Published in final edited form as:

AIDS Care. 2009 November ; 21(11): 1455–1462. doi:10.1080/09540120902883069.

Mediators of HIV-related stigma and risk behavior in HIV infected young women

Gretchen Clum^{a,*}, Shang-En Chung^b, Jonathan M. Ellen^b, and The Adolescent Medicine Trials Network for HIV/AIDS Interventions

^aSchool of Public Health and Tropical Medicine, Tulane University, New Orleans, CA, USA

^bJohns Hopkins University School of Medicine, Baltimore, MD, USA

Abstract

Stigma in HIV positive persons has been associated with numerous negative sequelae, including decreased social support, depressive symptoms, and engagement in risk behaviors. Few studies examined the interrelationships of these factors to facilitate understanding of the mechanisms by which HIV stigma influences risk behavior, thus the current study focuses on identifying pathways between HIV-related stigma and risk behavior in 147 young HIV positive women. Depression and social support were hypothesized to mediate between HIV-related stigma and risk behavior. Structural equation modeling was used to test these hypothesized pathways, results suggested that depression was a significant mediator between HIV-related stigma and risk behavior. Implications for interventions with young HIV positive women who report high levels of HIV-related stigma include a focus on depression as a method of reducing engagement in risk behavior and improving mental health and health behaviors in persons living with HIV.

Keywords

adolescent; HIV; risk; behavior; stigma; women

Stigma is defined as a “social identity that is devalued in a particular social context” (Crocker, Major, & Steele, 1998), and a “spoiled identity” (Goffman, 1963). HIV-related stigma can result in overt acts of discrimination to the stigmatized person, or lead to internalized stigma, such as negative self-image, feelings of shame, guilt, and concerns regarding disclosure, that may in turn exert subtle negative influences on social interactions and perceptions of the self (Berger, Ferrans, & Lashley, 2001; Bunn, Solomon, Miller, & Forehand, 2007; Deacon, 2006). This internalized stigma may play an important role in adjustment to living with HIV and affect behavioral outcomes such as engagement in risk behavior.

© 2009 Taylor & Francis

Corresponding author. gclum@tulane.edu.

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

Publisher's Disclaimer: The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Research has demonstrated links between stigma and risk behavior. A study of rural adult men who have sex with men (MSM) reported that perceived stigma from healthcare providers was associated with increased sexual risk behavior (Preston et al., 2004). Associations between stigma and bartering sex in young substance using persons with HIV have also been documented (Swendeman, Rotheram-Borus, Comulada, Weiss, & Ramos, 2006). There is some evidence that stigma is linked to substance use in young substance using adults, MSM, and adult women living with HIV (Courtenay-Quirk, Wolitski, Parsons, & Gomez, 2006; Swendeman, Comulada, Lee, & Rotheram-Borus, 2002; Swendeman et al., 2006). While these studies demonstrate a link between stigma and risk behavior, further exploration of possible meditational paths is needed.

Possible mechanisms linking stigma and risk behavior

Two possible pathways, distress (most often measured as depressive symptoms) and social support have been linked to both HIV-related stigma and engagement in risk behavior. Specifically, stigma is associated with increased reports of depressive symptoms and decreased social support (Berger et al., 2001; Lee, Kochman, & Sikkema, 2002; Mak et al., 2007; Pachankis, 2007; Vanable, Carey, Blair, & Littlewood, 2006). For example, internalized stigma was linked to less disclosure and a smaller social network in young women (Swendeman et al., 2006). Decreased positive affect has also been associated with engagement in sexual risk behavior (Mustanski, 2007), and negative affect has been associated with engagement in sexual risk taking and substance use in women (VanZile-Tamsen, Testa, Harlow, & Livingston, 2006). Both social support and psychological distress have been associated with health risk behaviors such as sexual risk taking and substance use in adolescents living with HIV (Henrich, Brookmeyer, Shrier, & Shahar, 2006).

The cognitive escape model delineates the conditions necessary for failure of self-regulation and engagement in risky health behaviors such as substance use and sexual risk (Heatherton & Baumeister, 1991; McKirnan, Ostrow, & Hope, 1996; McKirnan, Vanable, Ostrow, & Hope, 2001). These conditions include comparison of self against a high standard, ensuing heightening of aversive self-awareness, distress, and ensuing fatigue and engagement in risk to escape this negative and heightened self-awareness (Heatherton & Baumeister, 1991). A person experiencing HIV-related stigma experiences the self as devalued and socially “marked,” thus creating a heightened sense of negative self-awareness relative to the uninfected person. This heightened awareness can result in distress, such as depressive symptoms, and escape from these thoughts and feelings are sought, manifesting in risk behavior. In MSM, the cognitive escape model has been utilized to demonstrate associations with unprotected anal sex (Hoyt, Nemeroff, & Huebner, 2006; Parsons et al., 2004; Williams, Elwood, & Bowen, 2000) and substance use (McKirnan et al., 1996, 2001).

From a cognitive escape framework, young HIV positive women with high levels of HIV stigma may be at risk for impaired self-regulation and increased risk behavior (Inzlicht, McKay, & Aronson, 2006) through depressive symptoms. However, social exclusion has also been associated with engagement in riskier and unhealthy behaviors (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Twenge, Catanese, & Baumeister, 2002) and with HIV-related stigma (Berger et al., 2001; Pachankis, 2007), and may also constitute a salient pathway linking HIV-related stigma and risk behavior.

The goal of this study was to test the hypothesis that HIV-related stigma was associated with increased engagement in risk behavior in young, HIV positive women and that depressive symptoms and social support would mediate this relationship. A secondary goal was to conduct a latent class analysis of risk behavior that included indices of both sexual and drug risk to assess the complex nature of risk behavior in young women with HIV.

Methods

Procedures

We recruited 147 HIV-infected female adolescents and young adults, aged 13–24 who were receiving HIV-related care at Adolescent Medicine Trials Network (ATN) sites in New York City (Montifiore Medical Center, Adolescent AIDS Program), Miami (University of Miami/Jackson Memorial Medical Center), New Orleans (Tulane Medical Center), Chicago (Stroger Hospital of Cook County), and Los Angeles (Los Angeles Children's Hospital, University of Southern California). Nurse coordinators informed eligible female participants age 13–23 and 11 months with non-perinatal, non-transfusion acquired HIV infection of an ongoing study, and informed consent was obtained from all participants. Participants were followed for 18 months, with recruitment from January 2003 through November 2004, and data collection completed in May 2006. Approval for study protocol was granted from each institution's human subjects review board. At two sites, parental consent was required for women younger than 18 years. Baseline and six-month measures were collected using an extensive audio computer assisted self-interview (ACASI) questionnaire. Baseline interviews took from 2 to 3 hours, with follow up visits lasting approximately 1–2 hours. Participants were compensated \$25–\$50 per study visit, according to local site compensation procedures.

Measures

Conceptualization of risk—Problem behavior theory (Jessor & Jessor, 1977) posits that problem behaviors occur together due to common causal factors. Studies suggest that sexual behavior is more complex than what a single behavior, such as condom use, can measure (Beadnell et al., 2005; Cochran, de Leeuw, & Mays, 1995; Newman & Zimmerman, 2000). Further, in female adolescents with HIV, participation in ongoing sexual risk behavior is associated with substance use (Clark, Lindner, Armistead, & Austin, 2003; Futterman, Hein, Reuben, Dell, & Shaffer, 1993; Wilson et al., 1999), particularly marijuana use (Murphy, Durako, Muenz, & Wilson, 2000; Rosengard et al., 2006). Given the co-occurrence of behaviors such as unprotected sex and substance use, we used a latent class analysis approach (LCA) with multiple indicators of sexual and drug use to create risk groups.

Drug use—Drug use was assessed at the six-month interview by asking about marijuana use in the last 90 days (yes/no) and any other drug use in the past 90 days (yes/no).

Sexual risk behavior—Sexual risk behavior was assessed at the six-month interview with a modified version of the National Institute of Mental Health (NIMH) Multisite Cooperative Agreement sexual risk assessment (NIMH Multisite HIV Prevention Trial Group, 1997). Reported sexual behavior with main partners in the past three months including unprotected sex with an unknown or serodiscordant main partner (yes/no) and perceived partner concurrency (yes/no) were used in the LCA. Previous test-retest coefficients for the sexual behavior items used in the NIMH Multisite trial have been good (ranges 0.67–0.73).

HIV stigma—HIV stigma was assessed at baseline with the HIV Stigma Scale (Berger et al., 2001), a 40-item questionnaire with both a single higher order construct of stigma and four subscales. The measure has demonstrated good internal reliability, construct validity, discriminant validity, and test-retest reliability with a diverse sample of HIV positive individuals (Berger et al., 2001; Bunn et al., 2007). To reduce participant burden in the ACASI interview, two subscales, disclosure and negative self-image, were administered. The scales included agreement with statements such as "People's attitudes make me feel worse about myself," "Telling someone I have HIV is risky," and "I never feel the need to

hide the fact that I have HIV.” Anchors ranged from 1 to 4 with higher scores indicating greater internalized stigma. Items were summed, and internal reliability was good at 0.90.

Social support—Social support was measured at baseline using the 24-item Social Provisions Scale (Russell, Cutrona, Rose, & Yurko, 1984). Questions are anchored from one (strongly disagree) to four (strongly agree) for a possible range of 24–96, with higher scores indicating higher perceived support. The scale has demonstrated adequate reliability and validity across multiple samples (Cutrona, Russell, & Jones, 1984), internal reliability in this study was 0.91.

Major Depressive Disorder (MDD)—Major Depressive Disorder (MDD) was assessed at baseline using the computerized voice administered version of the NIMH Diagnostic Interview Schedule for Children (C-DISC: Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The C-DISC assesses clinically relevant symptoms of anxiety, mood, behavior, and substance use based on a current timeframe and DSM-IV diagnostic criteria. Studies have reported moderate test-retest reliabilities (Schwab-Stone et al., 1993). Diagnosis of MDD was coded as a 1, and 0 indicated no diagnosis.

Analysis

Descriptive statistics were performed on 147 participants. The LCA analysis was used to identify the discrete latent subgroups of participants based on four binary observed variables (marijuana use yes/no; any other drug use yes/no; condom use with unknown or serodiscordant main partner yes/no; and partner concurrency yes/no). Each participant was assigned to a class membership based on their posterior probabilities of class membership for a particular risk profile. The class with higher probability of endorsing any sexual and/or substance use behavior was defined as the higher risk class. Once the latent class memberships were determined based on both conceptual considerations and statistical fit indices, chi-square tests were used to examine if the probability of endorsing each sexual and drug risk behavior was different among the identified class memberships.

Our primary study hypothesis was that HIV stigma would be associated with risk class membership as defined by both sexual and substance use behavior, and this would be mediated by social support and MDD. We first examined associations between demographic variables, medical status (CD4, viral load), and study variables; associations were not significant and thus were not included in the final model. To simultaneously examine the role of MDD and social support as mediators in the relationship of HIV stigma and risk group, we used a structural equation modeling (SEM) approach. We constructed (1) a path from HIV stigma to risk; (2) two separate paths from HIV stigma to proposed mediators – social support and MDD; and (3) two separate paths from the proposed mediators – social support and MDD – to risk class membership (Figure 1). The Baron and Kenny (1986) causal steps approach to mediation suggests there first must be a relationship established between the predictor and outcome variable in order to establish a relationship to be mediated. However, more recent arguments for testing mediation suggest that this initial relationship is not required to identify important indirect effects. Thus, we use MacKinnon, Krull, and Lockwood (2000) and others (e.g., Shrout & Bolger, 2002) recommendations for tests of multiple mediator models in SEM, placing emphasis on discerning the significance of the specific indirect effects of our proposed mediators of depression and social support on the relationship between stigma and risk class membership.

LCA and SEM analyses were performed using Mplus 3.11 (Muthen & Muthen, 2004). Because of our small sample size, missing data were handled in Mplus using the full information maximum likelihood (FIML) estimator for the dependent variables in order to

utilize the most information available. Models were estimated with the weighted least-squares with mean and variance adjusted (WLSMV) estimator for categorical outcomes.

Results

Participants were predominately Black/African American (70.7%) and 7.8% described their race as Caucasian or other. Hispanic ethnicity was reported by 22.8% of the sample. Approximately, 40% of participants had at least a Certificate of General Educational Development (GED) or were high-school graduates. See Table 1 for complete demographics.

The LCA results (Table 2) suggested that a three-class model was preferred, where the Lo-Mendall-Rubin Likelihood ratio test showed a significant value ($p < 0.05$) and high value of Entropy (0.91). Class 1 (2%) was the highest risk sample, Class 2 accounted for 56% of the sample and represented the next lower level of risk. Class 3 represented 42% and was the lowest risk class. In examining the low prevalence in the highest risk group along with the patterns of behavior endorsement, we determined that collapsing the two higher risk classes into one high risk class would be a more meaningful representation of high risk (Everitt, Landau, & Morven, 2001; Muthen, 2002).

The two classes, high and low risk, were compared on the primary variables of interest, HIV stigma, social support, and MDD. As shown in Table 3, there was a statistically significant difference in recent drug use between the risk classes, and marijuana use and partner concurrency, while not significant did fall in the expected direction between risk classes. Condom use with an unknown or serodiscordant partner was not significantly different between the two risk classes. The two class model was utilized as the outcome in the structural equation model. The hypothesized and estimated model with the completely standardized coefficients is shown in Figure 1. HIV stigma significantly predicted social support ($\beta = -0.343$, $p < 0.05$) and MDD ($\beta = 0.056$, $p < 0.05$). There was also a significant effect of MDD ($\beta = 0.431$, $p < 0.05$) and a borderline significant effect of social support ($\beta = -0.019$, $p < 0.10$) on risk class. The total indirect effect of MDD and social support on risk class was 0.030 (Sobel = 2.43, $p < 0.05$). The specific indirect effect of HIV stigma on risk class through MDD and social support was 0.024 (Sobel = 2.05; $p < 0.05$) and 0.006 (Sobel = 1.81; $p < 0.10$), respectively. When mediational paths were included, the direct effect of stigma on risk class was reduced from 0.011 to -0.019 . Therefore, the final mediation model indicated that the combined effect of social support and MDD partially mediated the relationship between HIV stigma and risk class, but only MDD was a significant mediator between stigma and risk class. There was good fit of the hypothesized model to the data according to our examined fit indices, ($\chi^2(1) = 0.062$, $p = 0.80$; CFI = 1.0; Root Mean Square Error of Approximation (RMSEA) = 0.0; Weighted Root Mean Square Residual (WRMR) = 0.079). The final model accounted for 23% of the variance in risk class.

Discussion

The overall statistics for the model suggested that the model provided a good fit to the data and there was a significant combined indirect effect of depression and social support on risk class membership. Partially consistent with our hypotheses, greater HIV-related stigma influenced risk class membership through MDD, but not social support. The finding that MDD had a significant indirect effect on risk class membership is consistent with the cognitive escape model utilized to explain engagement in risk behaviors such as binge eating and, among MSM, engagement in unprotected sex and substance use (Heatherton & Baumeister, 1991; McKirnan et al., 1996, 2001). As predicted by the cognitive escape model, HIV-related stigma may result in a heightened and negative self-awareness that

depletes resources and leads to depressive symptoms, which results in risk behavior as a way to escape aversive self-awareness and negative affect.

Self-regulation theory posits that when distressed, people try to regulate affect, to feel better in the immediate moment (Tice et al., 2001). Use of marijuana and other drugs, and risky sexual encounters may serve as methods of escape associated with depression as a result of heightened negative self-awareness in young women experiencing high levels of HIV stigma (Cooper, Shapiro, & Powers, 1998; Folkman, Chesney, Pollack, & Phillips, 1992; Mustanski, 2007). Our results suggest that MDD is a significant mediator between HIV stigma and risk behavior, thus interventions targeting risk behavior in young women should consider inclusion of mental health components, such as cognitive behavior therapy, to address depressive symptoms. Research has repeatedly linked depression to sexual risk behavior in HIV positive youth (Brown et al., 2006; Murphy et al., 2001), suggesting that depression should be screened for and targeted in treatment planning or in prevention interventions. A recent meta-analysis of cognitive behavioral interventions (CBIs) to improve various mental health states in HIV positive persons found encouraging results for the effects of CBIs targeting depression, anger, anxiety, and stress (Crepaz et al., 2008), however, participants across studies were adults and primarily male, limiting the generalizability of those findings to young women.

Given our findings, interventions with young HIV infected women could benefit from including identification of triggers for activation of stigma and maladaptive coping, such as in negotiations of safe sex in intimate relationships, and provide skills for alternative coping strategies in the face of negative affect, including skills for emotional regulation. The social and developmental needs unique to this population of young women, and the possibility that other “layers” of stigma may be relevant, such as race, class, or gender should also be considered in intervention development. Furthermore, young women are engaging in at least some aspects of risk behavior in the context of a sexual partnership, and as such attention to desire for intimacy and stability in relationships, and partner communication skills might be necessary to assist with changes in risk behavior.

Social support did not attain significance as a specific indirect effect between stigma and risk class membership. However, given the trend toward significance found for social support, as well as the extant literature showing associations between stigma, social support, and risk behaviors, it is reasonable to continue exploration of this pathway. Certainly individuals high in stigma are at risk for both real and perceived social exclusion as they negotiate life situations and relationships both intimate and casual. Fear of disclosure or discovery, or negative self-evaluations stemming from HIV-related stigma may result in reduced perceptions of social support, which in turn lead to greater risk behaviors.

An additional goal of our paper was to conduct a latent class analysis of risk behavior in HIV positive young women. Our results support the premise that risk is multifactorial in young women. Membership in a high risk class may represent a synergistic effect of risk that focus on a single type of behavior may obscure. Interestingly, condom use with a serodiscordant or unknown partner was less likely than the other behaviors to differ on study variables across risk class. This may reflect the fact that condom use differs according to perceived partner or transmission risk. Other factors such as disclosure, negotiation, and communication skills might influence condom use. New methods of analyzing risk behavior as classes of high risk individuals or clusters of behavior may be important to future investigations of stigma, affect, and risk behavior, as well as adding to the armament of methodologies for studying relationships between affect and risk that have shown inconsistent relationships using other methodologies (Crepaz & Marks, 2001; Kalichman & Weinhardt, 2001).

Several limitations of this study should be discussed. First, we have attempted ambitious analyses given our small sample size, and these results should be replicated with a larger sample. Larger sample sizes would allow more fine grained analyses of differences in behaviors across classes, which our two class model could not accomplish. Additionally, we were restricted to observed, rather than latent variables in the SEM analysis. Additional limitations include the relatively small amount of variance explained by our model. It appears that there are other important pathways to risk behavior for young HIV positive women that are not examined here, including individual, interpersonal, and social/cultural effects. A recent study of stigma and depression in MSM suggested that the relationship between stigma and depression was partially mediated by concealment of HIV status (Frost, Parsons, & Nanin, 2007), thus disclosure concerns should be included in further studies in this area. Actual measurement of cognitive escape and avoidant coping is important for future studies. A recent instrument for cognitive escape has demonstrated validity with a sample of MSM (Nemeroff, Hoyt, Huebner, & Proescholdbell, 2008), applicability of this instrument to young women should be examined. More detailed assessments of stigma, including assessing stigma across multiple domains of identity is also relevant for future studies in this area.

In spite of these limitations, we have demonstrated an important relationship between stigma and engagement in risk behavior through depressive symptoms in young HIV positive women. Our study extends the literature on stigma by providing information on possible causal pathways linking stigma to risk behavior, and is unique in examining previously studied factors together in one explanatory model. Furthermore, few studies of stigma and risk behavior have focused on young women, and as such, this study extends the literature on risk with its focus on this group. Young women living with HIV can benefit from ongoing research on HIV-related and other stigma and its associated sequelae with an aim of improving quality of life by ameliorating negative self-beliefs associated with stigma, decreasing depression, and teaching alternate methods of emotion management.

Acknowledgments

The Adolescent Trials Network for HIV/AIDS Interventions (ATN) is funded by grant No. U01 HD40533 from the National Institutes of Health through the National Institute of Child Health and Human Development (A. Rogers, R. Nugent, L. Serchuck), with supplemental funding from the National Institutes on Drug Abuse (N. Borek), Mental Health (A. Forsyth, P. Brouwers), and Alcohol Abuse and Alcoholism (K. Bryant).

We acknowledge the contribution of the investigators and staff at the following ATN sites that participated in this study: Children's Hospital of Los Angeles, Los Angeles, CA (M. Belzer, D. Tucker, N. Flores); Montefiore Medical Center, Bronx, NY (D. Futterman, E. Enriquez-Bruce, M. Marquez); Stroger Hospital of Cook County, Chicago, IL (J. Martinez, C. Williamson, A. McFadden); Tulane University Health Sciences Center Department of Pediatrics (S. E. Abdalian, T. Jeanjacques, L. Kozina); and University of Miami School of Medicine, Division of Adolescent Medicine, Miami, FL (L. Friedman, D. Mafut, M. Moo-Young);

The study was scientifically reviewed by the ATN's Community Leadership Group. Network scientific and logistical support was provided by the ATN Coordinating Center (C. Wilson, C. Partlow), at University of Alabama at Birmingham. Network operations and analytic support was provided by the ATN Data and Operations Center at Westat, Inc. (J. Ellenberg, K. Joyce). The investigators are grateful to the members of the ATN Community Advisory Board for their insight and counsel and are particularly indebted to the youth who participated in this study.

References

- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 1986;51(6):1173–1182. [PubMed: 3806354]
- Baumeister RF, DeWall CN, Ciarocco NJ, Twenge JM. Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology* 2005;88(4):589–604. [PubMed: 15796662]

- Beadnell B, Morrison DM, Wilsdon A, Wells EA, Murowchick E, Hope M, et al. Condom use, frequency of sex, and number of partners: Multidimensional characterization of adolescent sexual risk-taking. *Journal of Sex Research* 2005;42(3):192–202. [PubMed: 19817033]
- Berger BE, Ferrans CE, Lashley FR. Measuring stigma in people with HIV: Psychometric assessment of the HIV Stigma Scale. *Research in Nursing & Health* 2001;24(6):518–529. [PubMed: 11746080]
- Brown LK, Tolou-Shams M, Lescano C, Houck C, Zeidman J, Pugatch D, et al. Depressive symptoms as a predictor of sexual risk among African American adolescents and young adults. *Journal of Adolescent Health* 2006;39(3):e1–e8.
- Bunn JY, Solomon SE, Miller C, Forehand R. Measurement of stigma in people with HIV: A reexamination of the HIV Stigma Scale. *AIDS Education and Prevention* 2007;19(3):198–208. [PubMed: 17563274]
- Clark HJ, Lindner G, Armistead L, Austin B-J. Stigma, disclosure, and psychological functioning among HIV-infected and non-infected African-American women. *Women & Health* 2003;38(4):57–71.
- Cochran SD, de Leeuw J, Mays VM. Optimal scaling of HIV-related sexual risk behaviors in ethnically diverse homosexually active men. *Journal of Consulting and Clinical Psychology* 1995;63(2):270–279. [PubMed: 7751488]
- Cooper ML, Shapiro CM, Powers AM. Motivations for sex and risky sexual behavior among adolescents and young adults: A functional perspective. *Journal of Personality and Social Psychology* 1998;75(6):1528–1558. [PubMed: 9914665]
- Courtenay-Quirk C, Wolitski RJ, Parsons JT, Gomez CA. Is HIV/AIDS stigma dividing the gay community? Perceptions of HIV-positive men who have sex with men. *AIDS Education and Prevention* 2006;18(1):56–67. [PubMed: 16539576]
- Crepaz N, Marks G. Are negative affective states association with HIV sexual risk behaviors? A meta-analytic review. *Health Psychology* 2001;20(4):291–299. [PubMed: 11515741]
- Crepaz N, Passin WF, Herbst JH, Rama SM, Malow RM, Purcell DW, et al. Meta-analysis of cognitive-behavioral interventions on HIV-positive persons' mental health and immune functioning. *Health Psychology* 2008;27(1):4–14. [PubMed: 18230008]
- Crocker, J.; Major, B.; Steele, C. Social stigma. In: Gilbert, DT.; Fiske, ST.; Lindzey, G., editors. *The handbook of social psychology*. 4th ed.. Vol. Vols. 1 and 2. New York, NY: McGraw-Hill; 1998. p. 504-553.
- Cutrona CE, Russell D, Jones RD. Cross-situational consistency in causal attributions: Does attributional style exist? *Journal of Personality and Social Psychology* 1984;47(5):1043–1058.
- Deacon H. Towards a sustainable theory of health related stigma: Lessons from the HIV/AIDS literature. *Journal of Community & Applied Social Psychology* 2006;16(6):418–425.
- Everitt, BS.; Landau, S.; Morven, L. *Cluster analysis*. 4th ed.. New York: Oxford University Press; 2001.
- Folkman S, Chesney MA, Pollack L, Phillips C. Stress, coping, and high-risk sexual behavior. *Health Psychology* 1992;11(4):218–222. [PubMed: 1396489]
- Frost DM, Parsons JT, Nanin JE. Stigma, concealment and symptoms of depression as explanations for sexually transmitted infections among gay men. *Journal of Health Psychology* 2007;12(4):636–640. [PubMed: 17584814]
- Futerman D, Hein K, Reuben N, Dell R, Shaffer N. Human immunodeficiency virus-infected adolescents: The first 50 patients in a New York City program. *Pediatrics* 1993;91(4):730–735. [PubMed: 8464659]
- Goffman, E. *Embarrassment and social organization*. Hoboken, NJ: John Wiley; 1963.
- Heatherton TF, Baumeister RF. Binge eating as escape from self awareness. *Psychological Bulletin* 1991;110(1):86–108. [PubMed: 1891520]
- Henrich CC, Brookmeyer KA, Shrier LA, Shahar G. Supportive relationships and sexual risk behavior in adolescence: An ecological-transactional approach. *Journal of Pediatric Psychology* 2006;31(3):286–297. [PubMed: 15827352]
- Hoyt MA, Nemeroff CJ, Huebner DM. The effects of HIV-related thought suppression on risk behavior: Cognitive escape in men who have sex with men. *Health Psychology* 2006;25:455–461. [PubMed: 16846320]

- Inzlicht M, McKay L, Aronson J. Stigma as ego depletion: How being the target of prejudice affects self-control. *Psychological Science* 2006;17(3):262–269. [PubMed: 16507068]
- Jessor, R.; Jessor, S. Problem behavior and psychosocial development: A longitudinal study of youth. New York: Academic Press; 1977.
- Kalichman S, Weinhardt L. Negative affect and sexual risk behavior: Comment on Crepaz and Marks. *Health Psychology* 2001;20(4):300–301. [PubMed: 11515742]
- Lee RS, Kochman A, Sikkema KJ. Internalized stigma among people living with HIV-AIDS. *AIDS and Behavior* 2002;6(4):309–319.
- MacKinnon DP, Krull JL, Lockwood CM. Equivalence of the mediation, confounding and suppression effects. *Prevention Science* 2000;1:173–181. [PubMed: 11523746]
- Mak WW, Cheung RY, Law RW, Woo J, Li PC, Chung RW. Examining attribution model of self-stigma on social support and psychological well-being among people with HIV+/AIDS. *Social Science & Medicine* 2007;64(8):1549–1559. [PubMed: 17223239]
- McKirnan DJ, Ostrow DG, Hope B. Sex, drugs and escape: A psychological model of HIV-risk sexual behaviours. *AIDS Care* 1996;8(6):655–669. [PubMed: 8993716]
- McKirnan DJ, Vanable PA, Ostrow DG, Hope B. Expectancies of sexual 'escape' and sexual risk among drug and alcohol-involved gay and bisexual men. *Journal of Substance Abuse* 2001;13(1–2):137–154. [PubMed: 11547615]
- Murphy DA, Durako S, Muenz LR, Wilson CM. Marijuana use among HIV-positive and high-risk adolescents: A comparison of self-report through audio computer-assisted self-administered interviewing and urinalysis. *American Journal of Epidemiology* 2000;152(9):805–813. [PubMed: 11085391]
- Murphy DA, Durako SJ, Moscicki AB, Vermund SH, Ma Y, Schwarz DF, et al. No change in health risk behaviors over time among HIV infected adolescents in care: Role of psychological distress. *Journal of Adolescent Health* 2001;29:57–63. [PubMed: 11530304]
- Mustanski B. The influence of state and trait affect on HIV risk behaviors: A daily diary study of MSM. *Health Psychology* 2007;26(5):618–626. [PubMed: 17845113]
- Muthen BO. Beyond SEM: General latent variable modeling. *Behaviormetrika* 2002;29(1):81–117.
- Muthen, L.; Muthen, B. Mplus: The comprehensive modeling program for applied researchers. Version 3rd ed.. Los Angeles, CA: Muthen & Muthen; 2004.
- National Institute of Mental Health Multisite HIV Prevention Trial Group. Demographic and behavioral predictors of sexual risk in a multisite HIV prevention trial. *AIDS* 1997;11:S21–S27.
- Nemeroff CJ, Hoyt MA, Huebner DM, Proescholdbell RJ. The Cognitive Escape Scale: Measuring HIV-related thought avoidance. *AIDS and Behavior* 2008;12:305–320. [PubMed: 18188691]
- Newman PA, Zimmerman MA. Gender differences in HIV-related sexual risk behavior among urban African American youth: A multivariate approach. *AIDS Education and Prevention* 2000;12(4):308–325. [PubMed: 10982121]
- Pachankis JE. The psychological implications of concealing a stigma: A cognitive-affective-behavioral model. *Psychological Bulletin* 2007;133(2):328–345. [PubMed: 17338603]
- Parsons JT, Vicioso KJ, Punzalan JC, Halkitis PN, Kutnick A, Velasquez MM. The impact of alcohol use on the sexual scripts of HIV-positive men who have sex with men. *Journal of Sex Research* 2004;41(2):160–172. [PubMed: 15326541]
- Preston DB, D'Augelli AR, Kassab CD, Cain RE, Schulze FW, Starks MT. The influence of stigma on the sexual risk behavior of rural men who have sex with men. *AIDS Education and Prevention* 2004;16(4):291–303. [PubMed: 15342332]
- Rosengard C, Stein LAR, Barnett NP, Monti PM, Golembeske C, Lebeau-Craven R. Co-occurring sexual risk and substance use behaviors among incarcerated adolescents. *Journal of Correctional Health Care* 2006;12(4):279–287. [PubMed: 19756249]
- Russell D, Cutrona CE, Rose J, Yurko K. Social and emotional loneliness: An examination of Weiss's typology of loneliness. *Journal of Personality and Social Psychology* 1984;46(6):1313–1321. [PubMed: 6737214]
- Schwab-Stone M, Fisher P, Piacentini J, Shaffer D, Davies M, Briggs M. The diagnostic interview schedule for children-revised version (DISC-R): II. Test-retest reliability. *Journal of the American Academy of Child Adolescent Psychiatry* 1993;32(3):651–657.

- Shaffer D, Fisher P, Lucas CP, Dulcan MK, Schwab-Stone ME. NIMH diagnostic interview schedule for children version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child Adolescent Psychiatry* 2000;39(1):28–38.
- Shrout PE, Bolger N. Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods* 2002;7:422–445. [PubMed: 12530702]
- Swendeman, D.; Comulada, W.; Lee, M.; Rotheram-Borus, M. The impact of stigma on the adjustment of young HIV+ persons; Paper presented at the International Conference on AIDS; Barcelona, Spain. 2002 Jul.
- Swendeman D, Rotheram-Borus MJ, Comulada S, Weiss R, Ramos ME. Predictors of HIV-related stigma among young people living with HIV. *Health Psychology* 2006;25(4):501–509. [PubMed: 16846325]
- Tice DM, Bratslavsky E, Baumeister RF. Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology* 2001;80(1):53–67. [PubMed: 11195891]
- Twenge JM, Catanese KR, Baumeister RF. Social exclusion causes self-defeating behavior. *Journal of Personality and Social Psychology* 2002;83(3):606–615. [PubMed: 12219857]
- Vanable PA, Carey MP, Blair DC, Littlewood RA. Impact of HIV-related stigma on health behaviors and psychological adjustment among HIV-positive men and women. *AIDS and Behavior* 2006;10(5):473–482. [PubMed: 16604295]
- VanZile-Tamsen C, Testa M, Harlow LL, Living-ston JA. A measurement model of women's behavioral risk taking. *Health Psychology* 2006;25(2):249–254. [PubMed: 16569118]
- Williams ML, Elwood WN, Bowen AM. Escape from risk: A qualitative exploration of relapse to unprotected anal sex among men who have sex with men. *Jornal of Psychology & Human Sexuality* 2000;11(4):25–49.
- Wilson TE, Massad LS, Riester KA, Barkan S, Richardson J, Young M, et al. Sexual, contraceptive, and drug use behaviors of women with HIV and those at high risk for infection: Results from the women's interagency HIV study. *AIDS* 1999;13:5. [PubMed: 10449274]

Figure 1. Final path model showing the indirect effect of HIV stigma on risk class membership through social support and depression. Standardized path coefficients were included in path diagram. * $p < 0.05$.

Table 1Description of demographics and study measures ($N = 147$).

Demographics	Percent	M	SD	Range
Age		20.6	2.2	(15–24)
Hispanic Origin	22.5			
Race - African American	70.7			
Race-Other	7.8			
Married	8.9			
GED/high-school graduate	39.5			
Currently working	25.5			
Ever been homeless	31.3			
Measures				
HIV-related stigma		58.2	12.3	(25–84)
Perceived social support		74.0	11.4	(30–93)
Major depressive disorder ^a	9.6			

^aIndicated by DISC.

Table 2

Intercorrelations among HIV stigma, perceived social support, depression and risk variables.

Variables	1	2	3	4	5	6	7
1. HIV stigma	–						
2. Perceived social support	–0.367**	–					
3. Depression ^a	0.314**	–0.170*	–				
4. Marijuana use	0.175*	–0.002	0.018	–			
5. Other drug use	0.124	–0.180*	0.204*	0.002	–		
6. Unprotected serodiscordant sex	0.006	–0.147	0.107	–0.010	0.041	–	
7. Partner concurrency	0.062	–0.084	0.032	0.080	0.187*	0.258*	–

^aDISC diagnosis.

*
 $p < 0.05$;

**
 $p < 0.001$.

Table 3

Percentage distribution of risk factor endorsement by latent classes.

Risk factor	High risk group (N = 86)	Low risk group (N = 61)
Marijuana use	37.7%	26.2%
Other drug use *	15.1%	3.3%
Unprotected serodiscordant sex	44.2%	50.8%
Partner concurrency	20.9%	14.8%

*
 $p < 0.05$.