Expectancies of sexual "escape" and sexual risk among drug and alcohol-involved gay and bisexual men

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Abstract

Purpose: We tested the hypotheses that sexual risk would relate to gay/bisexual men's patterns of combining alcohol or drugs with sex, their motivation to use drugs to cognitively "escape" awareness of HIV risk, and their use of bars as social and sexual settings. **Methods:** We conducted extensive interviews among African–American ($n = 139$) and White ($n = 112$) gay and bisexual men who were attending a behavioral intervention for safer sex results. Those who frequently combined drugs with sex reported higher rates of sexual risk and Hepatitis B infection than did men who infrequently combined substances with sex, or who combined only alcohol with sex. Sexual risk was pronounced among more frequent drug users who also reported strong expectancies that alcohol or drugs facilitate sex and cognitively escape from awareness of HIV risk. Frequenting bars per se was not an important factor in sexual risk. **Implications:** Men who use alcohol or drugs to enhance sexuality and escape self-awareness of HIV risk have a significantly diminished capacity to avoid sexual risk. © 2001 Elsevier Science Inc. All rights reserved.

1. Introduction

Behavior change continues to be critical to the prevention of HIV and other sexually transmitted diseases (STDs). No effective HIV vaccine is on the horizon, and the emergence

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of drug-resistant strains of HIV indicates that the epidemic will not be ended by drug treatment alone (see Kelly, Otto-Salaj, Sikkema, Pinkerton, & Bloom, 1998; Ostrow, 1999). Alcohol and drug use may be an important precursor to risky sexual behavior, and may represent an important target for behavioral interventions. However, empirical findings regarding the effects of substance use on sexual risk have yielded mixed results across different study populations and methodologies (Leigh, 1990).

While several investigators have documented a direct association between the use of recreational drugs or alcohol and high-risk sexual behavior and/or HIV infection (e.g., Chesney, Barrett, & Stall, 1998), other studies have not found such effects (e.g., Leigh & Miller, 1995; Weatherburn et al., 1993). This has led to a search for psychosocial factors that may moderate the effect of substance use on sexual risk (see Cooper, 1992; Derman & Cooper, 2000; Leigh & Stall, 1993; Perry et al., 1994). Understanding the effect of substances on risk, and designing effective interventions, will require that we understand the conditions and/or subgroups for whom alcohol or drugs increase vulnerability to risky sex and HIV infection.

We have proposed that a key moderator of the effect of drugs on sexual risk is the motivation to escape self-awareness of personal vulnerability to HIV (McKirnan, Ostrow & Hope, 1996). For people in identified risk groups, such as gay/bisexual men, thinking about HIV or AIDS is inherently aversive, both as a topic per se and because awareness of personal risk requires that one forgo highly desired activities. Coping with HIV requires long-term, difficult behavior change. This may induce "coping burnout" in the form of fatigue, fatalism, or low self-efficacy about one's ability to maintain safety indefinitely, and/or shame regarding previous safety lapses (see Odets, 1994). This, plus increasing optimism regarding HIV treatments (Vanable, Ostrow, McKirnan, Taywaeditep, & Hope, 1999), may decrease men's willingness to restrain their sexual activities.

Coping burnout may lead to the adoption of avoidant coping strategies that facilitate cognitive escape from awareness of past or ongoing HIV risk behavior. Such escape coping is facilitated by activities that shift self-awareness from the abstract or long-term implications of behavior to immediate, "here and now" sensations or actions (McKirnan et al., 1996; see Heatherton & Baumeister, 1991; Lazarus, 1993). Alcohol or drug use serves that purpose well; a common pharmacological effect of many psychotropic drugs is a decrease in abstract information processing, and substance use is a culturally accepted mechanism for temporary escape from stress (see Marlatt, 1976; Steele & Josephs, 1990). Individual differences in the expectancy that alcohol dampens stress or enhances sexuality relate to both alcohol problems and the use of alcohol as a "disinhibitor" in sexual and other contexts (see Cooper, 1992; Dermen & Cooper, 1994; Hull & Bond, 1986; Lang, Searles, Lauerman, & Adesso, 1980). Further, men who have strong expectancies that alcohol or drugs decrease anxiety may strategically combine alcohol or drugs with sex to decrease self-awareness of HIV risk (McKirnan & Peterson, 1988; McKirnan et al., 1996).

The use of drugs or alcohol as a means of cognitive escape may enhance risk by lessening one's capacity (or motivation) to monitor safer sex norms. This perspective is consistent both with cognitive expectancy models of "disinhibition" and the "alcohol myopia" perspective articulated by Steele and Josephs (1990). The latter hypothesizes that alcohol may facilitate non-normative behavior where a longer-term, more abstract concern (i.e., over HIV infection

or transmission) conflicts with more short-term motives, such as sexual arousal. Substance use may selectively decrease processing of the more abstract normative inhibitions. Direct effects of expectancies are supported by studies showing that alcohol use relates more strongly to sexual risk among those with strong sexual "disinhibition" expectancies for alcohol use (Dermen, Cooper, & Agocha, 1998; McKirnan & Peterson, 1992).

We proposed that expectancies for cognitive escape specific to HIV represent a sense of burnout or coping fatigue with regard to safer sex, the desire to be "in the moment" or non-reflective during sex, and the expectancy that alcohol or drugs enhance sexuality and decrease anxiety. This cluster of attitudes or escape motives is consistent with qualitative reports of "HIV coping fatigue" among gay men, and their motivation to escape self-awareness of HIV risk (see Williams, Elwood, & Bowen, 2000). We developed a self-report scale that combined these elements, and examined the relationship among expectancies for sexual escape, substance use, and sexual risk among alcohol- and drug-using gay/bisexual men.

In addition to individual expectancies, the context or setting of sexual behavior may influence how alcohol or drug use relates to sexual risk. The gay community has many alcohol- or drug-related settings — bars or clubs — that also serve as key sexual and social settings. In a large survey sample of gay men, individual differences in the social use of bars related to overall alcohol use, expectancies that substances enhance sexual experience, and to numbers of sex partners (see McKirnan & Peterson, 1989, 1992). Thus, substance use may be associated with sexual risk by simple exposure to alcohol or drugs in settings that also facilitate sex or meeting sex partners.

Finally, specific drug use patterns may underlie risk. For example, volatile nitrites ("poppers") have been associated with unprotected receptive anal sex, and both popper and cocaine use are significant independent predictors of HIV infection, even after accounting for levels of receptive anal sex and condom use (Ostrow, Di Franceisco, Chmiel, Wesch, & Wagstaff, 1995). Other substances, such as marijuana or alcohol, did not show these effects. Crack cocaine strongly predicts sexual risk, particularly among African–Americans (see Edlin et al., 1992; Fullilove & Fullilove, 1993). Hence, typical choice of drug may influence sexual risk and may vary by ethnicity.

2. Summary

This study examined sexual risk among African–American and White gay and bisexual men who combine alcohol or drugs with sex. The data come from baseline interviews with participants screened for enrollment in a controlled behavioral outcome trial of a safer sex intervention (The AIM Project; see Ostrow & McKirnan, 1997). We tested two general hypotheses. First, we hypothesized that specific patterns of combining alcohol or drugs with sex underlie sexual risk. We formed subgroups based on substance use patterns during recent sexual activity, examined ethnic differences in groups, and tested group differences in HIV risk behavior, infection status, and psychosocial variables (e.g., expectancies and bar use).

Second, we examined the effects of expectancies for sexual escape, personal standards for sexual safety, and participants' use of bars or clubs as a social focus, on sexual risk. We

hypothesized that there would be direct effects of each of these variables on rates of unprotected anal intercourse. Our key hypothesis was that escape motivation would moderate the effect of drug use on risk. We expected participants who combined drugs with sex to be most sexually risky if they had strong expectancies that substances would facilitate sexuality and cognitive escape. Conversely, men who combined drugs with sex but did not report such expectancies were expected to have more moderate levels of sexual risk. Support for this hypothesis would help clarify the mechanism whereby drug use increases risk: Drug or alcohol use per se may be less important to unsafe sex than is the combination of drug use and the motivation to decrease self-awareness of risk status and health concerns. Finally, we tested the competing hypothesis that the use of gay bars or clubs as personal and social resources may moderate the effect of drug use on sexual risk.

3. Methods

3.1. Sample

The initial sample consisted of 281 gay and bisexual men recruited for a structured, workshop-based behavioral intervention designed to promote safer sex among men who combine alcohol or drugs with sex. Participants were given a 1.5-h behavioral and clinical interview as part of study enrollment. Recruitment was designed to reach approximately equal numbers of African–American and White participants. The ethnic distribution of the original sample was: 49.5% African–American ($n = 139$), 39.9% White ($n = 112$), 6.4% Latino ($n = 18$), and 4.3% "other" ($n = 12$). To clarify ethnic differences, the relatively small Latino and "other" subsamples were dropped, yielding a final $n = 251$, 55% African–American and 45% White.

There were four major recruitment sources: 12% were recruited via HIV/STD testing and treatment clinics, 28% through advertisements or related publicity (posters, flyers), 19% through snowball sampling via study cohort members or members of other research cohorts in the clinic, and 41% via direct face-to-face outreach in bars, clubs, "cruise" areas, and similar settings. Participation rates from these venues could not be validly calculated, since we had no index of the number of potential participants we initially contacted. Recruitment source varied by ethnicity, $\chi^2(3, n = 244) = 52.6$, $P < .001$. African–Americans were more likely to be reached through direct outreach and snowball sampling (76%), whereas Whites were more often reached through advertisements or testing/medical contexts (60%).

The recruitment sources also showed differences in education level [$F(3,239) = 8.63$, $P < .001$] and income [$F(3,245) = 9.1$, $P < .001$]. Planned comparisons showed these effects to be due to a contrast of clinic settings vs. all others. Clinic recruits, all of whom were White, reported higher average education [$M = 17$ years vs. 14 years, $t(239) = 3.9$, $P < .001$] and income [$M = $ US \$ 40,000/year vs. US \$ 23,000/year, $t(245) = 6$, $P < .001$] than did men from the other three recruitment sources combined. Recruitment source did not have statistically significant effects on any of the study outcome variables, i.e., overall number of sex partners,

rates of unprotected anal sex, overall alcohol or drug use patterns, or alcohol–drug problems (all P values $> .01$).

Sexual orientation did not vary by recruitment source, $\chi^2(6, n=244)=9.6$, n.s., but did vary by ethnicity, $\chi^2(2, n=244)=32.7$, $P<.001$. White participants were primarily gay (98%, 2% bisexual), whereas 65% of African–American participants described themselves as gay, 27% as bisexual, and 8% as "straight."

3.2. Measures

At study outset, participants read and signed an informed consent statement indicating the nature of all measures, the payment schedule, the intervention, and their right to refuse any aspect of the study. The protocol was approved by the Institutional Review Boards of Howard Brown Health Center and the University of Illinois at Chicago. Participants were paid US$40 for completing a behavioral and clinical interview, and a self-administered questionnaire.

3.2.1. Interview assessment

The interview assessed sexual behavior over the previous 6 months. The measures and time frame were adopted from the Chicago Coping and Change Study (Ostrow, Di Franceisco et al., 1998) and other large cohort studies (Buchbinder et al., 1994; see Catania, Gibson, Chitwood, & Coates, 1990 for a discussion of sexual behavior measurement time frames). Respondents were first asked if they had a "primary" partner, defined as a sexual partner they were emotionally close to. If in a primary relationship, they answered the sexual behavior items for that person. They were subsequently asked how many other sex partners they had in the previous 6 months, and answered questions about those partners as a block. For both partner types, participants separately estimated how often they had engaged in insertive and receptive anal sex. For each activity, they then estimated the frequency with which they used condoms "from start to finish" using a five-point scale ranging from "Never" to "All the time." Participants were also asked the sero status of their primary partner (HIV $-$, HIV+, unknown), and the proportion of "other" partners they knew to be in each sero status group.

For each sexual partner type, participants also used the five-point scale to rate how often they drank "enough alcohol to be high or drunk . . .", used poppers (amyl or butyl nitrites) or drugs other than alcohol or poppers during sex. Prior research using similar measures of substance use with sex, assessed within a 6-month time frame, has shown these measures to be more useful in assessing the linkage between substance use and sexual risk than are measures of general substance use (Leigh & Stall, 1993).

After the partner-specific questions, participants were given two single-item measures. The first assessed the strictness of personal sexual standards, "How strict would you say your personal safer sex guidelines are compared to other men who have sex with men?", using a seven-point scale ranging from "Not at all" to "Extremely." The second item assessed self-efficacy for following personal guidelines, "How often have you found it difficult to follow

your safer sex guidelines in the past 6 months?'', using a seven-point scale ranging from ''Never'' to ''About every day.''

3.2.2. Self-administered questionnaire

The questionnaire first assessed the general use of alcohol, and each of 10 drugs, over the previous 6 months. Substance use was rated on a seven-point frequency scale ranging from ''Never'' to ''Every day or more.'' Following this was a section containing 39 personal attitude items, each of which was a simple declarative sentence rated on a five-point scale ranging from ''Does not agree at all'' to ''Strongly agree.'' Attitude items assessed seven constructs: HIV burnout, the desire to escape self-awareness during sex, expectancies that alcohol or drugs enhance sexuality and decrease stress, the use of bars as a social resource, sexual sensation-seeking, identification with the gay community, and miscellaneous sexual attitudes. The first three constructs were expected to cohere as a single factor. Factor analysis was used to test the construct validity of item sets, as described below.

3.2.2.1. Expectancies for sexual "escape" via alcohol or drugs: 12 items, $\alpha=.86$ Vulnerability to sexual escape use of drugs or alcohol should occur among individuals who experience ''burnout'' or fatigue over the continuing need for sexual safety, the desire to escape self-awareness during sex, and expectations that alcohol or drug use decreases anxiety and enhances sexual experience. To assess this, we drew from individual measures of these constructs: expectancies that alcohol or drugs enhance sexuality or decrease anxiety (eight items; see Dermen & Cooper, 1994; McKirnan & Peterson, 1988, e.g., ''After getting drunk or high, I am more sexually responsive''), safer sex burnout (two items; McKirnan et al., 1994; ''I find it difficult to maintain my commitment to safer sex.''); and two items from Gold, Skinner, Grant, and Plummer (1990) measuring self-awareness during sex (''When I am having sex, I can only think of what is going on in the moment.'').

Factor analysis showed these items to comprise two factors: one assessing burnout, decreased self-awareness, and several expectancy items, and a second factor consisting of the remaining expectancy items. However, mean scores of the items loading on these factors (factor scores ≥ 0.45) were themselves strongly correlated, $r=.57$, $P<.000$, and the full-scale α exceeded that of either subscale. No other pair of factor composites showed that high level of intercorrelation. Given our theoretical interests, plus these results, we summed the 12 items loading on these two factors to comprise a single ''escape motive'' scale, given in Appendix A.

3.2.2.2. Use of gay bars/clubs as a social resource. Four items we developed as a scale of ''bar orientation'' (McKirnan & Peterson, 1992) emerged as a single factor, $\alpha=.73$, e.g., ''I meet a lot of my sex partners in bars.''

3.2.2.3. Gay identification and sexual attitudes. The fourth factor consisted of items assessing identification with the gay community (''It is important that some of my friends are gay ...'') and negative sexual attitudes (''I feel stress or conflict within myself over having sex with men''), and a final factor comprised sexual sensation-seeking (Kalichman,

Heckman, & Kelly, 1996; "I like new and exciting sexual experiences."). We did not use these variables in the analyses reported here.

Following the attitude section, participants reported whether they had been tested for HIV, and the date and results of their last test. Ninety-nine percent of Whites vs. 91% of African–Americans had been HIV tested, $\chi^2(1) = 8.1$, $P < .003$. In both groups, over 80% of participants who reported being HIV sero-negative had been tested within the previous year. This section also assessed recent STDs: "In the last 6 months, have you been told by a health care provider that you had any of the following medical conditions?" (Syphilis; Gonorrhea, Chlamydia, or Non-Specific Urethritis; Hepatitis). All participants received a blood draw for past or current Hepatitis B infection, and had the option to receive an HIV test.

The self-administered instrument concluded with items assessing age, income, education, sexual orientation, living status, and involvement in gay activities (e.g., political involvement, gay media use). One activity item assessed how often during the previous month participants had gone to a gay/bisexual bar, and was used in analyses reported below.

3.2.3. Clinical interview

The measurement ended with a brief assessment of alcohol and drug problems. As an indicator of alcohol problems, we used the CAGE (Mayfield, McLeod, & Hall, 1974), a four-item, well-validated screening measure for dependence and tolerance (e.g., "Have you ever felt you should cut down on your drinking?"). Items were scored "yes/no"; we assigned 1 to "yes" responses and summed to produce a five-level (0–4) scale. This score was not diagnostic of alcoholism per se, but was used as a rough index of alcohol dependence. We assessed drug problems with a nine-item index corresponding to DSM-III-R dependence criteria (tolerance, dependence, disruption of activities; e.g., "Have you needed more ___ to get the same effect as you usually do?"). Respondents were asked if they used powder cocaine, crack cocaine, amphetamines, or heroin during the previous year. For any drug used, the responded was asked the nine dependence items. The drug problems score represented the total number of problem items endorsed. Since this face-valid scale was derived from the DSM, we assumed it to have criterion validity as a general index of drug dependence and problems, although we were not able to validate it against another, more formal diagnostic criteria.

3.3. Analyses

Sexual risk indices summed responses to the two partner types. We analyzed participants' overall number of sex partners, reports of any unprotected (insertive or receptive) anal sex, any unprotected receptive anal sex, the simple count of unprotected receptive anal exposures, and the rate of unprotected receptive anal sex. The latter represented the number of episodes of unprotected receptive anal sex, divided by the total episodes of any anal sex. This allowed us to compare the "riskiness" of participants while adjusting for individual and group differences in simple levels of sexual activity. Receptive anal sex was chosen as the key risk outcome because it is most conducive to HIV and other STD infection. All measures of sexual behavior were positively skewed. To eliminate outliers, we truncated measures of number of

partners and episodes of unprotected sex at 50 (over 6 months), and overall anal exposures at 70. These values exceeded the 95th percentile for each variable.

Participants were categorized into one of six subgroups based on their self-reported percentage of sexual occasions that involved the use of alcohol, poppers, or other drugs over the previous 6 months. Our grouping approach was guided by previous findings (Ostrow, Vanable, McKirnan, & Brown, 1999) and our initial focus groups. A consensus of focus group participants was that agents other than alcohol often enhanced sexual performance or sensation, whereas alcohol was seen as having less of these effects. In contrast, "poppers" were seen as specifically facilitating sexual intercourse, a finding echoed in the literature (e.g., Ostrow et al., 1995). A consensus from our qualitative data also confirmed other reports (see Deren, Estrada, Stark, & Goldstein, 1996; Word & Bowser, 1977) that crack cocaine users constitute a distinctive, high-risk subgroup. Thus, we differentiated alcohol, poppers, crack cocaine, and other drugs.

We placed a participant in a "frequent substance use with sex" category if he reported using the substance on 50% or more of sexual occasions. This created initial groups of men who did not frequently use substances during sex, frequently used alcohol alone during sex, used poppers during sex, used other drugs during sex, or used poppers plus other drugs during sex. Since we did not directly assess the use of crack cocaine with sex, a participant was considered a crack user if he reported using crack cocaine "one to three times per month" or more. Members of the drug + sex groups may also have frequently used alcohol during sex; over 50% of the men in each of the "drugs + sex" groups also used alcohol during sex.

This approach resulted in six drugs + sex groups: (1) infrequent use of alcohol/drugs with sex ($n = 42$, 17% of the sample); (2) alcohol only with sex ($n = 58$, 24%); (3) poppers with sex ($n = 28$, 12%); (4) other drugs ($n = 49$, 20%); (5) crack cocaine ($n = 36$, 15%), and; (6) poppers + other drugs with sex ($n = 31$, 13%). The "other drugs" category included marijuana, as well as substances often described as being used in gay clubs or similar settings: powder cocaine, "ecstacy," Ketamine ("Special K"), or other hallucinogens. Rates of injection drug use, heroin, or sedative use were too low to factor into category membership (all < 1.5%). For several analyses, we combined the six specific groups into two larger categories; infrequent and alcohol with sex only ($n = 100$, 41% of the sample) vs. the other four drugs + sex subgroups ($n = 144$, 60%).

Since the ethnic groups differed significantly in recruitment source, and to remove variance that may stem from idiosyncrasies of our recruitment approach, all analyses used recruitment source and participants' age as covariates. For analyses of continuous variables (e.g., number of sex partners), we created three dummy variables to code the four-level recruitment source variable using direct outreach as the contrast condition. We then entered these measures as covariates in univariate analyses of variance (ANOVA). For categorical outcomes (e.g., "any unprotected anal sex"), we used logistic regression with recruitment source specified as a categorical variable and entered into the equation first. Finally, ethnicity was entered as a covariate in all analyses except those specifically examining differences in ethnic groups.

To examine drug group differences in sexual risk, we first conducted overall tests of the six-level drug + groupings, using ANOVA or logistic regression, as appropriate. Since these

analyses showed the groups to significantly differ on each risk variable, we conducted post-hoc comparisons (via ANOVA or logistic regression) as shown in Table 2. We examined differences between the two major drugs + sex groupings (infrequent use and alcohol + sex only vs. all other drugs + sex groups) via univariate analyses of covariance using group membership as the grouping variable. We tested the moderating effect of expectancies and bar orientation via interaction terms. For both variables, we performed a median splits. Using the SPSS General Linear Model program, we entered the covariates, then the grouping main effects (e.g., high vs. low expectancy groups, drug use groups), then the drug group by escape group interaction term, in predicting participants' rate of unprotected receptive anal sex.

4. Results

4.1. Ethnic differences in sample characteristics and sexual risk

Participants' M age = 34 and did not vary by ethnicity. As is clear from Table 1, African–American and White participants differed considerably in socio-economic status, measured as employment, income, and education. General substance use, assessed as the number of days of any drug use or alcohol intoxication per month, was very high but did not differ by ethnic group. The African–American participants did report significantly more drug problems.

The sample was very high-risk. Over the previous 6 months, 74% reported at least one instance of (insertive or receptive) unprotected anal sex, 51% reported at least one instance of specifically unprotected receptive anal sex, and participants reported $M > 9$ sex partners. The cumulative prevalence of Hepatitis B and HIV infection was high, as was the 6-month incidence of other STDs (Table 1). Unprotected sex did not vary by ethnicity, although African–Americans were substantially more likely than were Whites to be infected with HIV or Hepatitis B.

Paradoxically, given the infection results, Whites reported a larger number of sex partners. In both ethnic groups, 58% of participants reported a primary partner, and 95% of White participants and 85% of African–American participants reported at least one non-primary partner, $\chi^2(1, n = 245) = 6.5, P < .01; M = 9$. Forty-five percent of participants' primary partners was known to be HIV+, 32% unknown, and 23% HIV −. Among non-primaries, 59% was HIV − or unknown, 41% HIV+. Our assessment of non-primary partners did not allow us to specifically map partner status onto participants' risk behavior; thus, we could not specifically analyze unprotected sex with known HIV+ or HIV − partners. However, the diversity of sero status in these men's partners indicates clearly that unprotected sex was highly "risky."

4.2. The effect of drugs+sex categories on sexual risk and psychosocial variables

Percentages of participants in each of the drugs + sex categories are given in Table 2. The ethnic groups were similar in the proportion who infrequently combined alcohol or drugs with sex, or who only used alcohol with sex, $\chi^2(1, n = 244) < 2.9$, n.s. However, there were

Table 1
Sample characteristics by ethnicity

Descriptive variable	Ethnicity		Complete sample
	African–American	White	
Demographics			
Percent reporting college degree or more	19	63*	38
Percent employed	42	83*	60
Modal income/year	10,000	30,000*	20,000
Substance use			
M days per month			
High or drunk on alcohol	8.3	6.0	7.5
Any other drug use	14.2	10.8	12.8
Alcohol problems	2.1	2.2	2.1
Drug problems	4.7	1.3**	3.2
Sexual risk (past 6 months)			
Percent any unprotected anal sex	73	75	74
Percent unprotected receptive anal sex	48	56	51
M number of sex partners	7.4	11.8**	9.4
Percent known HIV-infected[a]	49	13*	33
Percent Hepatitis B-infected[a]	68	39*	55
Percent new other STD diagnosis	16	8	12

[a] Lifetime prevalence.
* Tests of group difference: $\chi^2(1, n = 244) > 16.5$, $P < .000$.
** Tests of group difference: $F(1,243) > 7.1$, $P < .005$.

considerable ethnic differences in the other drugs + sex groups. Whites were overrepresented among poppers users, whereas African–Americans represented a high proportion of all other drugs + sex groups, particularly crack cocaine (all values of $\chi^2(1, n = 244) > 7.4$, $P < .005$). Consistent with other reports, those who used crack cocaine were less likely then men from all other subgroups to be employed (33% vs. 64%), to earn over US$20,000 (20% vs. 54%), and to have a college degree (11% vs. 43%), $\chi^2(1, n = 244) > 12$, $P < .000$.

4.2.1. Drugs+sex categories and sexual risk

Sexual risk was assessed as self-reports of any unprotected anal sex in the previous 6 months, any unprotected receptive anal sex, the rate of unprotected receptive anal sex, and overall number of sex partners. The most general pattern in the sexual risk data was the difference between the first two groups vs. all other drug use patterns (Table 2). Men who infrequently combined drugs with sex, or who only combined alcohol with sex, were less likely to report any unprotected anal sex, or specifically unprotected receptive anal sex, than were those who combined sex with any other drug, $\chi^2(1, n = 244) > 13.4$, $P < .000$. This effect was also found for the rate of unprotected receptive anal sex, $t(243) = 4.1$, $P < .000$, indicating that group differences were not due to simple differences in overall levels of sexual activity and Hepatitis B infection, $\chi^2(1, n = 244) = 11.1$, $P < .001$.

Table 2
Sexual risk and infection status by drugs + sex category

Ethnicity, risk, and infection status	Drugs + sex category						Complete sample (n=244)
	Infrequent (n=42)	Alcohol only (n=58)	Poppers (n=28)	General drugs (n=49)	Crack cocaine (n=36)	Poppers + drugs (n=31)	
Percent African–Americans	43[†]	41[†]	18	65	94	55	55
Sexual risk (previous 6 months)							
Percent of any unprotected anal sex	<u>48</u>	69	86	84	83	87	75
Percent of any unprotected receptive anal sex	<u>33</u>	41	79	55	56	65	52
Percent episodes with unprotected receptive anal sex	<u>10</u>	17	36	27	36	27	26
M number of sex partners	7.5	6.7	<u>17.1</u>	7.7	8.8	<u>15.4</u>	10.5
Infection status							
Percent of known HIV+	24	12	32	45	<u>64</u>	29	33
Percent of Hepatitis B-infected	<u>49</u>	36	60	61	74	62	55*

All analyses with participants' age and recruitment source as covariates.
The proportion of African–Americans and Whites significantly differed in each group, $P<.005$, except [†], n.s.
All overall group differences within row $P<.005$, except *, $P<.05$.
Planned comparisons: Underlined groups differed from all other groups within row, $P<.005$.

The exceptions to this general trend were overall number of sex partners and HIV infection status. Consistent with descriptions of the use of poppers to facilitate sex (Ostrow et al., 1995), men who either used poppers alone during sex, or combined poppers with other drugs, had significantly higher numbers of sex partners than all other groups combined, $M = 16.0$ vs. 7.3, $t(243) = 4.1$, $P < .000$. Despite higher numbers of partners, the poppers subgroups were similar to the other subgroups in sexual risk and infection status. Men who combined crack cocaine with sex were substantially more likely than the rest of the sample to be HIV-infected, 64% vs. 26% for all other subgroups combined, $\chi^2(1, n = 244) = 18.5$, $P < .000$.

4.2.2. Behavioral and psychosocial differences in major drug use groups

The major drug group effect on behavioral risk was between participants who either infrequently used substances with sex or who frequently used alcohol only with sex ("infrequent/alcohol only", $n = 100$) vs. all other drugs + sex subgroups ("other drugs", $n = 144$); this categorization accounted for 6.9% of the variance in the rate of unprotected receptive anal sex, when entered after the covariates [$t(235) = 4.3$, $P < .000$]. We therefore contrasted these larger groups on the behavioral and psychosocial measures (Table 3). The groups did not differ in income or education, but did differ in age [$M = 32$ vs. 35, $F(1,236) = 5.6$, $P < .02$] and ethnicity; White participants were equally distributed across group (52% vs. 48%), whereas African–Americans were more concentrated in the "other drugs" than the "infrequent/alcohol only" group, 68% vs. 32%, $\chi^2(1, n = 244) = 10.7$, $P < .000$. Group contrasts thus used recruitment source, age, and ethnicity as covariates.

We examined three sets of variables. First were measures of general alcohol and drug involvement. Despite our recruiting only men who were sexually risky while using alcohol or drugs, these subgroups may reflect a simple difference in alcohol or drug use severity. In fact,

Table 3
Behavioral and psychosocial variables by larger drugs + sex category

Study variables (*M* values)	Larger drugs + sex category		
	Infrequent and alcohol + sex only	Other drugs + sex groups	*P* <
Alcohol and drug involvement			
Days per month alcohol intoxication	5.6	8.7	.002
Days per month any drug use	4.3	18.6	.000
Alcohol problems	1.8	2.3	.01
Drug problems	1.5	4.4	.000
Psychosocial variables			
Sexual escape alcohol–drug use	3.0	3.4	.000
Strictness of sexual standards	4.0	3.5	.01
Difficulty in following sexual norms	2.4	3.2	.01
Bar-going and attitudes			
Days per month gay bar/club-going	3.9	5.4	.02
Use of bars/clubs as social resource	2.5	2.7	n.s.

All effects tested with recruitment source, age, and race as covariates.

men who combined drugs other than alcohol with sex were generally heavier substance users and reported more drug and alcohol use problems, F's$(1,236) > 6.9$, $P < .01$.

Second, we examined psychosocial variables hypothesized to create vulnerability to the effects of alcohol or drugs on sexual risk; sexual escape expectancies of alcohol or drug effects, strictness of personal safety standards, perceived difficulty in following safer sex guidelines, and orientation toward bars as a social resource. The two major drug groups significantly differed on each of these measures, F's$(1,236) > 7.8$, $P < .01$ (Table 3). Those who frequently combined drugs other than alcohol with sex reported greater "escape" expectancies of alcohol or drugs in the sexual context, less strict personal sexual standards, and less self-efficacy for adhering to personal safety standards. These men also showed a trend toward going to gay bars more frequently, $F(1,236) = 5.54$, $P < .02$, although the groups did not differ in their use of bars as a social or sexual setting.

4.3. Direct and moderating effects of cognitive escape and bar orientation on sexual risk

As a block, the measures of escape expectancies, sexual standards, and self-efficacy significantly related to participants' rate of unprotected receptive anal sex, after controlling for recruitment source, age, and ethnicity, $F(4,237) = 5.82$, adjusted $R^2\Delta = 0.13$. Subsequent univariate analyses showed each individual variable to significantly relate to risk after controlling for the covariates, t's$(235) > 3.1$, $P < .005$. The two-bar use variables — social bar orientation and frequency of bar use — were not related to sexual risk, $F(2,240) = 1.6$, n.s.

We hypothesized that drug use would relate to sexual risk most strongly among men who had strong expectancies that substances facilitated sexuality and cognitive escape from self-awareness of HIV. To test this, we performed a two-factor analysis of variance on rates of unprotected receptive anal sex, examining drug group — infrequent/alcohol only vs. other drugs + sex — and groups representing men above or below the median on the measure of expectancies for sexual escape. The hypothesis was tested by the interaction effect; we expected the effect of high drug involvement on sexual risk to be pronounced primarily among men with stronger expectancies. To clearly isolate the effects of drug use and expectancies, we used recruitment source, ethnicity, HIV sero-status, and age as covariates in this analysis.

The hypothesis was supported by a statistically significant interaction of drug + sex grouping by escape motive, $F(1,233) = 6.0$, $P < .015$ (see Fig. 1). Among men who frequently combined drugs with sex, those with strong sexual escape expectancies reported a substantially higher percentage of sexual episodes that included unprotected receptive anal sex then did men who had less intense expectancies, or who did not frequently combine drugs with sex. A similar interaction was found when the simple count of unprotected receptive anal episodes was used as the outcome variable, $F(1,233) = 4.75$, $P < .03$.

We also tested the moderating hypothesis in terms of participants' use of gay bars. We repeated the two-factor analysis of covariance, testing the factors of drug + sex group, and men above or below the median on bar orientation and frequency of bar use, on the rate of unprotected receptive anal sex. These analyses showed no main or interaction effects of bar
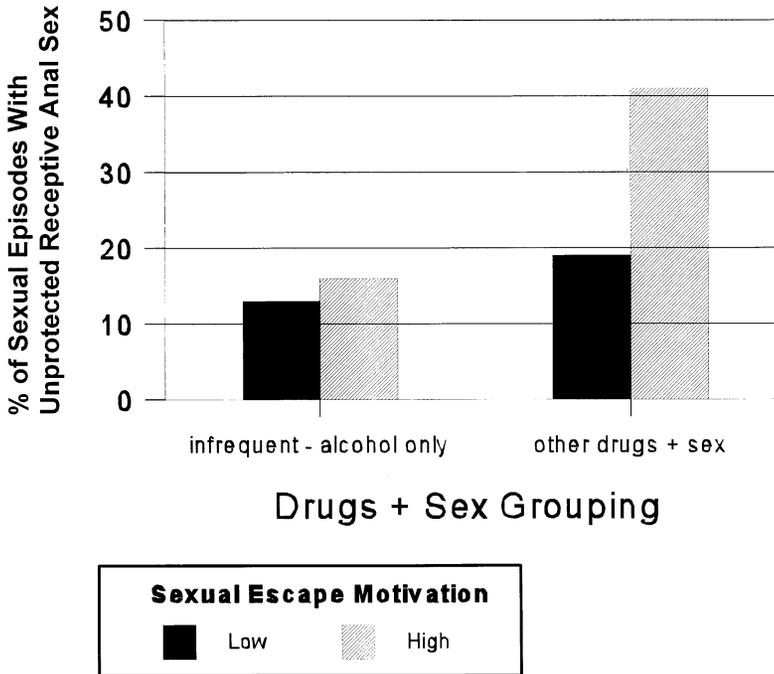
Fig. 1. Percentage of sexual episodes that included unprotected receptive anal sex by major drugs + sex category and escape motive.

orientation or bar use on sexual risk, $F(1,232) < 2.6$, n.s. Thus, participants' use of bars and clubs was neither an overall vulnerability factor nor did it interact with drug use pattern.

5. Discussion

We examined sexual risk among African–American and White gay and bisexual men in terms of patterns of drug use with sex, expectancies of sexual enhancement and cognitive escape, and gay bar use. Ethnic differences in these variables did emerge, particularly for the use of poppers, which were associated with the mainstream, White gay community, and crack cocaine, which was primarily used by lower socio-economic status, African–American participants. African–Americans tended to more frequently combine drugs other than alcohol with sex, and reported substantially higher rates of HIV and Hepatitis B infection, although the groups had similar rates of unprotected sex.

The hypothesis that rates of sexual risk would vary as a function of substance use patterns was supported. The primary effect was a contrast between participants who either infrequently combined substances with sex or who frequently combined alcohol alone with sex, vs. those who mixed drugs other than alcohol with sex. Among these high-risk, drug-involved gay and bisexual men, drugs other than alcohol may constitute "sex drugs" that are

intentionally used to disinhibit sexual activity, whereas alcohol does not appear to have that role. These differences were not simply a matter of the infrequent-alcohol-only group being less sexually active than the "other drugs + sex" group, since the basic finding emerged for the proportion of sexual episodes that contained unprotected sex, as well as the raw number of such exposures.

The other conspicuous finding regarding drug patterns concerned the high infection rates among crack cocaine users; the elevated HIV and Hepatitis B infection status of the African–American participants was largely driven by these men. This effect could not be explained by crack users being more likely to get HIV-tested, or having been tested more recently than other groups (P's>.05). These infection rates may reflect a higher prevalence of HIV among the partners of these men, given that White participants actually reported more sex partners, and crack use was not associated with higher self-reported sexual risk. The degree of de facto racial and social segregation in the research site (Chicago) suggests that these groups constitute distinct "risk pools" that differ in the likelihood that a given risk behavior may lead to infection.

The key finding of this study was that a set of attitudes reflecting alcohol- and drug-related sexual expectancies and cognitive escape motivation moderates the effect of drug use patterns on sexual risk. Men in the higher-risk drugs + sex group who also reported strong escape expectancies, i.e., for whom the larger topic of safer sex is aversive or difficult to think about and who had strong expectancies that alcohol or drugs reduce anxiety and facilitate sex, were significantly more risky. This was tested against relatively stringent criteria for risk, unprotected receptive anal intercourse, the sexual behavior with the highest transmission rate for HIV and other STDs. Thus, distinct high-risk subgroups of gay/bisexual men may be influenced by different behavioral or psychological processes.

Participants were self-selected for substance use and sexual risk. We used a multi-venue advertising and outreach recruitment process, during which we contacted many men for participation. Thus, there may be unmeasured self-selection biases beyond the simple effects of recruitment source that were covaried out of analyses. Further, were we to have included less alcohol- or drug-involved men, some findings may have changed. In particular, the finding that frequent drug use with sex confers risk beyond the effects of alcohol + sex may be characteristic of this cohort. In preliminary focus groups, several men reported that alcohol is not specifically used to enhance sexual experience, but is a "social lubricant" that is typically present during sex. For a less drug-involved group, alcohol may emerge as a stronger risk factor.

There has been some debate about whether alcohol or drugs directly "cause" sexual (or other health) risks. Our findings indicate that, at least among risky gay/bisexual men, neither habitual use nor simple exposure directly induces risk. Risk was pronounced primarily among men who reported strong expectancies for cognitive escape via substances, consistent with the proposal that the effects of alcohol or drug use are moderated by stable individual differences in attitudes or motives (Cooper 1992; Derman & Cooper, 2000; McKirnan et al., 1996). Substance use may constitute an active strategy to decrease painful self-awareness of the larger health implications of behavior, in this case regarding anxiety about HIV. Attending to the concrete "here and now" — immediate sensations, short-term goals, or automatic behavioral "scripts" — allows one to escape awareness of longer-term or more abstract

concerns, such as personal health or social obligations. Substance use, of course, is effective in narrowing attention to the immediate (Steele & Josephs, 1990).

These data indicate that alcohol or drug use programming is important to safer sex intervention design. However, interventions should not assume a simple effect of substance use on sexual risk. Rather, substance use may have an effect primarily among those participants with specific psychosocial vulnerabilities, such as burnout over coping with HIV and expectancies regarding the sexual effects of drugs. An examination of participants' motives for combining alcohol or drugs with sex should be woven into sexual risk reduction interventions.

Acknowledgments

Appendix A. Sexual "escape" expectancies of alcohol and drugs

(Rated on scale ranging from "Do not agree at all" [1] to "Strongly agree" [5] α=.86.)

When I am high or drunk, I am more likely to want to fuck or to be fucked.
When I am high or drunk, I am more likely to have sex with people I ordinarily wouldn't have sex with.
When I am high or drunk, I am more likely to do sexual things I usually wouldn't do.
Being drunk makes me more comfortable sexually.
I often feel more sexual after I get drunk or high.
After getting drunk or high, I am more sexually responsive.
When I am drunk or high, I will do anything with anyone.
When I am high, I find it difficult to stay within my sexual limits.
Once I have the chance to have sex, I can't say no even if we don't use condoms.
When I am having sex, I can only think of what is going on in the moment.
I find it difficult to maintain my commitment to safer sex.
It takes me a lot of effort to keep my sexual behavior safe.

References

Buchbinder, S., Judson, F., McKirnan, D. J., MacQueen, K., Scheer, S., O'Malley, P., Park, M. S., Douglas, J., Penley, K., Doetsch, J., & Bartholow, B. (1994). Predictors of seroconversion in high-risk gay men. *Proceedings of the Xth international conference on AIDS.* Yokohama, Japan.

Catania, J. A., Gibson, D. R., Chitwood, D. D., & Coates, T. J. (1990). Methodological problems in AIDS behavioral research: influences on measurement error and participation bias in studies of sexual behavior. *Psychological Bulletin*, *108*, 339–362.

Chesney, M. A., Barrett, D. C., & Stall, R. (1998). Histories of substance use and risk behavior: precursors to HIV seroconversion in homosexual men. *American Journal of Public Health*, *88* (1), 113–116.

Cooper, M. L. (1992). Alcohol and increased behavioral risk for AIDS. *Alcohol Health and Research World*, *16*, 64–72.

Deren, S., Estrada, A. L., Stark, M., & Goldstein, M. (1996). Sexual orientation and HIV risk behaviors in a national sample of injection drug users and crack smokers. *Drugs and Society*, *9* (1–2), 97–108.

Dermen, K. H., & Cooper, M. L. (1994). Sex-related alcohol expectancies among adolescents: II. Prediction of drinking in social and sexual situations. *Psychology of Addictive Behaviors*, *8*, 161–168.

Derman, K. H., & Cooper, M. L. (2000). Inhibition conflict and alcohol expectancy as moderators of alcohol's relationship to condom use. *Experimental and Clinical Psychopharmacology*, *8* (2), 198–206.

Dermen, K. H., Cooper, M. L., & Agocha, V. B. (1998). Sex-related alcohol expectancies as moderators of the relationship between alcohol use and risky sex in adolescents. *Journal of Studies on Alcohol*, *59* (1), 71–77.

Edlin, B. R., Irwin, K. L., Ludwig, D. D., McCoy, H. V., et al (1992). High-risk sex behavior among young street-recruited crack cocaine smokers in three American cities: an interim report. *Journal of Psychoactive Drugs*, *24* (4), 363–371.

Fullilove, M. T., & Fullilove, R. E. III (1993). Understanding sexual behaviors and drug use among African–Americans: a case study of issues for survey research. In: D. G. Ostrow, & R. C. Kessler (Eds.), *Methodological issues in AIDS behavior research* (pp. 117–132). New York: Plenum.

Gold, R. S., Skinner, M. J., Grant, P. J., & Plummer, D. C. (1991). Situational factors and thought processes associated with unprotected intercourse in gay men. *Psychology and Health*, *5*, 259–278.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, *110*, 86–108.

Kalichman, S. C., Heckman, T., & Kelly, J. A. (1996). Sensation seeking as an explanation for the association between substance use and HIV-related risky sexual behavior. *Archives of Sexual Behavior*, *25*, 141–154.

Kelly, J. A., Otto-Salaj, L. L., Sikkema, K. J., Pinkerton, S. D., & Bloom, F. R. (1998). Implications of HIV treatment advances for behavioral research on AIDS: protease inhibitors and new challenges in secondary prevention. *Health Psychology*, *17* (4), 310–319.

Lang, A. R., Searles, J., Lauerman, R., & Adesso, V. (1980). Expectancy, alcohol, and sex guilt as determinants of interest in and reaction to sexual stimuli. *Journal of Abnormal Psychology*, *89*, 644–653.

Lazarus, R. S. (1993). Coping theory and research: past, present, and future. *Psychosomatic Medicine*, *55*, 234–247.

Leigh, B. (1990). The relationship of substance use during sex to high-risk sexual behavior. *Journal of Sex Research*, *27*, 199–213.

Leigh, B. C., & Miller, P. (1995). The relationship of substance use with sex to the use of condoms among young adults in two urban areas of Scotland. *AIDS Education and Prevention*, *7*, 278–284.

Leigh, B. C., & Stall, R. (1993). Substance use and risky sexual behavior for exposure to HIV: issues in methodology, interpretation, and prevention. *American Psychologist*, *48*, 1035–1045.

Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: validation of a new alcoholism screening questionnaire. *American Journal of Psychiatry*, *131*, 1121–1123.

McKirnan, D. J., Buchbinder, S., MacQueen, K., Douglas, J., Judson, F., & Vanable, P. (1994). Stability of risk behaviors for HIV seroconversion among gay men. *7th Annual conference on advances in AIDS vaccine development.* Washington, DC (November).

McKirnan, D. J., & Peterson, P. L. (1988). Stress, expectancies, and vulnerability to substance abuse: a test of a model among homosexual males. *Journal of Abnormal Psychology*, *97*, 461–466.

McKirnan, D. J., & Peterson, P. L. (1989). AIDS risk behavior among homosexual males: the role of attitudes and substance abuse. *Psychology and Health*, *3*, 161–171.

McKirnan, D. J., & Peterson, P. L. (1992). Gay and lesbian alcohol use: epidemiological and psychosocial

perspectives. *Research symposium on alcohol and other drug problem prevention among lesbians and gay men*. California Department of Alcohol and Drug Problems.

Odets, W. (1994). AIDS education and harm reduction for gay men. *AIDS and Public Policy Journal*, *9* (1), 1–15.

Ostrow, D. G. (1999). Practical prevention issues. In: D. G. Ostrow, & S. C. Kalichman (Eds.), *Psychosocial and public health impacts of new HIV therapies* (pp. 151–169). New York: Plenum.

Ostrow, D. G., Di Franceisco, W. J., Chmiel, J. S., Wesch, J., & Wagstaff, D. (1995). Behavioral factors associated with HIV seroconversion among members of the Chicago MACS/CCCS cohort, 1984–1992, a case control study. *American Journal of Epidemiology*, *142*, 875–883.

Ostrow, D. G., & McKirnan, D. J. (1997). Prevention of substance-related high-risk sexual behavior among gay men: critical review of the literature and proposed harm reduction approach. *Journal of the Gay and Lesbian Medical Association*, *1* (2), 97–110.

Ostrow, D. G., Vanable, P. A., McKirnan, D. J., & Brown, L. (1999). Hepatitis and HIV risk among drug using men who have sex with men; demonstration of Hart's Law of Inverse Access and application to HIV. *Journal of Gay and Lesbian Medical Association* (in press).

Perry, M.J, Solomon, L. J., Winett, R. A., Kelly, J. A., et al (1994). High-risk sexual behavior and alcohol consumption among bar-going gay men. *AIDS*, *8* (9), 1321–1324.

Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: its prized and dangerous effects. *American Psychologist*, *45*, 921–933.

Vanable, P. V., Ostrow, D. G., McKirnan, D., Taywaditep, J., & Hope, B. (1999). Impact of combination therapies on HIV risk perceptions and sexual risk among gay and bisexual men. *Health Psychology* (in press).

Weatherburn, P., Davies, P. M., Hickson, F. C. I., Hunt, A. J., McManus, T. J., & Coxon, P. M. (1993). No connection between alcohol use and unsafe sex among gay and bisexual men. *AIDS*, *7*, 115–119.

Williams, M. L., Elwood, W. N., & Bowen, A. M. (2000). Escape from risk: a qualitative exploration of relapse to unprotected anal sex among men who have sex with men. *Journal of Psychology and Human Sexuality*, *11* (4), 25–49.

Word, C. O., & Bowser, B. (1977). Background to crack cocaine addiction and HIV high-risk behavior: the next epidemic. *American Journal of Drug and Alcohol Abuse*, *23* (1), 67–77.