Drug-Using Women's Sexual Risk: An Event Analysis

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Using event analysis, this study describes the most recent sexual events of drug-using women and their male partners and identifies relationship-specific and event-specific determinants of condom use. Women drug users (*n* = 320) were recruited from the streets of East Harlem. After validation of drug use, they participated in structured interviews and were offered HIV testing and counseling. Interview topics included the following: (1) demographic characteristics of respondents, (2) relationship factors, including age difference, race/ethnicity concordance, and HIV serostatus of partners, and (3) event-specific factors, including sexual repertoire, communication about condom use, and perception of HIV risk. Univariate and multivariate analyses identified five major variables associated with event-specific condom use: (1) closeness to partner, (2) perceived dyadic serostatus, (3) sexual repertoire, (4) communication about condoms, and (5) perceived control of condom use. Behavioral interventions to reduce sexual risk should target dyads with long-standing sexual relationships and focus on the dynamics of the relationship, especially the issues of dyadic serostatus, intimacy, communication, and control.

INTRODUCTION

There have been dramatic changes recently in the AIDS epidemic in the United States. First identified as a disease of gay men in 1981, and later associated with injection drug users who are primarily men, AIDS is the third leading cause of death among women aged 25–44 years (Elias and Coggins, 1996). Data from the Centers for Disease Control and Prevention (CDC, 1998) indicate that 108,032 women have been diagnosed with AIDS and more than one half have died from AIDS-related causes. Whereas AIDS-related deaths have recently declined overall, rates of new HIV infections continue to rise among women (while declining among men). In states with confidential HIV reporting, women now account for

1 in every 3 new cases of HIV infection, up from 1 in 5 in 1993 (CDC, 1994, 1998). Data also indicate a shift to heterosexual transmission of the virus, especially among women. For cases in which the route of transmission has been specified, HIV infections in women attributed to heterosexual contact have increased from 55% in 1993 to 73% in 1998, whereas cases attributed to injection drug use have declined from 42% to 26% over the same period (CDC, 1994, 1997).

In understanding the changing patterns of HIV infection, it is critical to recognize that women are at higher risk from heterosexual transmission than are men. First, the virus is more concentrated in semen than in vaginal secretions, and heterosexual transmission is estimated to be eight times more efficient from men to women than from women to men (Padian *et al.*, 1997). Second, many sexually transmitted diseases (STDs) are asymptomatic in women and these infections are likely to go untreated, especially among drug users (DeHovitz *et al.*, 1994). Because there is a synergy between HIV and other STDs (Wasserheit, 1991), HIV risk among women may be

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enhanced by the existence of an underlying STD (Chesney, 1994). Third, due to the sheer numbers of infected men, especially in neighborhoods where HIV infection is concentrated, women have a higher probability of encountering infected partners within their sexual networks than do men. Finally, while behavioral interventions and community-based programs across the United States have been instrumental in reducing injection-related risk behaviors (Beardsley *et al.*, in press; Coyle *et al.*, 1998), programs intended to reduce sexual risk have been less successful (Cottler *et al.*, 1998; Sloboda, 1998), especially among drug-using women (Ickovics and Yoshikawa, 1998). Thus, women will continue to be heavily represented among new infections for HIV and other sexually transmitted diseases.

Given the social nature of HIV transmission, we believe that an important aspect of sexual risk is the powerful effect of contextual factors, which includes both relationship-specific and event-specific variables (Auerbach *et al.*, 1994; Gillespie, 1997). Research has indicated that several contextual factors have a significant impact on sexual risk behavior. For example, condom-protected sexual encounters are more likely to occur within casual relationships than primary relationships, a finding demonstrated for drug users (e.g., Booth, 1995; Falck *et al.*, 1997; Friedman *et al.*, 1994; Siegal *et al.*, 1996; Watkins *et al.*, 1993) and other populations (e.g., Evans *et al.*, 1995; Leonard and Ross, 1997; Prince and Bernard, 1998; Roberts, 1998; St. Lawrence *et al.*, 1998; Wingood and DiClemente, 1998). Violent relationships have also been associated with high sexual risk behavior: partner violence was associated with unprotected sex in a sample of women from urban health clinics (Morrill *et al.*, 1996). Risk behavior in the context of alcohol or drug use has also been investigated, and several studies have reported an association between alcohol or drug intake and condom use behavior (e.g., Booth *et al.*, 1993; Falck *et al.*, 1997; Fitterling *et al.*, 1993; Graves and Hines, 1997; Larrat *et al.*, 1994; Molitor *et al.*, 1998; Sly *et al.*, 1997; Wingood and DiClemente, 1998). However, other studies have reported no correspondence between substance use and sexual risk behavior (e.g., Fortenberry *et al.*, 1997; Leonard and Ross, 1997; Weinstock *et al.*, 1993). Finally, the correspondence between protected sexual intercourse and communication and negotiation regarding condom use has been demonstrated in numerous studies (e.g., Malow *et al.*, 1993; Moore *et al.*, 1995; Nyamathi *et al.*, 1995; St. Lawrence *et al.*, 1998; White *et al.*, 1993).

One approach to learning more about the social context of sexual risk, especially the role played by situational variables, is to analyze detailed information regarding the most recent sex event. This minimizes recall bias if events are of recent origin and eliminates generalizations across a given time period (e.g., 30 days or 6 months). Compared to other formats, this approach has been demonstrated to yield higher completion rates for questions about condom use (Reitmeijer and Fichtner, 1998). In an effort to understand the social context of sexual risk among women drug users more completely, this study will (1) describe the most recent sex events of drug-using women from a New York City community with a high prevalence of drug injection, crack use, HIV infection, and AIDS, and (2) identify relationship-specific and event-specific determinants of condom use during these events.

METHODS

Recruitment and Eligibility Criteria

Women were recruited on the streets of East Harlem by experienced outreach workers using targeted sampling (Watters and Biernacki, 1989) and also by means of participant referrals. A brief screening form was administered at the time of initial contact to determine study eligibility. In order to participate, women had to be at least 18 years of age, heterosexually active at least once in the previous 6 months, and report the use of injected or noninjected heroin, cocaine, or crack in the previous 30 days.

Procedure

Women who qualified and agreed to participate in the project were either escorted directly to the field site for processing and assessment or were given an appointment card and invited to participate at a later time. Once at the field site, participants were asked to review and sign an informed consent. Urine was analyzed for morphine and cocaine metabolites. Results indicated that 91% of the women had used cocaine or heroine within the last 72 hr. A face-to-face structured interview lasting approximately 2 hr was administered in a private room by trained and experienced female interviewers. After the interview, women were paid $25 for their participation and offered counseling and testing for HIV infection.

Sample

The sample consisted of 320 women; 56% were African-American and 38% were Latina (mainly Puerto Rican). Median age was 39 years; 49% of the women were high school graduates and 40% were either married or living with a main partner. Approximately 13% lived in a shelter or on the streets at the time of interview. In the 30 days prior to the interview, 8% reported using injection drugs only, 24% used both injection drugs and noninjection drugs, and 68% used noninjection drugs only. Among IDUs, 85% reported injecting heroin, either alone or with another drug, and the remaining 15% injected cocaine only. Among those who reported using noninjection drugs, 57% reported smoking crack, 55% sniffed heroin, and 33% sniffed cocaine (percentages are not mutually exclusive). Twenty-seven percent tested positive for HIV infection.

Measurement

The interview included questions on respondents' demographics and risk factors. In addition, we collected detailed information about two types of most recent sex events: those involving exchange of sex for drugs and/or money and those involving no exchange. For the purpose of this study, we examined only those events in which no exchange occurred. Prior research has shown that the dynamics of sex exchange events are qualitatively different, and should be modeled separately, from events in which no exchange occurred (Logan *et al.*, 1998; Tortu *et al.*, 1999).

For each event, respondents were asked about partner characteristics and relationship-specific and event-specific variables. Partner characteristics consisted of demographics (e.g., age, race/ethnicity) and HIV risk factors (e.g., injection drug use, HIV serostatus). Relationship-specific characteristics included respondent–partner descriptors (e.g., age difference, race concordance), dyadic HIV serostatus (e.g., HIV concordant, male positive discordant), and type and duration of relationship (e.g., "main" vs. "casual," known for more than 1 year). Event-specific factors included the setting of the event, the use of drugs or alcohol, discussion of condom use, sexual behavior, use of condoms, and respondent perceptions of the event (e.g., perceived control over condom use, closeness to partner). In addition, using an open-ended format, respondents reported motivations for using or not using condoms. A complete list of variables is presented in Tables I and II.

Events were defined as either protected or unprotected as follows. A protected event was defined as an episode of heterosexual activity in which condoms were used consistently (i.e., at every instance of penetration) throughout vaginal and/or anal intercourse. An unprotected event was defined as an episode of heterosexual activity in which condoms were either not used at all or not used consistently throughout vaginal and/or anal intercourse. The terms "protected" and "unprotected" were not disclosed to the respondents prior to or during the interview.

Data Analysis

Standard univariate statistics were used to describe the women who participated in the study as well as the sample of sex events reported by these women. Respondents' most recent sex events comprised the units of analysis in all inferential statistical procedures. The sample used in this analysis consisted of each respondent's most recent sex event, whether protected or unprotected. In order to minimize recall bias, events that occurred more than 12 months prior to the interview were excluded from analysis. Finally, 10 events in which condoms were used or not used solely for reproductive reasons were also excluded from the analysis. In seeking to predict condom use in relation to HIV/AIDS prevention, the inclusion of reproductively motivated behavior in the analysis can lead to Type I and Type II errors (Crosby, 1998). The final sample used in this analysis consisted of 320 events.

In all inferential analyses, consistent condom use during the event was the dependent variable. Univariate logistic regression using maximum likelihood estimation (MLE) was applied to each of the predictor variables listed in Tables I and II. Significant predictors of condom use ($\alpha = .05$) were retained for further multivariate analysis. Principal components analysis with oblique (promax) rotation was employed as an exploratory tool to clarify the correlational structure among significant predictors of condom use. MLE multiple logistic regression was performed to determine which factors independently predict consistent condom use. In each analysis, events missing relevant information were excluded.

The instrument was designed to include a series of "analogous" items for which a measure of

agreement could be attained. For example, responses regarding the use of drugs during the sex event should be consistent with information given about short-term (e.g., 30 days) and long-term (e.g., over 1 year) drug use in an earlier section of the questionnaire. Analysis of these ''matching'' items yielded a kappa coefficient of 99.4%, indicating a high level of intrainstrument agreement with regard to response consistency.

RESULTS

Description of Most Recent Sex Events

The total number of recent sex events reported was 320, of which 103 (32%) were categorized as ''protected'' and 217 (68%) were ''unprotected.'' The majority of sex events involved main, rather than casual, partners (78%) and took place in the respondent's house or apartment (61%). All involved vaginal intercourse, while a minority of events also included other forms of sexual activity: cunnilingus (48%), fellatio (32%), and anal sex (4%). Drugs or alcohol were used in 71% of the events. Only about 7% of the events (22/320) were reported as being ''not typical at all'' when compared to the respondent's other sexual encounters. Tables I and II give descriptive data for other characteristics of respondent-reported recent sex events.

Approximately 53% of the events occurred within 1 week of the interview and 71% occurred within 1 month. The mean number of days that had elapsed between the date of the event and the date of the interview was not significantly different between protected and unprotected events as determined by the Wilcoxon rank-sum test ($z = 1.82$, $p > .05$).

Univariate Analyses

Protected/unprotected sex (dependent variable) was regressed separately on respondent and partner characteristics as well as relationship-specific and event-specific descriptors. In the logistic regression test outcomes (two-sided, $\alpha = .05$) presented in Tables I and II, the sample size provides for sufficient power (above 80%) to detect a medium to high effect size (Cohen, 1988). This means that nonsignificant test outcomes with an odds ratio (OR) of between 1.44 and 0.69 indicate variables that have either no

effect or only a small effect on the dependent variable. The univariate logistic regression analyses revealed 13 significant predictors of condom use or nonuse. Of these 13 predictors, all but 1 (''Partner was HIV positive'') were relationship-specific or event-specific variables. Significant relationship-specific predictors included ''Respondent-partner HIV seronegative concordant,'' ''Partner positive discordant,'' ''Length of time respondent knew partner prior to event,'' ''Respondent had had sex previously with partner,'' and ''Sex occurred with a main partner'' (see Table I). Event-specific significant predictors were ''Event occurred at respondent's home,'' ''Discussion of condom use preceded the event,'' ''Respondent's perceived closeness to partner during event,'' ''Respondent's perceived control of condom use,'' ''Respondent performed oral sex on partner,'' ''Partner performed oral sex on respondent,'' ''Event was special (e.g., birthday, anniversary etc.)'' (see Table II).

Multivariate Analyses

Principal components analysis (PCA) was applied to those variables that were significant at $p < .05$ in the univariate logistic regression analyses of the full sample. The PCA was used as a heuristic, exploratory tool to summarize the relationships among significant predictors of condom use. Consequently, the PCA scores are not reported here, nor were they used in any subsequent data analysis. The first four principal components accounted for 57% of the total variance and clearly divided the 13 separate predictors of condom use into four distinct groups (Table III). The first principal component distinguished a dyad-based factor involving the level of ''closeness'' between the respondent and her partner at the time of the event. The second component corresponded to a ''serostatus'' factor. The third component identified a ''sexual behavior'' factor. The fourth component contrasted communication about, and control of, condom use with whether or not the event marked a special occasion. Lack of communication about condoms or perceived lack of control over their use was associated with sex events that marked a ''special occasion,'' such as a birthday or anniversary. Oblique rotation of the principal axes permitted the components to be correlated in the analysis. Intercomponent correlations range from $r = .05$ to $r = .22$, with none significant at alpha = .05.

Table I. Univariate Logistic Regression Tests for Significant Individual and Dyadic Predictors of Protected Sex Events

			MLE logistic regression	
Variable	N	%	OR (95% CI)	p
Respondent-specific variables				
Respondent's age at event	320	38.9[a]	0.99 (0.96, 1.02)	.34
Respondent's race/ethnicity				
African-American (yes/no)	320	55.9	1.08 (0.68, 1.74)	.74
Latina (yes/no)	320	37.8	1.00 (0.62, 1.63)	.98
White (yes/no)	320	5.9	0.55 (0.18, 1.69)	.29
Respondent was current IDU (yes/no)	320	35.0	0.71 (0.43, 1.18)	.19
Respondent was pregnant (yes/no)	318	2.2	0.34 (0.04, 2.87)	.32
Respondent was HIV-positive (yes/no)	312	11.2	1.08 (0.51, 2.28)	.83
Partner-specific variables				
Partner's age at event	318	41.0[a]	0.99 (0.97, 1.01)	.42
Partner's race/ethnicity				
African-American (yes/no)	320	58.1	1.07 (0.66, 1.72)	.78
Latino (yes/no)	320	40.3	0.97 (0.60, 1.56)	.90
White (yes/no)	320	1.6	0.52 (0.06, 4.73)	.56
Partner was current IDU (yes/no)	318	16.0	1.06 (0.56, 1.99)	.88
Partner ever had sex with man (yes/no)	317	1.6	1.39 (0.23, 8.46)	.72
Partner was HIV-positive (yes/no)	318	9.1	2.45 (1.13, 5.29)	.02
Relationship-specific variables				
Respondent–partner age difference	318	−2.1[a]	1.00 (0.98, 1.03)	.91
Respondent–partner race concordance (yes/no)	320	82.5	1.23 (0.65, 2.32)	.52
Respondent–partner HIV serostatus concordant				
Respondent–partner HIV-seropositive concordant (yes/no)	311	3.9	0.18 (0.02, 1.40)	.10
Respondent–partner HIV-seronegative concordant (yes/no)	311	83.6	0.44 (0.24, 0.81)	.008
Respondent–partner HIV serostatus discordant				
Respondent–partner HIV male positive discordant (yes/no)	311	4.8	15.12 (3.34, 68.39)	.0004
Respondent–partner HIV female positive discordant (yes/no)	311	7.7	1.98 (0.84, 4.67)	.12
Length of time knew partner[b]	320	69.7	0.03 (0.02, 0.07)	<.0001
Sex previously with partner (yes/no)	315	93.4	0.37 (0.15, 0.93)	.03
Main or casual partner[c]	320	78.4	0.16 (0.09, 0.29)	<.0001

[a]Mean is reported.
[b]<6 months = 0; ≥6 months = 1.
[c]Main = 1; casual = 0.

Multiple logistic regression was performed to determine which variables were independent predictors of condom use. Several hierarchical model selection methods were employed in which different combinations of variables corresponding to the four components revealed in the PCA were entered into the model sequentially. However, choice of model selection method (hierarchical, simultaneous, forward, backward, or stepwise) had no effect on final model specification. In each case, the same five variables (one each from components one to three and two variables from component four) were found to be independently associated with condom use (Table IV). These included (1) events involving sex with a main partner, as opposed to a casual partner, ("closeness" component) were about three times more likely to be unprotected, (2) events in which the respondent performed fellatio ("sexual behavior" component)

were 2.8 times more likely to be unprotected, (3) protected sex was nearly 70 times more likely to occur in events in which the respondent perceived herself to be HIV-seronegative and perceived her partner to be HIV-seropositive ("serostatus" component), (4) events in which respondents discussed using condoms with their partners prior to having sex were 34 times more likely to be protected ("communication/control" component), and (5) events were 21 times more likely to be protected when respondents perceived having control over condom use during the event ("communication/control" component).

In the multiple regression test outcomes for the final model (two-sided, $\alpha = .05$) presented in Table IV, the sample size provided sufficient power (above 80%) to detect a medium to high effect size (i.e., an R^2 of about 15% or greater). Nonsignificant test outcomes with an OR of between 1.50 and 0.65 indi-

Table II. Univariate Logistic Regression Tests for Significant Event-Specific Predictors of Protected Sex Events

| | | | MLE logistic regression | |
Event-specific variable	N	%	OR (95% CI)	p
Time of event				
Day event occurred[a]	319	47.0	1.38 (0.86, 2.21)	.18
Event occurred between 7 pm–4 am (yes/no)	308	68.2	1.16 (0.69, 1.94)	.58
Location of event				
At respondent's home (yes/no)	320	61.3	0.52 (0.32, 0.83)	.007
At sex partner's home (yes/no)	320	20.9	1.45 (0.82, 2.53)	.19
At someone else's home (yes/no)	320	4.1	1.33 (0.42, 4.18)	.62
At a public place (bar, abandoned building, park) (yes/no)	320	12.8	2.01 (0.99, 3.90)	.06
Presence of others (yes/no)	318	9.4	0.74 (0.32, 1.72)	.48
Discussion of condom use occurred (yes/no)	320	38.1	35.45 (18.06, 69.58)	<.0001
Who wanted to use condoms more (n = 122, events w/discussion)				
Respondent wanted to use condoms more	122	30.3	0.42 (0.18, 0.99)	.046
You both wanted to use condoms equally	122	50.8	10.62 (3.71, 30.37)	<.0001
Partner wanted to use condoms more	122	7.4	1.28 (0.25, 6.51)	.77
You both did not want to use condoms equally	122	11.5	0.02 (0.00, 0.18)	.0004
Respondent's perception of closeness to partner[b]	320	76.9	0.43 (0.25, 0.73)	.002
Respondent's perception of control[c]	319	81.8	17.68 (4.22, 74.03)	.0001
Respondent's perceived threat from partner (yes/no)	319	1.9	0.41 (0.05, 3.59)	.42
Sexual acts performed at event				
Partner performed oral sex (yes/no)	320	47.5	0.56 (0.35, 0.91)	.02
Respondent performed oral sex (yes/no)	320	31.9	0.40 (0.23, 0.70)	.001
Anal sex occurred (yes/no)	319	3.8	0.69 (0.18, 2.60)	.58
Vaginal fondling occurred (yes/no)	320	83.4	0.61 (0.34, 1.12)	.11
Drugs/alcohol used at event				
Alcohol used (yes/no)	319	20.4	1.09 (0.61, 1.95)	.76
Any drugs/alcohol used (yes/no)	320	70.9	0.76 (0.46, 1.26)	.28
Drugs injected (yes/no)	320	15.3	1.41 (0.75, 2.65)	.28
Crack used (yes/no)	320	32.8	0.89 (0.54, 1.47)	.65
Noninjection drugs used (yes/no)	320	67.8	1.01 (0.61, 1.67)	.97
Two or more drugs used (yes/no)	320	34.7	1.31 (0.80, 2.13)	.28
Who provided drugs if used (n = 227; events involving drugs)				
Respondent only provided drugs (yes/no)	227	32.1	0.62 (0.33, 1.17)	.14
Partner only provided drugs(yes/no)	227	45.4	0.97 (0.54, 1.71)	.91
Both respondent and partner provided drugs (yes/no)	227	22.5	1.79 (0.94, 3.42)	.08
Event was special (e.g., birthday, anniversary) (yes/no)	320	5.3	0.12 (0.02, 0.94)	.04

[a]Friday–Sunday = 1; Monday–Thursday = 0.
[b]Very close = 1; less than very close = 0.
[c]More than somewhat = 1; somewhat or less = 0.

cate variables that had either no effect or only a small effect on the dependent variable. These were (1) event occurred at respondent's home (OR = 1.27, p = 0.65), (2) respondent's perception of closeness to partner (OR = 1.46, p = 0.54), and (3) event marked a special occasion (OR = 1.26, p = 0.84).

Respondent's Self-Reported Motives for Condom Use Behavior

Respondents were also asked to tell why they did or did not use condoms during the event. The responses were coded and appear in order of frequency in Tables V and VI.

DISCUSSION

The "critical event" methodology used in this study minimizes recall bias and eliminates generalizations over time. In order to study the social ecology of risk, we have tailored this methodology to our goals. Information on the context of risk is rarely obtained in traditional risk behavior surveys. In contrast, our respondents were asked to provide a detailed description of the setting in which the behavior occurred, and this made it possible to identify certain contextual determinants of condom use. Because information on the individuals involved in the event was also obtained, it was possible to estimate the relative effects of contextual factors and individual

Table III. PCA Component Loadings Expressed as Standard Regression Coefficients After Oblique (Promax) Rotation

Predictor variables by component	PC 1	PC 2	PC 3	PC 4
Eigenvalues of correlation matrix	2.62	2.33	1.36	1.14
Closeness to partner				
Length of time respondent knew partner	0.69*	0.01	−0.17	0.14
Respondent had sex previously with partner	0.61*	−0.03	−0.01	−0.02
Main versus casual partner	0.71*	0.09	0.08	−0.22
Event at respondent's home	0.72*	−0.07	−0.09	0.25
Respondent's perception of closeness to partner	0.60*	0.10	0.19	−0.11
HIV serostatus				
Partner was HIV-positive	0.04	0.92*	−0.01	−0.02
HIV seronegative concordant	0.06	−0.85*	−0.02	0.09
HIV discordant, male positive	0.04	0.83*	−0.02	0.12
Sexual practices				
Partner performed oral sex on respondent	−0.03	0.03	0.83*	0.15
Respondent performed oral sex on partner	−0.04	−0.04	0.82*	0.01
Communication and control				
Discussion of condom use occurred	−0.35	0.17	−0.09	0.43*
Respondent perceived control of condom use	0.11	−0.03	0.10	0.76*
Event was special	−0.03	0.01	−0.09	−0.59*

Note: $N = 306$. All coefficients are multiplied by 100 and rounded to the nearest integer.
*Value of coefficient exceeds the root mean square of all values in the matrix.

attributes on condom use by means of a single comprehensive analysis. In addition, when combined with period-specific survey items, it is also possible to assess intraindividual variation.

However, the following limitations to this study should be noted. It is not possible to obtain a random sample of street-based drug users. Data regarding the most recent sex events are self-reported. While we feel the use of the "critical event" reporting strategy minimized recall bias, the data may be subject to other reporting biases. Nonetheless, we believe some important implications for research and prevention efforts can be drawn from these data.

Our findings indicated that, overall, women drug users from East Harlem engage in high frequencies of unprotected vaginal sex. In many instances, unprotected sex occurs with partners exhibiting one or more risk factors, such as current injection drug use or HIV seropositivity. Thus, a considerable number

of the recent sex events of these women involved risk for HIV and other sexually transmitted diseases. Our analysis further showed that four main relationship-specific and event-specific factors accounted for a substantial proportion of the variance in condom use behavior (Table IV). While we recognize that condom use is a dyadic-level behavior (i.e., it involves reciprocal interaction between two individuals), women undoubtedly shape the behavior to some extent, perhaps through communication about condoms with their partner. Based on women's self-reports, five contextual variables appear to influence condom use behavior in dyads. These are (1) level of closeness or familiarity with sex partners (e.g., main vs. casual partner), (2) perception of event-specific HIV risk (e.g., respondent is HIV-negative and partner is HIV-positive), (3) occurrence of fellatio, (4) communication about condoms, and (5) perceived control over condom use. The five variables found to predict condom use independently are dis-

Table IV. Multiple Logistic Regression: Predictors of Condom Use at Most Recent Sex Events

Independent predictor of condom use	OR (95% CI)	p
Event was with main partner	0.34 (0.14, 0.79)	.01
Couple was HIV serodiscordant, male positive	68.57 (2.82, 99.00)	.009
Respondent performed oral sex on partner	0.36 (0.15, 0.83)	.02
Discussion of condom use occurred	34.36 (15.54, 75.99)	.0001
Respondent perceived control over condom use	20.67 (4.06, 105.36)	.0003

Note: $N = 311$.

Table V. Most Frequently Given Reasons Why Respondent Did Not Use Condom During Most Recent Unprotected Sex Event

	Percent positive response		
Response	Total sample of events (N = 217)	Events with main partners (N = 193)	Events with casual partners (N = 24)
Respondent has "been with" partner for a long time	65.9	73.6	4.2
Respondent felt that partner was not infected with any disease	59.4	61.7	41.7
Respondent didn't think she needed protection	55.3	58.5	29.2
Using a condom decreases partner's sexual pleasure	46.1	48.2	29.2
Using a condom makes sex less intimate	45.6	48.2	25.0
Partner didn't feel like using a condom	45.2	46.1	37.5
Using a condom decreases responsent's sexual pleasure	44.7	48.2	16.7
Both the respondent and her partner were HIV-negative	41.0	42.0	33.3
Respondent got "caught up in the moment"	37.8	35.8	54.2
Respondent didn't feel like using a condom	35.9	37.8	20.8
Partner refused to use a condom	14.7	15.0	12.5
No condoms were available	12.4	10.9	25.0
Using a condom makes your partner angry	10.1	10.4	8.3
Respondent had a tubal ligation	7.4	6.2	16.7
Rerspondent was too drunk or high	5.1	4.1	12.5
Both the respondent and her partner were HIV-positive	3.7	4.1	0.0
Respondent wanted to get pregnant	3.3	3.7	0.0
Respondent couldn't afford a condom	0.5	0.5	0.0

cussed below along with several variables of interest that did not predict condom use.

Type of Relationship

The finding that unprotected sex events were more likely to occur with main than casual partners has also been demonstrated for other drug-using populations (Booth, 1995; Falck *et al.*, 1997; Friedman *et al.*, 1994; Siegal *et al.*, 1996; Watkins *et al.*, 1993). The most frequently cited reasons for not using condoms with main partners centered around the respondent's perception that she was not at high risk for contracting HIV or other STDs because she has been with her partner for a long time and trusts that he

is not infected (Table V). Another frequently cited reason for not using condoms with main partners was the belief that condom use decreased sexual pleasure for both partners and made sex less intimate (Table V), a finding consistent with that of Kenen and Armstrong (1992). In contrast, the primary reason given by women for having unprotected sex with a casual partner was that they "got caught up in the moment." The responses "no condoms were available" and "I was too drunk or high" were also cited more frequently with casual partners than with main partners. However, many of the women who had unprotected sex with a casual partner also believed he was not infected with any disease. In addition, women frequently reported partner influence as a primary reason for engaging in unprotected sex with either main

Table VI. Most Frequently Given Reasons Why Respondent Did Use Condom During Most Recent Protected Sex Event

	Percent positive response		
Response	Total sample of events (N = 103)	Events with main partners (N = 58)	Events with casual partners (N = 45)
Using a condom makes respondent feel like a "responsible" person	92.2	89.5	95.6
Using a condom makes respondent feel safer from AIDS and other diseases	86.3	82.5	91.1
Using a condom protects the respondent's partner from AIDS and other diseases	77.5	75.4	80.0
Partner insisted on using a condom	25.5	29.8	20.0
Because the respondent did not want to get pregnant	25.5	26.3	24.4

or casual partners. In more than one half of all unprotected sex events, women reported that their partner did not want (or refused) to use a condom, and in about 10% of events, women stated that using a condom would make their partner angry (Table V).

Although protected sex was more likely to occur with casual partners, the reasons given for condom use with both main and casual partners were quite similar. Women who engaged in protected sex reported "feeling responsible" and "feeling safer from AIDS and other diseases." Our results show that there are important qualitative differences between main and casual relationships that should be investigated further. Despite the greater use of condoms during events with casual partners, the rate of unprotected sex was relatively high regardless of partner type. Interventions aimed at reducing sexual risk should target relationships rather than individuals and emphasize different strategies for condom negotiation with main and casual partners. Specifically, issues of trust and intimacy need to be addressed as the primary obstacles to condom use with main partners, whereas loss of control (e.g., "got caught up in the moment") and lack of preparation (e.g., "no condoms available") need to be addressed in the context of casual relationships.

HIV Serostatus Discordancy

Neither the HIV serostatus of the respondent nor that of the partner was an independent predictor of condom use, but HIV serodiscordance between respondent and partner was found to be a significant independent predictor of protected sex. Clark *et al.* (1997) and Padian *et al.* (1997) also reported a correspondence between sexual risk behavior and HIV serodiscordance. However, our analyses showed that only one type of HIV serodiscordancy (male-positive HIV-serodiscordancy) predicted condom use. Events involving female-positive HIV-serodiscordant sex partners were no more likely to be protected than unprotected. This indicates a type of self-protective behavior among our respondents.

Sexual Behavior

Our data also indicate that when the respondent performed oral sex on the partner (fellatio), condom use during vaginal sex was less likely to occur. Little research is available on the issue of sexual behavior

among drug-using couples and its relationship to sexual risk. Skurnick *et al.* (1998) found that fellatio was associated with a lack of condom use during vaginal sex in a retrospective analysis of HIV-serodiscordant couples. These authors concluded: "Those performing oral–penile sex may have been unwilling to interrupt a sexual encounter to use condoms" (p. 502). This finding suggests that certain sexual practices or "routines" may be more or less likely to lead to condom use. Further investigation is needed regarding this issue, perhaps through in-depth interviews.

Discussion of Condom Use

Discussion of condom use was also an independent significant predictor of protected sex, which supports research cited earlier. In approximately half of the 122 events with condom discussions, both partners were in agreement about using or not condoms. In 30% of the discussions, the respondent wanted to use condoms more, and in 20%, the partner wanted to use condoms more. On those occasions when a discussion of condom use took place, a protected sex event was more likely to occur if the man expressed a desire to use condoms more compared to when the woman wanted to use condoms more. This result supports previous theory indicating that men have greater influence over condom use than women. But it is also apparent that any discussion of condom use was better than no discussion at all (a protected sex event was more likely to occur when a discussion of condom use took place even when the partner did not express an initial desire to use condoms.) Further research is needed to investigate the timing and content of successful condom use discussions between partners.

Perceived Control of Condom Use

Our analysis also revealed that women's perceived control of condom use was a significant independent predictor of protected sex events. Previous studies of women's control of reproductive and condom use behavior have primarily focused on properties inherent to the individual, such as degree of "sexual nonassertiveness" (e.g., Wingood and DiClemente, 1998) or "self-efficacy" (e.g., Montoya, 1998). While such studies are informative, our analysis indicates that perceived control over condom use

seems to be influenced more by event-specific factors than by individual attributes. For example, perceived control of condom use at most recent sex event did not covary with respondent's age, race/ethnicity, level of education, or religion. By contrast, several contextual variables were found to covary with perceived control of condom use, including type of relationship, whether or not a discussion of condom use occurred, use of drugs or alcohol during the event, and the respondent's ''getting caught up in the moment.'' Our own previous research (Tortu *et al.*, 1998) has shown considerable intraindividual variation in perception of control, further indicating that this variable is influenced more by contextual factors than individual attributes. Future research should investigate the interrelationships among the determinants of perceived control in more detail. In addition to the covariates listed above, other contextual factors, such as level of education, access to economic resources, and relationship-specific communication patterns may impact on women's perceived control.

Drug and Alcohol Use

Our critical events analysis revealed no correspondence between alcohol or drug use and condom use behavior. However, in a previous study we conducted (McMahon and Tortu, 1998), an analysis of 30-day behavior of the same respondents yielded several significant associations between drug or alcohol use and condom use behavior. This discrepancy was noted in studies cited in the Introduction and appears to correspond at least in part to differences in survey methods. Studies in which an association was found between psychoactive drug use and sexual risk behavior were almost always based on analysis of averages or frequencies of behavior over a given time period (e.g., 30 days or 6 months). In contrast, studies that found no significant association between drug use and condom use were almost always based on analysis of most recent sex events. Our results indicate that the time frame used in the survey is one methodological aspect that should be taken into consideration when examining the effects of drug use on sexual risk behavior.

Perceived Threat from Partner

Partner violence or the threat of violence has frequently been mentioned as a major barrier to con-

dom use (Wingood and DiClemente, 1997), yet few events (1.9%) included threats or acts of violence in our sample of 320 events. It is possible that discussions regarding condom use that escalate to violence preclude subsequent sexual behavior, or they may take place in a different situational context altogether. More research is needed on the possible effects of dyadic violence and the threat of violence on sexual risk behavior.

Relevance to HIV Prevention

It is important to recognize that the women in this sample were recruited in a neighborhood that has one of the highest rates of AIDS in New York City. Drug users who live in East Harlem have been targeted frequently for preventive efforts. The women in our sample appear to be concerned about HIV: our own unpublished data indicate they have been tested for HIV an average of about four times. They have all heard the prevention messages and yet there are still high rates of unprotected sex. It is clear that new tactics are needed. Our findings, for example, indicate the importance of factors such as being in a long-standing relationship with a main partner, perceived dyadic HIV serostatus, discussion and control of condom use, and sexual practices. These are all variables that involve interactions between people and which profoundly influence risk behavior. Most HIV risk reduction interventions target individuals rather than relationships. Perhaps interventions designed to decrease sexual risk among drug users should employ different strategies. One approach might be to target drug-using couples with long-standing sexual relationships and tailor the intervention to a risk assessment conducted at the dyadic level. Not all couples share the same sexual risk: unprotected sex may not be risky if all the indicators are that both partners are HIV-negative, monogamous, and do not inject. For a couple with this risk profile it may only be necessary to encourage condom use if sex were to occur outside the relationship. In contrast, if a dyadic risk assessment finds that a couple is at high risk and condom use is indicated, then partners should be assisted in making this behavior part of their sexual repertoire. If a public health educator introduces the issue of condom use, the burden of raising this issue is taken away from one of the partners, whose request for condom use may be regarded as an admission of infidelity or mistrust. Drug treatment programs, STD clinics, and facilities that

conduct HIV testing and counseling are all possible venues for couples-based interventions.

It is crucial that practitioners continue to explore methods of engaging couples in activities which focus on increasing sexual pleasure as well as protection from disease. An intervention currently being conducted in New York City recruits couples from methadone programs and focuses on both eroticizing the use of condoms and increasing sexual pleasure (Nabila el-Bassel, personal communication). The recent invention of a new condom for males (Brown, 1999) which actually enhances sexual pleasure may go a long way in removing a major objection to condoms. Initial reports of its acceptability were promising. Finally, it is critical to increase the range of options available for protection. Dyadic risk reduction strategies should offer couples an array of protective methods, including expanding the sexual repertoire to include low-risk sexual behaviors such as mutual masturbation, the use of the female condom, and any protective microbicides which may be developed in the future. Ultimately, the complex dynamics that occurs within a sexual relationship needs to be addressed by increasingly sensitive and sophisticated intervention programs.

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