

# UCLA

## UCLA Previously Published Works

### Title

HIV-transmission-related risk behavior in HIV+ African American men: Exploring biological, psychological, cognitive, and social factors

### Permalink

<https://escholarship.org/uc/item/10b701p0>

### Journal

Journal of HIV/AIDS & Social Services, 15(3)

### ISSN

1538-1501

### Authors

Arentoft, Alyssa  
van Dyk, Kathleen  
Thames, April D  
[et al.](#)

### Publication Date

2016-07-02

### DOI

10.1080/15381501.2016.1166092

Peer reviewed



Published in final edited form as:

*J HIV AIDS Soc Serv.* 2016 ; 15(3): 299–318. doi:10.1080/15381501.2016.1166092.

## HIV-transmission-related risk behavior in HIV+ African American men: Exploring biological, psychological, cognitive, and social factors

Alyssa Arentoft<sup>1</sup>, Kathleen Van Dyk<sup>2</sup>, April D. Thames<sup>2</sup>, Nicholas S. Thaler<sup>2</sup>, Philip Sayegh<sup>2</sup>, and Charles H. Hinkin<sup>2,3</sup>

<sup>1</sup>Department of Psychology, California State University, Northridge, Northridge, California

<sup>2</sup>Department of Psychiatry & Biobehavioral Sciences, University of California-Los Angeles, Los Angeles, California

<sup>3</sup>Department of Psychology, West Los Angeles VA Healthcare Center, Los Angeles, California

### Abstract

**OBJECTIVES**—To identify factors associated with HIV-transmission-related risk behavior among HIV+ African American men.

**METHOD**—We examined biological, psychological, cognitive, and social factors and recent HIV-transmission-related risk behavior (i.e., needle sharing, unprotected sex, exchange sex) among a sample of HIV+ African American men.

**RESULTS**—A binary logistic regression showed that individuals under age 50 (OR=4.2), with clinically-elevated masochism scores (OR=3.9) on the Millon Clinical Multiaxial Inventory-III (MCMI-III), current substance abuse/dependence (OR=2.6), and higher sensation-seeking (OR=1.3) were more likely to report recent risk behavior.

**CONCLUSIONS**—Reducing substance use, addressing self-defeating attitudes, and improving self-control may be avenues for future prevention and intervention research among HIV+ African American men engaging in HIV-transmission-related risk behavior.

### Keywords

HIV; risk behavior; transmission risk; health disparities

---

African Americans are disproportionately affected by HIV disease, representing only 14% of the overall U.S. population yet 44% of the HIV+ population in the U.S. (Centers for Disease Control and Prevention, 2013). Since the 1980s, HIV incidence has declined for many racial/ethnic groups but remain high among African Americans (Centers for Disease Control and Prevention, 2012b). Additionally, among African Americans, men comprise about 70% of new HIV infections (Centers for Disease Control and Prevention, 2012a). Because HIV infection rates remain high among African Americans, behavior related to HIV-transmission

—including unprotected and other forms of risky sex, and drug-related behaviors such as needle sharing—should be examined more closely.

HIV-transmission-related risk behavior (or high risk behavior), has primarily been examined in HIV seronegative (HIV-) individuals, or individuals at risk for *contracting* HIV. Interestingly, research has shown that HIV- African Americans typically report lower rates of HIV-risk behavior compared to their non-Hispanic white counterparts (Blankenship, Smoyer, Bray, & Mattocks, 2005; G. A. Millett, Flores, Peterson, & Bakeman, 2007) and higher rates of HIV infection are thought to be due to other factors. For example, in regard to sexual transmission, higher rates of HIV disease may be due to concurrent high rates of other sexually transmitted infections (which leaves individuals more susceptible to contracting HIV), the rarity of being homozygous for CCR5-2 (a co-receptor which reduces the likelihood of infection following exposure to the HIV virus), less frequent HIV testing (allowing HIV+ individuals to go undetected for longer periods), as well as partner-related factors, such as rates of antiretroviral usage among their HIV+ sexual partners, which affects transmissibility of the virus (G. A. Millett et al., 2007; Oster et al., 2011; Zimmerman et al., 1997). Compared to individuals from other racial/ethnic backgrounds, African American men are also more likely to select partners of the same race and have more highly interconnected sexual networks (Berry, Raymond, & McFarland, 2007; Bingham et al., 2003; Laumann & Youm, 1999; Raymond & McFarland, 2009), increasing the chances of HIV transmission within racial group.

Fewer studies have examined risk behavior among HIV+ individuals—or those at risk for *transmitting* HIV to others—despite estimates that 30–60% of HIV+ individuals engage in HIV-risk behaviors (Avants, Warburton, Hawkins, & Margolin, 2000; Dolezal, Meyer-Bahlburg, Remien, & Petkova, 1997; Kalichman, 2000; Stein et al., 2005). In particular, HIV + African American men have the highest rates of injection drug use among individuals newly diagnosed with HIV (Centers for Disease Control and Prevention, 2012a). Predictors of health risk behaviors may differ across racial/ethnic groups. Our group has shown greater healthcare-provider satisfaction predicted better HIV medication adherence among African Americans, while lower rates of depression and increased treatment-specific social support predicted better adherence among non-Hispanic whites (Thames et al., 2012).

In order to improve prevention and intervention efforts among HIV+ African American men, a better understanding of the factors associated with risk behavior is needed. Although studies focusing on African Americans are limited, across racial/ethnic groups, several factors have been independently associated with HIV-transmission-related risk behaviors in HIV+ individuals. The evidence, as briefly reviewed below, supports examining several biological, psychological, cognitive, and social variables, which we explored in this study.

## Biological factors

There were initially some concerns that individuals on antiretroviral therapy may be more likely to engage in risky behaviors, including unprotected sex. This has generally not been found to be the case, although among a sample of HIV+ men, being on HAART was *perceived* to reduce one's risk of transmitting HIV (but did not make one more likely to

actually engage in risky behavior (Remien, Halkitis, O'Leary, Wolitski, & Gomez, 2005). A related concern is the possibility that individuals with poor adherence may also be engaging in other health risk behaviors. Poor medication adherence can lead to poor virological control, and higher levels of HIV viral replication, which can increase HIV transmissibility (Hughes et al., 2012). However, the evidence linking risk-behavior and objective markers of disease progression has been mixed. In one study, markers indicating better disease management (i.e., undetectable viral load and higher CD4 cell count) were associated with more risk behavior in HIV+ men who have sex with men (MSM; Dukers et al., 2001). Others have found no association between disease markers (i.e., viral load) and risk behavior (Crepaz, Hart, & Marks, 2004), or between length of HIV infection and risk behavior (Bingman, Marks, & Crepaz, 2001; Posner & Marks, 1996; Semple, Patterson, & Grant, 2000). Additionally, it has been suggested that individuals with advanced disease progression may experience more HIV-related symptoms and worse overall health, resulting in decreased libido and greater difficulty finding sexual partners, thus decreasing risk for transmission (Dolezal et al., 1997; Rabkin, Rabkin, & Wagner, 1995). Importantly, these relationships have not yet been examined among HIV+ African American men, yet HIV+ African American individuals may have lower medication adherence rates than non-Hispanic white individuals (Gifford et al., 2000; Kleeberger et al., 2001; Thames et al., 2012).

## Psychological factors

Among psychological factors related to risk, substance abuse commonly emerges as a strong predictor. Increased and problematic alcohol use (Hasse et al., 2010; Stein et al., 2005); and drug use (Aidala et al., 2006; Beckett, Burnam, Collins, Kanouse, & Beckman, 2003; Hasse et al., 2010) have been associated with higher rates of sexual risk behavior among HIV+ individuals, and a meta-analysis showed that greater alcohol consumption and problematic drinking were associated with greater rates of unprotected sex among HIV+ individuals (Shuper, Joharchi, Irving, & Rehm, 2009). Other psychological factors have also been associated with risk behavior in the context of substance use. HIV+ individuals who recently engaged in sexual risk behavior scored higher on the Addiction Severity Index (ASI) psychiatric severity composite score (Avants et al., 2000). Among HIV+ individuals entering methadone maintenance treatment, higher scores on a psychological dysfunction composite (i.e., combining depression, anxiety, and hostility scales) were associated with more drug-related risk behavior (Camacho, Brown, & Simpson, 1996). However, the findings on mood symptoms alone have been mixed; some have reported that HIV+ individuals engaging in HIV-transmission-related sexual risk behavior reported more depression symptoms than those who were not (Kelly et al., 1993). Among HIV+ MSM, those with moderate depression were significantly less likely to engage in sexual risk behavior (O'Cleirigh et al., 2013) Yet a meta-analysis found no association between anxiety or depression symptoms and sexual risk behaviors among HIV+ individuals (Crepaz & Marks, 2002). Few studies, however, have examined clinically-significant levels of mood symptoms, particularly major depression. Additionally, mood symptoms have not been explored among HIV+ African American men.

Although few studies have examined personality characteristics among HIV+ individuals, significant findings among HIV- individuals have been reported. For example, higher neuroticism, lower conscientiousness, and lower agreeableness were associated with sexual risk behavior in a primarily African American, HIV- sample (Trobst, Herbst, Masters, & Costa, 2002). Among HIV- individuals who used injection drugs, diagnosis of antisocial personality disorder was associated with more drug-related and sexual risk behaviors (Brooner, Bigelow, Strain, & Schmidt, 1990), and among HIV+ individuals, higher levels of narcissism were associated high rates of unprotected sex (Martin, Benotsch, Lance, & Green, 2013). Among HIV+ MSM (Semple et al., 2000), sensation seeking was more strongly associated with sexual risk behaviors than substance use among HIV+ MSM (Dolezal et al., 1999). A review of 26 research studies that examined HIV+ individuals found that sexual compulsiveness and sensation seeking were strongly associated with sexual risk behavior (Shuper, Joharchi, & Rehm, 2014). Overall, research suggests that substance use and personality factors may be linked to risk behavior among some groups, while the findings on mood symptoms have been less consistent.

## Cognitive Factors

The literature examining the relationship between cognitive functioning and risk behavior in HIV+ individuals is very limited. There is some evidence to suggest that learning/memory, attention/working memory, and executive functions (i.e., decision-making, planning, behavioral regulation, and self-monitoring) may play a role in these complex behaviors, however, the findings to date have been mixed, particularly in regard to executive functioning. For example, recent condom use was significantly associated with reduced abstraction (i.e., Halstead Category Test performance), and total sexual partners was associated with deficits in a measure of overall executive functioning (Bousman et al., 2010). Prospective memory, which involves executive functioning, was linked to sexual and drug-related risk behaviors in a sample of both HIV+ and HIV- individuals (Martin et al., 2007). In contrast, another study found no association between sexual risk behavior and performance on measures of decision-making, working memory, and response inhibition among both HIV+ and HIV- African American individuals who reported current substance use; however, among those who performed well on the decision-making task, higher sensation seeking was linked to sexual risk behavior (Gonzalez et al., 2005). Finally, in a sample of HIV+ and HIV- injection drug users, worse memory performance was associated with less sexual risk behaviors, and was thought to reflect reduced sexual activity due greater HIV disease progression (Dolezal et al., 1999). Overall, relatively few studies have examined cognitive factors, it appears that associations between executive function and risk behavior have been inconsistent.

## Social factors

Several studies have examined social predictors, including demographic characteristics, to determine which factors may help identify individuals who are likely to engage in HIV-transmission-related risk behavior. Evidence from such studies indicate that younger individuals (Aidala et al., 2006; Wolf et al., 2003) and individuals with lower educational achievement (Purcell et al., 2006) were more likely to report engaging in sexual risk

behaviors. Numerous studies have reported that African American men who have sex with men (MSM) are less likely to self-identify as gay compared to MSM of other racial/ethnic backgrounds (Dodge, Jeffries, & Sandfort, 2008; Miller, Serner, & Wagner, 2005). It has been suggested that non-gay-identifying MSM may perceive themselves to be at lower risk (Dworkin, 2015), possibly because they may engage in receptive sex less frequently (Fields et al., 2012; Siegel, Schrimshaw, Lekas, & Parsons, 2008). Among African American men, individuals who reported male and female sexual partners had higher rates of sexual risk behavior compared to individuals who reported exclusively male or exclusively female sexual partners (Spikes et al., 2009).

Studies have also shown that partner characteristics may be important, but are likely complex. Individuals with a steady partner (Aidala et al., 2006) or an HIV+ partner (Wolf et al., 2003) were more likely to report sexual risk behavior; however, in one sample of HIV+ gay and bisexual men, individuals were more likely to have unprotected sex with partners whose HIV status is unknown (Parsons, Schrimshaw, Wolitski, et al., 2005). Evidence also suggests that among individuals who solicit sexual encounters through the internet, a subset of HIV+ gay men may intentionally engage in unprotected sex—known as barebacking—including some among partners of unknown serostatus (Halkitis & Parsons, 2003). Further, among HIV+ gay and bisexual men, individuals tended to be inconsistent in disclosing their serostatus (Parsons, Schrimshaw, Bimbi, et al., 2005). Some evidence suggests that African American MSM were less likely to know the HIV status of their sexual partner (Oster et al., 2011), and less likely to share their HIV status with sexual partners (Millett, Malebranche, Mason, & Spikes, 2005; Sullivan et al., 2014). In a study examining sexual networks among MSM in Atlanta, perceived serostatus was compared to laboratory HIV testing for study participants and several of their sexual partners. Compared to non-Hispanic white MSM, African American MSM were more likely to have HIV+ partners. This included partners that were known to be HIV+ partners as well as partners who were thought to be HIV– or were of unknown serostatus prior to laboratory testing (Grey, Rothenberg, Sullivan, & Rosenberg, 2014).

However, some report that African American men who do not disclose past sexual interactions with other men may engage in fewer HIV-transmission risk behaviors (Millett et al., 2005) and among HIV+ gay and bisexual men, men of color were less likely to self-identify as a barebacker (Halkitis et al., 2005).

Finally, other demographic and social factors that have received less attention may be linked to risk behavior as well. Individuals who lived alone (Wolf et al., 2003) or reported homelessness (Aidala et al., 2006) were more likely to report sexual risk behaviors. However, this has not been investigated among HIV+ African American men.

Collectively, numerous factors in the extant literature have been linked to risk behavior. Given the complexity of these behaviors, the most informative approach is likely to be one that examines the influence of multiple factors (Millett et al., 2007). To our knowledge, no prior study has concurrently examined the association between risk behavior and biological, psychological, cognitive, and social factors, and compared the relative strength of these associations in HIV+ African American men.

This study examined factors related to HIV-transmission-related risk behavior among a group of HIV+ African American men. We evaluated the association between recent risk behavior (i.e., behaviors in the past 12 months) and several biological, psychological, cognitive, and social factors. Based on the extant literature, we hypothesized that recent risk behavior (i.e., in the past 12 months) would be significantly associated with 1) demographic and social factors (i.e., younger age), 2) psychiatric diagnoses (i.e., current substance use disorder), 3) personality characteristics (i.e., increased sensation-seeking, antisocial and avoidant personality tendencies), and 4) cognitive factors (i.e., impaired executive functioning). Given the paucity of evidence, no hypotheses were made regarding the relationship between biological factors and risk behavior but exploratory analyses were conducted.

## Method

### Participants

Participants included 144 HIV+ African American men who were enrolled in a larger study examining medication adherence in HIV+ individuals of all racial/ethnic backgrounds (DA 013799). Participants were recruited through infectious disease clinics, hospitals, and community-based organizations within the Los Angeles area between 2002–2006. Inclusion criteria for the parent study required participants to be HIV+, at least 18 years old, and self-administering their HIV medications. Participants were included in the present study if they were male and identified as African American. Participants completed questionnaires, interviews, and comprehensive neuropsychological assessment (described in the Procedure section below). Study procedures received approval from the University of California, Los Angeles (UCLA) and West Los Angeles Veterans Affairs (VA) Healthcare Center institutional review boards (IRBs). All participants provided written, informed consent and were compensated for their time.

### Procedure

#### Risk-Taking Behavior

Risk-taking behavior was assessed through a structured questionnaire, administered by trained study staff. Relevant to the present study, participants were asked yes/no questions about whether or not they engaged in drug-related risk behaviors, i.e., injection drug use or needle sharing, and sexual risk behaviors, i.e., unprotected sex, or sex in exchange for money or drugs, in the past 12 months. Participants also provided estimates of the number of times they engaged in each behavior, but given the highly skewed nature of this measure and the lack of empirically-supported cut-offs in the literature, we examined this data dichotomously in the present study (i.e., a “Risk” group, comprised of individuals who engaged in at least one instance of injection drug use, needle sharing, unprotected sex, or sex in exchange for money or drugs in the past 12 months, and a “No risk” group comprised of individuals who had not engaged in any of these behaviors in the past 12 months).

## Biological Factors

Self-reported data was collected on select biological indices relevant to HIV infection: most recent CD4 count, nadir CD4 count, most recent plasma HIV viral load, highest plasma HIV viral load, and length of HIV diagnosis. Adherence to HIV medication was assessed via MEMS caps, an electronic monitoring device, over the course of 30 days.

## Psychological Factors

### **Abbreviated Structured Clinical Interview for the DSM-IV-TR (SCID)—**

Participants underwent a semi-structured interview (i.e., a brief, modified version of the SCID for the Diagnostic and Statistical Manual of Mental Disorders-IV Text Revision (DSM-IV; (First, Spitzer, Gibbon, & Williams, 2002) in order to assess for current and past substance abuse/dependence, major depression, bipolar, or psychotic-spectrum disorder.

**Millon Multiaxial Clinical Inventory-III (MCMI-III)—**Participants completed the MCMI-III, a 175-item inventory assessing personality functioning across 10 clinical syndrome scales and 14 personality disorder scales (Millon, Millon, Davis, & Grossman, 2009). Base rate scores were computed, which range from 0–115 for each subscale. Scores of 75 and greater reflect a significant elevation (i.e., presence of a personality trait or clinical syndrome, depending on the subscale).

**Sensation Seeking Scale-V (SSS-V)—**Participants also completed the SSS-V, a 40-item questionnaire that assesses personality and risk preference across the following subdomains: Thrill and Adventure Seeking (TAS), Disinhibition (Dis), Experience Seeking (ES), and Boredom Susceptibility (BS). Possible scores range from 0–10 for each subscale, and 0–40 for the total score (Zuckerman, Eysenck, & Eysenck, 1978). Cronbach's alpha for the scale was 0.72, indicating adequate internal-consistency reliability.

## Cognitive Factors

**Neuropsychological (NP) Test Battery—**Participants completed a comprehensive neuropsychological test battery. Based on the extant literature, we examined functioning in the domains of learning/memory, attention/working memory, and executive functioning. Raw scores were converted to demographically-corrected T-scores based on published, normative data (see Table 1) and averaged within domain to obtain domain T-scores. T-scores less than 40 were considered to be impaired, while T-scores of 40 and greater were considered to be within normal limits.

## Social Factors

A background questionnaire assessed the following: age, years of education, gender of sexual partners, participants' current relationship status, partner's HIV status, current employment status, income (defined as at or below the poverty level), and whether or not the individual had children.



## Statistical Analyses

Statistical analyses were performed using IBM SPSS Statistics Version 21. Variables met homogeneity of variance assumptions and were normally distributed except current and highest plasma HIV viral loads, which were logarithmically transformed. Categorical variables were examined using chi-square. Independent-samples *T*-tests and Mann-Whitney *U*-tests were used to analyze group differences in continuous variables. A multivariate binary logistic regression was computed to examine the overall model.

## RESULTS

First, we characterized the rates of risk behavior across the study sample (see Table 2). In their lifetime, nearly all participants (96%) reported engaging in unprotected sex, about half reported engaging in exchange sex (i.e., sex in exchange for money or drugs), and approximately a quarter or less reported in engaging in drug-related risk behaviors (i.e., injection drug use, needle sharing). Over the past 12 months, participants reported between 0–1000 instances of risk behavior. Among the 60% of the sample who reported engaging in any type of risk behavior at all in the last 12 months, individuals reported a mean of 44.89 ( $SD = 114.31$ ) and a median of 7 instances of risk behavior. Participants were more likely to report sexual than drug-related risk behaviors. Similar to lifetime risk frequency, the most commonly reported recent risk behavior was unprotected sex, followed by exchange sex, then drug-related risk behaviors. More individuals reported engaging in sexual risk behavior than drug-related risk behaviors. Overall, 75 individuals reported engaging in only sexual risk behaviors in the past year and no drug-related risk behavior, while only 6 individuals reported engaging in only drug-related risk behavior in the past year, and denied any sexual risk behaviors.

For subsequent analyses, we dichotomized participants into two groups based on whether or not they had engaged in any risk behavior over the past 12 months: 1) a “Risk” group, comprised of 60% of the study sample, and 2) a “No Risk” group, with the remaining 40% of the sample. First, we compared risk groups on demographic, social, and biological factors (see Table 3). Men in the “Risk group” were significantly younger than men in the “No Risk” group. However, groups did not differ on education, genders of sexual partners, income level, or relationship status, however, among those who were in a relationship, significantly more individuals in the “Risk” group reported having an HIV+ partner (62%) than those in the “No Risk” group. Exploratory analyses compared groups on biological factors related to HIV disease but no group differences were found. Finally, groups did not differ on the proportion of individuals with adequate (i.e., 90% adherence) HIV medication adherence.

We also examined psychological factors, including psychiatric, personality, and cognitive variables (see Table 4). More individuals in the “Risk” group met criteria for substance abuse/dependence and past major depression. The “Risk” group had significantly higher mean scores on the disinhibition subscale of the SSS-V compared to those in “No Risk” group. On the MCMI-III, significantly more individuals in the “Risk” group had clinically elevated scores on the antisocial, negativistic, masochistic, and alcohol dependence subscales compared to those in the “No Risk” group. Contrary to expectations, the “Risk”

group did not have significantly higher rates of NP impairment in learning, attention/working memory, or executive functioning compared to the “No Risk” group.

Last, we computed a multivariate binary logistic regression to explore the degree to which these factors would predict risk group membership. Age (dichotomized as 50 or older vs. under 50, based on CDC grouping and convention in the HIV literature; (Centers for Disease Control and Prevention, 2008), current substance abuse/dependence diagnosis, past major depression, MCMI elevations (i.e., on antisocial, negativistic, masochistic, and alcohol dependence scales, each entered separately), and SSS-V disinhibition subscale score, were all entered stepwise as predictors, with risk group membership (Risk group or No Risk group) as the dependent variable. The odds ratio (OR) for age was 4.23 (95% CI [1.06–16.87], Wald  $\chi^2=4.17$ ,  $p=.04$ ), for MCMI masochism score was 3.87 (95% CI [1.14–13.11], Wald  $\chi^2=4.72$ ,  $p=.03$ ), for substance abuse/dependence was 2.61 (95% CI [1.04–6.53], Wald  $\chi^2=4.18$ ,  $p=.04$ ), and for SSS-V disinhibition score was 1.27 (95% CI [1.00–1.62], Wald  $\chi^2=3.89$ ,  $p<.05$ ).

To follow-up, we separated drug-related risk behaviors and sex-related risk behaviors, and computed multivariate binary logistic regressions to explore the degree to which these factors would predict risk group membership. In predicting sex-related risk behavior, the odds ratio (OR) for age was 5.23 (95% CI [1.20–22.86], Wald  $\chi^2=4.83$ ,  $p=.03$ ), for MCMI alcohol dependence was 2.84 (95% CI [1.01–7.96], Wald  $\chi^2=3.94$ ,  $p<.05$ ), for current substance abuse/dependence was 2.49 (95% CI [0.93–6.36], Wald  $\chi^2=3.26$ ,  $p=.07$ ). In predicting drug-related risk behavior, only MCMI masochism score remained a significant predictor, and the odds ratio (OR) was 5.56 (95% CI [1.14–27.05], Wald  $\chi^2=4.51$ ,  $p=.03$ ).

Finally, we explored whether or not higher rates of risk behavior in the past year (continuously) were associated with these same factors. Nonparametric tests were used given the highly skewed nature of the total risk count variable, and in the interest of space, only significant analyses will be reported.

Analyses of demographic factors showed that total instances of risk behavior in the past 12 months was significantly, negatively correlated with age ( $r_s = -.24$ ,  $p < .01$ ). Mann-Whitney U tests showed that individuals with children engaged in significantly fewer risk behaviors ( $Mdn = 0$ ), than individuals without children ( $Mdn = 2$ ;  $U = 1683.50$ ,  $p = .04$ ), and among individuals who reported having a partner, those with HIV+ partners engaged in significantly more ( $Mdn = 10$ ) risk behaviors than individuals with HIV– partners ( $Mdn = 2$ ;  $U = 187.50$ ,  $p < .01$ ). Analyses of SCID diagnoses showed that individuals with current substance abuse/dependence diagnoses engaged in significantly more risk behaviors ( $Mdn = 1$ ) than those without current diagnoses ( $Mdn = 1$ ;  $U = 1298.50$ ,  $p < .01$ ). The same pattern was found for individuals with past diagnoses of substance abuse/dependence ( $Mdn = 1$ ) compared to those without past diagnoses ( $Mdn = 1$ ;  $U = 986.00$ ,  $p = .02$ ). Analyses of MCMI scales showed that total risk count was significantly associated with the following base rate scores: Antisocial ( $r_s = .33$ ,  $p < .01$ ), Sadistic ( $r_s = .19$ ,  $p < .05$ ), Compulsive ( $r_s = -.23$ ,  $p = .02$ ), Masochistic ( $r_s = .21$ ,  $p = .03$ ), Bipolar ( $r_s = .22$ ,  $p = .02$ ), Alcohol Dependence ( $r_s = .28$ ,  $p < .01$ ), Drug Dependence ( $r_s = .23$ ,  $p = .02$ ), and Thought Disorder ( $r_s = .20$ ,  $p < .05$ ). Analyses of NP domains showed that total counts of risk behavior in the past year were

significantly correlated with attention T-score ( $r_s = .173, p = .04$ ), and correlated with executive functioning T-score at the trend-level ( $r_s = .15, p = .07$ ). There were no associations between any SSS-V scores and total instances of risk behavior.

## DISCUSSION

This study examined recent risk behavior in a sample of HIV+ African American men. Appreciating the complex nature of risk behavior, we examined several biological, psychological, cognitive, and social factors associated with recent risk behavior in the past year, as well as the relative strength of those predictors.

Sixty-percent of our sample reported engaging in risk behavior in the last year. Among the demographic and social factors explored, men who reported risk behavior tended to be younger than those who did not, which is consistent with prior research (Aidala et al., 2006); (Wolf et al., 2003). Individuals with an HIV+ partner were more likely to engage in risk behavior. No significant associations were found between biological (i.e., virological) characteristics and risk behavior. It is noteworthy that we found no differences in medication adherence rates between risk behavior groups, which suggests that patterns may not necessarily consistent across different types of health risk behaviors. Further, it discourages the use of medication adherence rates as a proxy for transmission-related risk behaviors.

We found stronger relationships between psychological predictors and risk behavior. Recent risk behavior was independently associated with current substance abuse/dependence diagnosis, past major depression, clinically-elevated scores on several MCMI-III subscales (i.e., antisocial, negativistic, masochistic, and alcohol dependence), and higher scores on the SSS-V (i.e., disinhibition subscale scores). This is partially consistent with our hypotheses and the extant literature suggesting that substance abuse, as well as maladaptive personality characteristics associated with interpersonal difficulties and reduced regard for others, are associated with risk behavior (Brooner et al., 1990; Semple et al., 2000; Trobst et al., 2002). We did not anticipate that past but not current depression would be associated with risk. This seems to suggest that a history of disordered mood is associated with greater risk taking, but that the current presence of these symptoms is not, which may explain why studies have reported contradictory findings regarding the impact of mood symptoms on risk-taking (Camacho et al., 1996; Crepaz & Marks, 2002; Kelly et al., 1993). It is possible that acute episodes of depression may involve vegetative symptoms (i.e., withdrawal, anhedonia, fatigue) that reduce social interaction and opportunities to engage in risk behavior. However, some of the cognitive distortions involved in mood disorder, such as poor self-esteem and low self-worth, may persist once the depressive episode resolves, predisposing one to engage in HIV-transmission-related risk behaviors.

Unexpectedly, we did not find statistically significant associations between risk behavior and cognition. It does not appear that learning/memory, attention/working memory, or executive functioning, as measured by conventional neuropsychological domains, are associated with recent risk behavior. It is possible that the types of neuropsychological measures used in this study, particularly measures of executive functioning, were not sensitive enough to specific aspects of cognition most directly related to risk. For example, our executive functioning

measures included in this study (i.e., WCST, Trails B, Stroop) more strongly reflect dorsolateral prefrontal cortex functioning compared to other prefrontal areas. It is possible that tests that more specifically target the ventromedial and orbitofrontal cortices may be more strongly associated with risk-taking. Alternatively, given that most of our sample had a past history of HIV-transmission-related risk behavior, cognitive differences may only emerge in comparison to a low- or no-risk sample. Nonetheless, our findings indicate that other factors are more strongly related to HIV-transmission-related risk behavior.

Finally, a binary logistic regression model showed that age, MCMI-III masochism scores (which might be conceptualized as self-defeating behaviors), current substance abuse/dependence diagnosis, and SSS-V disinhibition scores remained significant predictors of risk behavior. Individuals who were under age 50 were 4.2 times more likely to have recently engaged in risk behavior, those who had clinically elevated MCMI masochism scores were 3.9 times more likely, and those with current substance abuse/dependence were 2.6 times more likely. Additionally, for each 1-point increase in SSS-V score, individuals were 1.3 times more likely to report recent risk behavior. When sexual and drug-related risk behavior was examined separately, engagement in sexual risk was predicted by age, MCMI alcohol dependence scores, current substance abuse/dependence diagnosis, suggesting that substance use facilitates risky sexual behavior, while drug-related risk behavior was predicted by MCMI masochism scores.

Aside from the expected relationships with age and substance use disorders, our findings highlight the salience of psychiatric and personality factors. Specifically, self-defeating and disinhibited personality characteristics were most predictive of recent risk behavior. Interestingly, while some studies have suggested that lack of regard for others—including antisocial attitudes and hostility—may predict risk behavior (Brooner et al., 1990; Camacho et al., 1996), our results seem to suggest that lack of self-regard is more strongly associated. Additionally, the relationship between disinhibition, or the preference for “out of control” experiences, and risk behavior, suggests that self-control is a key factor. Although further investigation of these constructs is needed, our results suggest that reducing substance use, addressing self-defeating or self-punishing attitudes, and improving self-control, as well as targeting younger individuals, may be important avenues for prevention and intervention programs among HIV+ African American men who engage in risk behavior.

Our study also has several limitations. First, details regarding participants’ unprotected sexual encounters were unknown. Some participants might have engaged in unprotected sex in a monogamous relationship with an HIV+ partner. While this may not present an HIV-transmission risk, it does pose a risk for super-infection and transmission of other sexually-transmitted diseases. Additionally, the influence of a single risk factor alone was mitigated by our grouping strategy (i.e., any risk in the past year versus no risk in the past year). Second, we did not have information on other factors that might mediate risk behavior, such as attitudes toward specific risk behaviors and future intentions to engage or not engage in them. For example, it was recently reported that attitudes related to intimacy were associated with unprotected sex among gay and bisexual men (Golub, Starks, Payton, & Parsons, 2012). Third, as this study is correlational in nature, although we can speculate about the directionality of the relationships observed, we cannot infer causation.

Limitations notwithstanding, this represents one of the first studies to concurrently compare the associations of multiple biological, psychological, cognitive, and social factors (including virological, psychiatric, personality, cognitive, demographic, and social variables) in relation to HIV-transmission-related risk behavior in HIV+ African American men. Our findings highlight the complex underpinnings of risk behavior and the need for further research in this area, particularly among groups who are disproportionately affected by HIV disease. By improving our understanding of the correlates of risk behavior among HIV+ individuals, we may be able to develop more tailored, evidence-based prevention and intervention programs. Such efforts may help reduce rates of HIV transmission, and eventually reduce some of the significant health disparities associated with this disease.

## CONCLUSIONS

We investigated the associations between specific biological, psychological, cognitive, and social factors and recent engagement in HIV-transmission-related risk behaviors among a sample of HIV+ African American men. Results showed that younger individuals, those with clinically-elevated MCMI subscale scores (particularly masochism scores), those with higher reported levels of disinhibition, and individuals substance abuse/dependence diagnoses were more likely to have engaged in risk behavior in the past year. Notably, we did not find any association between medication adherence and HIV-transmission risk behavior, suggesting that behavior may vary across different types of health risk behaviors. Our results suggest several potential targets for intervention and prevention programs, particularly younger and middle-aged adults. Additionally, our results suggest that reducing substance use, addressing self-defeating or self-punishing attitudes, and improving self-control may be particularly important avenues for future prevention and intervention efforts among HIV+ African American men who are engaging in HIV-transmission-related risk behavior.

## Acknowledgments

This work was supported by National Institutes of Health grant R01 DA013799 (PI: C.H. Hinkin) and a Ruth L. Kirschstein National Research Service Award T32 MH019535 (PI: C.H. Hinkin).

## References

- Aidala AA, Lee G, Howard JM, Caban M, Abramson D, Messeri P. HIV-positive men sexually active with women: sexual behaviors and sexual risks. *Journal of Urban Health*. 2006; 83(4):637–655. DOI: 10.1007/s11524-006-9074-1 [PubMed: 16770702]
- Avants SK, Warburton LA, Hawkins KA, Margolin A. Continuation of high-risk behavior by HIV-positive drug users: Treatment implications. *Journal of Substance Abuse Treatment*. 2000; 19(1): 15–22. [http://dx.doi.org/10.1016/S0740-5472\(99\)00092-6](http://dx.doi.org/10.1016/S0740-5472(99)00092-6). [PubMed: 10867296]
- Beckett M, Burnam A, Collins RL, Kanouse DE, Beckman R. Substance use and high-risk sex among people with HIV: a comparison across exposure groups. *AIDS & Behavior*. 2003; 7(2):209–219. [PubMed: 14586205]
- Berry M, Raymond HF, McFarland W. Same race and older partner selection may explain higher HIV prevalence among black men who have sex with men. *AIDS*. 2007; 21(17):2349–2350. DOI: 10.1097/QAD.0b013e3282f12f41 [PubMed: 18090287]
- Bingham TA, Harawa NT, Johnson DF, Secura GM, MacKellar DA, Valleroy LA. The effect of partner characteristics on HIV infection among African American men who have sex with men in the

- Young Men's Survey, Los Angeles, 1999–2000. *AIDS Education & Prevention*. 2003; 15(1 Suppl A):39–52. [PubMed: 12630598]
- Bingman C, Marks G, Crepaz N. Attributions About One's HIV Infection and Unsafe Sex in Seropositive Men Who Have Sex With Men. *AIDS and Behavior*. 2001; 5(3):283–289. DOI: 10.1023/A:1011348828325
- Blankenship KM, Smoyer AB, Bray SJ, Mattocks K. Black-white disparities in HIV/AIDS: the role of drug policy and the corrections system. *Journal of Health Care for the Poor and Underserved*. 2005; 16(4 Suppl B):140–156. DOI: 10.1353/hpu.2005.0110 [PubMed: 16327113]
- Bousman CA, Cherner M, Atkinson JH, Heaton RK, Grant I, Everall IP, Hnrc Group T. COMT Val158Met Polymorphism, Executive Dysfunction, and Sexual Risk Behavior in the Context of HIV Infection and Methamphetamine Dependence. *Interdisciplinary Perspectives on Infectious Disease*. 2010; :678648.doi: 10.1155/2010/678648
- Brooner RK, Bigelow GE, Strain E, Schmidt CW. Intravenous drug abusers with antisocial personality disorder: increased HIV risk behavior. *Drug and Alcohol Dependence*. 1990; 26(1):39–44. [http://dx.doi.org/10.1016/0376-8716\(90\)90081-O](http://dx.doi.org/10.1016/0376-8716(90)90081-O). [PubMed: 2209414]
- Camacho LM, Brown BS, Simpson DD. Psychological dysfunction and HIV/AIDS risk behavior. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*. 1996; 11(2):198–202. [PubMed: 8556403]
- Centers for Disease Control and Prevention. HIV/AIDS among Persons Aged 50 and Older. 2008. Retrieved from [http://www.cdc.gov/hiv/pdf/library\\_factsheet\\_HIV\\_among\\_personsaged50andolder.pdf](http://www.cdc.gov/hiv/pdf/library_factsheet_HIV_among_personsaged50andolder.pdf)
- Centers for Disease Control and Prevention. Estimated HIV incidence among adults and adolescents in the United States, 2007–2010. 2012a. Retrieved from <http://www.cdc.gov/hiv/topics/surveillance/resources/reports/-supplemental>
- Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 U.S. dependent areas—2010. 2012b. Retrieved from <http://www.cdc.gov/hiv/topics/surveillance/resources/reports/>
- Centers for Disease Control and Prevention. HIV Surveillance Report, 2011. 2013; 23
- Crepez N, Hart TA, Marks G. Highly active antiretroviral therapy and sexual risk behavior: a meta-analytic review. *JAMA*. 2004; 292(2):224–236. DOI: 10.1001/jama.292.2.224 [PubMed: 15249572]
- Crepez N, Marks G. Towards an understanding of sexual risk behavior in people living with HIV: a review of social, psychological, and medical findings. *AIDS*. 2002; 16(2):135–149. [PubMed: 11807297]
- Dodge B, Jeffries WL IV, Sandfort TG. Beyond the down low: Sexual risk, protection, and disclosure among at-risk Black men who have sex with both men and women (MSMW). *Archives of Sexual Behavior*. 2008; 37(5):683–696. [PubMed: 18512140]
- Dolezal C, Meyer-Bahlburg HF, Liu X, Ehrhardt AA, Exner TM, Rabkin JG, ... Stern Y. Longitudinal changes in sexual risk behavior among HIV+ and HIV– male injecting drug users. *American Journal of Drug and Alcohol Abuse*. 1999; 25(2):281–303. [PubMed: 10395161]
- Dolezal C, Meyer-Bahlburg HFL, Remien RH, Petkova E. Substance Use During Sex and Sensation Seeking as Predictors of Sexual Risk Behavior Among HIV+ and HIV– Gay Men. *AIDS and Behavior*. 1997; 1(1):19–28. DOI: 10.1023/A:1026209704125
- Dukers NH, Goudsmit J, de Wit JB, Prins M, Weverling GJ, Coutinho RA. Sexual risk behaviour relates to the virological and immunological improvements during highly active antiretroviral therapy in HIV-1 infection. *Aids*. 2001; 15(3):369–378. [PubMed: 11273217]
- Dworkin, SL. *Men at Risk: Masculinity, Heterosexuality and HIV Prevention*. NYU Press; 2015.
- Fields EL, Bogart LM, Smith KC, Malebranche DJ, Ellen J, Schuster MA. HIV risk and perceptions of masculinity among young black men who have sex with men. *Journal of Adolescent Health*. 2012; 50(3):296–303. [PubMed: 22325136]
- First, MB., Spitzer, RL., Gibbon, M., Williams, JBW. *Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition With Psychotic Screen (SCID-I/P W/PSY SCREEN)*. New York: Biometrics Research, New York State Psychiatric Institute; 2002.

- Gifford AL, Bormann JE, Shively MJ, Wright BC, Richman DD, Bozzette SA. Predictors of self-reported adherence and plasma HIV concentrations in patients on multidrug antiretroviral regimens. *Journal of Acquired Immune Deficiency Syndromes*. 2000; 23(5):386–395. [PubMed: 10866231]
- Golub SA, Starks TJ, Payton G, Parsons JT. The critical role of intimacy in the sexual risk behaviors of gay and bisexual men. *AIDS & Behavior*. 2012; 16(3):626–632. DOI: 10.1007/s10461-011-9972-4 [PubMed: 21630012]
- Gonzalez R, Vassileva J, Bechara A, Grbesic S, Sworowski L, Novak RM, ... Martin EM. The influence of executive functions, sensation seeking, and HIV serostatus on the risky sexual practices of substance-dependent individuals. *Journal of the International Neuropsychological Society*. 2005; 11(2):121–131.
- Grey JA, Rothenberg R, Sullivan PS, Rosenberg ES. Racial differences in the accuracy of perceived partner HIV status among men who have sex with men (MSM) in Atlanta, Georgia. *Journal of the International Association of Providers of AIDS Care*. 2014; 14(1):26–32. DOI: 10.1177/2325957414555226 [PubMed: 25348797]
- Halkitis PN, Parsons JT. Intentional unsafe sex (barebacking) among HIV-positive gay men who seek sexual partners on the internet. *AIDS Care*. 2003; 15(3):367–378. DOI: 10.1080/0954012031000105423 [PubMed: 12745400]
- Halkitis PN, Wilton L, Wolitski RJ, Parsons JT, Hoff CC, Bimbi DS. Barebacking identity among HIV-positive gay and bisexual men: demographic, psychological, and behavioral correlates. *AIDS*. 2005; 19(Suppl 1):S27–35.
- Hasse B, Ledergerber B, Hirschel B, Vernazza P, Glass TR, Jeannin A, ... Weber R. Frequency and determinants of unprotected sex among HIV-infected persons: the Swiss HIV cohort study. *Clinical Infectious Diseases*. 2010; 51(11):1314–1322. DOI: 10.1086/656809 [PubMed: 21034200]
- Hughes JP, Baeten JM, Lingappa JR, Magaret AS, Wald A, de Bruyn G, ... Celum C. Determinants of per-coital-act HIV-1 infectivity among African HIV-1-serodiscordant couples. *Journal of Infectious Diseases*. 2012; 205(3):358–365. DOI: 10.1093/infdis/jir747 [PubMed: 22241800]
- Kalichman SC. HIV Transmission Risk Behaviors of Men and Women Living With HIV-AIDS: Prevalence, Predictors, and Emerging Clinical Interventions. *Clinical Psychology: Science and Practice*. 2000; 7(1):32–47. DOI: 10.1093/clipsy.7.1.32
- Kelly JA, Murphy DA, Bahr GR, Koob JJ, Morgan MG, Kalichman SC, St Lawrence JS. Factors associated with severity of depression and high-risk sexual behavior among persons diagnosed with human immunodeficiency virus (HIV) infection. *Health Psychology*. 1993; 12(3):215–219. [PubMed: 8500451]
- Kleeberger CA, Phair JP, Strathdee SA, Detels R, Kingsley L, Jacobson LP. Determinants of heterogeneous adherence to HIV-antiretroviral therapies in the Multicenter AIDS Cohort Study. *Journal of Acquired Immune Deficiency Syndromes*. 2001; 26(1):82–92. [PubMed: 11176272]
- Laumann EO, Youm Y. Racial/ethnic group differences in the prevalence of sexually transmitted diseases in the United States: a network explanation. *Sexually Transmitted Diseases*. 1999; 26(5):250–261. [PubMed: 10333277]
- Martin AM, Benetsch EG, Lance SP, Green M. Transmission risk behaviors in a subset of HIV-positive individuals: The role of narcissistic personality features. *Personality and Individual Differences*. 2013; 54(2):256–260.
- Martin EM, Nixon H, Pitrak DL, Weddington W, Rains NA, Nunnally G, ... Bechara A. Characteristics of prospective memory deficits in HIV-seropositive substance-dependent individuals: preliminary observations. *Journal of Clinical and Experimental Neuropsychology*. 2007; 29(5):496–504. DOI: 10.1080/13803390600800970 [PubMed: 17564915]
- Miller M, Serner M, Wagner M. Sexual diversity among black men who have sex with men in an inner-city community. *Journal of Urban Health*. 2005; 82(1):i26–i34. [PubMed: 15738323]
- Miller M, Serner M, Wagner M. Sexual diversity among black men who have sex with men in an inner-city community. *Journal of Urban Health*. 2005; 82(1):i26–i34. [PubMed: 15738323]

- Millett G, Malebranche D, Mason B, Spikes P. Focusing“ down low”: bisexual black men, HIV risk and heterosexual transmission. *Journal of the National Medical Association*. 2005; 97(7 Suppl): 52S. [PubMed: 16080458]
- Millett GA, Flores SA, Peterson JL, Bakeman R. Explaining disparities in HIV infection among black and white men who have sex with men: a meta-analysis of HIV risk behaviors. *AIDS*. 2007; 21(15):2083–2091. 2010.1097/QAD.2080b2013e3282e2089a2064b. [PubMed: 17885299]
- Millon, T., Millon, C., Davis, R., Grossman, S. *MCMII-III Manual*. 4. Minneapolis, MN: Pearson Education, Inc; 2009.
- Oster AM, Wiegand RE, Sionean C, Miles IJ, Thomas PE, Melendez-Morales L, ... Millett GA. Understanding disparities in HIV infection between black and white MSM in the United States. *AIDS*. 2011; 25(8):1103–1112. DOI: 10.1097/QAD.0b013e3283471efa [PubMed: 21505305]
- O’Cleirigh C, Newcomb ME, Mayer KH, Skeer M, Traeger L, Safren SA. Moderate levels of depression predict sexual transmission risk in HIV-infected MSM: a longitudinal analysis of data from six sites involved in a “prevention for positives” study. *AIDS and Behavior*. 2013; 17(5): 1764–1769. [PubMed: 23605154]
- Parsons JT, Schrimshaw EW, Bimbi DS, Wolitski RJ, Gomez CA, Halkitis PN. Consistent, inconsistent, and non-disclosure to casual sexual partners among HIV-seropositive gay and bisexual men. *AIDS*. 2005; 19(Suppl 1):S87–97. [PubMed: 15838198]
- Parsons JT, Schrimshaw EW, Wolitski RJ, Halkitis PN, Purcell DW, Hoff CC, Gomez CA. Sexual harm reduction practices of HIV-seropositive gay and bisexual men: serosorting, strategic positioning, and withdrawal before ejaculation. *AIDS*. 2005; 19(Suppl 1):S13–25.
- Posner SF, Marks G. Prevalence of high-risk sex among HIV-positive gay and bisexual men: a longitudinal analysis. *American Journal of Preventative Medicine*. 1996; 12(6):472–477.
- Purcell DW, Mizuno Y, Metsch LR, Garfein R, Tobin K, Knight K, Latka MH. Unprotected sexual behavior among heterosexual HIV-positive injection drug using men: associations by partner type and partner serostatus. *Journal of Urban Health*. 2006; 83(4):656–668. DOI: 10.1007/s11524-006-9066-1 [PubMed: 16736116]
- Rabkin JG, Rabkin R, Wagner G. Testosterone replacement therapy in HIV illness. *General Hospital Psychiatry*. 1995; 17(1):37–42. [PubMed: 7737494]
- Raymond HF, McFarland W. Racial mixing and HIV risk among men who have sex with men. *AIDS & Behavior*. 2009; 13(4):630–637. DOI: 10.1007/s10461-009-9574-6 [PubMed: 19479369]
- Remien RH, Halkitis PN, O’Leary A, Wolitski RJ, Gomez CA. Risk Perception and sexual risk behaviors among HIV-positive men on antiretroviral therapy. *AIDS Behav*. 2005; 9(2):167–176. DOI: 10.1007/s10461-005-3898-7 [PubMed: 15933836]
- Semple SJ, Patterson TL, Grant I. Psychosocial predictors of unprotected anal intercourse in a sample of HIV positive gay men who volunteer for a sexual risk reduction intervention. *AIDS Education & Prevention*. 2000; 12(5):416–430. [PubMed: 11063061]
- Shuper PA, Joharchi N, Irving H, Rehm J. Alcohol as a correlate of unprotected sexual behavior among people living with HIV/AIDS: review and meta-analysis. *AIDS & Behavior*. 2009; 13(6): 1021–1036. DOI: 10.1007/s10461-009-9589-z [PubMed: 19618261]
- Shuper PA, Joharchi N, Rehm J. Personality as a predictor of unprotected sexual behavior among people living with HIV/AIDS: a systematic review. *AIDS and Behavior*. 2014; 18(2):398–410. [PubMed: 23835736]
- Siegel K, Schrimshaw EW, Lekas HM, Parsons JT. Sexual behaviors of non-gay identified non-disclosing men who have sex with men and women. *Archives of Sexual Behavior*. 2008; 37(5): 720–735. [PubMed: 18506616]
- Spikes PS, Purcell DW, Williams KM, Chen Y, Ding H, Sullivan PS. Sexual risk behaviors among HIV-positive black men who have sex with women, with men, or with men and women: implications for intervention development. *American journal of public health*. 2009; 99(6):1072–1078. [PubMed: 19372509]
- Stein M, Herman DS, Trisvan E, Pirraglia P, Engler P, Anderson BJ. Alcohol use and sexual risk behavior among human immunodeficiency virus-positive persons. *Alcoholism: Clinical and Experimental Research*. 2005; 29(5):837–843.



- Sullivan PS, Peterson J, Rosenberg ES, Kelley CF, Cooper H, Vaughan A, ... DiClemente R. Understanding racial HIV/STI disparities in black and white men who have sex with men: a multilevel approach. *PLoS One*. 2014; 9(3):e90514. [PubMed: 24608176]
- Thames AD, Moizel J, Panos SE, Patel SM, Byrd DA, Myers HF, ... Hinkin CH. Differential predictors of medication adherence in HIV: findings from a sample of African American and Caucasian HIV-positive drug-using adults. *AIDS Patient Care and STDS*. 2012; 26(10):621–630. DOI: 10.1089/apc.2012.0157 [PubMed: 22889235]
- Trost KK, Herbst JH, Masters HL III, Costa PT Jr. Personality Pathways to Unsafe Sex: Personality, Condom Use, and HIV Risk Behaviors. *Journal of Research in Personality*. 2002; 36(2):117–133. <http://dx.doi.org/10.1006/jrpe.2001.2334>.
- Wolf K, Young J, Rickenbach M, Vernazza P, Flepp M, Furrer H, ... Bucher HC. Prevalence of unsafe sexual behavior among HIV-infected individuals: the Swiss HIV Cohort Study. *Journal of Acquired Immune Deficiency Syndromes*. 2003; 33(4):494–499. [PubMed: 12869838]
- Zimmerman PA, Buckler-White A, Alkhatib G, Spalding T, Kubofcik J, Combadiere C, ... Murphy PM. Inherited resistance to HIV-1 conferred by an inactivating mutation in CC chemokine receptor 5: studies in populations with contrasting clinical phenotypes, defined racial background, and quantified risk. *Molecular Medicine*. 1997; 3(1):23–36. [PubMed: 9132277]
- Zuckerman M, Eysenck S, Eysenck HJ. Sensation seeking in England and America: cross-cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology*. 1978; 46(1):139–149. [PubMed: 627648]

**Table 1**

## Neuropsychological tests and normative data sources

---

<b>Domains, Tests, and Normative Sources</b>
<b>Learning/Memory</b> California Verbal Learning Test-II (CVLT-II) (Delis, Kramer, Kaplan, & Ober, 2000) Brief Visuospatial Memory Test-Revised (BVRT-R) (Benedict, 1997)
<b>Attention/Working Memory</b> Paced Auditory Serial Addition Test (PASAT) (Stuss, Stethem, & Pelchat, 1988) WAIS-III Letter-Number Sequencing (Wechsler, 1997) WAIS-III Digit Span (Wechsler, 1997)
<b>Executive Functioning</b> Trail Making Test (Part B) (Heaton, Grant, & Matthews, 1991) Stroop Color-Word Test (Selnes et al., 1991) Wisconsin Card Sorting Test—64 card version (WCST-64) (Kongs, Thompson, Iverson, & Heaton, 2000)

---

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 2**

Risk behavior of the study sample (N= 144)

<i>Risk Behavior</i>	<u>No risk behavior in past 12 months (n=58)</u>	<u>Any risk behavior in past 12 months (n=86)</u>	
	<i>Lifetime (%)</i>	<i>Lifetime (%)</i>	<i>Past 12 Months (%)</i>
Injection drug use	26	25	22
Needle Sharing	22	19	5
Unprotected sex	93	98	88
Exchange sex	41	58	33

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 3**  
Demographic, social, and virological characteristics and recent risk behavior of the study sample (N= 144)

Characteristic	No Risk (n=58)			Risk (n=86)			Statistic	p
	M or %	SD	M or %	M or %	SD	SD		
Age	44.60	6.35	40.95	6.07	6.07	6.07	$F=3.48$	.00
Education	12.78	1.94	12.74	1.85	1.85	1.85	$t=0.12$	.91
Income (% at or below poverty level)	67%		63%				$\chi^2=0.32$	.57
Genders of Sexual Partners								
Women	22%		12%				$\chi^2=3.67$	.16
Men	42%		55%					
Women & Men	36%		33%					
Relationship (% in a relationship)	39%		34%				$\chi^2=0.30$	.59
HIV+ partner	32%		62%				$\chi^2=4.58$	.03
Has children	38%		23%				$\chi^2=3.61$	.06
Length of HIV infection (years)	9.87	4.78	10.46	6.04	6.04	6.04	$F=-.61$	.55
HIV Medication Adherence ( 90%)	33%		36%				$\chi^2=0.12$	.73
	<i>Mdn</i>	<i>IQR</i>	<i>Mdn</i>	<i>IQR</i>	<i>IQR</i>	<i>IQR</i>	<i>Statistic</i>	<i>p</i>
Current CD4	302	450	372	363	363	363	$U=0.91$	.36
Nadir CD4	180	332	200	276	276	276	$U=0.68$	.50
Current HIV viral load <sup>a</sup>	3.10	3.01	2.92	3.16	3.16	3.16	$U=0.53$	.60
Highest HIV viral load <sup>a</sup>	4.48	1.77	4.69	1.67	1.67	1.67	$U=1.23$	.22

<sup>a</sup>log<sub>10</sub> transformed

**Table 4**

Psychiatric/psychological factors and cognitive performance by risk behavior group (N = 144)

<i>SCID Diagnoses</i>	No Risk ( <i>n</i> =58)	Risk ( <i>n</i> =86)	<i>x</i> <sup>2</sup>	<i>p</i>
	% Diagnosed	% Diagnosed		
<b>Current Substance Abuse/Dependence</b>	<b>26</b>	<b>53</b>	<b>7.01</b>	<b>&lt;.01</b>
Past Substance Abuse/Dependence	80	83	.22	.64
Current Major Depression	9	17	1.33	.25
<b>Past Major Depression</b>	<b>21</b>	<b>42</b>	<b>6.31</b>	<b>.01</b>
Current Bipolar Disorder	0	0	-	-
Past Bipolar Disorder	2	3	.06	.81
Current Psychotic Spectrum Disorder	6	11	1.92	.28
Past Psychotic Spectrum Disorder	7	14	1.20	.27
<i>MCMI-III Subscales</i>	% Elevated	% Elevated	<i>x</i> <sup>2</sup>	<i>p</i>
<b>Alcohol Dependence</b>	<b>20</b>	<b>43</b>	<b>6.3</b>	<b>0.01</b>
<b>Antisocial</b>	<b>20</b>	<b>38</b>	<b>4.08</b>	<b>0.04</b>
Anxiety Disorder	49	53	0.2	0.65
Avoidant	29	32	0.09	0.76
Bipolar	2	10	2.5	0.11
Borderline	7	7	0	1
Compulsive	7	2	1.75	0.19
Delusional Disorder	4	5	0.02	0.9
Dependent	22	20	0.08	0.78
Depressive	20	27	0.63	0.43
Drug Dependence	36	42	0.4	0.53
Dysthymic	22	23	0.02	0.89
Histrionic	2	0	1.35	0.25
Major Depression	4	7	0.24	0.63
<b>Masochistic</b>	<b>11</b>	<b>28</b>	<b>4.61</b>	<b>0.03</b>
Narcissistic	22	35	2.02	0.16
<b>Negativistic</b>	<b>11</b>	<b>27</b>	<b>3.89</b>	<b>&lt;.05</b>
Paranoid	13	18	0.47	0.49
Post-Traumatic Stress	9	12	0.21	0.65
Sadistic	4	15	3.06	0.08
Schizoid	31	27	0.25	0.62
Schizotypal	9	17	1.35	0.25
Somatoform Disorder	11	5	1.36	0.24
Thought Disorder	4	2	0.72	0.4
<i>SSS-V Subscale</i>	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>	<i>F</i>	<i>p</i>
Thrill & Adventure Seeking	3.81 ± 1.84	3.94 ± 1.89	0.00	.68
Boredom Sensitivity	2.55 ± 1.63	2.74 ± 1.71	0.35	.50

	No Risk (n=58)	Risk (n=86)	$\chi^2$	<i>p</i>
	% Diagnosed	% Diagnosed		
<i>SCID Diagnoses</i>				
Experience Seeking	4.76 ± 1.58	5.31 ± 1.85	1.54	.06
<b>Disinhibition</b>	<b>3.52 ± 1.99</b>	<b>4.23 ± 2.05</b>	<b>0.00</b>	<b>.04</b>
Total	14.64 ± 4.49	16.23 ± 4.97	0.30	.05
<i>NP Domains</i>				
	% Impaired	% Impaired	$\chi^2$	<i>p</i>
Learning/Memory	45	43	.05	.83
Attention/Working Memory	29	23	.67	.42
Executive Function	52	38	2.51	.11

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript