



Full length article

## Sex-related substance use and the externalizing spectrum



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### ABSTRACT

**Background:** Substance use before and during sexual activity is associated with many negative health outcomes. Estimates suggest that at least 4.3 million American adults annually engage in *regular sex-related alcohol consumption*, indicating that the intersection of substance use and sexual behavior is of public health concern. However, it is likely that when considering broader *sex-related substance use*, estimates would be notably higher. While substance use disorders and antisocial personality disorder have been associated with sex-related alcohol consumption, no study has investigated how regular sex-related substance use is associated with the broader transdiagnostic externalizing spectrum. Further, no studies have assessed whether or not sexual risk-taking behaviors can be integrated into the externalizing spectrum.

**Methods:** In a large internet sample ( $N=936$ ), we used confirmatory factor analysis, item response theory, and logistic regression to link sex-related alcohol and drug use to an externalizing latent variable; identified psychometric characteristics of these behaviors; and determined the extent to which one's externalizing level was associated with changes in odds of regular sex-related substance use. We then replicated these findings in a nationally representative sample ( $N=34,653$ ).

**Results:** Results highlighted the close association between sex-related substance use and externalizing, with externalizing increases being associated with significantly increased odds of regular sex-related substance use.

**Conclusions:** These findings bear notable implications for conceptualization and treatment of sex-related substance use. Transdiagnostic intervention can be an efficient means of addressing this problematic behavior as well as other comorbid presentations. Results expand the current conceptualization of the externalizing spectrum.

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### 1. Introduction

Approximately 4.3 million American adults regularly drink alcohol prior to sex (Eaton et al., 2015a). While no similar national studies of regular sex-related drug use exist, smaller studies indicate that many individuals use substances other than alcohol for sex-related purposes (Calsyn et al., 2010a; Colfax et al., 2004; Hirshfield et al., 2004).

Although a wealth of research has been conducted on the negative associations of *general* substance use, less focus has been paid to *sex-related* substance use specifically—which is associated with risk for negative health outcomes. Pre-sex alcohol use is associated with increased engagement in unprotected sex (Caldeira et al., 2009; Colfax et al., 2004); decreased intention to use, and decreased consistency of using, protection during sex (Rehm et al., 2012; Zablotska et al., 2006); reduced effectiveness of safer sex practices (Fisher et al., 2010); and increases in general number of sexual partners and incidence of casual sex (Caldeira et al., 2009; Cooper, 2002). Similar associations have been reported for sex-related drug use (Caldeira et al., 2009; Hirshfield et al., 2004; Leigh et al., 2008). Given these associations with unsafe sexual behaviors, sex-related substance use is associated with increased risk of sexually

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transmitted infection, including HIV (Kim et al., 2013; Koblin et al., 2006; Stall et al., 1986; Zablotska et al., 2006).

While no studies to our knowledge have examined individual differences variables in relation to sex-related alcohol or drug use per se, previous studies have demonstrated that personality traits such as disinhibition, sensation seeking, and impulsivity; general substance use; and other risky sexual behaviors are positively interrelated (e.g., Caspi et al., 1997; Cooper et al., 2000; Cooper, 2002; Donahew et al., 2000; Hendershot et al., 2007; Justus et al., 2000). Hoyle et al. (2000) found the variables sensation seeking, impulsivity—and to a lesser extent hostility/aggression—positively associated with various risky sexual practices. Similarly, other empirical evidence has found these personality constructs are positively associated with problematic substance use (e.g., Verdejo-Garcia et al., 2008). Not only do personality variables appear to explain the associations between substance use and risky sexual behaviors (Kalichman et al., 1996; Justus et al., 2000), but they also prospectively predict them (e.g., Caspi et al., 1997). Thus, individual differences variables appear to be important foci for investigation in attempts to account for the observed link between substance use and risky sexual behavior. Considering the significant number of American adults who engage in regular sex-related substance use, understanding these behaviors becomes a matter of notable public health importance

### 1.1. The externalizing spectrum and sex-related substance use

A key individual-differences construct that may underlie sex-related substance use is the externalizing spectrum, which has been linked to disinhibition-related personality traits like sensation seeking, impulsivity and aggression (Krueger et al., 2001, 2002, 2007). The externalizing spectrum accounts for comorbidity among substance use disorders and impulsivity- and antisociality-related disorders, like antisocial personality disorder (ASPD), oppositional defiant disorder, and attention-deficit/hyperactivity disorder (Carragher et al., 2015; Eaton et al., 2015a,b,c; Krueger and Eaton, 2015; Krueger and Markon, 2006).

Several externalizing disorders have been previously associated with regularly drinking alcohol before sex (Eaton et al., 2015a; Thompson et al., 2014). Though it is unsurprising that the presence of an alcohol (or other substance) use disorder has been associated with increased odds of regular pre-sex drinking, it is noteworthy that ASPD—a non-substance externalizing disorder—has also been associated with increased odds of regularly drinking before sex. Such a finding suggests that it is the shared externalizing core that may account for the associations of these heterogeneous disorders with regular pre-sex drinking, and this finding also highlights the need to understand better the link between the externalizing spectrum and broader regular sex-related substance use. Furthermore, because key individual differences variables (e.g., disinhibition and sensation-seeking) have previously been associated with risky sexual behaviors and substance use in general, investigation of how risky sexual behaviors associate with this externalizing core may help coalesce distinct literatures on psychiatric and SUDs, risky sexual behaviors, and individual differences variables.

### 1.2. The current study

The current study investigated the associations between sex-related substance use and the externalizing spectrum by addressing four questions: (1) Do individuals who regularly use substances in sexual contexts display higher externalizing levels than individuals who do not? (2) How are individuals' externalizing levels associated with the odds of reporting regular sex-related substance use? (3) Can regular sex-related substance use be modeled as indicators of the externalizing spectrum? (4) What are the psychometric

properties of these variables within externalizing? We address these questions in two samples and using two different variations of externalizing. Finally, we investigated potential gender differences in the above associations, given that women and men generally differ in latent transdiagnostic externalizing levels (Eaton et al., 2013; Hicks et al., 2007; Kramer et al., 2008).

## 2. Method

### 2.1. Participants

**2.1.1. Internet sample.** Data were from a sample of 1001 individuals who completed an Internet survey about sexuality on Amazon Mechanical Turk (MTurk) for compensation of a small fee in 2014. The study was approved by the Stony Brook University Institutional Review Board.

The current study, after exclusion rules were applied,<sup>1</sup> utilized an analytic sample of  $N=936$ , 49.0% of whom were women. Only cisgender (i.e., non-transgender) individuals were included. Gender for individuals who self-identified as neither cisgender male or female ( $n=12$ ) was coded as missing. Participants' ages ranged from 18 to 82 (median = 31). Participants self-identified as 80% White, 10% Black, 8% Asian, 6% Hispanic, and 2% Native American, with the ability to choose more than one race/ethnicity category. Participants self-identified as 79% heterosexual, 13% bisexual, and 4% lesbian/gay. The remaining 4% reported they were asexual, did not know their sexual orientation, or made a free response to the sexual orientation question (e.g., pansexual). Participants were included in the analysis regardless of sexual orientation.

**2.1.2. Nationally representative sample.** Data were from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; see Grant et al., 2009), which comprised two waves: Wave 1 ( $N=43,093$ ; fielded 2001–2002), and a Wave 2 follow-up of Wave 1 participants ( $N=34,653$ ; fielded 2004–2005). The current study used Wave 2 data only, because this is when sex-related alcohol use was assessed. We conducted analyses using both the full NESARC Wave 2 sample, as well as a subsample of only sexually active drinkers—defined as those participants who had sex or consumed alcohol in the past year ( $n=17,491$ ; Eaton et al., 2015a)—with results remaining largely unchanged. We present the analyses using the full sample herein. Participant ages ranged from 20 to >90 years and were 58% female. They self-identified into race/ethnicity categories: non-Hispanic White (70.9%), Hispanic/Latino (11.6%), non-Hispanic Black (11.1%), Asian/Pacific Islander (4.3%), and Native American (2.2%). Both NESARC waves were weighted to be representative of the age, racial/ethnic, and gender distributions of the adult United States population based on the 2000 Census. The NESARC research protocol, including informed consent, received full ethical review and

<sup>1</sup> We used three methods to ensure quality of the data and derive an analytic sample. First, we removed subjects who completed the task in fewer than seven minutes ( $n=46$ ), which was suggestive of careless responding (median completion time = 13 min). Second, we repeated two items (about appealingness of two sexual behaviors; not included in the current study) scored on a seven-point Likert-type scale throughout the survey, and we removed participants whose responses to both item pairs differed by three or more scale points ( $n=5$ ), consistent with Tellegen's variable response inconsistency (VRIN) used in other measures (e.g., the Minnesota Multiphasic Personality Inventory-2 [MMPI-2], Butcher et al., 1989); the Multidimensional Personality Questionnaire [MPQ], Tellegen and Waller, 2008) to minimize inconsistent and random responding (see Tellegen, 1988). Third, participants were queried at the end of the study about the degree of honesty with which they responded to items, noting that this would not impact payment, and we removed any participants who reported being "somewhat honest" or less ( $n=20$ ). Some participants met more than one exclusion criterion.

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