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The Relationship between Trauma, Internalized HIV Stigma, Social Support, and Sexual Risk Behavior among HIV-Positive Men who have Sex with Men Who Seek Sex Partners Online

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The Relationship between Trauma, Internalized HIV Stigma, Social Support, and
Sexual Risk Behavior among HIV-Positive Men who have Sex with Men Who
Seek Sex Partners Online

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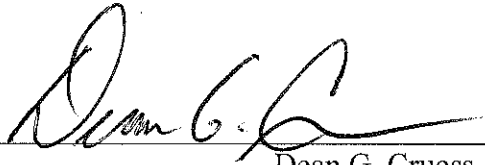
Masters of Arts Thesis

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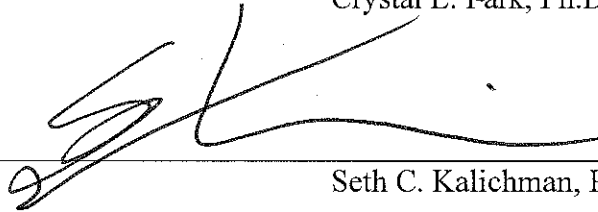
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The Internet has become a common venue to meet sex partners and companions. Websites, chatrooms, blogs, online boards, instant message and video chatting services are a popular way for people to connect online. As the ubiquity of mobile technologies allows people to access the Internet from anywhere, connection with others online for sex is more available than ever. Some studies suggest that men who have sex with men (MSM) are more likely to meet partners online than offline (Benotsch, Kalichman, & Cage, 2002; Elford et al., 2004). In a meta-analysis, Liao, Millett, and Marks (2006) found across studies that recruited MSM both online and offline that at least 40% of MSM had sought a sex partner online. The Internet provides a convenient forum for meeting a greater number people in a wider geographical range and retaining anonymity. However, meeting people online for sex also brings considerable risks to health and safety. Notably, meeting sex partners on the Internet has been associated with higher rates of sexual risk behavior and transmission of HIV and other sexually transmitted infections (Bull, McFarlane, Lloyd, & Rietmeijer, 2004). This is particularly relevant for MSM, who account for over half of the existing cases of HIV in the United States and remain the highest risk group for HIV transmission (CDC, 2012).

The use of the Internet to meet sex partners was raised as a public health concern in 1999, when cases of syphilis among a group of MSM in San Francisco were linked to an online chat room (Klausner, Wolf, Fischer-Ponce, & Zolt, 2000). Since then, other Internet chat rooms have been implicated in new HIV infections as well (Tashima, Alt, Harwell, Fiebig-Perez, & Flanagan, 2003). Meeting sex partners online appears to be linked to riskier sexual behavior. The rate of unprotected anal intercourse (UAI) among MSM meeting sex partners online is estimated to be at least 66% (Bentosch, Kalichman, & Cage, 2002). Online sex seeking has been further linked to the emergence of the rise in “barebacking” behavior, defined as intentionally having

sex without a condom (Halkitis & Parsons, 2003). It should be noted that UAI is also occurring among serodiscordant partners (one HIV-positive partner having sex with an HIV-negative partner, or serostatus unknown partner), which creates risks for HIV transmission and increasing incidence in MSM (Liau, Millett, and Marks, 2006). Unprotected sex among seroconcordant partners met online (sex involving two partners of the same status) can also increase health risks such as coinfection, making treatment more challenging for MSM who are already infected (Wheater, Cook, Clark, Syed, & Bellis, 2003; Grov, et al., 2007).

The negotiation of “safer sex” behaviors is influenced by numerous psychosocial factors. Relationships between such variables and sexual risks have been well documented in offline samples. However, few studies to date have examined the psychosocial predictors of risk in a sample of men who report seeking sex online. Kalichman, Cherry, Cain, Pope, and Kalichman (2005) found that men who had sought sex partners online reported higher rates of depression, higher sexual compulsivity, and lower optimism scores compared to MSM who had not sought sex partners online. Studies examining barebacking behavior in online samples demonstrate higher rates of sexual adventurism (Halkitis & Parsons, 2003). No studies, to date, have examined how other relevant psychological factors, such as trauma history and HIV-related stigma impact risk behavior in an online sample.

Trauma and Sexual Risk

Trauma disproportionately affects people living with HIV/AIDS (PLWHA). Leserman, et al. (2005) found that PLWHA experience at least two traumatic events in their lifetimes. Men living with HIV/AIDS reported experiencing an average of more than seven different types of traumatic events in their lives (Kamen, et al., 2012). Repeated exposure to trauma is more likely to result in posttraumatic stress disorder (PTSD). Thus, PTSD is also more prevalent in PLWHA

(Gore-Felton & Koopman, 2002). Over 60% of HIV-positive MSM in one sample fell in the clinical range for PTSD symptoms (Kamen, *et al.*, 2012). This figure is particularly striking in comparison to rates of PTSD in the general population reported from the National Comorbidity Survey estimated at approximately 7% (Kessler, Berglund, Delmer, Jin, Merikangas, & Walters, 2005).

Trauma exposure and trauma-related symptoms have been associated with higher rates of sexual risk behavior (Gore-Felton & Koopman, 2002; Kamen, *et al.*, 2012). Trauma plays a role in sexual risk for a number of potential reasons. Sikkema and colleagues (2008) suggested that the sense of powerlessness and victimization may contribute to sexual risk behavior, and that survivors of abuse engage in coping strategies that predict sexual risk. Avoidant styles of coping are often utilized when dealing with traumatic events, but become maladaptive in the long-term; and these avoidant strategies have been linked to riskier sexual behaviors with partners (Yi, Sandfort, & Shidlo, 2010). Furthermore, the experience of trauma has been associated with underestimation of personal risk as well as more impulsive behaviors (Ben-Zur & Zeidner, 2009; Gore-Felton & Koopman, 2002).

Trauma, Stigma and Sexual Risk

Diagnosis with a life threatening illness (e.g., HIV diagnosis) qualified as a Criterion A1 event that could lead to PTSD according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (APA, 1994). The fifth edition of the DSM that was released in 2013 specified that a life threatening illness is “not necessarily considered a traumatic event” (APA, 2013, p.274). Defining an HIV diagnosis as a traumatic event is particularly controversial given the current environment of effective HIV treatments that have made HIV a chronic condition rather than an illness that is immediately life threatening. These changes in what

qualifies as an A1 event indicate that a person would need to meet criteria across all domains (B-E) according to the DSM-5 and describe their HIV diagnosis as sudden and catastrophic. What is clear is that people who are diagnosed with HIV face a number of social and psychological consequences, including HIV-related stigma (Katz & Nevid, 2005). Trauma history may predict greater sensitivity to HIV-related stigma though the direction between these relationships is not well understood. For instance, HIV-related stigma has been associated with increased risk for traumatic events (Whetten, *et al.*, 2008). Thus, another variable that warrants investigation in this group of HIV-positive MSM who seek sex partners online is internalized HIV stigma.

Men report that HIV stigma in the gay community leads to fear of rejection by sex partners (Courtenay-Quirk, *et al.*, 2006), and stigma may in part explain the desirability of meeting people online where one can preserve anonymity and identify people who share similarities (i.e., other MSM who are living with HIV). Stigma is a common experience for PLWHA and it has been identified as a barrier to health as well as a correlate with adverse mental health outcomes (Logie & Gadalla, 2009). Stigma's link to sexual risk behavior has not been well understood to this point. Kelly, Bimbi, Izienicki, and Parsons (2009) found that high risk sexual behaviors including UAI and drug use were associated with greater perceptions of stigma and suggested that HIV-positive men may engage in riskier behaviors to cope with living with HIV. In contrast, another study found no relationship of stigma experience on sexual risk and disclosure of HIV status among HIV-positive adults (Vanable, Carey, Blair, & Littlewood, 2006). Given the conflicted nature of the literature on stigma and sexual risk, further investigation in this area is needed.

The Role of Social Support

Social support is another important variable to consider in addressing health, psychological adjustment and stigma experience, particularly among PLWHA. Contextualizing the social networks and perceived validation of support for MSM is important in understanding sexual risks. Social support is protective in the adjustment to living with HIV/AIDS (Turner-Cobb, *et al.*, 2002), and it has been related to a number of health-related behaviors including sexual risk behavior (Kimberly, & Serovich, 1999). In a study on potential motivators to engage in intentional unprotected sex, MSM reported engaging in unprotected sex to cope with stressors and to promote connection with other men (Bauermeister, Carballo-Diequez, Ventuneac, & Dolezal, 2009). Men who are experiencing more distress may seek out more sex partners and may engage in more UAI as a way to establish supportive relationships. However these relationships have not been examined specifically in men who seek sex online.

Social support is relevant in its association with greater psychological wellbeing, and it protects against stress in PLWHA and other health populations. Moreover, due to the social nature of stigma as it promotes disconnection from others, social support may reduce the impact stigma has on PLWHA. In two separate meta-analyses, social support was negatively associated with the experience of stigma among HIV-positive individuals (Smith, Rossetto, & Peterson, 2008; Logie & Gadalla, 2009). That is, people reporting greater perceived HIV stigma had less supportive social networks. No work to our knowledge has examined these variables together in MSM who seek sex partners online.

Present Study

Considering the impact of trauma and HIV-related stigma on MSM who are living with HIV along with the potential role of social support, it is relevant to examine the relationships among these variables on men seeking sex partners online who may engage in riskier sexual behavior.

The purpose of the current study is to investigate the relationship between trauma, internalized HIV stigma, social support, and their impact on sexual risk behavior among HIV-positive MSM who meet sex partners on the Internet. This study seeks to examine the trauma experience among this unique sample of HIV-positive MSM, and to determine the association of trauma-related symptoms with sexual risk behavior. Additionally, this study aims to investigate whether the internalization of HIV-related stigma and social support affect this association of trauma on sexual risk behavior. All of these relationships will be examined as they affect sexual risk with serodiscordant partners (conferring HIV transmission risk) and seroconcordant partners (conferring health risks to self).

Research Questions and Hypotheses

Research Questions

1. What is the reported trauma experience of HIV-positive MSM who use the Internet to meet sex partners?
2. Is there a relationship between the presence of trauma-related symptoms and seeking sex partners online?
3. What is the relationship between trauma-related symptoms and sexual risk behavior among HIV-positive MSM who use the Internet to meet sex partners?

4. Does internalized HIV stigma mediate the relationship between trauma-related symptoms and sexual risk behavior?
5. What is the role of social support in the relationship between trauma-related symptoms and sexual risk behavior in this sample of HIV-positive MSM?

Hypotheses

1. HIV-positive MSM who use the Internet to meet sex partners will report higher rates of trauma experience and trauma-related symptoms compared to published data on MSM in the general population.
2. A positive correlation is expected between trauma-related symptoms and the likelihood of seeking sex partners online and number of sex partners met online.
3. It is expected that more trauma-related symptoms will be associated with higher rates of sexual risk behavior.
4. It is expected that internalized HIV stigma will mediate the relationship between trauma-related symptoms and sexual risk behavior. That is, internalized stigma will account for the relationship between trauma-related symptoms and sexual risk behavior.
5. Social support is expected to mediate the relationship between trauma-related symptoms and sexual risk behavior. That is, social support will account for the impact of trauma on sexual risk behavior among HIV-positive MSM who seek sex partners online.

Methods

The data collected for this study is part of a larger intervention study (HIV Internet Sex Study (HINTS) Study) funded by a grant from the National Institute of Mental Health and whose protocol has been approved by the University of Connecticut Institutional Review Board. A Certificate of Confidentiality was sought to protect participants' data, given the sensitive health information that was collected.

Participants

This study recruited 170 MSM living with HIV/AIDS, who had ever used the Internet in order to meet a potential sex partner or companion, and who had engaged in risky sexual behavior. Included participants were 1) over 18 years of age; 2) gay or bisexual; 3) HIV-positive; 4) Internet users who had ever sought a sex partner online; and 5) men who had ever engaged in anal sex without a condom either as insertive or receptive partner in their lifetime.

Procedure

The current study used a cross-sectional design using participants recruited for a larger intervention study testing the feasibility of an online group behavioral intervention in reducing sexual risk behavior among HIV-positive MSM who use the Internet to meet sex partners. Participants were recruited from across the United States using online and offline recruitment methods. Online, ads were posted on Craigslist each day in different cities within the Eastern and Central time zones; a banner advertisement was placed on a popular gay dating website (BlackGayChat); and classified ads were placed in online boards that cater to LGBT and HIV-positive communities (Edge, TheBody.com, AIDSconnect, Yahoo Groups). Offline, study staff emailed flyers to directors of LGBT and HIV/AIDS service organizations and clinics to post on their community boards. Individuals interested in participating in the HINTS Study called the

HINTS screening phone line for a brief intake to determine study eligibility. A total of 368 people were screened for the HINTS Study. Of those, 249 were eligible to participate and 119 were ineligible because they did not meet inclusion criteria. Eligible participants were given a unique screening ID. Once participants screened into the study, they provided their email address to receive all study-related information. The first email they received included a link and their password to their individual consent form; 52 eligible participants did not complete the consent, and four individuals declined to participate at consent. Once a participant consented to participate in the study they were emailed a link to their confidential baseline survey. Surveys were administered through LimeSurvey. LimeSurvey is a free, open-source web application that was installed on the secure server at the Center for Health Intervention and Prevention (CHIP) at the University of Connecticut. LimeSurvey allows users to set survey questions and collect responses that get stored on the host server and downloaded as SPSS files. Access to the survey was controlled through the use of tokens that were assigned to individual participants when they logged into their survey. Participants had a two-week window in which they could complete their survey, and they were encouraged to finish it within a 24-hour period of beginning the survey. Of the 195 men who consented to be in the study, 24 did not complete their baseline survey and were lost to follow-up. One participant withdrew from the study after completing his baseline survey. The survey consisted of a battery of self-report measures that took approximately 60-90 minutes to complete. Participants were compensated \$25 for their time to complete the baseline assessment.

Measures

Demographic and Health Information. Demographic information was collected from participants including their age, race, years of education, employment status, income, sexual

orientation, openness about sexual orientation, and relationship status. Health information was also collected including date of HIV-diagnosis, date and result of most recent CD4 cell count and viral load status. Patients were also asked whether they experienced any of a list of 14 HIV-related symptoms (e.g. unintentional weight loss, recurring fever, enlarged glands, night sweating) over the past two weeks.

Trauma History. The experience of trauma in this sample was measured using the Life Event Checklist (LEC; Blake, *et al.*, 1995). The LEC is a 17-item measure that asks participants to describe their experience with events known to potentially result in distress or PTSD (criterion A1 events). Response options included: a) happened to them personally, b) they witnessed it happen, c) they heard about it happen, d) they are not sure if the event applies to them, and e) the item does not apply to them. For this study, the LEC was modified so participants responded whether the event occurred in childhood (prior to age 18) or in adulthood (after age 18). Many studies of trauma in HIV/AIDS populations have focused on childhood sexual abuse, so it was important to account for a variety of potentially traumatic events and to specify some temporal measurement of when each event occurred for participants. Participants were not asked to specify any other details about each of the events.

Trauma-Related Symptoms. Symptoms of PTSD were evaluated in two ways. First, participants responded to the Impact of Event Scale – Revised version (IES-R; Weiss, Marmar, 1997). The IES-R is a 22-item self-report measure of subjective distress related to a specific life event. Items are rated on a scale from 0 (*not at all*) to 4 (*extremely*). Participants were asked to report on their distress over the past week related to the event of being diagnosed with HIV. The IES-R assesses symptoms of hyperarousal, intrusion and avoidance to yield a total score. A score of 33 indicates clinically significant trauma-related symptoms indicative of PTSD (Creamer,

Bell, & Failla, 2003). The IES-R demonstrated very strong reliability in this sample of HIV-positive MSM, Cronbach's alpha = .96.

Participants also reported trauma-related symptoms on the PTSD Checklist-Civilian version (PCL-C; Weathers, Litz, Huska, & Keane, 1994). The 17 items on the PCL-C reflect DSM-IV criteria for symptoms of PTSD. Participants responded on a Likert scale from 1 (*not at all*) to 5 (*extremely*) based on how they have felt in the past month. Participants were instructed to rate their symptoms based on a stressful event they have experienced. Items on the PCL-C are summed to yield a total score ranging from 17-85. A total PCL-C score above 50 is associated with clinical symptoms of PTSD. Reliability for the PCL-C was very good for the present sample, Chronbach's alpha = .96.

Internalized HIV Stigma. The experience of HIV stigma was measured using the Internalized HIV Stigma scale which is 28-item assessment developed by Sayles, *et al.* (2008). Participants responded to each item on a 5-point scale based on how true the item is for them from 1 (*none of the time*) to 5 (*all of the time*). Internalized stigma is measured with 4 subscales: stereotypes, disclosure concerns, social relationships, and self-acceptance. To calculate the overall mean internalized HIV stigma score, participants' responses are converted to scores of 1-100 and averaged for each of the four factors; then the mean of the 4 subscale scores is found. Items on the Internalized HIV Stigma Scale had a coefficient alpha of .93, demonstrating good reliability within this sample.

Social Support. Participants' perceived social support was assessed using the Social Support Questionnaire (Brock, Sarason, Sarason, & Pierce, 1996). This self-report measure assessed the availability and validation of supportive relationships (i.e. "There are several people that I trust to help me solve problems," and "I have chosen relationships that provide me with a

sense of emotional security and wellbeing.”). It consisted of 15 items on which participants responded on a four-point scale ranging from 1 (*completely true*) to 4 (*completely false*). Responses were summed to yield a score ranging from 15 to 60. Higher scores indicated greater levels of social support. The Social Support Questionnaire demonstrated good internal consistency in the present sample, Cronbach’s alpha = .88.

Frequency of Meeting Sex Partners Online. Participants reported the number of times in the past three months they used the Internet to meet potential sex partners on a measure of Internet behavior. Responses were indicated on a four-point scale from no times (0) to more than seven times (4) they used the Internet in an attempt to meet sex partners. In addition, participants indicated the number of men they had sex with in the past six months they had met online. An open response format was used for this question so participants could freely respond without bias.

Sexual Risk Behavior. Sexual risk behavior was measured by asking participants the number of men they had anal sex with in the past six months. Participants were asked to recall how many of their sex partners were HIV-positive, HIV-negative, and unknown serostatus. For each partner serostatus category, participants reported how many times they engaged in anal sex in past six months, either as the receptive or insertive partner. Of their sexual encounters participants reported on how many occasions a condom was not used (UAI) and how many times a condom was used. This approach to assessing sexual risk behavior has been widely used in the HIV/AIDS literature (e.g. Sikkema, Hansen, Meade, Kochman, & Fox, 2009; Kalichman, Gore-Felton, Benotsch, Cage & Rompa, 2004; Benotsch, Kalichman, & Cage, 2002). An open response format was used so participants could freely enter a number of partners and sexual encounters to control for response bias, and this format has demonstrated increased reliability of

self-report (Kalichman, *et al.*, 1997). LimeSurvey was set so that the survey would track participants' past responses to aid their recall for each question. For example, participants were prompted with the number they entered in response to how many times they had sex with an HIV-negative man when asked to recall how many times they used a condom with all of their HIV-negative sex partners.

Sexual behavior variables tend to be non-normally distributed and positively skewed. To ensure that relationships between study variables with sexual risk behavior were not outcomes based on a small number of men reporting high numbers of sexual encounters in the last six months, participants were categorized into one of four groups based on their self-reported sexual risk behavior. This categorization was made twice based on the two outcomes of interest: sexual risk with HIV-negative and serostatus unknown partners (serodiscordant partners, conferring HIV transmission risk) and sexual risk with HIV-positive partners (seroconcordant partners, conferring health risks to self). Men who reported no anal sex encounters in the past six months were assigned to the no-risk group (0). Men who reported having anal sex in the past six months but never engaging in UAI were categorized in the low-risk group (1). Men who reported engaging in UAI on at least one occasion but less than every occasion they had sex were categorized in the moderate risk group (2). And men who reported never using a condom in any of their sexual encounters were assigned to the high-risk group (3). This categorization approach was guided by previous research on sexual risk (Ostrow, De Franceisco, & Wagstaff, 1998; Preston, D'Augelli, Kassab, & Starks, 2007). Sexual risk outcomes were treated as continuous rather than categorical variables in the present analyses, which is an approach that has been supported by previous research on sexual risk that used path analyses (Preston, *et al.*, 2007).

Data Analysis Plan

All data were collected and stored within the LimeSurvey database online. Data were downloaded biweekly and securely stored on lab computers. Prior to analysis, data were cleaned and checked for any technical or computational errors. Listwise deletion was used to address missing data, which excluded 26 cases from analysis in the proposed models. Analyses were conducted using SPSS software version 20.0. Correlations and one-way ANOVAs were used to examine relationships of demographic and health variables with outcome measures in order to identify potential covariates for inclusion in the proposed models.

To examine the first hypothesis, descriptive analyses were carried out to determine the type of traumatic events participants endorsed on the LEC. Events participants endorsed happened to them personally in childhood (before age 18) and adulthood (after age 18) were summed and percentages were calculated. Next, means and standard deviations were calculated for trauma symptoms endorsed on the IES-R and on the PCL-C. A correlation analysis was conducted to determine if exposure to a greater number of types of traumatic events predicted trauma-symptoms on the PCL-C in this sample. One-way ANOVAs were also carried out to examine whether being exposed to a potentially traumatic event predicts trauma-related symptoms reported on the PCL-C. This analysis was conducted separately for men who endorsed a sexual event.

To test the second hypothesis regarding the relationship between trauma symptoms and the frequency of meeting sex partners online, bivariate correlations were conducted to find the direction and strength of the relationships between trauma symptoms reported on the IES-R with the number of times participants reported using the Internet to meet sex partners in the past three months and the number of sex partners participants reported meeting online in the last six

months. Since childhood sexual abuse has been associated with greater sexual risk in adulthood, men in this sample were categorized into group based on whether they reported experiencing a potentially traumatic sexual event in childhood and adulthood. One-way ANOVAs were used to assess whether there were differences between these two groups in their frequency of searching for sex partners online, and the number of men they reported meeting online for sex.

The remaining research questions were addressed using mediation analyses in SPSS PROCESS (Hayes, 2013). Bootstrapping was used to test for mediating effects without assuming normality in the sampling distribution (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Demographic and health variables, such as age, relationship status, openness about sexual orientation, time since HIV diagnosis, and number of HIV symptoms in the past two weeks were considered as covariates in analyses after assessing their relationships with the main study variables. Proposed paths for analysis yield the co-mediation model shown in Figure 1. The direct effect of trauma-related symptoms indexed on the event of being diagnosed with HIV was tested as a predictor of sexual risk behavior (path c' in Figure 1), the indirect effect of internalized stigma (path ab) and the indirect effect of social support in this relationship (path de) were simultaneously evaluated. Using this approach of mediation analysis, this direct path does not have to be significant in order for mediation to be present (MacKinnon, *et al.*; Hayes, 2009). Two separate models were evaluated with the two outcomes of sexual risk with serodiscordant partners and sexual risk with seroconcordant partners.

The sample size was of 170 men who completed baseline assessments was chosen to fit within the scope of a feasibility study, of which the current investigation was a part of. In examining the correlation between trauma symptoms and meeting sex partners online, the sample size of 170 provides sufficient power ($1 - \beta = .80$) for detecting small to medium effects

($r = .25$) with alpha set at .05. A sample between 100 and 200 is considered medium-size for path analysis.

Results

Sample Characteristics

A description of the sample's demographics is included in *Table 1*. The mean age of the participants was 45.5 years (range 21-67). The majority of the sample self-identified their race as White (57%), 25% identified as African American, 14% identified as Hispanic or Latino, 2% as Asian or Pacific Islander, and 2% identified as biracial or mixed ethnicity. Almost all of the men completed high school or beyond, only 2% had not completed high school. Employment status ranged widely: 41% were employed, 31% living on disability, 5% were students, 4 % were retired, and 17% of the sample reported being unemployed. A little more than one third of the sample (39%) reported making an income of less than or equal to \$20,000 per year. The vast majority of the sample identified as gay (92%), and 8% of the men identified as bisexual. Most men were open about their sexuality, while 30% reported not always being open about their sexual orientation. Overall, 79% reported that they were single or not living with a partner, and 20% reported being married or living with a partner.

The mean number of years men reported they had been living with HIV was about 12 years (range 0 – 32 years); 10% of the sample reported they had been diagnosed with HIV within the last year. Three quarters of the sample reported having an undetectable HIV viral load, and the remaining 25% reported a detectable viral load or being unaware of their viral load. The mean CD4 cell count was reported to be about 642 cells/mm³. The men reported an average of about 3 (out of 14 total listed) HIV-related physical symptoms in the past two weeks.

Relationships between outcome measures (sexual risk with serodiscordant partners and sexual risk with seroconcordant partners), as well as the two potential mediator variables (internalized stigma and social support), and demographic and health variables (age, ethnicity, education, employment status, income, relationship status, years since HIV diagnosis, CD4 cell count, viral load, and number of HIV symptoms in the past two weeks) were examined to identify control variables. Bivariate correlations were used to examine the relationships between continuous variables and sexual risk, which are described in Table 4. There was a significant negative correlation between age and sexual risk with serodiscordant partners ($r = -.21, p < .01$) and between time since HIV diagnosis and sexual risk with serodiscordant partners ($r = -.20, p < .05$). HIV-related physical symptoms experienced in the past two weeks were positively correlated with internalized HIV stigma ($r = .30, p < .001$) and negatively correlated with social support ($r = -.26, p < .01$). There was no relationship between age or time since diagnosis and sexual risk with seroconcordant partners ($p > .10$). Means were compared for categorical demographic variables to determine potential covariates. Men who reported they were not always open about their sexual orientation reported greater internalized HIV stigma ($F(1, 166)=12.8, p < .001$) and higher sexual risk with seroconcordant sex partners ($F(1, 161)=6.8, p < .05$), compared to men who were always open about their sexual orientation. Men who were married or living with a partner reported significantly greater social support compared to men who were single or not living with a partner ($F(1, 157)=5.2, p < .05$). There were no other significant relationships between demographic or health variables with the study outcome variables ($p > .10$). Age, openness about sexual orientation, relationship status, time since HIV diagnosis, and number of HIV symptoms in the past two weeks were included as covariates in the final mediation models.

Description of Trauma in HIV-positive MSM who seek Sex Partners Online

The experience of traumatic events and trauma-related symptoms among this sample of men is summarized in Table 2. More than 80% of the sample reported directly experiencing at least one type of traumatic event before the age of 18; and 90% reported experiencing at least one type of event after age 18. It should be noted that these frequencies of events refer to the type of event experienced (i.e. natural disaster, motor vehicle accident, physical assault, sexual assault, combat or exposure to war-zone, life-threatening illness or injury) and not to a number of instances of traumatic events reported in a person's lifetime. A total of 32.4% (N = 55) men reported experiencing sexual assault or an unwanted sexual experience before the age of 18, and 37.1% (N = 63) reported experiencing sexual assault or other unwanted sexual activity in adulthood. Other commonly reported events in this sample of men included motor vehicle accidents (31% endorsed before age 18, and 54% after age 18), natural disasters (28% and 32%), physical assault (44% and 45%; and 30% reported assault with a weapon as adults), life threatening illness or injury (15% and 55%), and sudden unexpected death to someone close to the participant (28% and 59%).

Men in the sample reported trauma-related symptoms on the IES-R, indexed on the event of their HIV diagnosis, at a mean of 17.1 (SD=19.2). Thus, the mean of the overall sample did not exceed the suggested clinical cutoff for potential PTSD diagnosis. Of the men in the sample, 36 (21%) exceeded the clinical cutoff of a total score greater than or equal to 33 on the IES-R. On the PCL-C, the sample mean for trauma-related symptoms related to a stressful experience was 34.6 (SD=15.6). Using the suggested clinical cutoff for PTSD symptoms, 44 men (26%) met or exceeded the threshold for clinically significant trauma-related symptoms on the PCL-C. The number of different types of traumatic events reported on the LEC was examined as a predictor

of trauma-related symptoms reported on the PCL-C and there was not a significant relationship in this sample ($p > .10$).

The Association Between Trauma and Seeking Sex Partners Online

Associations between measures of trauma and seeking sex partners online are described in Table 2. Frequency of using the Internet in an attempt to meet sex partners online was greater among men who reported more symptoms of avoidance on the IES-R ($r = .18, p < .05$). Relationships between symptoms of intrusion and the total score on the IES-R were significant at the level of $p < .10$, indicating trends in the positive direction. There were no significant relationships between trauma-related symptoms and the number of sex partners participants reported meeting online and had sex with in the past 6 months ($p > .10$).

Sexual Risk Behavior

A description of sexual risk behavior reported in this sample of men is included in Table 3. About 70% of the sample reported they had met a sex partner online in the past six months, with an average of about three sex partners met online ($SD=4.9$). The total number of male sex partners men reported having anal sex with in the past six months was about 5 ($SD=6.3$). These men reported that they engaged in UAI with their serodiscordant sex partners about 29% of the time, and they engaged in UAI with their seroconcordant partners about 52% of the time. Bivariate correlations among sexual risk variables and all other study variables are described in Table 4. Meeting sex partners online in the past six months was predictive of greater sexual risk with serodiscordant sex partners ($r = .34, p < .001$) and with seroconcordant sex partners ($r = .33, p < .001$).

Mediation Analyses of Trauma, Internalized HIV Stigma and Social Support on Sexual Risk

Bivariate relationships among the variables included in the path models are described in Table 5, and the path models are illustrated in Figure 2 (path model predicting sexual risk with serodiscordant partners) and Figure 3 (path model predicting sexual risk with seroconcordant partners). Examining the relationships among all of these variables using mediation analyses, there was no evidence that trauma-related symptoms predicted sexual risk with serodiscordant partners (path $c' = -.012$, $p = .095$) or seroconcordant partners (path $c' = .000$, $p = .998$) independent of internalized HIV stigma. Results from regression analyses can be found in Tables 6 and 7, and are reported in unstandardized form to promote interpretation based on the metrics used in this study. Trauma-related symptoms indirectly influenced sexual risk with serodiscordant partners, conferring HIV transmission risk, through its effect on internalized HIV stigma ($ab = .011$), as can be seen in Figure 2. A bias-corrected 95% confidence interval for the indirect effect (ab) based on 5,000 bootstrap samples was above zero (.003 - .021). So participants who differ by one unit of HIV-related trauma symptoms differ by .011 units in their level of sexual risk with serodiscordant partners, with those experiencing greater internalized HIV stigma having greater sexual risk. Though this appears to be a small effect it should be interpreted in light of the small scale of sexual risk on which a small change could be substantial. Conditions for mediation with the social support variable were not met because social support was not significantly related to sexual risk category with either serodiscordant or seroconcordant partners (path e shown in both models). However, social support was correlated with internalized stigma ($r = -.34$, $p < .001$) and may have played a role in its effect on sexual risk. None of these predictors were associated with sexual risk with seroconcordant partners in the regression model ($p > .05$).

Discussion

The present study examined the relationships between psychosocial variables and sexual risk in a sample of HIV-positive MSM who seek sex partners online. Specifically we explored whether trauma-related symptoms indexed on the event of one's HIV diagnosis predicted sexual risk behavior with serodiscordant partners and seroconcordant partners, as well as how internalized HIV stigma and perceived social support affected the relationship between trauma and sexual risk.

We hypothesized that HIV-positive MSM who meet sex partners online would report higher rates of trauma compared to MSM in the general population. Incidence of trauma and trauma-related symptoms in this sample were high when compared to rates of clinical trauma symptoms in the general population. We found in our sample that 26% of men exceeded clinical cutoff for trauma-related symptoms when thinking about the most stressful event they had experienced. This figure can be contrasted to 3.5% of people reporting clinically significant PTSD symptoms on the National Comorbidity Survey which used a nationally representative sample (Kessler, et al., 2005). However, trauma history and trauma-related symptoms reported in the present sample were lower than those reported elsewhere in the literature for HIV-positive MSM. For example, Kamen, et al. (2012) found that nearly 60% of their sample of HIV-positive MSM exceeded clinical cutoff for PTSD symptoms. One explanation for the differences in these findings could be socioeconomic. We may have recruited a more educated sample with higher socioeconomic status since this sample was recruited on the basis of some computer literacy, which is supported when we compare this sample to others in the literature. In the present sample 82% completed their education beyond high school and 60% reported an income greater than \$20,000 per year. In contrast, Kamen, et al. (2012) observed that 61.1% of their sample of MSM

completed more than 12 years of education, and only 30.1% had an income greater than \$20,000 per year.

Another surprising finding was that greater experience of different types of traumatic events was not predictive of trauma-related symptoms in this sample. It should be noted that the incidence of types of traumatic events were assessed in this study and not the total number of traumatic events these men had ever experienced. We may have compared a man who had experienced sexual assault one time to a man who had experienced sexual assault on multiple occasions, which would likely lead to different experiences of trauma-related symptoms. More thorough assessment of trauma history and symptoms should be considered in future work.

Men who reported more trauma-related symptoms were expected to be more likely to seek sex partners online and meet more of their sex partners online. Symptoms of avoidance related to the event of being diagnosed with HIV predicted increased likelihood that men used the Internet in an attempt to meet sex partners. However, trauma-related symptoms were not related to the number of sex partners men reported meeting online. Using the Internet to connect with others for sex may serve as a coping strategy for men to avoid thinking about their HIV diagnosis. Meanwhile meeting sex partners in person may be overwhelming given the interpersonal dynamics of negotiating sex and discussing one's serostatus, particularly with serodiscordant sex partners. Similarly, Sikkema, *et al.* (2009) and Gore-Felton and Koopman (2002) found that avoidant coping strategies related to trauma history predicted less sexual risk. Both suggested that men using avoidant strategies may also avoid sexual situations and have fewer opportunities to engage in risky sexual situations, though they were not able to test that association. A focus of future research should be to understand the strength and direction of the

relationships between trauma-related symptoms, coping strategies, sex seeking, and sexual behavior.

Trauma-related symptoms were expected to predict greater sexual risk in this sample of HIV-positive MSM. Self-reported trauma-related symptoms did not appear to directly predict sexual risk in HIV-positive MSM who seek sex partners online, contrary to findings in previous literature on trauma and sexual risk in PLWHA (Gore-Felton & Koopman, 2002). The most likely reason for this lack of association is a potential moderator that could impact how trauma related to sexual risk behavior. Previous literature has suggested that men may engage in riskier behaviors in order to cope with trauma histories. Sikkema, *et al.* (2009) found that trauma-related symptoms were not predictive of HIV transmission risk behavior, but that trauma-related behavioral difficulties (including sexual concerns, dysfunctional sexual behavior, and tension reduction behavior) did predict greater sexual risk. Measuring how trauma manifests behaviorally for individuals may provide richer information about how trauma impacts sexual risk-taking. Thus, including measures of coping, sexual concerns, and sexual compulsivity may have boosted the effects in our models if these relationships were to hold true for HIV-positive MSM who seek sex online.

We did find an indirect association of trauma-related symptoms on sexual risk with serodiscordant sex partners through internalized HIV stigma. This finding was expected as we hypothesized that men with greater distress related to their HIV diagnosis may be more sensitive to stigmatization which may then impact their self-efficacy to negotiate safer sex practices with men who are not HIV-positive. Stigma appeared to predict sexual risk with serodiscordant partners more than the other variables in our model. The effect of stigma on sexual risk behavior, particularly with serodiscordant sex partners, has been supported by recent literature

(Hatzenbuehler, *et al.*, 2011). It is possible that stigma explains sexual risk beyond the effects of trauma-related symptoms, or that internalized stigma may intensify feelings of distress and limit coping related to one's HIV diagnosis. In the present sample, these relationships did not hold true for sex partners who were seroconcordant, and who may share many of the experiences of being diagnosed HIV-positive and the experiences of stigmatization. It appears that a different decision making process occurs with partners differing by serostatus, and that stigma plays less of a role when sex partners share the same serostatus.

We hypothesized that social support would account for the relationship between trauma-related symptoms and sexual risk, which we did not find in this sample of men. There was a strong relationship between trauma-related symptoms and social support, however these did not predict greater sexual risk with serodiscordant or seroconcordant partners in our models. Our sexual risk variable captured number of unprotected anal sex encounters, but did not necessarily account for number of partners. It is possible that some men in the sample had a primary sex partner with whom they engaged in more instances of UAI as a means to promote emotional intimacy in their relationship. Indeed, men in this sample who reported living with a partner also reported greater levels of social support. Perhaps the effects of these men accounted for our findings as compared to the effects of men who reported lower social support and may have engaged in more UAI as a means to initiate intimate relationships with other MSM they meet online as we may have expected.

Limitations

Results of this study should be interpreted in light of some limitations. First, given the cross-sectional design of this study, no causal relationships can be determined. Second, baseline

assessments were completed online, which allowed the inclusion of diverse participants across the United States. But there was little control over the environment in which participants completed their surveys and the level of attention contributed. There was no guarantee that participants completed the survey accurately, though thorough screening procedures were in place to limit the inclusion of false data.

Our assessment of trauma-related symptoms indexed on the event of one's HIV diagnosis is potentially problematic in light of the recent revision of the DSM, which specifies that diagnosis of a life threatening illness may not qualify as a traumatic event (APA, 2013). The decision to use this variable in the proposed model was made prior to the release of the new DSM and there was not a screening tool available to assess across criterion B-E that have been newly specified in the newer version. In the future, the chronic stress associated with being HIV positive may be looked at as a potential predictor of sexual risk. Or PTSD may be assessed based on a specific traumatic event, like sexual assault in childhood, which has shown greater effects on sexual risk behavior in previous research.

While our method of assessing sexual behavior by partner serostatus, sexual positioning, and condom use has been widely used throughout the literature on sexual risk among MSM (e.g. Sikkema, Hansen, Meade, Kochman, & Fox, 2009; Kalichman, Gore-Felton, Benotsch, Cage & Rompa, 2004; Benotsch, Kalichman, & Cage, 2002), we did attempt to capture reports of sexual risk over a long recall period of six months. This may have impacted the accuracy of reports of sexual behaviors. We attempted to correct for these reporting issues by creating sexual risk categories on a spectrum, however this approach could have dampened finer differences in sexual risk had we examined number of reported sexual encounters. In addition, we did not differentiate sexual risk behaviors among male partners who were met online versus those met

offline. Future studies should assess sexual risk between partners that were met on and offline to understand if there may be some differential in risk assessment between these partner types.

The length of the baseline assessment was a potential limitation. Participants reported in an exit survey that the assessment was lengthy. Responses at the end of the assessment, which included the trauma measures, may not have been completely accurate if participants were feeling burdened by the number of questions they were being asked.

Conclusions

Previous research has shown relationships between trauma, stigma, social support and sexual risk; but no studies to date have examined these psychosocial factors together in a sample of MSM who seek sex partners online. We investigated the relationships between reports of trauma-related symptoms, internalized HIV stigma, social support and sexual risk behavior in a novel sample of HIV-positive MSM who use the Internet to meet potential sex partners. This study is one of the first to demonstrate an indirect relationship of trauma-related symptoms on HIV transmission risk through the effect of internalized stigma. The modest effect we found indicates the presence of additional moderators in these relationships that should be investigated in future research. This indirect relationship did not hold for sexual risk with seroconcordant partners, indicating that a different set of factors contributes to the negotiation of sexual risk with partners who are also HIV-positive, compared to those who do not share one's serostatus. Given that sexual networks and sexual risk environments are expanding with the increasing use of the Internet to connect with others for sex, it is important to understand the predictors of sexual risk behavior so that tailored interventions can promote sexual health for men seeking sex online.

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Appendix: Figures and Tables

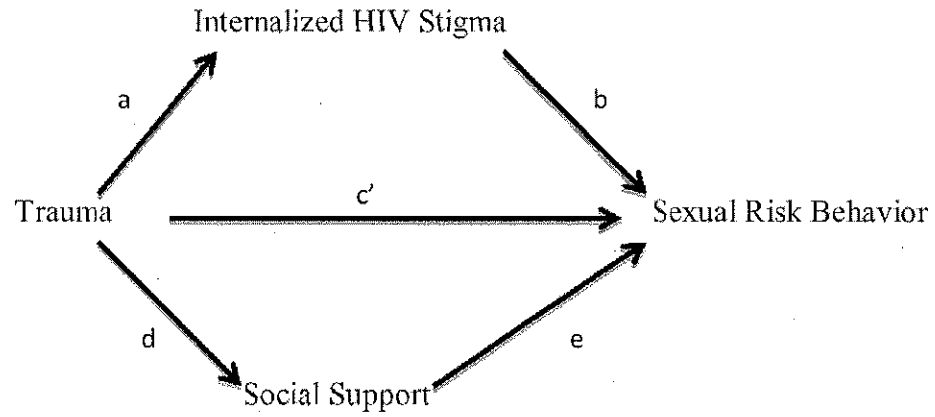


Figure 1. Proposed path model with multiple mediators to be tested to determine the impact of internalized HIV stigma and social support as potential mediators in the relationship between trauma-related symptoms and sexual risk behavior.

Table 1. Demographic and health characteristics of sample (N = 170).

Characteristic	n or M	% or SD
Age (years)	M: 45.5	SD: 10.1
Education completed		
11 th grade	2	1%
12 th grade	28	17%
13 years of school	17	10%
14 or more years of school	123	72%
Ethnicity		
White	97	57%
African American	43	25%
Hispanic/Latino	23	14%
Asian/Pacific Islander	3	2%
Biracial/Mixed Ethnicity	4	2%
Employment Status		
Unemployed	28	17%
Working	70	41%
On disability	53	31%
Student	9	5%
Retired	6	4%
Income		
\$0 - \$10,000	28	17%
\$11,000 - \$20,000	38	22%
\$21,000 - \$30,000	28	17%
\$31,000 - \$40,000	25	15%
\$41,000 - \$50,000	11	7%
Over \$50,000	35	21%
Sexuality		
Gay or homosexual	157	92%
Bisexual	13	8%
Openness about sexual orientation		
Not open/Closeted	5	3%
Closeted sometimes	46	27%
Open	119	70%
Relationship Status		
Not married or living with partner	135	79%
Married	2	1%
Living with a partner	32	19%
Years since HIV Diagnosis	M: 12.1	SD: 9.4
Self-reported CD4 Cell Count	M: 642.0	SD: 255.9
Viral Load		
Detectable	36	21%
Undetectable	127	75%
Do not know	6	4%
Taking antiretroviral medication	159	94%
#HIV symptoms in past 2 weeks	M: 3.1	SD: 3.5
Ever hospitalized for HIV/AIDS	50	29%

Table 2. Description of trauma experience and trauma-related symptoms and bivariate correlations between trauma variables and online sex seeking.

Variable (range)	M	SD	Observed Range	Correlations	
				Using the Internet to meet sex partners	# sex partners met online
# Types Traumatic events before age 18 (0-17)	2.91	2.57	0-12	-.047	.081
# Types Traumatic events after age 18 (0-17)	4.52	3.04	0-15	-.050	-.024
Impact of event scale (0-88)	17.1	19.2	0-82	.149*	.059
Intrusion (0-4)	0.74	0.91	0-3.88	.137*	.045
Avoidance (0-4)	0.89	0.96	0-3.50	.175**	.045
Hyperarousal (0-4)	0.69	0.91	0-4	.084	.053
PTSD Checklist (17-85)	34.6	15.6	17-85	.101	.029
Men reporting sexual event before age 18	n=55	32%		n.s.	n.s.
Men reporting sexual event after age 18	n=63	37%		n.s.	F=3.51*

* $p < .10$; ** $p < .05$

Table 3. Descriptive statistics of self-reported sexual behavior in the past 6 months.

Variable	M	SD	Range
# Male sex partners	4.8	6.3	0 – 30
# Sex partners met online	3.3	4.9	0 – 27
# serodiscordant sex partners	3.2	5.7	0 – 43
# seroconcordant sex partners	3.2	4.9	0 – 30
# UAI serodiscordant partners	3.8	8.7	0 – 60
# UAI encounters with seroconcordant partners	7.8	23.8	0 – 250
Proportion UAI with serodiscordant partners	29.3	39.3	0 – 100
Proportion UAI with seroconcordant partners	51.8	44.5	0 – 100
Sex Risk Category with serodiscordant partners	1.1	1.2	0 – 3
Sex Risk Category with seroconcordant partners	1.7	1.3	0 – 3

Table 4. Bivariate correlations between all measured variables.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. IES-R total	---										
2. PCL-C total	.732***	---									
3. Internalized HIV Stigma	.624***	.609***	---								
4. Social Support	-.260***	-.442***	-.344***	---							
5. Using the Internet to meet sex partners	.149*	.101	.139*	-.138*	---						
6. # Sex partners	-.093	-.064	.097	-.014	.276***	---					
7. # Sex partners met online	.059	.029	.188**	-.054	.333***	.828***	---				
8. Sexual Risk with serodiscordant partners	.042	.076	.195**	.021	.266**	.420***	.338***	---			
9. Sexual Risk with seroconcordant partners	-.125	-.040	-.065	.134*	.163*	.373***	.326***	.244**	---		
10. Age	-.203**	-.073	-.295**	-.033	-.093	-.155**	-.207**	-.208**	.114	---	
11. Time since HIV dx	-.211**	-.172**	-.252**	.073	-.125	-.096	-.039	-.198**	.025	.534***	---
12. # HIV symptoms	.218**	.273***	.303**	-.260**	-.004	-.022	.011	.018	-.088	.036	.063

* $p < .10$; ** $p < .05$; *** $p < .001$

Table 5. Bivariate correlations among variables included in path model.

Variable	1	2	3	4
1. IES-R total score	---			
2. Internalized HIV Stigma	.624**	---		
3. Social Support	-.260**	-.344**	---	
4. Sexual Risk with serodiscordant partners	.042	.195**	.021	---
5. Sexual Risk with seroconcordant partners	-.125	-.065	.134	.244**

* $p < .10$; ** $p < .05$

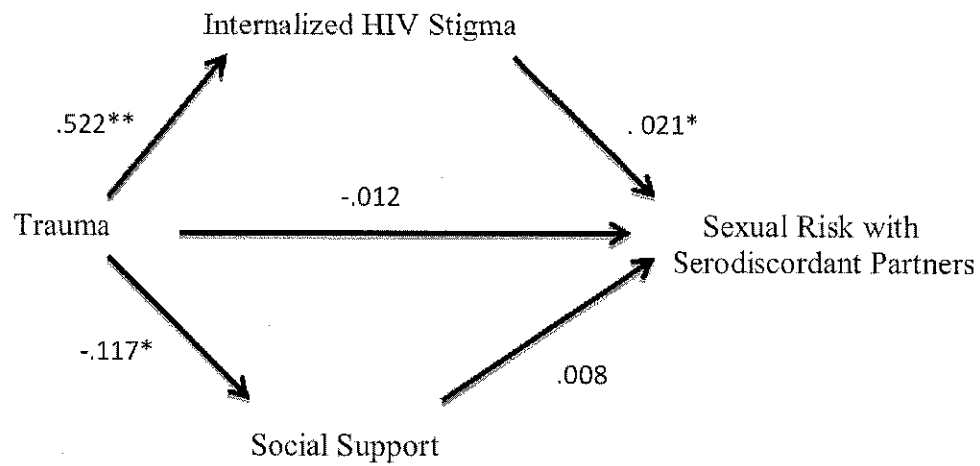


Figure 2. Final model demonstrating observed relationships predicting sexual risk with serodiscordant (HIV- and serostatus unknown) sex partners.

Note: $^* p < .05$; $^{**} p < .001$

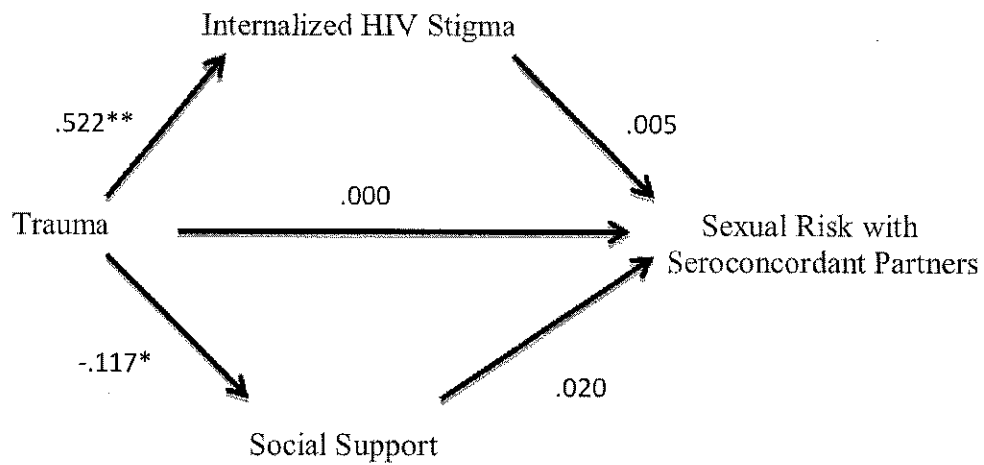


Figure 3. Final model demonstrating observed relationships predicting sexual risk with seroconcordant (HIV+) sex partners.

Note: $^* p < .05$; $^{**} p < .001$

Table 6. Regression analyses among study variables predicting sexual risk with serodiscordant sex partners.

		Criterion										
		M ₁ (Stigma)			M ₂ (Social Support)			Y (Sexual Risk)				
Predictor		B	SE	p		B	SE	p		B	SE	p
X (Trauma)	a	.522	.059	<.001	d	-.117	.039	.003	c'	-.012	.007	.095
M ₁		---	---	---		---	---	---	b	.021	.008	.012
M ₂		---	---	---		---	---	---	e	.008	.012	.544
Constant	i _{M1}	38.791	5.484	<.001	i _{M2}	53.540	3.630	<.001	i _Y	.518	.936	.581
		R ² =.528			R ² =.205			R ² =.096				
		F(6, 135)=25.114, p<.001			F(6, 135)=5.786, p<.001			F(8, 133)=1.773, p=.088				

Age, Relationship status (married or living with a partner vs. not living with a partner), Openness about sexual orientation, time since HIV diagnosis, and number of HIV-related symptoms in the past 2 weeks were entered as covariates in the above analyses.

Table 7. Regression analyses among study variables predicting sexual risk with seroconcordant sex partners.

		Criterion										
		M ₁ (Stigma)			M ₂ (Social Support)			Y (Sexual Risk)				
Predictor		Coeff	SE	p		Coeff	SE	p		Coeff	SE	p
X (Trauma)	a	.522	.059	<.001	d	-.117	.039	.003	c'	.000	.008	.998
M ₁		---	---	---		---	---	---	b	.005	.009	.580
M ₂		---	---	---		---	---	---	e	.020	.013	.134
Constant	i _{M1}	38.791	5.484	<.001	i _{M2}	53.540	3.630	<.001	i _Y	-.258	1.015	.800
		R ² =.528			R ² =.205			R ² =.078				
		F(6, 135)=25.114, p<.001			F(6, 135)=5.786, p<.001			F(8, 133)=1.396, p=.204				

Age, Relationship status (married or living with a partner vs. not living with a partner), Openness about sexual orientation, time since HIV diagnosis, and number of HIV-related symptoms in the past 2 weeks were entered as covariates in the above analyses.