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Prospective Associations Among Alcohol Use-Related Sexual Enhancement Expectancies, Sex after Alcohol Use, and Casual Sex

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Abstract

Higher levels of alcohol use have consistently been related to higher rates of sexual risk taking; however, it is not clear whether this relationship is causal. This study examined the concurrent and predictive associations among alcohol use-related sexual enhancement expectancies, drinking alcohol prior to engaging in sex, and casual sex during the transition into emerging adulthood and whether these associations differed for men and women. Data came from 590 men and women who were interviewed three times at six-month intervals following high school. Growth curve analyses indicated that alcohol-related sexual enhancement expectancies were related to casual sex indirectly through drinking prior to sex, but did not predict change in either of these behaviors. However, increases in drinking prior to sex predicted increases in casual sex over time. The findings provide some support for prevention programs that focus on alcohol-related sexual expectancies in order to reduce sexually transmitted illnesses among emerging adults.

Keywords

alcohol; drugs; high-risk sex; emerging adulthood; sexual expectancies

Although rates of HIV infection among U.S. emerging adults are relatively low, rates on some college campuses are as high as 1 in 100 students (Cooper, 2002). In addition, approximately 12%–25% of sexually experienced college students report having been diagnosed with a sexually transmitted illness (STI) (Centers for Disease Control and Prevention, 2002; Cooper, 2002). Thus, risky sexual behavior can have negative consequences for a sizeable minority of emerging adults. Research is needed to identify those factors that increase the chances that emerging adults will engage in risky sexual behavior.

One factor that has been linked to risky sexual behavior in both adolescence and emerging adulthood is alcohol use. Alcohol use and risky sex have been associated on a global level (i.e., those who engage in one behavior are more likely to engage in the other), as well as on a situational level (i.e., both behaviors are likely to occur simultaneously) (Cooper, 2002). At

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the global level, research indicates that having drunk alcohol is a significant predictor of ever having sex, and that frequency and quantity of alcohol use predict frequency of sexual involvement and number of sexual partners (for a review see Cooper, 2002). At the situational level, evidence indicates that drinking in a social situation that could potentially lead to sex is associated with a greater probability of sexual intercourse in that situation and that drinking before engaging in sexual intercourse is associated with choosing a risky partner (for a review see Cooper, 2002). In terms of risky sexual behaviors, the findings are particularly strong for alcohol use and increased participation in indiscriminate sexual behaviors (especially having casual sex), but less consistent for decreased protective behaviors (i.e., condom and birth control use) (Bryan, Ray, & Cooper, 2007; Cooper, 2002, 2006; Leigh, Ames, & Stacy, 2008; Weinhardt & Carey, 2000).

The association between alcohol use and sexual behavior may exist simply because both behaviors share common underlying risk factors (e.g., sensation seeking, behavioral undercontrol, deviant peer groups, family background) (Caspi et al., 1997; Cooper, 1992, 2006; Cooper, Wood, Orcutt, & Albino, 2003; Leigh & Stall, 1993; Justus, Finn, & Steinmetz, 2000; Kalichman, Tannenbaum, & Nachimson, 1998; Rees, Argys, & Averett, 2001; White & Johnson, 1988). Alternatively, the association may be causal and alcohol use may increase sexual behavior due to pharmacological effects of alcohol or expectancies about the effects of alcohol (Cooper, 2002). Consistent with the attentional or “alcohol myopia” perspective (Steele & Josephs, 1990), when individuals are under the influence of alcohol, salient cues that instigate behavior (e.g., sexual arousal) are processed, whereas more distal cues that should inhibit behavior (e.g., the possibility of getting an STI) are no longer attended to (Cooper, 2002). Several experimental studies have supported this model and indicate that individuals are more likely to engage in high-risk sexual behaviors when under the influence of alcohol compared to when they are sober (e.g., MacDonald, MacDonald, Zanna, & Fong, 2000; for reviews see Cooper, 2002, 2006). The alcohol use-related sexual expectancies model postulates that beliefs that alcohol use enhances sexual behavior increase the likelihood that someone will engage in sexual behavior when drinking (George, Stoner, Norris, Lopez, & Lehman, 2000). Survey research indicates that alcohol-related sexual enhancement expectancies correlate highly with reasons for drinking (Leigh, 1990) and that individuals who score high compared to low on alcohol-related sexual enhancement expectancies are more likely to drink in sexual situations (Derman & Cooper, 1994b) and to demonstrate a stronger relationship between alcohol and risky sexual behavior (Cooper, Peirce, & Huselid, 1994; see also Bryan et al., 2007).

Experimental research demonstrates that both acute intoxication and alcohol-related expectancies contribute to risky sexual behavioral intentions and attitudes (Maisto, Carey, Carey, & Gordon, 2002). For example, George and colleagues (2000) found a moderating effect of alcohol-related sexual expectancies on participants’ sexual responses in a placebo condition compared to controls. Strong placebo effects were found only among those who also held strong beliefs about alcohol’s capacity to disinhibit or enhance sexual experience.

Across several different samples, Kalichman and colleagues (Kalichman et al., 1998; Kalichman & Cain, 2004; Kalichman, Cain, Zweben, & Swain, 2003; Kalichman, Simbaya, Jooste, Cain, & Cherry, 2006) have found that the effect of alcohol-related sexual expectancies on unsafe sexual behavior is mediated through alcohol use in sexual contexts. Hendershot, Stoner, George, and Norris (2007) also tested the Kalichman et al. model in a sample of young adults. They found no direct effects of sexual enhancement alcohol expectancies on the number of sexual partners. Instead expectancies increased the frequency of drinking before sex, which in turn predicted the number of partners. The existing research, therefore, points to a complex set of associations among alcohol-related sexual expectancies, alcohol use, and risky sexual behavior.

This study extends prior research by using three waves of prospective longitudinal data collected every six months from a community sample of emerging adults from the first fall post high school (Wave 1, W1), the following spring (Wave 2, W2), and the following fall (Wave 3, W3). Most of the research on the connection between substance use and risky sex in heterosexual, nonclinical samples has focused on college students or community adolescents (Bryan et al., 2007). In this study we use a sample of emerging adults and include individuals who went to college and those who did not.

We also compare models for men and women. The findings on gender differences in the associations among alcohol use and risky sexual behavior have been inconsistent as have those for gender differences in alcohol-related sexual expectancies (Cooper, 2002; Dermen & Cooper, 1994a). Hendershot et al. (2007) found that the cross-sectional relationships among alcohol-related sexual expectancies, alcohol use during sex, and sexual risk behavior were similar for men and women and we extend that research by testing models separately for men and women to assess the generalizability of relationships across gender.

We test several hypotheses that come from the existing literature: 1) higher alcohol-related sexual enhancement expectancies increase the probability that people will use alcohol prior to sex; 2) people are more likely to engage in risky sex after drinking alcohol than when not drinking; and 3) therefore, alcohol-related sexual expectancies will have an indirect effect on casual sex through increasing the frequency of engaging in sex under the influence of alcohol. For the most part, prior studies that purported to show evidence that substance-related sexual expectancies indirectly caused risky sexual behavior relied on cross-sectional data and were not able to test whether expectancies predict changes in risk behaviors. Although Kalichman and Cain (2004) used longitudinal data to test this model, they did not examine changes over time. In this study, we use longitudinal data to extend this literature. Using growth curve models, we examine whether alcohol-related sexual enhancement expectancies at the beginning of emerging adulthood are associated with higher frequency of engaging in sex after drinking and greater likelihood of engaging in casual sex at this time point; we also examine whether expectancies predict changes in the two sexual risk behaviors. Finally, we examine whether the association between sexual expectancies and casual sex operates indirectly through drinking prior to sex and how drinking prior to sex and casual sex are related over time.

Methods

Design and Sample

The data were collected as part of the Raising Healthy Children (RHC) project (Catalano, Mazza, Harachi, Abbott, Haggerty, & Fleming, 2003). The RHC project is a longitudinal study of the etiology of problem behavior with an experimental evaluation of an intervention to reduce drug use and other problem behaviors nested within it (Haggerty, Catalano, Harachi, & Abbott, 1998). Covariation matrices among the variables included in this analysis were similar across experimental and control groups in terms of direction, magnitude, and significance levels of associations.¹ Given that we found no differences, the experimental and control groups were combined for analysis in the current study.

In the first two years of the project (1993 and 1994), 1,040 first and second grade students and their parents (76% of those eligible) were recruited from 10 suburban public elementary schools in a Pacific Northwest school district. The current study organizes data by grade level, utilizing data from when participants, if they were progressing in school according to schedule, were in their first two years post high school.² Annual surveys were completed every spring and two

¹A model in which all possible associations between model variables were constrained to equality across groups showed good model fit ($\chi^2(19) = 11.42, p = .909, CFI = 1.00, RMSEA = .000$ for covariances of alcohol expectancies, sex after alcohol, and casual sex).

additional fall surveys were included in the fall post high school and the following fall. For the present study we used data from the first fall post high school (W1), the first spring post high school (W2), and the next fall (W3). Surveys were administered either one-on-one by interviewers using laptop computers or were completed on line.³ During the one-on-one interviews, sensitive questions (i.e., substance use and sexual behavior) were completed in a self-administered mode. All questions and procedures were approved by a University of Washington Institutional Review Board. Retention has remained relatively high, averaging 86% (of the original sample of 1040) across the three waves. Because we excluded anyone who did not complete a W1 survey (N = 176), we compared them to those who completed a W1 survey. There were no significant differences in gender, ethnicity, or free lunch status at baseline.

For the current study we also excluded anyone who was married at any assessment or did not report having been sexually active or drinking alcohol in the month prior to at least one of the three assessments. The sample was predominantly heterosexual, although 4% reported having sex with same sex partners. The final sample for this analysis included 590 participants and was 52% male; 84% were White, 4% Hispanic, 5% Asian or Pacific Islander, 5% Black, and 3% Native American. During the first fall (W1), the average age was 18.64 years ($sd = 0.32$) and 40% were enrolled in a 2- or 4-year college (39% at W2 and 37% at W3). Thirty-one percent of participants received free/reduced-price lunch in the first two years of the study.

Measures

All of the variables were based on self-reports from the youth. Self-reports of substance use and sexual behavior have been shown to be valid in most studies (Cooper, 2002; Johnston, O'Malley, Bachman, & Schulenberg, 2007).

Alcohol use-related sexual expectancies—We used the enhancement subscale from the alcohol use-related sexual expectancy questionnaire developed by Dermen and Cooper (1994a), which contained four items (“I think that after a few drinks: people enjoy sex more, people are less nervous about sex, people are more sexually responsive, and people feel closer to their sexual partners”).⁴ Each item was rated on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree. Scale scores were created by averaging scores across all items and were highly reliable (range of $\alpha = .87-.88$ across the three waves).

Sex after drinking—Participants reported the proportion of their time that they had sex in the prior 30 days (vaginal or anal intercourse or oral sex) after drinking alcohol on a 5-point ordinal scale ranging from 0 = never to 4 = always. They also reported on the frequency they had sex in the last month, an ordinal scale ranging from 0 = never to 5 = everyday. By recoding the proportion and frequency questions and then multiplying these two numbers, we created a continuous measure of the number of times that youths had sex after drinking in the last month. This measure was log transformed.⁵

²Most of the participants had graduated or dropped out of school prior to the fall survey; however, 32 were still in high school at W1, 22 at W2 and 7 at W3.

³Analyses of those randomly assigned to administration mode at the first time that the online survey was used showed virtually no differences in responses to sensitive questions between modes of administration (McMorris, Petrie, Catalano, Fleming, Haggerty, & Abbott, 2009).

⁴We deleted one item from the original scale after W1, “I think that after a few drinks of alcohol, people are better lovers,” because dropping it did not affect the reliability of the scale and we needed to reduce the length of the W2 and W3 assessments.

⁵Proportion of the time that participants drank prior to sex was recoded as never = 0, some of the time = 0.33, half of the time = 0.5, most of the time = 0.67, and all of the time = 1.0. Frequency of having sex in the last month was recoded as never = 0, once or twice = 1.5, less than once a week = 3, once a week = 4, a couple of times a week = 16, and daily = 30. These two numbers were multiplied to create a continuous measure of frequency of drinking prior to sex in the last month. We then log transformed this measure, reducing the influence of outliers so that the skewness ranged from 1.26 to 1.62 across the three time points and kurtosis ranged from $-.80$ to 1.13.

Casual sex—Respondents were coded as having had casual sex if they reported that, in the prior 30 days, they either had (1) sex with someone who was not a spouse or not “someone you consider to be your boyfriend or girlfriend, that is, someone you are in an exclusive relationship with”, (2) more than one sexual partner, or (3) sex with someone whom they had known for less than two weeks prior to first sex. This measure was treated as dichotomous.

Analysis

Preliminary analyses examined prevalence rates of being sexually active and of casual sex and means for alcohol expectancies and sex after alcohol by gender. Gender differences in continuous measures were tested by t-tests and in dichotomous measures by chi square analysis.

Latent growth models (LGM; Duncan, Duncan, Strycker, Li, & Alpert, 1999) were used to model level and change in both sex after alcohol and casual sex across the three post-high school time points. This analytic approach was chosen because it utilized information from all three assessments in order to produce estimates of levels of sexual risk behaviors at the beginning of the post-high school period as well as estimates of how these behaviors increased or decreased over the subsequent 18 months. Models were estimated using Mplus 5.2 (Muthén & Muthén, 2008). Sex after alcohol use was treated as a continuous variable, whereas casual sex was modeled as dichotomous and categorical, using a probit model (Muthén & Muthén, 1998–2007). For both constructs two-factor linear growth models were used, with the loadings of the intercept factor set to 1 for each time point and the slope factor set to 0 for W1, 1 for W2, and 2 for W3. The intercept represents the level at W1 and the slope represents average rate of change between W1 and W3. Models were run separately for each construct to assess fit and means and variances of the growth factors.

A model was then run relating alcohol-related sexual enhancement expectancies to sex after drinking and casual sex to test the Kalichman et al. (1998) hypothesized indirect path from expectancies to casual sex through sex after drinking. In this model, both intercepts and slopes for the two risk behaviors were regressed on expectancies at W1. Slopes were also regressed on the respective intercepts for those behaviors in order to adjust for initial levels. In addition, the intercept and slope of casual sex were regressed on the intercept and slope, respectively, of sex after alcohol, thus testing whether both levels and changes in these behaviors were related. This model was run first for the entire sample and then run separately for men and women. In order to accommodate the categorical variable of casual sex, the Weighted Least Squares Mean Variance estimator (WLSMV) was used. The Tucker-Lewis Index (TLI, Tucker & Lewis, 1973) and the root mean square error of approximation (RMSEA, Browne & Cudeck, 1993) were used to assess model fit.⁶

Results

Descriptive Findings

Males, compared to females, were more likely to report casual sex at W1 and W3 and were more likely to report sex after drinking at W2 (see Table 1). There were no gender differences in alcohol-related sexual expectancies.

Separate Growth Models

Linear growth models for sex after alcohol showed good fit to the data ($\chi^2(1) = 0.87, p = .35$, TLI = 1.00, RMSEA = 0.000). The mean of the slope was significantly greater than zero (slope mean = 0.050, $se = 0.022, p < .05$) indicating that the sample increased in frequency of sex after drinking across the three time points. The variance of both the intercept and slope were

⁶Conservative benchmarks for good model fit are TLI above .95 and RMSEA below .06 (Hu & Bentler, 1999).

significantly greater than zero (intercept variance = 0.298, $se = 0.057$, $p < .05$; slope variance = 0.077, $se = 0.030$, $p < .05$) indicating greater variability in level and change than would be expected by chance.

A linear model also fit well for casual sex ($\chi^2(1) = 0.83$, $p = .364$, TLI = 1.00, RMSEA = 0.000). The average rate of change in the likelihood of casual sex was negative but not significantly different from zero (mean of slope = -0.042, $se = 0.041$, $p = .311$). Significant variance in the intercept (variance = 0.752, $se = 0.158$, $p < .05$) and the slope (variance = 0.191, $se = 0.089$, $p < .05$) both showed evidence of between-individual variation.

Full Growth Model

The full model showed good model fit ($\chi^2(7) = 10.77$, $p = .149$, TLI = 0.936, RMSEA = 0.030) (see Figure 1). The model estimates indicated that higher alcohol-related sexual enhancement expectancies were related to a higher level of sex after alcohol at W1, which in turn was related to higher likelihood of casual sex at W1. There was no direct effect of expectancies on casual sex. Expectancies did not directly predict change in sex after alcohol or in casual sex, but change in sex after alcohol was significantly positively related to change in likelihood of casual sex. That is, increases in frequency of sex after alcohol use predicted increases in likelihood of casual sex.

Because of the gender differences in casual sex and sex after alcohol use, we reran the model including gender as an exogenous variable. Being male was significantly ($p < .01$) and positively related to the level of casual sex, but not to any of the other variables. The rest of the paths were almost identical to those in the model without gender, and the model fit was slightly worse for the model with gender ($\chi^2(10) = 18.31$, $p = .050$, TLI = 0.887, RMSEA = 0.038) than without.

We also ran two separate models for men and women.⁷ The results for men mirrored those for the total sample. For women, alcohol-related sexual expectancies predicted a higher intercept of sex after drinking, but none of the other paths was significant (not shown).

Discussion

This study examined the longitudinal associations among alcohol use-related sexual enhancement expectancies, drinking prior to engaging in sex, and casual sex. Our findings contribute to previous research by examining changes in behavior over three time points during emerging adulthood. As in other studies (e.g., Hendershot et al., 2007; Kalichman et al., 1998, 2003, 2006), we found that alcohol-related sexual expectations were related cross-sectionally to drinking prior to sex, but did not have a direct, independent relationship with casual sex. Therefore, the results supported the hypothesis that the effects of expectancies on risky sexual behavior are indirect through engaging in sex after drinking. Because alcohol sexual enhancement expectancies did not predict changes in either sex after drinking or casual sex, it appears that this indirect effect occurs only contemporaneously.

There were both significant cross-sectional and longitudinal associations between alcohol use prior to sex and casual sex. That is, as predicted those individuals who more often drank prior to sex were more likely to engage in casual sex and those who increased their frequency of drinking before sex increased their engagement in casual sex. The psychopharmacological

⁷We attempted to test a multiple groups model to test moderation of specified associations by gender. However, because there was little variance in the casual sex slope factor for women and it was not significantly different from zero, a multiple groups model would not run. Therefore, we ran two separate models, one for men and one for women, setting the variance of the slope for casual sex to zero for women. This approach tests for the generalizability of relationships, that is, whether they are statistically significant for both males and females, but not whether specific paths are significantly different for men and women.

effects of substance use on attention and other cognitive processes may account for this association (Cooper, 2002). Alternatively, drinking before sex and casual sex may simply reflect two different indicators of engaging in high-risk sexual behavior for emerging adults. Instead of a causal association, they may both be explained by common predictors. Therefore, future studies should control for confounding factors.

Hendershot and colleagues (2007) suggested that women may be more likely to engage in sexual acts with a less well-known partner when they have been drinking than when sober. Our findings suggest that drinking prior to sex was related to casual sex for men but not for women. Perhaps for women concerns about negative consequences from engaging in casual sex (e.g., STIs or stigma) are as salient as sexual arousal cues, and are thus not affected by drinking. On the other hand, for men, concerns about negative consequences may be less salient cues than sexual arousal cues and attention to these less salient cues may be diminished by drinking prior to sex (see Cooper, 2002; Steele & Josephs, 1990). Alternatively, because of lower base rates of casual sex for women compared to men, there may not have been enough power to detect a significant relationship for women. Furthermore, casual sex is only one measure of risky sexual behavior. If we had measured other indicators of risky sex, such as inconsistent condom use, we may have found a stronger effect of drinking prior to sex on sexual risk taking for women and even for men. Therefore, the gender differences observed here should be interpreted with caution and future studies testing the association between alcohol use prior to sex and risky sex should include multiple indicators of sexual risk behavior. In general, drinking prior to sex can have negative consequences for both young men and women (Testa, 2002) and is, therefore, an important target for prevention.

There were some limitations to the present study that should be considered when interpreting the results. First, all of the measures were based on self-reports and, therefore, there is a potential for inaccurate reporting. Second, we did not control for confounding variables that might explain the associations between sexual expectancies and sexual behaviors (e.g., personality factors, peer norms, etc.). Therefore, more research is needed to test the common cause model. Finally, the sample was comprised primarily of heterosexuals and the findings may not generalize to gays, lesbians, and bisexuals. Also, the sample came from one primarily white suburban community; therefore, the results may not generalize to other samples.

Despite these limitations, the present study had several strengths. It was one of the only studies to examine the longitudinal associations among alcohol use-related sexual enhancement expectancies, drinking prior to engaging in sex, and engaging in casual sex and included three points in time over a relatively short time period. In addition, the study was based on a relatively large sample of both male and female emerging adults and was not limited to a college sample.

In the total sample, higher alcohol use-related sexual enhancement expectancies predicted drinking more frequently prior to sex, which in turn predicted engaging in more casual sex. Therefore, prevention programs that address these expectancies have the potential to reduce high-risk sexual behaviors among post high school youth (Kalichman et al., 1998, 2003).

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Figure 1.

Growth curve results for the total sample.

Notes: Standardized coefficients presented. * $p < .05$; ** $p < .01$

Table 1

Gender Differences on Sexual Expectancies and Behaviors

Sexual Expectancies and Behaviors	Gender	
	Female (<i>n</i> =281)	Male (<i>n</i> =309)
Sexually active W1	77.2%	76.7%
Sexually active W2	83.2%	77.0%
Sexually active W3	82.3%	78.5%
Casual sex W1	12.8%	25.2% *
Casual sex W2	14.9%	18.2%
Casual sex W3	12.3%	21.5% *
	<i>M (sd)</i>	<i>M (sd)</i>
Alcohol enhance W1	3.20 (0.96)	3.23 (0.90)
Sex after alcohol W1	0.46 (0.83)	0.43 (0.79)
Sex after alcohol W2	0.45 (0.80)	0.61 * (0.91)
Sex after alcohol W3	0.54 (0.87)	0.53 (0.87)

*
 $p < .05$