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ORIGINAL ARTICLE

Childhood Sexual Abuse and HIV Risk Among Men Who Have Sex with Men: Initial Test of a Conceptual Model

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Abstract Childhood sexual abuse has been associated with HIV transmission risk behavior in men who have sex with men. This study examined an adapted model that was originally developed to explain the relationship between childhood sexual abuse and HIV risk behavior among women in a sample of men who have sex with men. Men attending a large gay pride event ($n = 647$) completed anonymous surveys that assessed demographic characteristics, childhood sexual abuse, symptoms of dissociation, trauma-related anxiety, borderline personality characteristics, hopelessness, substance use, and sexual risk behavior. A latent variable partial least squares analysis was conducted to test the interrelationships between childhood sexual abuse, exchanging sex for money or drugs, emotional disturbances, drug use, substance use in the context of sexual behavior, and sexual risk behavior. The model fit the data well and accounted for 10% of the total variance in sexual risk behavior. History of childhood sexual abuse predicted exchanging sex for money or drugs and this relationship was partly accounted for by active drug use. Substance use proximal to sexual behavior also emerged as a key factor in predicting sexual risk behavior. Findings from this study, therefore, indicate a direct association between history of child sexual abuse and high risk for HIV infection related to engaging in sex trade.

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Psychological effects of childhood sexual abuse, such as depression, posttraumatic stress, and dissociation symptoms, may influence the relationship between sexual abuse and risk for HIV infection. Adults with a history of childhood sexual abuse frequently exhibit symptoms of trauma (Polusny & Follette, 1995), anxiety disorders (Bremner, Southwick, Johnson, Yehuda, & Charney, 1993), dissociative experiences, and borderline personality (Becker, Rankin, & Rickel, 1998). There is also evidence that for women, a history of childhood abuse is a risk factor for sexually transmitted diseases (STDs), particularly HIV infection (Lodico & DiClemente, 1994; Zierler et al., 1991). Although research has shown that women with a history of childhood sexual abuse experience long-term psychological, social, and health consequences (McCauley, Kern, Kolodner, Dill, & Schroeder, 1997), less is known about men who survive child sexual abuse.

It is estimated that as many as 31% of men in the United States experience sexual abuse in childhood (Finkelhor, Hotaling, Lewis, & Smith, 1990). Studies report between 4 and 76% of men having a history of child sexual abuse, with the wide range accounted for by use of different definitions of sexual abuse. In a study, examining child sexual abuse among gay and bisexual men, 33% experienced their first sexual contact with an older person prior to age 16 (Doll, Joy, Bartholow, Harrison, Bolan, et al., 1992). A history of child sexual abuse in men who have sex with men has been associated with HIV risk behavior; men with a history of abuse are more likely to engage in unprotected receptive anal intercourse (Carballo-Diéguez & Dolezal, 1995), have

more sexual partners, and are more likely to be HIV positive (Jinich, et al., 1998).

Miller (1999) reported a conceptual model to examine the linkages among sexual abuse, social networks, psychopathology (i.e., PTSD, dissociation, borderline personality, depression), drug use, and sexual adjustment as predictors of HIV risk behavior in women. Miller suggested that a history of child sexual abuse has bidirectional relationships with psychopathology (dissociation and depression) and drug abuse, which in turn have direct associations with sexual and drug risks for HIV infection. The role of substance use may be particularly important as empirical studies show a significant association between physical and sexual abuse in childhood and the use of illicit drugs in adulthood (Acoca, 1998; Dembo, Dertke, Borders, Washburn, & Schmeidler, 1988; Wilsnack, Vogeltanz, Klassen, & Harris, 1997). In addition, it is common for trauma survivors to experience residual anxiety and self-medicate their anxiety with alcohol and other substances. In Miller's model, sexual abuse history has a direct path to sexual adjustment, which is related to sexual risks for HIV. Thus, Miller provides a conceptual framework for understanding the link between childhood sexual abuse history and sexual risks in women.

Because the prevalence of sexual abuse in men is high and because some subpopulations of men are at particularly high-risk for HIV-AIDS, examining psychological and behavioral factors in relation to history of child sexual abuse and HIV risk behavior is warranted. In the current study, we adapted (Miller, 1999) a model to examine the direct and indirect effects of factors associated with child sexual abuse and HIV risk behavior among men who have sex with men. We hypothesized that child sexual abuse history would be significantly related to indicators of psychopathology and substance use, which in turn would predict sexual risk behavior in men who have sex with men. We also predicted that history of child sexual abuse would be independently associated with sexual risk behaviors, including exchanging sex for money or drugs.

Methods

Participants

The total number of men who participated in this survey was 647; with missing data and nonresponse resulting in 603 (93%) useable surveys. Participants were men who have sex with men, averaging 34.4 years of age ($SD = 9.2$, range = 17–72). Most of the sample was Caucasian (71%) or African American (21%) with the remaining 8% consisting of Hispanics/Latinos and Asian Americans. The sample was well educated with the majority of the respondents completing one or more years of college. Incomes ranged from less than $10,000 per year to more than $40,000 with a median income of $21,000–$30,000 range. Nearly 54% of the sample was sexually active and not in an exclusive relationship of 6 months duration or longer.

Procedure

Participants were recruited from a gay pride festival in Atlanta, Georgia. This festival was chosen as the site for the survey because of the over 300,000 men who attend this annual event, the diversity of festival attendees, and because previous research has shown that men who attend gay pride festivals report significant rates of high-risk sexual behaviors (Hickson et al., 1996; Kalichman & Rompa, 1995). Georgia ranks eighth among US states in cumulative number of AIDS cases, and over 70% of AIDS cases in Georgia have been reported in metropolitan Atlanta. More than half of Atlanta's AIDS cases have occurred among men who have sex with men (Georgia Division of Public Health, 2001).

Participants were recruited as they walked through the area of the festival grounds where retail venders and community organizations occupied display booths, two of which were rented for the purposes of this study. Participants were told that the 11-page survey concerned sexual relationships, contained personal questions about their sexual history including childhood sexual abuse, was anonymous, and required approximately 15 min to complete. Over 85% of men approached agreed to complete the survey. Participants' names were not collected with the survey at any time. Participants were offered $4 for completing the survey, of which half could be donated to a local AIDS service organization. Forty-five percent of the sample chose to donate their entire incentive payment.

Measures

Participants completed self-administered anonymous surveys that asked for information about the sample's demographic characteristics, sexual history, substance use, sexual practices, and included scales assessing dissociation, trauma-related anxiety, hopelessness, and borderline personality symptoms. The following sections briefly describe these measures.

Demographics

Participants were asked about their age, years of education, income, ethnicity, home zip code, whether they self-identified as gay, bisexual, or heterosexual, whether they had been tested for HIV antibodies, and if so the results of their most recent HIV test. Men were also asked if they were

exclusively partnered, defined as being in a relationship with only one man for at least 6 months.

Sexual health and sexual abuse history

To assess sexual health we asked participants to respond Yes or No to items asking whether they had been treated for an STD, and exchanged sex for money or drugs. Participants also indicated whether a male relationship partner had ever hit them. History of unwanted sexual contact was assessed using an instrument adapted from a widely used measure of sexually coercive experiences in heterosexual relationships (Koss & Gidycz, 1985). We asked men to respond Yes or No to the question, "Has a man ever forced or pressured you to have sex when you did not want to?" In order to differentiate child sexual abuse from adult sexual coercion, we also asked participants to report their age at which these events first occurred and to indicate the age of their partner at the time of first sexual coercion. Men reporting that they had been coerced into sex at age 16 or younger by a man 5 years their senior or older were defined as having a history of child sexual abuse (Finkelhor et al., 1990).

Substance use

Participants were asked if they had used tobacco, alcohol, marijuana, nitrite inhalants (poppers), powder or crack cocaine, and methamphetamine in the previous 6 months. Participants were also asked to indicate whether they had used drugs in a sexual context in the past 6 months and whether they had received substance-abuse treatment in their lifetime. Responses to these items were coded as dichotomous variables, Yes or No.

Borderline personality

We used six items from the Borderline Personality Scale of the Schedule for Nonadaptive and Adaptive Personality (SNAP) to assess borderline personality characteristics that parallel the diagnostic criteria for Borderline Personality Disorder Clark (1993). Sample items include "Sometimes I get so upset I feel like hurting myself," "I'll do almost anything to keep someone from leaving me," and "My mood sometimes changes without good reason." Participants responded to these items using a 4-point scale (1 = *very much like me*, to 4 = *very much not like me*). The six borderline personality items were internally consistent ($\alpha = .83$).

Dissociation experiences

To assess symptoms of dissociation, we used six items adapted from the Detachment subscale of the Dissociative Processes Scale that reflected tendencies to feel separated from one's own thoughts and actions (Harrison & Watson, 1996). Example items include "I often lose track of time," "Things around me feel unreal," and "My mind and my body do not feel like they are connected to each other." Participants responded to these items using a 4-point scale (1 = *very much like me*" to 4 = *very much not like me*"). The six dissociation items used in the current study were internally consistent ($\alpha = .82$).

Hopelessness

A shortened six-item version of the Beck Hopelessness Scale (BHS) was used to assess hopelessness. Sample items include "My future seems dark to me," and "I look forward to the future with hope and enthusiasm" (reversed), responded to on a 4-point scale (1 = *very much like me* to 4 = *very much not like me*). The scale has demonstrated high internal consistency and adequate test–retest reliability (Beck & Steer, 1988). Internal consistency within the present sample was adequate ($\alpha = .79$).

Trauma-related anxiety symptoms

To assess trauma-related anxiety, we used three items that reflected long-term anxiety symptoms that are commonly associated with traumatic events. Participants were asked how often they experienced three specific symptoms over the previous 3 months. Example items include, "Felt anxious or scared but did not understand why?" and "Had nightmares about something bad that had happened to you?" Participants responded to these items using a 5-point scale (0 = *never*, 5 = *very often*). This measure was internally consistent in the current sample ($\alpha = .74$).

Sexual practices

Sexual behavior was measured by asking participants to report the number of times they had engaged in anal intercourse, as the insertive and receptive partner, as well as the number of times they used or did not use condoms during anal intercourse in the past 6 months. We were particularly interested in anal intercourse because of the high risk that this behavior poses for HIV transmission. Participants were also asked to report the number of times they had engaged in unprotected oral sex, as the insertive and receptive partner. Further, participants recorded the number of sexual partners with whom they had engaged in each behavior in the previous 6 months. Open response formats were used for the sexual behavior measures to reduce response bias and to

minimize measurement error. Measures similar to these have been found reliable (Shroder, Carey, & Vanable, 2003).

Data analysis

Data were analyzed using the Latent Variable Partial Least Squares (LVPLS) 1.8 computer program. Partial Least Squares (PLS) is a type of component analysis (Falk & Miller, 1992) and is related to principal components analysis and canonical correlation analysis. Unlike Structural Equation Modeling (SEM) techniques that fit a common factor model and emphasize the derivation of weights that will optimally reproduce an observed set of correlations, PLS estimates a linear composite, the purpose of which is to maximally account for variation in a set of variables. Although more than one component can be retained in PLS to represent each latent construct, the common practice is to retain only the first component. After all component variables have been estimated, the program uses an iterative procedure and a least squares criterion to estimate all model parameters. Like SEM, therefore, PLS adjusts for measurement error and simultaneously estimates direct and indirect effects. When data are less-well conditioned, the estimates of the structural parameters by PLS are considered only approximate.

Several characteristics of the PLS approach made it preferable for use with our data over SEM techniques. Unlike SEM, the PLS model does not make assumptions regarding the measurement or distributional properties of the variables. PLS can therefore be used when one or more of the manifest variables is categorical without meeting the stringent sample size requirements necessary in some SEM software packages (Yung & Bentler, 1994). PLS is also useful when distributions on the variables are nonnormal and when the theory accounting for the relationships between the variables is not well developed or the relationships between constructs are not entirely known (Falk & Miller, 1992).

Unlike SEM in which model fit is indexed, in part, by a chi-square goodness-of-fit test, in PLS fit is indicated by *R*-square that describes the proportion of variance accounted for in one component, given the other components that predict it in the model. Similar to the root mean square residual (RMR) statistic in SEM, the PLS program calculates the root mean square covariance (RMS COV) statistic which indexes the proportion of correlation not accounted for by

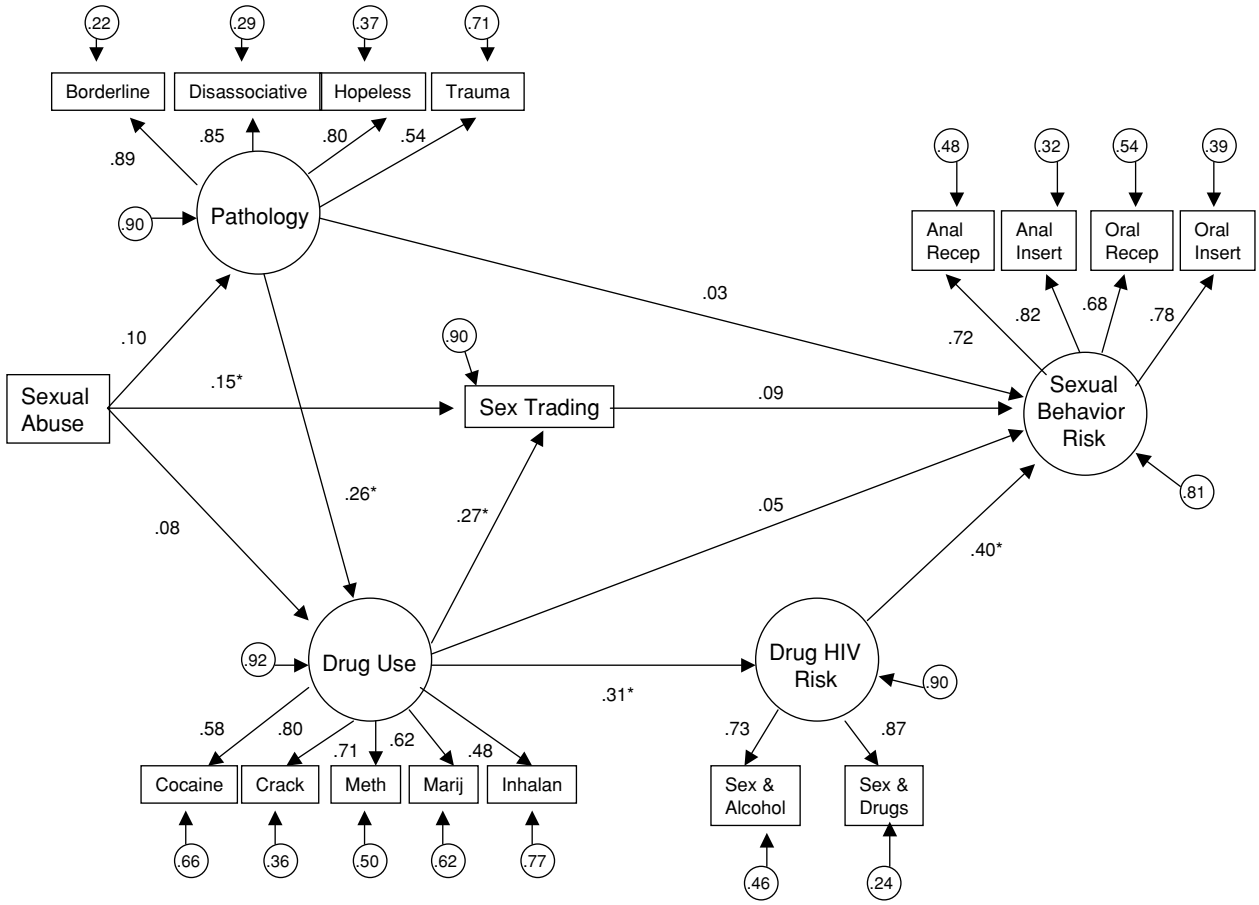

Fig. 1 Model of sexual child abuse in relation to substance use and sexual risk behavior with resulting path coefficients (Meth - methamphetamine, Marij - marijuana, Inhalan - inhalants, Anal Recep - receptive anal intercourse, Oral Recep - receptive oral intercourse).

the model. A test of the significance of the difference of the *R*-squared values from zero can be calculated using standard formulas (Pedhazur, 1982, p. 57). Values of the RMS COV statistic above .20 are said to indicate a poor fitting model and those below .05 a very good fitting model. A model that fits perfectly would have an RMS COV value of 0.

Results

Model definition, diagnostics, and fitting

The model tested was based on Miller (1999) conceptual framework relating sexual abuse to HIV risk in women. As proposed, Miller's model was not fully tested because the construct "social networks" cannot be assessed in the context of a self-administrated anonymous survey. In addition, Miller's specification included a number of bidirectional paths that may be relevant longitudinally but cannot be adequately modeled in the context of a cross-sectional study. For these reasons, the model was modified slightly resulting in the one shown in Fig. 1. We found that 93 (15%) of men in this community sample had a history of child sexual abuse as defined in the Methods section and 106 (17%) had a history of exchanging sex for money or drugs.

Internal validity checks on the model

In a PLS analysis, the manifest variable residual matrix shown as the values above the diagonal in Table 1, was examined for evidence of misspecification of the measurement portion of the model. The residual between block correlations between the manifest variables were all very low (range −.07 to .06). Since correlations greater in absolute value than .20 are considered indicative of possible model misspecification, this range of values supports the conclusion that the definition of the blocks or groupings of variables assumed to represent separate constructs or components was acceptable for these data.

The pattern matrix describing the relationships of the manifest variables to their latent constructs is given in Table 2. Under PLS rules of thumb (Falk & Miller, 1992), variables with component loadings less than .55 may be dropped from the analysis since they contribute little to the definition of a component. Loadings associated with the variable representing use of poppers failed to surpass this criterion while the loading for the variable trauma was very close. Despite this, it was decided to retain both variables in the analysis due to their theoretical importance as contributors to risky sexual behavior. All other indicators were considered satisfactory under this criterion and were also retained in the analyses. Similarly, the correlations between the latent variables were generally supportive of the model (see Table 3). Correlations

Table 1 Rescaled correlations between manifest variables from SCAL program (below diagonal) and residual covariances between manifest variables (above diagonal)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Sexual abuse	–	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	Sex trading	.18	–	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	Borderline	.13	.19	–	−.12	−.08	−.08	−.03	.00	.00	.03	.02	−.02	.01	.00	.00	.00	.00
4	Dissociation	.07	.14	.63	–	−.11	−.19	−.03	.02	.04	.00	−.03	.01	−.01	−.01	.01	−.01	.01
5	Hopelessness	.04	.18	.62	.56	–	−.11	.04	−.01	−.01	−.01	−.02	.00	.00	.03	−.02	.01	−.02
6	Trauma	.06	.08	.39	.26	.32	–	.06	−.03	−.06	−.02	.06	.02	−.01	−.02	.02	.00	.00
7	Cocaine	.11	.26	.18	.20	.20	.17	–	−.20	−.23	−.21	−.25	.04	−.03	.01	−.03	.01	.03
8	Crack	.05	.21	.12	.16	.06	.02	.27	–	−.02	−.12	−.09	.01	−.01	.06	.00	−.04	−.05
9	Methamphetamine	.10	.17	.16	.23	.11	.03	.18	.55	–	−.16	−.08	−.03	.02	−.03	.05	.00	−.04
10	Marijuana	.07	.11	.19	.18	.11	.07	.15	.37	.27	–	−.01	−.05	.04	−.03	.00	.01	.02
11	Poppers	.02	.13	.10	.07	.04	.10	.04	.29	.26	.29	–	.04	−.03	−.03	−.04	.05	.05
12	Anal sex/drinking	.07	.04	.01	.02	−.02	.04	.16	.19	.10	.08	.09	–	−.33	.06	−.07	−.01	.03
13	Anal sex/drug	.07	.10	.07	.04	.01	.04	.15	.25	.22	.23	.06	.31	–	−.05	.05	.01	−.02
14	Freq. Anal sex	.06	.16	.05	.01	.06	.01	.13	.23	.06	.08	.10	.29	.26	–	−.18	−.25	−.17
15	No. anal partners	−.03	.09	.07	.04	.03	.04	.07	.14	.11	.08	.08	.22	.43	.41	–	−.13	−.15
16	Insertive oral sex	.04	.08	.06	.02	.05	.02	.06	.04	.01	.05	.13	.12	.20	.24	.43	–	.12
17	Receptive oral sex	.01	.10	.10	.08	.06	.04	.14	.11	.04	.12	.18	.19	.20	.39	.49	.66	–

Table 2 Pattern matrix of manifest variables in relation to their latent constructs

	Component/Block					
	Sexual abuse	Sex trading	Psychopathology	Drug use	Drug use in context of sex	Sexual risk behavior
Sexual abuse	1.0					
Sex trading		1.0				
Borderline			.89			
Dissociation			.85			
Hopelessness			.80			
Trauma symptoms			.54			
Cocaine				.58		
Crack				.80		
Methamphetamine				.71		
Marijuana				.62		
Poppers				.48		
Anal sex/drinking					.73	
Anal sex/drug					.87	
Frequency of anal sex						.72
Number of anal sex partners						.82
Insertive oral sex						.68
Receptive oral sex						.78

between constructs theorized to be related were higher than those between variables not believed related.

Tests of the conceptual model

Overall, the model fit the data well. The communality coefficient for the entire model was .59 and the RMS COV = .03 indicating that all but a very small proportion of the correlations between variables was unaccounted for by the specified model. *R*-squared values for the endogenous latent constructs and *F*-tests of the difference of these statistics from 0 are given in Table 3. While all of the *R*-squared values were significant at the .05 level, the greatest proportion of variance was accounted for in the variables sex trading, HIV drug risk, and sexual behavior risk (unprotected anal and oral intercourse). Little of the variation in psychopathology (borderline personality, dissociation, hopelessness, and trauma symptoms), and a lesser amount of the variation in drug use was explained by the other variables in the model. Overall, the average *R*-square equaled .10 suggesting that the model accounted 10% of the total variation in the behavior observed.

Structural relations

Table 4 lists the direct, total, and indirect effects for the latent variables in the model. Falk and Miller (1992) state a rule of thumb that variables should explain at least 1.5% of the variance in another variable for the path to be retained in the model. To allow for the evaluation of the model based on this criterion, a column of these values has been added to Table 4. Based on this criterion, the paths between sexual abuse, and sex trading, psychopathology and drug use, drug use and sex trading, drug use and HIV drug risk, and HIV drug risk and sexual risk behavior are all important and should be retained in the model. Paths between sexual abuse and psychopathology, sexual abuse and drug use, psychopathology and sexual risk behavior, and drug use and sexual risk behavior are unimportant and could be excluded from the model. In general, the effects of each component on another are direct. Indirect effects are small, but occur for sexual abuse on sex trading through drug use, sexual abuse on drug use through psychopathology, psychopathology on sexual risk behavior through drug use and HIV drug-related risk, and drug use on sexual risk behavior through HIV-related drug risk. Total effects were highest for HIV drug risk on sexual risk behavior, drug use on HIV drug risk and sex trading, and psychopathology on drug use.

Discussion

To our knowledge this is the first study to test Miller (1999) framework of child sexual abuse and HIV risk in men who have sex with men. Contrary to expectations, we did not find strong support for the independent effects of child sexual abuse on indices of psychopathology, substance use, or engaging in unprotected anal intercourse. Child sexual abuse history was, however, associated with a history of trading sex for money or drugs. In addition, the effect of childhood sexual abuse on trading sex for money or drugs was mediated by current active drug use. As a predictor of sexual risk for HIV infection, child sexual abuse history was therefore most

Table 3 Correlations between latent variables and squared multiple correlations associated with each component

	Component								
	1	2	3	4	5	6	*R*-squared	*F*	*p*
Sexual abuse	1.0						–	–	–
Sex trading	.18	1.0					.10	31.58	<.01
Psychopathology	.10	.19	1.0				.01	6.07	<.05
Drug use	.11	.28	.27	1.0			.08	26.09	<.01
HIV drug risk	.08	.09	.05	.31	1.0		.10	66.78	<.01
Sexual behavior risk	.02	.14	.08	.21	.42	1.0	.19	46.99	<.01

closely associated with high risk resulting from exchanging sex for money or drugs. The strongest predictor of unprotected sexual behavior was substance use in sexual contexts and the best predictor of general substance use was psychopathology. Therefore, consistent with the broader HIV risk behavior literature, drug use has a prominent role in the risks for HIV infection among men who have sex with men (Stall & Purcell, 2000).

We believe there may be several factors that explain the observed direct effects and indirect effects of our study. First, there may be other factors that are relevant to explaining the relationship between child sexual abuse and HIV risk behavior among men who have sex with men. For example, we did not examine the severity of child sexual abuse, such as number of assaults or duration of the abuse, of which previous research has suggested have an impact on psychopathology (Briere & Runtz, 1987; Polusny & Follette, 1995; Pribor & Dinwiddie, 1992). Second Miller (1999), the original model was focused on women and we have no way of knowing how gender may affect the interrelationships between the variables in the model. Third, we adapted the model for our sample by omitting the social network variable and we do not know how this omission influenced the remaining relationships examined in the model. Finally, it may be the case that a history of child sexual abuse is coincidental to drug use, which has a well-established relationship to sexual risk behaviors.

As previously noted, this study was conducted with a convenience sample of gay and bisexual men attending a large gay pride event. Men who completed the survey likely differed from the general population of gay men along such dimensions as age, socioeconomic status, education, etc. Our sample cannot therefore be considered as a representative of gay and bisexual men. This study is further limited by its reliance on self-report measures and a retrospective cross-sectional design. Self-report measures of sensitive behaviors may introduce socially desirable responses and other biases. In addition, our retrospective cross-sectional design precluded the possibility of establishing the direction of causality between the variables that we examined. Together these limitations should be carefully considered when interpreting our findings. Nevertheless, we believe that our findings advance our understanding of childhood sexual abuse and its relationship to HIV risk behavior.

Our findings suggest that among men who have sex with men, identification of childhood sexual victimization may be an important factor in some of the highest risks for HIV infection, such as exchanging sex for money or drugs. Current HIV risk reduction strategies rarely include formal mechanisms for addressing issues of childhood sexual abuse as well as other traumatic life events Kalichman (1998). Addressing issues of child sexual abuse seem particularly important when intervening with men who trade sex for money or drugs. However, our data suggest that it is imperative for prevention

Table 4 Percentage of variation accounted for by each variable, direct, indirect, and total effects

	Direct effects	Variance accounted for (%)	Total effects	Indirect effects
Sexual abuse→sex trading	.15	.027	.18	.03
Sexual abuse→psychopathology	.10	.010	.10	.00
Sexual abuse→drug use	.08	.008	.11	.03
Sex trading→sexual risk behavior	.09	.001	.09	.00
Psychopathology→drug use	.26	.070	.26	.00
Psychopathology→sexual risk behavior	.03	.002	.08	.05
Drug use→sex trading	.27	.075	.27	.00
Drug use→HIV drug risk	.31	.096	.31	.00
Drug use→sexual risk behavior	.05	.001	.20	.15
HIV drug risk→sexual risk behavior	.40	.168	.40	.00

interventions to address issues of substance abuse as it is related to sexual risk behavior. Although interventions can also effectively address mental health problems when they occur in the context of the long-term sequelae of childhood sexual abuse, the current study does not support the notion that a history of child sexual abuse in and of itself predicts unprotected sexual risk behavior in general. Rather, drug use and particularly drug use in the context of sex, is a proximal target for broadly applied risk reduction interventions. We therefore conclude that interventions that focus on resolving issues of child sexual abuse are urgently needed to improve the emotional well-being and mental health of survivors of sexual abuse and that such interventions be targeted to men who have a history of child sexual abuse and exchange sex for money or drugs.

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