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Alcohol Use, Expectancies and Sexual Sensation Seeking as Correlates of HIV Risk Behavior in Heterosexual Young Adults

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Abstract

Most theoretical models of HIV risk behavior have not considered the role of personality factors, and few studies have examined mechanisms accounting for dispositional influences on sexual risk-taking. This study elaborated on a conceptual model emphasizing sexual sensation seeking, alcohol expectancies and drinking before sex as key predictors of HIV risk (Kalichman, Tannenbaum, & Nachimson, 1998). Multiple groups structural equation modeling was used to determine whether gender moderated relationships among these variables in a sample of 611 heterosexual, young adult drinkers (49% female, 76% Caucasian, mean age = 25). The model provided an excellent fit to the data, and gender differences were not substantiated. Sexual sensation seeking predicted HIV risk directly as well as indirectly via sex-related alcohol expectancies and drinking in sexual contexts. Findings suggest that expectancies and drinking before sex represent proximal mechanisms through which dispositional factors influence sexual risk outcomes. Moreover, these relationships appear similar in men and women. Interventions could benefit from targeting alcohol expectancies and drinking before sex in individuals with a dispositional tendency toward sexual risk-taking.

Introduction

Approximately 40,000 people in the U.S. are infected with HIV each year, with an estimated 30% of recent diagnoses resulting from heterosexual contact (Centers for Disease Control and Prevention, 2004). With no imminent promise of a vaccine, psychosocial interventions remain the most promising strategies for curtailing new infection. Greater understanding of the factors involved in heterosexual transmission can be achieved through the development and refinement of theory-based models of sexual risk behavior. Theoretical models of HIV risk have invoked numerous social and contextual factors. Among the most frequently studied variables is alcohol use, which has been linked to risky sexual practices in numerous studies subsuming various methodological approaches (for reviews see Cooper, 1992, 2002; George & Stoner, 2000; Leigh & Stall, 1993; Weinhardt & Carey, 2000). Also receiving consistent attention is the influence of alcohol expectancies, which have been associated with sexual risk behavior in multiple studies (e.g., Dermen & Cooper, 2000; Maisto, et al., 2002; Weinhardt et al., 2002).

Among personality variables studied in relation to sexual risk-taking, the most commonly examined factors coalesce around the domain of sensation seeking. In a meta-analysis of personality and HIV risk research (Hoyle, Fejfar & Miller, 2000), sensation seeking was the most frequently studied trait and was significantly associated with all sexual risk indices examined across studies. Notwithstanding consistently observed associations such as these,

research on personality and HIV risk has been subject to criticism on theoretical and methodological grounds. For instance, most research has focused on broad personality traits with nonspecific bearings on sexuality (Bancroft et al., 2004; Jaccard & Wilson, 1991), and many studies reporting simple correlations between personality variables and HIV risk behavior appear atheoretical (Bancroft et al., 2004; Hoyle, Fejfar, & Miller, 2000; Pinkerton & Abramson, 1995). Also, attempts to examine and characterize mechanisms accounting for personality-HIV risk associations have been scarce.

A nuanced understanding of personality-HIV risk associations requires attention to sexuality-relevant dispositional factors in the context of theory-based models of sexual behavior. Two personality constructs of particular relevance to sexuality are *sexual sensation seeking*, defined as “the propensity to attain optimal levels of sexual excitement and to engage in novel sexual experiences” (Kalichman et al., 1994, p. 387), and *sexual compulsivity*, defined as “a propensity to experience sexual disinhibition and under-controlled sexual impulses and behaviors” (Kalichman & Cain, 2004a, p. 235). Each of these traits has been associated with sexual risk behavior (e.g., Benotsch, Kalichman, & Kelly, 1999; Dodge, Reece, Cole, & Sandfort, 2004; Kalichman et al., 1994; Kalichman & Rompa, 1995; 2001). In addition to developing measures to assess these constructs, Kalichman and colleagues formulated and tested a conceptual model of HIV risk incorporating both personality and substance use variables (Kalichman, Tannenbaum, & Nachimson, 1998). This model stipulates that sensation-seeking tendencies predict stronger endorsement of expectancies about enhancement effects of substance use on sexual behavior. In turn, these expectancies may promote sexual risk behavior by predicting more frequent substance use in sexual contexts. The first two studies to evaluate this model in heterosexual samples (Kalichman et al., 2003; Kalichman & Cain, 2004b) showed that the relationship between sensation seeking and alcohol use in sexual contexts was mediated by expectancies, a finding noteworthy in at least two respects. First, this result is consistent with the notion that expectancies may serve as a cognitive mechanism whereby biologically based personality factors influence alcohol use or other risk-taking behaviors (e.g., Katz, Fromme and D'Amico, 2000; Sher, Walitzer, Wood, & Brent, 1991). A second point concerns the identification of viable targets for HIV risk reduction efforts. Although personality traits may pose intransigent targets for interventions, expectancies are potentially modifiable and therefore serve as a possible route for reducing high-risk behavior.

Initial support for this conceptual model remains somewhat constrained by sampling limitations. Thus far, research with heterosexual groups has focused on individuals seeking services at sexually transmitted infection (STI) clinics. These studies utilized samples that were predominantly African American (Kalichman et al., 2003; Kalichman & Cain, 2004b) or indigenous African (Kalichman, Simbayi, Jooste, Cain, & Cherry, 2006). It is therefore uncertain whether these relationships are specific to certain populations rather than broadly applicable. Moreover, initial studies with heterosexual populations suggest the need to evaluate the stability of relationships between sensation seeking, expectancies and sexual risk behavior across demographic groups. Whereas studies conducted in the U.S. showed that alcohol expectancies mediated the influence of sensation seeking on risk-taking (Kalichman et al., 2003; Kalichman & Cain, 2004b), a subsequent study conducted in South Africa did not replicate this finding, suggesting that expectancies may not serve as a viable intervention target in all populations (Kalichman et al., 2006). Additionally, the first study to include women found that associations between sensation seeking and risk behaviors varied by gender (Kalichman & Cain, 2004b). Other research has similarly suggested gender differences in relationships between sexual sensation seeking and sexual behaviors (Gaither & Sellbom, 2003). In sum, possible group differences in the nature or strength of these associations suggest the need to examine their stability across demographic contexts, ethnicity and gender.

The present research sought to extend previous studies of this conceptual model in three ways. First, we provided a methodological extension of previous studies by using structural equation modeling (SEM) to examine latent indicators of sexual sensation seeking, alcohol expectancies and HIV risk behavior. The common practice of using single measured variables or composites of measured variables does not take measurement error into account; thus, idiosyncrasies of the particular scale or instrument that was chosen could account for significant effects. On the other hand, using latent variables to represent these constructs reduces measurement error by building it into the model. Use of latent variables can also show that an underlying commonality among measures accounts for the effects, bolstering construct validity and thus advancing the theory. Second, our analytic approach allowed for a stringent test of gender differences in the relationships examined. Whereas including gender as a predictor in the model tests for main effects of gender on each of the key variables, using multiple groups SEM allows an examination of whether paths between variables vary by gender (i.e., gender is evaluated as a moderator of all relationships). Third, since studies with heterosexuals have focused on fairly specific populations it remains unclear whether sample characteristics accounted for observed findings. Therefore, we examined these relationships in a novel population: primarily Caucasian, heterosexual young adult drinkers recruited from college campuses and urban census tracts with elevated prevalence of HIV infection. The current sample also represents the largest in which these associations have been examined to date. Demonstrating good model fit in a substantially different population can enhance external validity and inform prevention programs targeting a wider range of demographic groups and risk levels.

On the basis of previous research with heterosexual samples (Kalichman et al., 2003; Kalichman and Cain, 2004) we predicted that the hypothetical model (Figure 1) would demonstrate an adequate fit in accounting for a latent measure of HIV risk behavior. We further predicted that alcohol expectancies would at least partially mediate the influence of sexual sensation seeking on use of alcohol in sexual contexts, and that alcohol use in sexual contexts would at least partially mediate the influence of expectancies on sexual risk behavior. Although a goal was to examine gender as a moderator of these relationships, we did not have a priori hypotheses about the nature of gender effects. Finally, we predicted that sexuality-specific personality constructs (sexual sensation seeking and sexual compulsivity) would load higher on a latent indicator of sexual sensation seeking than would a general measure of sensation seeking.

Method

Participants

Participants ($N = 611$, 49.4% female, mean age = 25.2 years, $SD = 3.9$) were recruited via newspaper advertisements and fliers placed in the Seattle, WA area. Recruitment focused on two areas: college campuses and urban census tracts with documented elevated prevalence of HIV infection. Interested individuals called the laboratory for a preliminary eligibility screening. Those who were between the ages of 21 and 35 years, consumed alcohol at least weekly in the past month, were not currently in a committed relationship, and reported being interested in dating members of the opposite sex were eligible to participate. The resulting sample was 76% Caucasian, 6% Asian American, 5% African American and 2% Native American, and ten percent "other". Six percent of participants reported Hispanic or Latino/a ethnicity. Forty-one percent identified as students, and 64% were employed at least part-time. On average, participants reported consuming 12.5 ($SD = 10.1$) standard drinks per week.

Measures

Sexual sensation seeking, nonsexual sensation seeking and sexual compulsivity—Kalichman et al. (1994) developed two measures of sensation seeking on the

basis of the Zuckerman Sensation Seeking Scales (Zuckerman, Kolin, Price, & Zoob, 1964). The sexual sensation seeking scale is a domain-specific measure of novelty seeking comprising 11 items (e.g., *I like wild “uninhibited” sexual encounters; I like to have new and exciting sexual experiences and sensations*). The nonsexual sensation seeking scale includes 10 items assessing general risk-taking tendencies (e.g., *I have been known by my friends as a “risk taker,” I sometimes like to do things that are a little frightening.*). Response options for each scale range from 1 (*not at all like me*) to 4 (*very much like me*). Each scale has demonstrated internal consistency and test-retest reliability (Kalichman et al., 1994; Kalichman and Rompa, 1995). In the present sample, scale alphas were .79 for sexual sensation seeking and .72 for nonsexual experience seeking. The sexual compulsivity scale (Kalichman et al., 1994; Kalichman & Rompa, 1995) is a ten-item measure assessing sexually compulsive behavior, sexual preoccupations and intrusive sexual thoughts. In previous research with heterosexuals this scale was negatively associated with sexual risk-reduction intentions (Kalichman & Rompa, 1995) and positively associated with various sexual risk indices, including use of alcohol/drugs in sexual contexts and recent STD diagnosis (Kalichman & Cain, 2004). Items (e.g., *I think about sex more than I would like to, My sexual thoughts and behaviors are causing problems in my life*) are rated on a scale of 1 (*not at all like me*) to 4 (*very much like me*). In this sample, scale alpha was .84.

Alcohol expectancies for sexual enhancement—Participants completed the 5-item sexual enhancement subscale of the Revised Alcohol Expectancy Questionnaire (AEQ-R; George et al., 1995). Items were rated on a scale of 1 (*disagree strongly*) to 6 (*agree strongly*). Example items include *I enjoy having sex more if I've had some alcohol*, and *I often feel sexier after I've had a few drinks*. Internal consistency was .78. Participants also completed the 5-item sexual enhancement subscale of the Sex-Related Alcohol Expectancy Questionnaire (SRAEQ; Dermen & Cooper, 1994). Items were rated on a scale of 1 (*disagree strongly*) to 6 (*agree strongly*). Example items include *After a few drinks of alcohol I am more sexually responsive*, and *After a few drinks of alcohol I am a better lover*. Internal consistency for this measure was .84.

Alcohol use—Alcohol consumption in the past month was measured using the Daily Drinking Questionnaire (Collins, Parks & Marlatt, 1985). Frequency of drinking prior to sexual activity in the past year was assessed with the item: *In the past 12 months, how often have you engaged in sexual activity after having consumed alcohol?* Responses ranged from 0 (*Never*) to 6 (*All of the time*).

Sexual risk indices—We used four sexual risk indices. Three of these (number of sexual partners in the past year, lifetime number of one-night stands and anticipated number of sexual partners over the next 5 years) were assessed with the Sociosexual Orientation Inventory (Simpson & Gangestad, 1991). The fourth risk indicator was a composite variable reflecting lifetime number of sexual partners. Participants provided information on the total number of opposite sex partners with whom they had engaged in vaginal intercourse, anal intercourse, performed oral sex and received oral sex. Separate estimates were collected for each behavior and a composite variable was computed by summing these four estimates. Partners and activities are conflated in this composite; a single partner is counted more than once if the participant engaged in multiple behaviors with that partner.

Procedure and data preparation

Participants completed the questionnaires in the laboratory, alone in a private room, via computer. Participation lasted 1-2 hours and participants were compensated \$15 per hour. Data were screened for outliers, univariate skewness, and kurtosis. Inspection of the sexual risk indices (sex partner data) revealed that each of these measures was extremely skewed.

Participants with more than ten sex partners in the past year were above the 97th percentile, those anticipating more than twenty sex partners in the next five years were above the 95th percentile, those with more than fifteen one night stands were above the 93rd percentile, and those with more than 100 lifetime sex partners were above the 95th percentile. Thus, the variables were trimmed to these maximum values to pull in the tails of their distributions. These trimmed variables remained somewhat skewed but were well within acceptable limits for maximum likelihood estimation using robust standard errors and numerical integration to accommodate non-normality and missing data. No more than 6.2% of the data was missing for any variable.

Structural equation modeling (SEM)—Path analysis was performed using Mplus statistical modeling software for Windows (Muthén & Muthén, 2004) using maximum likelihood estimation with robust standard errors (MLR estimator). A latent variable for sexual sensation seeking was constructed using three indicators: means of the sexual sensation seeking scale, sexual compulsivity scale, and nonsexual sensation seeking scale. The standardized factor loadings for these indicators were .84, .66, and .35, respectively, all significantly different from zero ($z_s > 1.96$, $ps < .05$). Based on the factor loadings, we interpreted these indicators as tapping into the essence of sexual sensation seeking. A latent variable for sex related alcohol expectancies was constructed using two indicators: means of the SRAEQ sexual enhancement scale and AEQ-R sexual enhancement scale score. A latent variable for number of sexual partners was constructed using four indicators: lifetime number of opposite sex partners, lifetime number of one night stands, number of sex partners in the past year, and anticipated number of sex partners in the next 5 years. Factor loadings for the indicators are shown in Figure 2. The hypothesized model was fit both across and between gender.

Results

Across-Gender

The mean, standard deviation, minimum, maximum, median for each measured variable are shown in Table 1. Intercorrelations among the measured variables are shown in Table 2. The hypothesized structural model shown in Figure 1 was tested. This model, Model A, fit the data adequately but not exceptionally well ($\chi^2[30] = 104.495$, $p < .0001$, CFI = .955, TLI = .932, RMSEA = .064, SRMR = .032). Inspection of the modification indices suggested that the errors of the composite lifetime total number of sexual partners and lifetime number of one night stands covaried and that modeling this covariance would improve model fit. This was reasonable considering that both are lifetime measures which would be expected to be correlated with both chronological age and age of sexual debut. Thus, this covariance was added to a subsequent model, Model B. Fit indices suggested that Model B fit the data exceptionally well ($\chi^2[29] = 39.650$, $p = .0898$, CFI = .994, TLI = .990, RMSEA = .025, SRMR = .021). Satorra-Bentler scaled chi-square difference testing (Satorra & Bentler, 2001) was used to compare models A and B.¹ Results indicated that Model B fit the data significantly better than Model A ($T_d[1] = 43.520$, $p < .0001$). Inspection of the parameters indicated that all path coefficients were significantly different from zero, with the exception of the path from alcohol expectancies to number of sexual partners. Thus, this path was fixed to zero in a subsequent model, Model C. Shown in Figure 2, Model C also fit the data exceptionally well ($\chi^2[29] = 40.391$, $p = .0975$, CFI = .994, TLI = .990, RMSEA = .024, SRMR = .023). Satorra-Bentler scaled chi-square difference testing revealed that Model C fit the data no worse than

¹Because we used maximum likelihood estimation with robust standard errors (the MLR estimator in Mplus statistical software), simple chi-square difference testing, customarily used to compare nested models, was contraindicated. Satorra-Bentler scaled chi-square difference testing (Satorra & Bentler, 2001) corrects for inaccuracies in simple chi-square difference testing under conditions of non-normality. The test statistic, T_d , is nonetheless distributed as chi-square and evaluated under the number of degrees of freedom that corresponds to the difference in the number of independent parameters estimated by the two models being compared.

Model B ($T_d[1] = .518, p = .4716$). This result suggests that there was no significant direct effect of expectancies on number of sexual partners.

Between-Gender

Model A was tested using multiple-groups SEM. Unstandardized factor loadings and intercepts were constrained to be equal across groups, but all other parameters were free to vary (as is the default using Mplus). Model A fit the data marginally well ($\chi^2[72] = 184.207, p < .0001$, CFI = .930, TLI = .913, RMSEA = .071, SRMR = .052). As before, inspection of the modification indices suggested that the errors of the composite lifetime total number of sexual partners and lifetime number of one night stands covaried, particularly for men, and that modeling this covariance would improve model fit. Thus, Model B was tested between groups. Fit indices suggested that Model B fit the data well ($\chi^2[70] = 115.552, p = .0005$, CFI = .972, TLI = .964, RMSEA = .046, SRMR = .045). Satorra-Bentler scaled chi-square difference testing indicated that Model B fit the data significantly better than Model A ($T_d[2] = 36.714, p < .0001$). Inspection of the parameters for men indicated that the path from sensation seeking to alcohol use before sex was not significantly different from zero. Inspection of the parameters for women indicated that the path from alcohol use before sex to number of sexual partners was not significantly different from zero. The path from alcohol expectancies to number of sexual partners was not significantly different from zero in men or in women.

In an attempt to substantiate apparent gender differences, we first tested a model where all structural paths were constrained to be equal for men and women, Model D. Model D fit the data reasonably well ($\chi^2[77] = 137.871, p < .0001$, CFI = .962, TLI = .956, RMSEA = .051, SRMR = .058); however, as would be expected, Satorra-Bentler scaled chi-square difference testing revealed that Model D fit the data significantly worse than Model B ($T_d[7] = 17.533, p = .0143$). Next, we tested a model where the path from sensation seeking to alcohol use before sex was free to vary between genders, Model E. Model E did not fit the data significantly better than Model D ($T_d[1] = 0.611, p = .4342$). Thus, a gender difference between men and women for this path was not substantiated. Next, we tested a model where the path from alcohol use before sex to number of sexual partners was free to vary between genders, Model F. Model F did not fit the data significantly better than Model D ($T_d[1] = 1.475, p = .2246$). Thus, a gender difference between men and women for this path was also not substantiated.

Discussion

In the present study sexual sensation seeking predicted HIV risk directly as well as indirectly via sex-related alcohol expectancies and drinking in sexual contexts. This finding suggests that alcohol expectancies and drinking before sex represent proximal pathways through which dispositional factors such as sexual sensation seeking influence sexual risk behavior. Gender differences in the relationships among the variables were not supported, demonstrating that sexual sensation seeking, alcohol expectancies, and drinking before sex function similarly in predicting sexual risk behavior among heterosexual young adult men and women. In evaluating these relationships we extended a conceptual model that has previously been studied in samples at putative high risk for contracting HIV, including gay and bisexual men (Kalichman et al., 1998; 2002) and heterosexuals seeking STI services (Kalichman et al., 2003, 2006; Kalichman & Cain, 2004). Substantiating previous findings, the overall model showed an excellent fit in predicting a latent measure of HIV risk.

The present study extended previous research in three ways. First, support for the model in a novel population enhances external validity and suggests that prevention programmers can apply these findings across a range of demographic groups with greater confidence. Second, the use of SEM allowed for examination of latent variables representing sexual sensation seeking, alcohol expectancies and HIV risk. Previous studies used measured variables to

represent these constructs. The use of latent variables enhances construct validity by accounting for measurement error in the model, minimizing the possibility that findings owe to idiosyncrasies of the particular scales chosen to represent presumably robust underlying constructs. Third, the use of multiple-groups SEM enabled a highly rigorous test of potential gender differences in hypothesized relationships. Specifically, gender was evaluated as a moderator of relationships between the variables examined. Gender differences were not substantiated.

The consistent support for this theoretical model across varied contexts is noteworthy and augurs well for its utility in studying HIV risk behavior across heterogeneous populations. In particular, the current results were obtained despite considerable differences between this and previous studies with regard to sample characteristics (e.g., age, racial/ethnic representation, reported substance use behavior), geographic locale and recruitment strategy. The consistency of observed relationships across independent research teams further enhances confidence in the reliability of these associations. Taken with previous findings, the present results support that this theoretical framework holds promise for guiding future research and prevention efforts. One exception to previous findings was that our results indicated a direct influence of sensation seeking on frequency of alcohol use in sexual contexts. This relationship was not reported in initial studies with heterosexual groups (Kalichman et al. 2003; Kalichman & Cain, 2004b). However, a subsequent study with a larger sample did find this association (Kalichman et al., 2006). It is possible that the use of larger sample sizes increases sensitivity for detecting this relationship. Alternatively, differences in sample characteristics may account for discrepancies across studies. Future research should evaluate the consistency of this relationship across contexts.

Results of this study are consistent with the notion that research on personality and HIV risk should attempt to include personality factors of theoretical relevance to sexuality (Bancroft et al., 2004). As predicted, factor loadings indicated that sexuality-relevant personality constructs loaded considerably higher on a latent indicator of sexual sensation seeking than did a measure of nonsexual sensation seeking. This suggests that the latent variable used in this study tapped dispositional tendencies related to sexuality as opposed to broad novelty seeking aspects of personality. Other efforts to study dispositional factors specific to sexuality have suggested that this approach may lead to a more nuanced understanding of sexual risk behavior. For instance, Bancroft and colleagues (Bancroft et al., 2003; 2004; Janssen, Vorst, Finn, & Bancroft, 2002) have developed measures assessing individual variation in the influence of contextual factors (e.g., mood, sexual arousal) on sexual behavior, and these constructs have shown promise in differentiating patterns of sexual risk-taking (Bancroft et al., 2003; 2004). Continued attention to sexuality-specific constructs should lead to greater methodological and theoretical precision in studying how personality relates to HIV risk.

Few attempts overall have been made to study mechanisms accounting for dispositional influences on sexual risk-taking (Hoyle, Fejfar, & Miller, 2000). Findings suggesting that sexual sensation seeking influences HIV risk behavior via intermediary variables (i.e., stronger endorsement of alcohol expectancies and greater frequency of drinking in sexual contexts) are potentially important to identifying such mechanisms. Together with previous studies, (Kalichman et al., 1998; 2002; 2003), our findings coincide with the notion that expectancies serve as a cognitive construct that may mediate the influence of biologically based dispositional factors on alcohol use and other risk-taking behaviors (Katz, Fromme, & D'Aimico, 2000; Sher et al., 1991). Results from another study (Horvath & Zuckerman, 1993) similarly implicated cognitive mechanisms in explaining greater sexual risk-taking among high sensation seekers. These researchers found evidence to suggest that individuals high and low in sensation seeking do not differ in terms of initial HIV risk appraisal; instead, after engaging in high-risk behavior those higher in sensation seeking may be less likely to subsequently evaluate the activity as

risky. Thus, compared to low sensation seekers, high sensation seekers might a) place a premium on the stimulation afforded by risky sexual practices, notwithstanding attendant risks for contracting HIV, and b) perceive reduced risk after engaging in such behavior (Horvath & Zuckerman, 1993; Pinkerton & Abramson, 1995).

These hypotheses, although not tested directly in this study, appear theoretically compatible with the present findings. Consistent with the notion that high sensation seekers place an emphasis on maximizing stimulation or experience, expectancies about alcohol's ability to enhance sexual activity partially mediated the link between sexual sensation seeking and drinking in the context of sex. Among individuals for whom intoxication serves as a vehicle for sexual enhancement, associated expectancies may be maintained or strengthened in the absence of negative consequences for engaging in risky behavior. In the case of sexual risk-taking, such consequences are often neither reliable nor immediate, perhaps increasing the likelihood that positive expectancies are maintained and/or that the behavior is subsequently deemed less risky.

Other processes underlying personality-HIV risk associations undoubtedly exist but are as-yet unidentified. A possible advantage of focusing on psychobiological theories of personality (e.g., Cloniger, Svrakic, & Przybeck, 1993; Eysenck, 1990; Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993) is that they posit theoretical mechanisms underlying personality influences on behavior (Hoyle, Fejfar, & Miller, 2000). Consistent with the possibility that these mechanisms may be in part biologically based, some evidence suggests that genetic variations implicated in neurotransmitter regulation are predictive of both substance use and novelty-seeking aspects of personality (e.g., Berman, Ozkaragoz, Young and Noble, 2002; Lusher, Chandler and Ball, 2001). Continuing developments in genetics research will likely aid in elucidating the biological bases of personality and behavior (Plomin & Caspi, 1998), and may ultimately prove informative to understanding the relationships studied here.

The present findings carry potential implications for the design of HIV risk reduction strategies. While it has been noted that personality factors may pose intransigent targets for interventions (Carey & Lewis, 1999), understanding the role of relevant personality constructs could nonetheless help to identify high-risk individuals and/or anticipate intervention effectiveness, perhaps enhancing the efficacy of individualized interventions (Bancroft et al., 2004). In addition, the availability of efficacious cognitive-behavioral strategies for reducing substance use behavior (e.g., Miller & Rollnick, 2002) as well as preliminary evidence that drinking patterns can be altered via manipulation of expectancies (Jones, Corbin & Fromme, 2001) suggest that drinking and expectancies could serve as viable intervention targets for individuals with a dispositional proclivity for risk-taking.

Several limitations to this study should be considered in interpreting the present findings. We relied on participants' self-reports of behavior and experiences; the accuracy of these reports is unknown. Moreover, the cross-sectional nature of this study precludes accurate inferences about causality. Participants in the present study likely differ from the general population in several respects. We sought a sample of young adults who used alcohol regularly; this group consequently reported rates of drinking higher than would be expected in the general population. Also, participants were volunteers for a study that included assessment of sensitive information concerning sexual behavior. Results may not generalize to other groups. However, a focus on high-risk samples is warranted given that HIV risk research and interventions are especially relevant for such groups.

The present research expands on previous studies by including latent measures of sexual sensation seeking, alcohol expectancies and HIV risk behavior, by evaluating hypothesized relationships in a novel population, and by providing a stringent test of model invariance across

gender. Current findings suggest that interventions targeting individuals with a dispositional tendency toward risk-taking might attempt to intervene at the level of expectancies and/or alcohol use, considering that personality characteristics are not readily amenable to change. Evaluating this possibility requires continued attention to personality factors as related to HIV risk behavior, as well as the development of personality-tailored interventions. Greater efforts to study mediating mechanisms will further aid in delineating the processes by which personality factors confer behavioral risk for acquiring HIV.

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Figure 1. Hypothetical model relating sexual sensation seeking, alcohol expectancies for sexual enhancement, alcohol use prior to sexual activity, and number of sexual partners.

Figure 2.

Model C, final mediational model with standardized estimates. * $p < .01$, ** $p < .001$.

Table 1
Descriptive Statistics for All Measured Variables

Variable	<i>M</i>	<i>SD</i>	Min	Max	Median
Sexual sensation seeking	3.31	0.65	1.0	5.0	3.3
Sexual compulsivity	2.10	0.74	1.0	5.0	2.0
Nonsexual sensation seeking	3.39	0.67	1.4	5.0	3.4
SRAEQ sexual enhancement	3.42	1.03	1.0	6.0	3.6
AEQ-R sexual enhancement	3.50	1.01	1.0	6.0	3.6
Drinking prior to sex	2.66	1.51	0	6	3
Sex partners in the past year	3.52	5.66	0	88	2
Sex partners in the next 5 years	8.77	17.42	0	250	5
Lifetime number of one night stands	6.18	22.60	0	400	2
Lifetime number of sex partners	45.39	47.94	0	482	34

Table 2
Intercorrelations Among Cognitive Responses and Among Behavioral Responses from the Final Model

Variable	2	3	4	5	6	7	8	9	10
1. Sexual sensation seeking	.555	.297	.156	.168	.158	.288	.337	.212	.285
2. Sexual compulsivity	--	.220	.189	.194	.107	.236	.234	.160	.182
3. Nonsexual sensation seeking		--	.108	.085	.122	.111	.125	.108	.070
4. SRAEQ sexual enhancement			--	.805	.253	.057	.076	.048	.022
5. AEQ-R sexual enhancement				--	.239	.093	.147	.078	.054
6. Drinking prior to sex					--	.241	.213	.222	.150
7. Sex partners in the past year						--	.641	.509	.515
8. Trimmed sex partners in the next 5 years							--	.463	.435
9. Trimmed lifetime number of one night stands								--	.612
10. Trimmed lifetime number of sex partners									--

Note. Coefficients in bold are significant at $p < .05$, in bold italics are significant at $p < .01$.