Adult Attachment and High-Risk Sexual Behavior Among HIV-Positive Patients

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The present study investigated the relationship between adult attachment style and sexual behavior among HIV-positive patients. HIV-positive (HIV+) participants (N = 48) completed questionnaires assessing number of sexual partners, adult attachment, self-esteem, and depressive symptoms. Results revealed that insecure attachment styles (particularly negative attachment representations of self and fearful attachment) were associated with having multiple sexual partners, including at-risk HIV-negative (HIV-) partners. These relationships remained significant after controlling for sexual orientation, self-esteem, and depressive symptomatology. These results suggest that interpersonal issues may play a key role in high-risk sexual behavior among HIV+ individuals.

Human Immunodeficiency Virus (HIV) infection is a chronic and terminal illness that is frequently associated with disruptions in many aspects of patients' daily lives. Sexuality, in particular, can be affected as HIV-positive (HIV+) individuals carry a deadly virus that can be transmitted through sexual contact. Although most of these individuals are aware that their HIV status requires particular care with regard to sexual activity, they nevertheless continue to experience the natural emotional and physical drives for having sexual relationships. As such, many HIV+ individuals continue to be sexually active. Unfortunately, a significant minority of HIV+ individuals engage in risky sexual activities.

A recent study found that 42% of HIV+ men and 42% of HIV+ women reported at least one instance of unprotected intercourse during a 6-month period, frequently with partners with unknown or seronegative HIV status (Kalichman, 1999). Another study reported that 25% of serodiscordant heterosexual couples (couples in which only one partner is HIV+) do not consistently use condoms during sexual intercourse (Kennedy et al., 1993). These findings are primarily of concern because of the possibility that HIV-negative (HIV-) individuals might become infected with the virus. Yet even high-risk contact between two HIV+ individuals can have negative repercussions on health. Other sexually transmitted

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diseases, including different and more treatment-resistant strains of HIV, may be transmitted (Wainberg & Friedland, 2000).

Remarkably, although a great deal of attention in the literature has been paid to factors contributing to HIV risk behavior in the general population, much less attention has been given to understanding and predicting these same behaviors among HIV+ individuals. Factors that have been linked to increased risky behavior among HIV+ samples include substance abuse (Heckman, Kelly, Somlai, Kalichman, & Heckman, 1999; Kalichman, 1999; Kalichman, Kelly, & Rompa, 1997; Kelly et al., 1993; Robins et al., 1994) and the exchange of sex for money or drugs (Kalichman, Kelly, & Rompa, 1997). Negative emotionality and maladaptive coping also have been linked to such sexual behavior (Heckman et al., 1999; Kalichman, Kelly, & Rompa, 1997; Kelly et al., 1993; Kennedy et al., 1993), though not consistently (Kalichman, 1999).

While such research has been valuable, it has been criticized for being mechanistic and ignoring the interpersonal and affectional nature of sexual relationships (Feeney & Raphael, 1992). The need for a greater understanding of these interpersonal and affectional motives for continued risky sex behavior is highlighted by findings demonstrating that among HIV+ samples, unsafe sex is more common in long-term relationships than in casual relationships (Doll et al., 1991; Heckman et al., 1999; Remien, Carballo-Dieguez, & Wagner, 1995). Further, the primary reasons provided by gay men for engaging in unprotected intercourse include a desire to communicate commitment, as well as to seek closeness and emotional warmth (Prieur, 1990). It has been proposed that attachment theory (Bowlby, 1980) may provide a useful framework through which to explore the interpersonal nature of HIV risk behavior (Feeney & Raphael, 1992).

Attachment theory posits that one's experience within close interpersonal relationships throughout the course of the lifespan gives rise to working models or cognitive representations of others, as well as of self in relation to others (Bowlby, 1973, 1980). These models guide and organize behavior, affect, and cognition in intimate relationships. Bartholomew and Horowitz (1991) described four prototypical adult attachment styles representing the four combinations possible from positive and negative models of self and others: secure, dismissing, preoccupied, and fearful. *Secure* individuals have positive models of both self and others, while *fearful* individuals have negative models of both. *Preoccupied* individuals have positive models of others and negative models of self, while *dismissing* individuals have the reverse pattern. Such attachment styles and working models are thought to affect a broad range of interpersonal behaviors, including sexual behaviors (Feeney & Noller, 1990; Feeney & Raphael, 1992; Levy & Davis, 1988; Shaver & Hazan, 1988; Shaver, Hazan, & Bradshaw, 1988).

Working-model and attachment-style differences are likely to be related to a number of interpersonal and relationship factors that affect intimate relationships and sexual practices. For example, Shaver and his colleagues (Shaver & Hazan,

1988; Shaver et al., 1988) proposed that adult attachment may be related to the nature (e.g., duration, exclusivity) of individuals' sexual relationships and their motivations for seeking these relationships. Other factors potentially leading to an attachment/sexual-behavior link include relationship commitment (Feeney & Noller, 1991), sexual coercion (Kalichman et al., 1993; Sarwer, Kalichman, Johnson, Early, & Ali, 1993), level of intimacy (Mikulincer & Erev, 1991), mutual caregiving (Collins & Feeney, 2000), openness and disclosure (Mikulincer & Nachshon, 1991), interpersonal power (Bartholomew & Horowitz, 1991), preference for casual sex versus intimacy (Brennan, Clark, & Shaver, 1998), and ability to insist on safer-sex practices (Feeney, Kelly, Gallois, Peterson, & Terry, 1999).

Adult attachment might affect the sexual relationships and risk behaviors of HIV+ individuals in a similar manner. Not only are the relationships of HIV+ individuals likely impacted by the same factors as the relationships of HIV- individuals, they are additionally complicated by such issues as serostatus disclosure and concerns of being rejected because of their HIV status. It is also possible that attachment insecurity leads to risk behavior among HIV+ individuals in an attempt to regulate their mood and self-esteem (Brennan & Shaver, 1995). HIV+ individuals have been estimated to be at a twofold risk for major depressive disorder relative to comparable HIV- controls (Ciesla & Roberts, 2001) and face considerable life stress (Roberts, Ciesla, Direnfeld, & Hewitt, 2001). Likewise, various aspects of adult attachment insecurity are associated with both low self-esteem and depressive symptoms (Hammen et al., 1995; Roberts, Gotlib, & Kassel, 1996). It may be that insecure attachment in the context of HIV is particularly distressing and leads to risk behaviors that temporarily reduce this psychological discomfort.

The present study tests the hypothesis that insecure adult attachment will be associated with high-risk sexual behavior among HIV+ individuals and explores the degree to which low self-esteem and depressive symptoms mediate these associations. We administered measures of adult attachment, sexual behavior, self-esteem, and depressive symptoms to HIV+ patients receiving treatment at an immunodeficiency clinic at a community hospital. Two dependent measures were of interest: number of sexual partners in the previous 3 months and number of sexual partners of either unknown or negative HIV status with whom the participant engaged in unprotected intercourse. The latter variable is of special relevance from a public health perspective.

Method

Participants and Procedure

Participants were HIV+ patients being treated at the Erie County Medical Center's Immunodeficiency Clinic in Buffalo, New York. Patients were approached

when they came in for their regular checkups to participate in a study concerning "stress and coping." Those who consented completed a questionnaire packet described in the Measures section. Questionnaires were completed in private, although a trained research assistant periodically checked on the participant and addressed any questions. Information regarding participants' disease progression (i.e., presence of AIDS, CD4+ cell counts) was then obtained from participants' medical files. A total of 500 patients were approached, and 78 consented and participated (success rate = 15.6%). Of these, 30 did not provide complete data, resulting in a total sample size of 48. Lack of time was the primary explanation given for declining to participate. Individuals who could not read and write English were excluded or simply not approached if this was already known.

Participants were 42 HIV+ men and 6 HIV+ women. Participants' average age was 37 years (SD = 7.9). The sample was predominantly Caucasian (68%) and homosexual (64%). Our sample did not significantly differ from the population of known HIV+ cases in the United States provided by the Centers for Disease Control and Prevention (2000) on gender, $\chi^2(1, N = 48) = 0.77, p > .05$; age, $t(47) = 1.09, p > .05$; or sexual orientation, $\chi^2(1, N = 48) = 1.74, p > .05$. However, our sample consisted of a significantly higher percentage of Caucasians, $\chi^2(1, N = 48) = 20.30, p < .01$: 68% vs. 37%. In our sample, 44% of participants had AIDS; the mean CD4 cell count in the entire sample was 344. On average, the sample was of low income, with a median income bracket of $10,000 to $20,000. In terms of relationship status, 13 participants indicated that they were "married or living with someone as married," 21 reported that they were never married, 13 were separated or divorced, and 1 individual was widowed.

Measures

Adult attachment. The Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) presents four short paragraphs, each describing a different attachment style (secure, preoccupied, dismissing, and fearful). Participants were asked to rate each paragraph in terms of how well it describes their thoughts and feelings in relationships on a 10-point scale ranging from 1 (*not at all like me*) to 10 (*just like me*).

Three different types of data were derived from these ratings. First, each of the four ratings was used as a continuous measure of each style. Second, the dominant attachment style for each participant was determined by inspection of the continuous ratings. Consistent with Mickelson, Kessler, and Shaver (1997), in the event of ties between styles, a fearful style took precedence over all other styles, whereas dismissing and preoccupied styles took precedence over secure styles. There were no ties between dismissing and preoccupied styles. Third, scores for working models of self (WM–Self) and other (WM–Other) were

derived from the four continuous ratings. WM–Self was computed by adding the secure and dismissing scores, then subtracting the preoccupied and fearful scores. WM–Other was computed by adding the secure and preoccupied scores, then subtracting the dismissing and fearful scores (Griffin & Bartholomew, 1994). The four-item WM–Self scale is thought to reflect the degree to which individuals have a positive, internalized sense of self-worth versus an externalized or negative sense of self-worth, resulting in preoccupation or anxiety over being unloved by others. The four-item WM–Other sale is thought to reflect individuals' perceptions of others as available and supportive.

The Adult Attachment Scale (AAS; Collins & Read, 1990) is an 18-item instrument that yields three subscales: anxiety over being abandoned or unloved (Anxiety), comfort with closeness (Close), and ability to depend on others (Depend). The Anxiety scale has been shown to overlap conceptually with WM–Self (involving anxiety over being alone), whereas the Depend and Close scales reflect different aspects of WM–Other (involving perceptions of the availability of others and comfort with being close to them; Brennan et al., 1988). In this sample, coefficient alphas for the Anxiety, Depend, and Close scales were .72, .75, and .61, respectively.

Depressive symptoms. The Inventory to Diagnose Depression (IDD; Zimmerman, Coryell, Corenthal, & Wilson, 1986) was used to assess overall severity of depressive symptoms. The IDD is a 22-item self-report instrument that is used to measure severity of depressive symptoms. Zimmerman et al. (1986) reported that the IDD overall severity index correlated highly with the Beck Depression Inventory (Beck, Ward, Mendelsohn, Mock, & Erlbaugh, 1961; $r = .87$) and the Hamilton Rating Scale for Depression (Hamilton, 1960; $r = .80$). Coefficient alpha was .92 in the present sample.

Self-esteem. The Rosenberg (1979) Self-Esteem Scale (RSE) was used to measure participants' global self-esteem. This widely used scale consists of 5 positively and 5 negatively valenced self-referent statements to which participants indicate agreement or disagreement on a 5-point Likert scale. In the present sample, the RSE had a coefficient alpha of .88.

Sexual behavior. A questionnaire was developed for this study asking participants to report the number of sexual partners (individuals with whom the participant had vaginal or anal intercourse) that they had had during the past 3 months. They were also asked to indicate whether they were aware of their partners' HIV status, and if so, what that status was. Participants also indicated the number of these sexual partners with whom they had had unprotected intercourse. Two types of data were derived from this questionnaire. The first was total number of sexual partners over the past 3 months. The second was total number of *at-risk partners*, defined as individuals of unknown or negative HIV status with whom the participant had had unprotected vaginal or anal intercourse during the past 3 months. Kauth, St. Lawrence, and Kelly (1991) demonstrated

that such 3-month retrospective assessments of sexual HIV risk behavior have acceptable reliability.

Data Analytic Plan

Multiple linear regression was used to test the relationship between sexual risk (number of sexual partners and at-risk partners) and the continuous measures of attachment style. On the basis of these regression analyses, follow-up chi-square tests of independence were then used to further examine the relationship between categorical, dominant, adult attachment styles, and the presence or absence of multiple sexual partners. Finally, the potential mediating effects of self-esteem and depression were explored by first examining the zero-order correlations among the study variables. Self-esteem and depression were then added to the regression models as control variables. Evidence for mediation would include significant relationships between the potential mediator (self-esteem or depression) and adult attachment, as well as between the potential mediator and sexual risk. Further, mediation would suggest that the relationship between attachment and sexual partners should diminish when self-esteem and depression are included as control variables in the regression model (Baron & Kenny, 1986).

Results

Preliminary Analyses

Of the 48 participants, 21 (43.8%) reported having two or more sexual partners in the previous 3 months, and 15 (31.3%) reported having had unprotected vaginal or anal intercourse with a partner of negative or unknown HIV status. In total, the 48 participants reported having had 168 sexual partners during the past 3 months. Of these, 97 were of unknown or negative HIV status with whom the participant had had unprotected intercourse. Because significant positive skews were observed for number of sexual partners (skew = 2.56, $p < .001$) and number of at-risk sexual partners (skew = 2.84, $p < .001$), inverse transformations were conducted on these variables.[2] These transformations resulted in a considerable reduction in skew for number of sexual partners (skew = -0.50, $p > .05$) and for number of at-risk partners (skew = 1.08, $p < .05$). With regard to primary attachment styles, 16.7% of participants were secure, 35.4% were dismissing, 20.8% were preoccupied, and 27.1% were fearful.

There were no significant gender or disease stage (HIV vs. AIDS) differences on any of the measures used in the present study. Age significantly correlated only with severity of depressive symptoms ($r = -.31$, $p < .05$). Individuals who

[2]Inverse transformations were conducted using the following equation: $-1/x + 1$. "–1" was used as the numerator to preserve the direction of the values and for ease of statistical interpretation. "1" was added to the denominator to avoid undefined values.

reported that their sexual orientation was either homosexual or bisexual indicated significantly more sexual partners relative to those who reported that their orientation was heterosexual ($M = 4.73$, $SD = 6.65$, vs. $M = 0.80$, $SD = 0.68$), $t(33.4) = 3.35$, $p < .01$, equal variances not assumed. Further, homosexual and bisexual individuals provided higher ratings on the continuous dismissing item, $t(41.2) = 3.18$, $p < .01$, equal variances not assumed, although they were not significantly more likely to have Dismissing as their dominant attachment style, $\chi^2(1, N = 48) = 1.21$, $p > .05$. Consistent with conceptual models (Brennan et al., 1998), Anxiety was significantly correlated with WM–Self ($r = -.59$, $p < .01$) but not WM–Other ($r = .16$, $p = .29$), and Close was correlated with WM–Other ($r = .36$, $p < .05$) but not WM–Self ($r = 22$, $p = .13$). Interestingly, Depend correlated with WM–Self ($r = .35$, $p < .05$), but not WM–Other ($r = .24$, $p = .11$), a pattern that is the reverse of what would be predicted.

Attachment and Total Number of Partners

Working models of self and other were first examined as potential predictors of total number of sexual partners over the past 3 months. WM–Self and WM–Other were entered simultaneously into a multiple linear regression predicting number of sexual partners. As can be seen in Table 1, WM–Self was a significant predictor ($\beta = -.338$, partial correlation [pr] = -.34, $p < .05$), whereas WM–Other was not statistically significant. Individuals with more positive models of self reported fewer sexual partners. Controlling for sexual orientation in this regression model did not affect the relationship between WM–Self and sexual partners ($\beta = -.290$, $pr = -.32$, $p < .05$).

Next, we explored the potential relationship between the Anxiety, Depend, and Close dimensions of attachment and risky sexual behavior. Again, Anxiety was thought to be related to negative WM–Self, whereas Depend and Close were thought to be related to negative WM–Others (Brennan et al., 1998). Anxiety, Close, and Depend were entered simultaneously into a multiple linear regression predicting number of sexual partners. Close and Depend did not predict number of sexual partners, whereas the Anxiety scale showed a marginally significant trend ($\beta = .271$, $pr = .25$, $p = .10$), although this trend was eliminated after controlling for sexual orientation ($\beta = .168$, $pr = .16$, $p = .28$).

The next series of analyses was conducted to examine other aspects of adult attachment that might contribute to these high-risk behaviors. Each continuous measure of attachment style was entered simultaneously into a regression equation predicting number of partners. Fearful attachment was associated with a greater number of sexual partners ($\beta = .355$, $pr = .32$, $p < .05$). Individuals with a more fearful attachment style reported a greater number of partners. No other style was statistically significant. The effect of Fearful attachment remained significant after controlling for sexual orientation in this model ($\beta = .310$, $pr = .30$,

Table 1

Hierarchical Multiple Linear Regression Analyses Predicting Number of Sexual Partners

Predictor	β	*pr*	*t*
Working models (WM) of self and other			
WM–Self	-.34	-.34*	-2.41*
WM–Other	-.05	-.05	-0.34
Model $R^2 = .12$, $F(2, 45) = 2.96$, $p = .06$			
Adult attachment scale			
Anxiety	.27	.25†	1.69†
Close	.01	.01	1.07
Depend	-.14	-.11	-0.76
Model $R^2 = .12$, $F(3, 45) = 2.05$, $p = .12$			
Continuous ratings of attachment styles			
Secure	-.01	-.01	-0.04
Dismissing	-.15	-.16	-1.03
Preoccupied	.06	.06	0.37
Fearful	.36	.32*	2.20*
Model $R^2 = .16$, $F(4, 43) = 1.98$, $p = .11$			

Note. β = standardized beta weight. *pr* = partial correlation.
†$p < .10$. *$p < .05$.

$p < .05$). To further examine this relationship, primary attachment style was dichotomized into Fearful versus Nonfearful, and number of sexual partners was dichotomized into the absence or presence of multiple partners (more than 1). These variables were then tested for independence using a two-way chi square. The result was a significant relationship, $\chi^2(1, N = 48) = 4.70$, $p < .05$, such that a Fearful primary attachment style was associated with being more likely to have multiple sexual partners during the past 3 months (69% vs. 34%).

Attachment and Total Number of At-Risk Partners

The next set of analyses examined number of at-risk partners (those sexual partners of unknown or negative HIV status with whom the participant reported unprotected vaginal or anal sex). As can be seen in Table 2, regression analysis indicates that WM–Self significantly predicted the total number of at-risk sexual

Table 2

Hierarchical Multiple Linear Regression Analyses Predicting Number of At-Risk Partners

Predictor	β	*pr*	*t*
Working models (WM) of self and other			
WM–Self	-.33	-.34*	-2.40*
WM–Other	-.14	-.15	-0.98
Model $R^2 = .13$, $F(2, 45) = 3.33$, $p < .05$			
Adult attachment scale			
Anxiety	.43	.40**	2.86**
Close	.04	.04	0.82
Depend	-.10	-.09	0.57
Model $R^2 = .22$, $F(3, 45) = 4.24$, $p < .01$			
Continuous ratings of attachment styles			
Secure	-.19	-.20	-1.35
Dismissing	-.001	.00	0.01
Preoccupied	.17	.17	1.12
Fearful	.28	.26†	1.78†
Model $R^2 = .19$, $F(4, 43) = 2.46$, $p = .06$			

Note. β = standardized beta weight. *pr* = partial correlation.
†$p < .10$. *$p < .05$. **$p < .01$.

partners (β = -.333, *pr* = -.34, $p < .05$), whereas WM–Other was not significant. Controlling for sexual orientation in this model did not affect this relationship (β = -.292, *pr* = -.32, $p < .05$). Thus, it appears that negative models of self were associated with both the total number of sexual partners and the number of sexual partners put at risk for contracting HIV who may not already be infected. Next, we regressed the Anxiety, Close, and Depend dimensions of attachment on number of at-risk sexual partners. This analysis reveals that Anxiety predicted at-risk partners (β = .433, *pr* = .40, $p < .01$), whereas Close and Depend were not significant. The Anxiety association remained significant even after controlling for sexual orientation (β = .355, *pr* = .34, $p < .05$).

When number of at-risk partners was regressed on the four continuous attachment style scores, Fearful attachment showed a trend toward significance (β = .278, *pr* = .26, $p < .08$), whereas the other attachment styles failed to make a significant contribution. This trend remained after controlling for sexual orientation

($\beta = .257, pr = .25, p = .10$). A chi-square analysis indicates that individuals with Fearful attachment were significantly more likely to report having one or more at-risk partners (54%) than were those with Nonfearful attachment (23%), $\chi^2(1, N = 48) = 4.24, p < .05$.

Self-Esteem and Depressive Symptoms as Possible Mediators

To explore the possibility that self-esteem and depressive symptoms also were related to number of sexual partners, and perhaps driving the relationship between risk behavior and working models of self and Fearful attachment, further analyses were conducted. As shown in Table 3, Pearson correlations indicate that although self-esteem was related to WM–Self ($r = .30, p < .05$), Anxiety ($r = -.40, p < .01$), and ratings of Fearful attachment ($r = -.27, p = .07$), self-esteem was not associated with number of sexual partners ($r = .14$) or number of at-risk partners ($r = .18$). Thus, although WM–Self, Anxiety, and Fearful attachment correlated with both global self-esteem and number of sexual partners, the latter two were independent. Depressive symptoms were significantly correlated with Anxiety ($r = .30, p < .05$), although they were not significantly associated with WM–Self, Fearful attachment, sexual partners ($r = -.03$), or at-risk partners ($r = -.08$).[3] The regression analyses reported in Tables 1 and 2 were repeated using self-esteem and depression as covariates, and the pattern of findings remained unchanged. In other words, statistically significant findings remained significant ($p < .05$), while marginal trends remained marginal trends ($p < .10$).

Discussion

Our findings suggest that adult attachment is an important aspect of the interpersonal context in which high-risk sexual behavior takes place among individuals living with HIV. In particular, working models of self and fearful attachment may be important in understanding and identifying individuals who continue to engage in high-risk sexual behavior following notification of HIV infection. Our results suggest that individuals with more negative attachment representations of self and more fearful attachment have greater likelihood of having multiple sexual partners, including HIV- partners.

In our sample, such risk behavior was common, with almost 44% of participants reporting two or more sexual partners in the previous 3 months and 31% reporting unprotected intercourse (vaginal or anal) with a partner of unknown or negative HIV status during this time period. These figures are comparable with those found in other studies of high-risk behavior among HIV+ individuals

[3]These analyses were repeated after eliminating items from the IDD (Zimmerman et al., 1986) that are potentially confounded with HIV-related symptoms (e.g., weight loss, fatigue). The same pattern of results was found using this new depression index.

Table 3

Correlations Among Study Variables

Variable	WM–Self	WM–Other	Secure	Dismissing	Preoccupied	Fearful	Anxiety	Close	Depend	Sexual partners	At-risk partners	IDD
WM–Other	-.01	—										
Secure	.45**	.57***	—									
Dismissing	.46**	-.62***	.04	—								
Preoccupied	-.65***	.38**	.12	-.10	—							
Fearful	-.64***	-.45**	-.12	.16	.42**	—						
Anxiety	-.59***	.16	-.10	-.13	.69***	.39**	—					
Close	.22	.36*	.29*	-.16	-.05	.50***	-.32*	—				
Depend	.35*	.24	.12	-.12	-.27	-.49***	-.47**	.50***	—			
Sexual partners	.34*	.04	.05	.10	-.22	-.36*	-.33*	.14	.26	—		
At-risk partners	.33*	.13	.21	-.02	-.26	-.29*	-.47**	.15	.28	.59***	—	
IDD	-.07	-.06	-.19	-.01	.01	-.04	.30*	-.28	-.25	-.03	-.08	—
RSE	.30*	.14	.21	-.10	-.29*	-.27	-.40	.33*	.33*	.14	.18	-.56***

Note. WM = working models; IDD = Inventory to Diagnose Depression (Zimmerman et al., 1986); RSE = Rosenberg Self-Esteem Scale (Rosenberg, 1979).

*$p < .05$. **$p < .01$. ***$p < .001$.

(Higgins et al., 1991; Kalichman, Greenberg, & Abel, 1997; Kalichman, Kelly, et al., 1997; Lemp et al., 1994). More alarmingly, 69% of HIV+ individuals with a Fearful attachment style reported having multiple sexual partners. Likewise, negative WM–Self and our continuous measure of Fearful attachment were associated with number of sexual partners (including partners of unknown or negative HIV status), even after statistically controlling for sexual orientation, self-esteem, and depressive symptoms. These results are consistent with the possibility that interpersonal issues related to attachment insecurities have helped to fuel the HIV epidemic in urban U.S. communities. If our findings were to replicate, as much as 20% of the variance in number of sexual partners (a major contributor to the transmission of HIV) could be explained by interpersonal issues related to attachment insecurity.

Interestingly, the association between WM–Self and number of partners was not driven by self-esteem. Not only did self-esteem fail to predict number of partners, but the association between WM–Self and number of partners remained significant after controlling for self-esteem. These results suggest that sexual behavior is related to individuals' concepts of self in the context of romantic relationships rather than their global concepts of self devoid of interpersonal context. Specifically, negative WM–Self involve feelings of discomfort with the self in intimate relationships, anxiety regarding abandonment, and dependence on others' acceptance and affirmation, rather than global poor self-regard.

Furthermore, the relationship between adult attachment and sexual behavior was not driven by sexual orientation. Although sexual orientation was significantly associated with one of the indexes of attachment (continuous ratings of Dismissing attachment) as well as number of sexual partners (including at-risk partners), controlling for sexual orientation did not affect the direction or significance of our findings. Interestingly, as a result of the fact that sexual orientation was positively related to sexual partners as well as Dismissing attachment, we would expect this third variable to push the relationship between WM–Self and sexual partners in a positive direction, which was the opposite of our observed effect.

There are several possible mechanisms through which negative WM–Self and fearful attachment may lead to having multiple sexual partners. First, dysfunctional attachment may lead to having a greater number of sexual relationships. As mentioned earlier, individuals with a Fearful and Dismissing attachment style reported a greater preference for casual sexual behavior than did individuals with a Secure or Preoccupied style (Brennan et al., 1998). Second, persons with negative WM–Self may avoid disclosure of their HIV+ status for fear of rejection and abandonment. Quite relatedly, they may fear the possible negative repercussions of refusing the sexual advances of others. For example, individuals with a Fearful attachment style tend to rate themselves as being more submissive, less autocratic, and more exploitable compared to Secure, Preoccupied, or Dismissing

individuals (Bartholomew & Horowitz, 1991). Likewise, degree of fearful attachment (measured as a continuous variable) was found to be associated with imbalance in relationship control, such that the more fearfully attached an individual was, the less control they perceived (Bartholomew & Horowitz, 1991). Thus, a lack of assertiveness may contribute to risky sexual behavior. Finally, individuals with a negative WM–Self, whose self-concept and emotional well-being is overly dependent on others, may attempt to use sex as a way to seek acceptance and stability in romantic relationships. On the other hand, our results are not consistent with the hypothesis that low self-esteem or depressive symptoms mediate the association between adult attachment and high-risk sexual behavior.

These findings have important implications for public health. Worldwide, the number of people living with HIV is now well into the millions, and currently the sole weapon to fight this epidemic is behavior change. Given this, it would be difficult if not impossible to make a significant impact on the spread of HIV without the ability to target relevant populations for intervention. Such interventions are also limited in their efficacy by our limited understanding of the reasons why persons might engage in risky sexual behaviors. Many risk-prevention programs do little more than provide education regarding safer-sex practices. Given that the clinic that our sample was drawn from provides such information to patients when they present for testing and treatment, we can assume with confidence that the participants of our study were aware of the risks associated with continued sexual behavior. Nonetheless, many engage in risky sexual practices. This underscores the robust nature of interpersonal processes in understanding individuals' sexual behavior. Our findings demonstrate that interpersonal motivations are important influences of sexual behavior, even when such behavior would be socially scorned (having risky sex with uninfected individuals) and places the health of another person at great risk. As such, we propose that interventions for reducing risky behaviors in an HIV+ population should address explicitly the interpersonal context in which high-risk behaviors occur, including issues such as disclosure, assertiveness, and fear of rejection or abandonment.

While the findings from this study were conceptually convergent and statistically robust, these results must be considered preliminary because of our cross-sectional design, limited sample size, and reliance on self-report. With regard to the latter, it would be important for future studies to replicate these findings with more reliable methods for assessing sexual behavior. For example, it would be wise for investigators to use interview-based devices that involve retrospective accounts of daily behavior over a fixed time period, such as the Timeline Follow-Back Interview (Midanik et al., 1998).

The cross-sectional design of this study did not allow us to address the issue of causal directionality. While attachment insecurity may influence sexual activity, it is possible that a history of dysfunctional short-term sexual relationships

may lead to the development of an insecure attachment style. Likewise, prospective investigations with larger sample sizes would be necessary to test the possible causal relationship between working models of attachment and sexual behaviors among HIV+ individuals. Perhaps most importantly, it remains for future research to explore the possible mechanisms underlying the association between adult attachment and high-risk sexual behaviors. Greater understanding of these mechanisms could be invaluable in developing interventions to reduce risky behaviors and ultimately the spread of HIV.

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