drinking were asked, “How much time before sexual activity did you stop drinking?” They were also asked “How many hours did you spend drinking prior to sexual activity?” A drop-down menu ranged from “half hour or less” to “24 hours” in half hour increments.

***Intoxication Before and During Sexual Activity.*** Participants who reported engaging in pre-sex drinking were asked two questions about level of subjective intoxication: “What was your highest level of intoxication before sexual activity?” and “What was your highest level of intoxication during sexual activity?” Response options ranged from 1 = *Not at all intoxicated* to 7 = *Extremely intoxicated*.

***Likelihood of Engaging in Sexual Activity.*** Participants were asked two questions about their perceived likelihood of engaging in sexual activity: “Before you started drinking, how likely did you think it was that you would engage in sexual activity later?” and “After you started drinking, how likely did you think it was that you would engage in sexual activity later?” Response options ranged from 1 = *Not at all likely* to 7 = *Extremely likely*.

### **Data Analytic Plan**

Analyses were conducted using SPSS Version 21. All continuous independent variables were standardized prior to analyses and all analyses were conducted controlling for relationship type. Hypotheses 1 and 2 were examined using two linear regression models. H3 was tested using a logistic regression model. H4 and H5 were examined using two linear regression models. H6a and H6b could not be examined using mediation analysis because the predictors were not associated with the outcomes (see results section). Models were bootstrapped with 1000

resamples for linear regression models where the residuals in the outcome were not normally distributed (Field, 2013). Finally, H6c was tested using a mediation model examined in the PROCESS Macro. The model was tested using 1,000 bootstrap resamples (Hayes, 2013). The PROCESS Macro uses bootstrapping to conduct more accurate tests with the presence of nonnormally distributed residuals in dependent variables (Hayes, 2018; Shrout & Bolger, 2002).

## Results

### Descriptive Statistics

Correlations were examined between all primary study variables (Tables 1 and 2). Means, standard deviations, and ranges are also included for all variables.

Descriptive statistics were examined for those who engaged in pre-sex drinking. Participants drank an average of 4.29 drinks ( $SD = 2.45$ ) prior to engaging in sexual activity with a range of .5 to 12. They spent an average of 2.31 hours drinking prior to sexual activity ( $SD = 1.33$ ) with a range of .5 to 7 and stopped drinking an average of 1.26 hours prior to sexual activity ( $SD = 1.27$ ) with a range of .5 to 9. Participants' average level of highest intoxication prior to sexual activity was 4.22 ( $SD = 1.60$ ) and during sexual activity was 3.66 ( $SD = 1.64$ ). Before they started drinking, participants' perceived likelihood that they would engage in sexual activity later was an average of 5.16 ( $SD = 1.88$ ) and after they started drinking was an average of 5.46 ( $SD = 1.65$ ). A post hoc paired samples t-test showed that the perceived likelihood of engaging in sexual activity after starting to drink alcohol was higher than the perceived likelihood prior to drinking,  $t(188) = -3.11, p < .01$ . Finally, participants reported a range of relationships with their sexual partners. Of the whole sample, about two thirds of the sample reported that their sexual partner was a boyfriend or exclusive sex partner ( $n = 192$ ) and about a

third ( $n = 108$ ) reported that their sexual partner was a “hook-up”, “friend with benefits”, or “fuck buddy” among other categories that indicated more casual sexual relationships.

### **Inferential Statistics**

Trait sex-related distress but not ASA severity was significantly associated with event-specific sex-related distress when both were included in the bootstrapped model (Table 3). Relationship type was not significantly associated with the outcome. When trait sex-related distress was removed, relationship type became significant but the significance of ASA severity did not change (Table 4). When relationship type was removed from the model, ASA severity was significantly associated with event-specific sex-related distress,  $B = .14$ ,  $p < .05$ , 95% CI [.03, .26]. Thus, H1 was supported, but the effect of ASA severity was no longer significant when relationship type was included. A post-hoc bootstrapped regression analysis was conducted to examine the interaction between ASA severity and relationship type on event-specific sex-related distress and the interaction was not significant,  $B = .17$ ,  $p = .16$ , 95% CI [-.07, .41]. There were no other models where the removal of relationship type changed the results.

ASA severity positively predicted likelihood of engaging in pre-sex drinking, but trait sex-related distress did not (Table 5), partially supporting H2. Regarding the association of ASA severity with the event-specific outcome variables, ASA severity was positively associated with negative sexual consequences, supporting H3 (Table 6). Among individuals who engaged in pre-sex drinking, ASA severity was not associated with number of pre-sex drinks (Table 7). Therefore, H4 was not supported. H5 was also not supported, as ASA severity was not associated with level of subjective intoxication during sexual activity (Table 8).

Mediation hypotheses were examined within those who engaged in pre-sex drinking and H6 was partially supported. Two separate linear regressions showed that event-specific sex-

related distress was not significantly associated with either number of pre-sex drinks,  $\beta = -.01$ ,  $t(180) = -.06$ , *ns*, or subjective level of intoxication during sexual activity,  $\beta = .02$ ,  $t(179) = .29$ , *ns*, so mediation analyses were not conducted. However, a linear regression showed that event-specific sex-related distress was significantly associated with number of negative sexual consequences,  $\beta = .36$ ,  $t(178) = 5.18$ ,  $p < .001$ , and a mediation analysis was conducted as planned. Mediation analysis showed that, when controlling for relationship type, the sex-related drinking to cope motive partially mediated the relationship between event-specific sex-related distress and number of negative sexual consequences (Table 9).

### **Discussion**

The current research extends support for the sex-related distress self-medication model of alcohol use, examining distal factors and proximal relationships within a specific sexual event. ASA severity and trait sex-related distress were associated with event-specific sex-related distress and ASA severity was associated with a higher likelihood of engaging in pre-sex drinking, affirming the validity of this coping process measured at an event-specific level. Relationship type was also consistently associated with event-specific behavior and experiences and the significant effect of ASA severity on event-specific sex-related distress dropped out of the model when relationship type was included. Those with less committed partners experienced higher event-specific sex-related distress. However, ASA severity and relationship type did not interact, as shown in a post-hoc examination. These findings support previous research that ASA severity is associated with sex-related distress, but also highlight the importance of considering relationship type in future research. It is possible that in certain circumstances, such as in cases of recent ASA experiences, ASA severity would be associated with sex-related distress independent of relationship type.

In line with previous research (Testa & Dermen, 1999), ASA severity was associated with a higher likelihood of engaging in pre-sex drinking over the past six weeks. However, contrary to hypotheses, participants were less likely to engage in pre-sex drinking with increased trait sex-related distress. It is possible that trait sex-related distress is associated with increased likelihood of engaging in pre-sex drinking only for certain women, which would call for moderation analyses. That is, some women may respond to sex-related distress by drinking before sex and some may respond by either decreasing pre-sex drinking or not taking it up. One tentative explanation is that women with higher sex-related distress compared to lower, who engage in pre-sex drinking, may expect to engage in sexual activity and attempt to cope ahead through drinking. Others, who do not engage in pre-sex drinking, may not expect to engage in sexual activity, and thus, do not drink ahead of time. Given that all participants did engage in sexual activity, sexually distressed women are not avoiding sexual activity all together, but are simply less likely to have engaged in pre-sex drinking. Clearly, more research is needed to understand the relationship between trait sex-related distress and pre-sex drinking.

We also examined the associations between ASA severity and the event-specific outcome variables. Interestingly, among those who engaged in pre-sex drinking, ASA severity was not associated with number of pre-sex drinks or level of subjective intoxication during sexual activity. It is possible that ASA severity is only associated with increased pre-sex drinking behavior for certain individuals, such as those who tend to engage in the sex-related drinking to cope motive, or that the two are related through a mediation process. ASA severity was associated with negative sexual consequences for all participants. Future research should examine mechanisms through which this connection exists. This association could be the result of a third variable or a mediation process, or may only exist for certain individuals.

A similar pattern emerged regarding the mediation analyses of the sex-related distress self-medication model in that among those who engaged in pre-sex drinking, negative sexual consequences emerged as the only outcome associated with sex-related distress. That is, sex-related distress was not associated with number of pre-sex drinks or subjective level of intoxication. One previous study found that sexual victimization was associated with drinking consequences through general distress but was not associated with heavy drinking (Smith et al., 2014). It is possible that the self-medication model (both general and sexual) is more closely associated with increased drinking consequences rather than the quantity of alcohol use per se. Authors posit that women, in this case, are consuming alcohol in a way that that is more likely to lead to adverse consequences (Smith et al., 2014). Future research examining this theory is warranted. Providing the most direct support for the sex-related distress self-medication model, sex-related distress was indirectly positively associated with negative sexual consequences through increases in the sex-related drinking to cope motive. This drinking motive did not fully mediate the relationship and future research should continue to examine other factors that could help explain the association between sex-related distress and negative sexual consequences. This is the first study to examine the sex-related distress self-medication model during a specific event, expanding previous research that used longitudinal methodology (Bird et al., *in preparation*), and providing support for this coping model at another level of analysis.

Although ASA severity was positively associated with event-specific sex-related distress, apart from whether it originated from ASA history/severity, sex-related distress may play a determinative role in women's tendency to endorse the sex-related drinking to cope motive. Sex-related distress can stem from a multitude of factors including body dissatisfaction (Castellini, Giovanni, Castellini, Lo Sauro, Ricca, & Rellini, 2017; Staples, Bird, Gregg, & George, *in*

*press*), medical conditions (Bakker et al., 2016), early distress related minority sexual orientation development (Shepler & Perrone-McGovern, 2016), and general emotional well-being and emotional relationship with the partner during sexual activity (Bancroft, Loftus, & Long, 2003), among others. Future research might examine the relative contribution of these types of factors along with ASA severity.

All results were found controlling for relationship type. About two thirds of the sample were in a more committed relationship with their sexual partner compared to the remaining third. In all models, relationship type was significantly associated with the outcomes (i.e. sex-related distress, negative sexual consequences, engaging in pre-sex drinking, number of pre-sex drinks, and subjective level of intoxication) such that increases were seen in those with less committed sexual partners compared to more committed. Future research should take the examination of relationship type further by actually studying differences between these groups.

Regarding the descriptive information about pre-sex drinking, the perceived likelihood that participants would engage in sexual activity prior to drinking was indeed higher after alcohol consumption began compared to before, which is consistent with previous research (Davis, Hendershot, George, Norris, & Heiman, 2007). However, the means were still quite similar (5.16 v.s. 5.46), which supports the argument that we are measuring pre-sex drinking (drinking with the anticipation of sexual activity occurring) as opposed to sex that occurs after drinking (where anticipation of sexual activity did not precede drinking). Furthermore, participants drank an average of 4.29 drinks over 2.31 hours prior to sexual activity, a level that actually constitutes heavy episodic drinking (NIAAA, 2011). Also supporting that pre-sex drinking is being measured, participants stopped drinking an average of 1.26 hours prior to sexual activity and their average subjective level of intoxication during sexual activity was 3.66 with a potential

range of 1 = *Not at all intoxicated* to 7 = *Extremely intoxicated*. These statistics suggest that we were indeed capturing pre-sex drinking as opposed to drinking that occurred separately from sexual activity.

### **Limitations**

There are important limitations to consider. Although the current study collected data about a specific day, retrospective recall was used to do so. Some past research has shown good reliability of participant recall of alcohol use and sexual behavior within similar time-frames (Simpson Xie, Blum, & Tucker, 2011), but future research should still study these relationships using daily diary or ecological momentary assessment methods in order to improve accuracy of reporting. Because ecological momentary assessment was not used, directionality of event-specific relationships also cannot be confirmed. For example, sex-related distress was asked about regarding that specific day, but the timing during the day was not specified. It is possible that sex-related distress occurred during or following sexual activity instead of prior to.

This study examined between person relationships. Different results may be found if variables are examined within person. Also, levels of sex-related distress were low (see Tables 1 and 2) in our college sample. Future research should study community and clinical samples, searching to understand who may be engaging in the sex-related drinking to cope motive and in which situations; certain groups are likely to experience greater sex-related distress than others. Finally, this study asked about the most recent day that participants engaged in pre-sex drinking or sexual activity, which only captures a small snapshot of their behavior. Studies that examine behavior over time would gather more nuanced and representative information.

### **Conclusion and Implications**

Given the high rates of drinking and intoxicated sexual activity on college campuses (Downing-Matibag & Geisinger, 2009; Lewis et al., 2011), it is imperative that we understand various motives and etiologies behind these behaviors. The current study supports the hypothesis that some college women engage in the sex-related drinking to cope motive and, in turn, experience more negative sexual consequences. This study is the first to examine the sex-related distress self-medication model at the event-specific level and it provides further support for this coping process. ASA severity and trait sex-related distress were shown to be important factors in predicting event-specific behavior and experiences and suggest that these are risk factors for engaging in the sex-related distress self-medication model. It may be important for therapists attempting to decrease clients' sexual risk behavior or risky alcohol use to assess for sex-related distress and the sex-related drinking to cope motive, particularly if clients have a history of ASA. It may be helpful for them to conduct behavioral chain analyses to understand how these experiences unfold and result in negative consequences. Awareness of these patterns is a key first step to behavior change and failure to assess could result in less effective interventions. Future research should continue to study this coping model using different levels of analysis and seek to understand the adaptive and maladaptive coping behaviors that women engage in when they experience sex-related distress, particularly following ASA.

Table 1.

*Correlations, means, standard deviations, and ranges for variables that all participants completed.*

Variable	1	2	3	4	5
1. Relationship	--	-.16**	-.19**	-.17**	-.35**
2. ASA Severity	--	--	.28**	.18**	.24**
3. Trait Sex Distress	--	--	--	.31**	.34**
4. Event Sex Distress	--	--	--	--	.35**
5. Sex Consequences	--	--	--	--	--
Range	0/1	0-63	0-4	1-5	0-11
Mean	--	11.35	.41	1.33	1.66
SD	--	14.18	.44	.79	2.03
Committed/Not	192/108				
N	300	300	300	300	297

*Note:* \*  $p < .05$ , \*\*  $p < .01$ . Relationship = type of relationship with sexual partner.

Table 2.

*Correlations, means, standard deviations, and ranges for variables that were completed by those who engaged in pre-sex drinking.*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Relationship	--	-.05	-.15*	-.16*	-.35**	-.30**	-.21**	-.21**	-.08	.27**	.15*	.06	-.08
2. ASA Severity	--	--	.26**	.12	.23**	.03	.06	.05	.32**	-.02	-.10	-.10	.04
3. Trait Sex Distress	--	--	--	.33**	.38**	-.01	.01	.03	.32**	-.26**	-.24**	-.12	-.11
4. Event Sex Distress	--	--	--	--	.36**	-.01	.02	-.05	.18*	-.23**	-.21**	-.09	-.17*
5. Sex Consequences	--	--	--	--	--	.16*	.16*	.08	.34**	-.26**	-.17*	-.01	.01
6. Pre-Sex Drinks	--	--	--	--	--	--	.64**	.69**	.02	-.02	.05	-.08	.47**
7. Intox During Sex	--	--	--	--	--	--	--	.84**	.16*	.00	.08	-.23**	.26**
8. Intox Before Sex	--	--	--	--	--	--	--	--	.07	-.00	.04	-.16*	.34**
9. Drink Sex Cope	--	--	--	--	--	--	--	--	--	-.06	-.02	.14	-.07
10. Sex Likelihood Before	--	--	--	--	--	--	--	--	--	--	.73**	-.17*	.04
11. Sex Likelihood After	--	--	--	--	--	--	--	--	--	--	--	-.20**	.04
12. Time Stop Drinking	--	--	--	--	--	--	--	--	--	--	--	--	.13
13. Hours Drank Pre Sex	--	--	--	--	--	--	--	--	--	--	--	--	--
Range	0/1	0-63	0-4	1-5	0-11	0-25+	1-7	1-7	0-2	1-7	1-7	.5-24	.5-24
Mean	.54	14.05	.40	1.37	1.71	4.29	3.66	4.22	.12	5.16	5.46	1.26	2.31

SD	.50	15.61	.39	.83	2.07	2.45	1.64	1.60	.37	1.88	1.65	1.27	1.33
N	185	190	189	182	184	190	189	190	186	189	189	190	190

*Note:* \*  $p < .05$ , \*\*  $p < .01$ . Relationship = type of relationship with sexual partner, Intox During Sex = subjective level of intoxication during sexual activity, Intox Before Sex = subjective level of intoxication before sexual activity Drink Sex Cope = drinking motives to cope with sex-related distress, Sex Likelihood Before = subjective likelihood that participant would engage in sexual activity before they started drinking, Sex Likelihood After = subjective likelihood that participant would engage in sexual activity after they started drinking, Time Stop Drinking = number of hours prior to sexual activity participants stopped drinking, Hours Drank Pre Sex = number of hours participants drank alcohol prior to engaging in sexual activity.

Table 3.

*Linear Regression of ASA Severity and Trait Sex-Related Distress Predicting Event-Specific Sex-Related Distress Controlling for Relationship Type*

Independent Variable	<i>B</i>	<i>df</i>	$r^2$	95% <i>CI</i>
ASA Severity	.07	296	.12	-.05, .17
Trait Sex-Related Distress	.23**		.12	.36
Relationship Type	-.17			-.39, .02

*Note.* Model is bootstrapped using 1000 resamples. Relationship type is scored such that 0 = Not committed and 1 = Committed; \* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .

Table 4.

*Linear Regression of ASA Severity Predicting Event-Specific Sex-Related Distress Controlling for Relationship Type*

Independent Variable	<i>B</i>	<i>df</i>	<i>r</i> <sup>2</sup>	95% <i>CI</i>
ASA Severity	.12	297	.04	-.01, .25
Relationship Type	-.23*			-.44, -.01

*Note.* Model is bootstrapped using 1000 resamples. Relationship type is scored such that 0 = Not committed and 1 = Committed; \* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$ . See results section for statistics on model including ASA severity only.

Table 5.

*Logistic Regression of ASA Severity and Trait Sex-Related Distress as Predictors of Likelihood of Engaging in Pre-Sex Drinking Controlling for Relationship Type*

Independent Variable	<i>B</i>	<i>SE</i>	OR; (95% CI)
ASA Severity	.67***	.16	1.95; (1.43, 2.66)
Trait Sex-Related Distress	-.34*	.15	.72; (.53, .96)
Relationship Type	-1.26***	.30	.28; (.16, .50)

*Note.* Relationship type is scored such that 0 = Not committed and 1 = Committed; \* =  $p < .05$ ;

\*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .

Table 6.

*Linear Regression of ASA Severity Predicting Event-Specific Negative Sexual Consequences**Controlling for Relationship Type*

Independent Variable	$\beta$	<i>B</i>	<i>t</i>	<i>df</i>	$r^2$	95% <i>CI</i>
ASA Severity	.18**	.37	3.39	294	.16	.16, .59
Relationship Type	-.32***	-1.36	-5.94			-1.81, -.91

*Note.* Relationship type is scored such that 0 = Not committed and 1 = Committed; \* =  $p < .05$ ;

\*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .

Table 7.

*Linear Regression of ASA Severity Predicting Number of Pre-Sex Drinks Controlling for*

*Relationship Type*

Independent Variable	$\beta$	$B$	$t$	$df$	$r^2$	95% CI
ASA Severity	.02	.05	.32	182	.09	-.26, .36
Relationship Type	-.30***	-1.46	-4.19			-2.14, -.77

*Note.* Relationship type is scored such that 0 = Not committed and 1 = Committed; \* =  $p < .05$ ;

\*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .

Table 8.

*Linear Regression of ASA Severity Predicting Subjective Level of Intoxication During Sexual Activity Controlling for Relationship Type*

Independent Variable	$\beta$	<i>B</i>	<i>t</i>	<i>df</i>	$r^2$	95% <i>CI</i>
ASA Severity	.04	.06	.57	181	.05	-.15, .27
Relationship Type	-.21**	-.69	-2.92			-1.15, -.22

*Note.* Relationship type is scored such that 0 = Not committed and 1 = Committed; \* =  $p < .05$ ;

\*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .

Table 9.

*Indirect and Direct Effects for Event-Specific Sex-Related Distress and Negative Sexual Consequences Through the Sex-Related Drinking to Cope Motive*

	Path	Coefficient	95% CI	SE	r <sup>2</sup>
<b>Antecedent:</b>					
<b>Consequent: M</b>					
X(Event-Specific Sex-Related Distress)	a	.19*	.04, .33	.08	.04
Covariates					
Relationship Type		-.11	-.42, .20	.16	
<b>Antecedent:</b>					
<b>Consequent: Y</b>					
X(Event-Specific Sex-Related Distress)	c'	.54***	.29, .80	.14	.30
M(Sex-Related Drinking to Cope Motive)	b	.55**	.29, .81	.13	
Covariates					
Relationship Type		-1.23***	-1.77, -.70	.27	
Indirect Effect	ab	.10	.01, .37	.09	
Total Effect	abc	.65***	.38, .91	.14	

*Note.* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ ; Coefficients are standardized. The c' path denotes the direct effect of X on Y. The ab path denotes the indirect effect of X on Y. The indirect effect is significant if the coefficient is within the CI.

## V. General discussion

This dissertation comprised two papers investigating the existence and features of a unique sex-related distress self-medication model of alcohol use, with a focus on SV history. Multiple levels of assessment were used to examine how first and second year college women cope with sex-related distress and to understand the resulting consequences.

The first study used a longitudinal methodology where data were collected over a three-month period. Evidence suggested that a pathway from ASA severity to sex-related distress to the sex-related drinking to cope motive exists in the same model as a more typically studied pathway from ASA severity to general distress to the general drinking to cope motive. Furthermore, increased experience of potentially traumatic non-sexual events was not associated with this sex-related self-medication coping model, but was associated with the typical self-medication pathway. As has been discussed in previous research (e.g., Bird et al., 2018), some sexual problems may be worse following sexual trauma compared to non-sexual trauma (e.g., combat). Additional research is needed to understand the consequences associated with the sex-related drinking to cope motive given that associations were not found for pre-sex drinking or negative sexual consequences. Different types of measurement, additional outcomes, varied samples, and the inclusion of moderators could all help elucidate the longitudinal sex-related self-medication model more fully.

The second study was an event-specific analysis of the sex-related self-medication model of alcohol use. The general self-medication model is often discussed as both a process that develops over time and as a set of behaviors that unfolds within a specific event. As we seek to confirm the existence of and understand a sex-specific version of this model, it is important that researchers use multiple levels of analysis. The questions that can be answered using longitudinal

and event-level methodologies are different, and differences in findings can help us understand the self-medication processes. Results in this paper did find that event-specific sex-related distress was associated with event-specific negative sexual consequences indirectly through the event-specific sex-related drinking to cope motive. Here, the drinking motive is linked to a negative outcome, whereas the longitudinal methodology did not show such an association. A more immediate relationship may exist between the sex-related drinking to cope motive and negative sexual consequences as opposed to their development over time. Similarly to the longitudinal analysis, event-specific sex-related distress was not associated with number of pre-sex drinks. However, trait sex-related distress was negatively associated with likelihood of having engaged in pre-sex drinking. These findings highlight the nuance of alcohol research, or perhaps, of research in general. Future research should continue to examine which outcomes may be pertinent for whom.

For the general self-medical model as well, additional longitudinal research is needed to understand how the habit of using alcohol to cope develops over time. Most research has either focused on the event-level (e.g., Kaysen et al., 2014) or used cross-sectional methods with an attempt to still make predictive claims (e.g., Asberg et al., 2012). The relationship between drinking motives and drinking outcomes may be artificially inflated due to retrospective recall and the confound of time. Although much research has focused on the self-medication model, more robust data collection methods are needed to truly understand the development of this coping process as it relates to general and sex-related alcohol use.

The event-specific analysis also showed the association between ASA severity and multiple event-specific variables, including sex-related distress. Although women without an ASA history (or with a less severe history) may engage in sex-related self-medication alcohol

use if they experience sex-related distress, the severity of a woman's ASA history remains an important risk factor for sexual problems and maladaptive coping at longitudinal and event-specific levels. Future research could be more specific in its examination of who is at risk for developing these coping habits, such as those with pre-existing sex-related distress prior to ASA, and how behavioral repertoires established prior to ASA influence behavior after. Trait sex-related distress was associated with event-specific sex-related distress, which was associated with endorsing the sex-related drinking to cope motive for those who drank prior to sex. This is interesting given that trait-sex related distress was associated with a decreased likelihood of engaging in pre-sex drinking for the entire sample. It seems that, overall, although women with increased trait sex-related distress may be less likely to engage in pre-sex drinking, when they do, they may do so with the sex-related drinking to cope motive.

The longitudinal models examined are a robust investigation of the general and sex-related self-medication models. Inclusion of ASA experienced during the study, variables measured at previous time-points, and the inclusion of both sexual and non-sexual trauma history improve upon previous research. The event-specific examination of the sex-related self-medication model is a more preliminary analysis with a somewhat limited methodology compared to daily diary or ecological momentary assessment. It will be important that future research studies the sex-specific self-medication model using more vigorous event-level data collection methods.

Sex-related distress, especially associated with ASA, would benefit from increased research attention given that sexual wellbeing is one factor that predicts life satisfaction over time (Stephenson & Meston, 2015). This dissertation suggests that college women's drinking can be motivated by a desire to decrease discomfort related to sexuality, over and above the general

drinking to cope motive. Focusing only on this general drinking motive and ignoring the sex-related motive may lead to inadequate prevention and intervention efforts related to alcohol use behavior and negative consequences. Furthermore, college can be an important time for sexual development (Anders & Olmstead, 2019) and open discussion of sexuality is still often considered taboo in the United States, particularly regarding women's sexual pleasure (Blunt-Vinti, Stokowski, & Bouza, 2018). A failure to acknowledge the reasons that women drink related to sexuality and the learning experiences that lead them to those behavioral patterns (e.g., ASA history) would be a missed opportunity to progress the sexual wellbeing of young women.

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