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Pathways to HIV-Related Behavior Among Heterosexual, Rural Black Men: A Person-Centered Analysis

Steven M. Kogan¹, Junhan Cho¹, Stacey Barnum², Allen Barton², Megan R. Hicks¹, and Geoffrey L. Brown¹

¹Department of Human Development and Family Science, 123 Dawson Hall, University of Georgia, Athens, GA 30602, USA

²Center for Family Research, University of Georgia, Athens, GA 30602-4527, USA

Abstract

We investigated the psychosocial mechanisms linking personal and contextual risk factors to HIV-related behavior among 498 rural Black men. We characterized HIV-related behavior in terms of profile groups and hypothesized that contextual and personal risk factors (childhood adversity, community disadvantage, incarceration, and racial discrimination) would predict HIV-related behavior indirectly via two psychosocial mechanisms: impulsivity and negative relational schemas. Study results documented 3 HIV-related behavior profile groups. The *Safer* group reported low levels of risky behavior. The *Risk-Taking* group reported inconsistent condom use and elevated substance use. The *Multiple Partners* group reported the highest numbers of partners and relatively consistent condom use. Risk factors predicted profile groups directly and indirectly through psychosocial mechanisms. Impulsivity mediated the association between community disadvantage and membership in the risk-taking group. Negative relational schemas mediated the associations of childhood experiences and community disadvantage with membership in the multiple partners group. Specificity in pathways suggests the need for targeted interventions based on multidimensional characterizations of risk behavior.

Keywords

African American men; HIV; Risk taking; Psychosocial aspects; Heterosexual men; Rural environments

INTRODUCTION

Nationally, rates of HIV among Black men who have sex with women (hereafter designated as heterosexual men) in both rural and urban areas are nearly 10 times as high as those reported for heterosexual Caucasian men (McCree, 2009). Elevated rates are particularly evident in small towns and rural communities in the South (Hall, Li, & McKenna, 2005). Although HIV is more prevalent among heterosexual Black women than men, heterosexual transmission is facilitated by high rates of non-HIV STIs, both inflammatory and ulcerative, which increase HIV infectivity and susceptibility in both women and men (Fleming & Wasserheit, 1999). Thus, risk conferred by STIs acquired in heterosexual relationships increases the potential for HIV to spread throughout a population.

The young Black men who are the focus of the present study live in small towns and rural communities representative of the Southern “Black Belt” (Wimberly & Morris, 1997), a geographic concentration of rural poverty that coincides with the nation’s worst economic and health disparities by race (Hartley, 2004). For individuals with little discretionary income, residing in rural areas can be more challenging than living in urban areas due to restricted educational and employment opportunities (Probst et al., 2002). The challenge of overcoming the environmental obstacles associated with poverty is exacerbated by oppressive social structures and racial discrimination (Brody et al., 2014; Sanders-Phillips, Settles-Reaves, Walker, & Brownlow, 2009).

Rural contexts pose unique challenges that increase young men’s exposure to risk factors for HIV-related behavior. Specifically, young rural men are exposed, disproportionately, to *community disadvantage*, including neighborhoods with few resources and high crime levels. Such community factors have been linked to HIV risk in past studies of rural and urban African Americans (Aral, Adimora, & Fenton, 2008; Friedman, Cooper, & Osborne, 2009). Experiences of *racial discrimination* have been linked to a range of risky sexual behaviors among rural Black youth (Roberts et al., 2011) and to multiple sexual partners among young Black men (Kogan, Yu, Allen, Pocock, & Brody, 2014). Studies reveal that Black males growing up in rural areas are more likely than are those in other areas to experience a range of *adverse childhood experiences*, including abuse, neglect, and household dysfunction (Heath Resources and Services Administration, 2011; Umberson, Williams, Thomas, Liu, & Thomeer, 2014). Past research documents substantial associations between various forms of adverse childhood experiences and sexual risk behavior among adolescents and young adults (Bornoalova, Gwadz, Kahler, Aklin, & Lejuez, 2008; Stevens, Murphy, & Mcknight, 2003). Finally, compared to their Caucasian peers, rural Black men are disproportionately affected by incarceration. *Incarceration history* has been identified as a robust correlate of men’s HIV-related behaviors, including inconsistent condom use, multiple sexual partners, and substance use, as well as laboratory confirmed STIs (Harawa & Adimora, 2008).

Psychosocial Mechanisms Linking Risk Exposures to HIV-Related Behavior

Although studies have begun to identify risk factors relevant to rural African American men’s risk behavior, little is known regarding the proximal, psychosocial mechanisms that translate risk exposure into HIV-related behaviors. Psychosocial mechanisms of behavioral risk include proximal intrapersonal attitudes and characteristics that shape risk behavior in romantic and sexual contexts. In studies of African American women, a range of mechanisms, such as self-efficacy, attachment style, and emotional distress, have illuminated the effects of exposures to contextual and personal risks, such as interpersonal violence and poverty, on women’s behavior (Harvey, Bird, Galavotti, Duncan, & Greenberg, 2002; Klein, Elifson, & Sterk, 2007; Wingood & DiClemente, 2000). Articulating these pathways has informed intervention strategies that have proven important in affecting risk for HIV and other STIs. No similar literature exists for men; the present study is designed to begin meeting this need.

Informed by perspectives on stress, coping, and attachment, we hypothesized that men's exposure to community disadvantage, racial discrimination, adverse childhood experiences, and incarceration would represent stressful circumstances that signal to young men that their environment is chaotic or hostile. Such environments are hypothesized to affect men's risk behavior via two psychosocial pathways, *impulsivity* and *negative relational schemas*. Impulsivity refers to a reduction in an individual's ability to self-regulate and responsibly govern impulses and urges (Hoyle, Fejfar, & Miller, 2000). Research has shown that impulsivity is a multifaceted trait that may be characterized in part by a lack of premeditation, the inability to think through possible consequences of one's behavior before acting (Magid & Colder, 2007; Miller, Flory, Lynam, & Leukefeld, 2003). Exposure to chaotic and hostile environments in childhood, adolescence, and young adulthood has been linked to compromised executive control and problems with premeditation, which in turn affects multiple behaviors that include risky sex (Bornovalova et al., 2008; Hoyle et al., 2000) and substance use (Trobst, Herbst, Masters, & Costa, 2002).

Relational schemas are cognitive structures that represent interpersonal association patterns (Baldwin, 1995). Developed in response to one's history of interpersonal interactions with important others, relational schemas help individuals to define situations more efficiently by drawing attention to salient cues in the social environment, goals associated with response options, and consequences associated with particular responses (Crick & Dodge, 1994). Youth and young adults exposed to inconsistent or chaotic relationships are hypothesized to develop relational schemas characterized by defensive and mistrustful expectations of close relationships (Verdejo-García, Lawrence, & Clark, 2008). Such schemas have been linked previously to difficulty in engaging in satisfying monogamous relationships (Kogan et al., 2013) as well as with sexual attitudes, sex with strangers, substance use before sex, and unprotected intercourse (Brennan & Shaver, 1995; Feeney, Peterson, Gallois, & Terry, 2000).

Multidimensional Characterization of Rural Black Men's HIV-Related Behavior

We hypothesized that exposure to the risk factors described previously will affect men's impulsivity and negative relational schemas, which in turn would predict HIV-related risk behavior. Among heterosexual young people, HIV-related risk taking has been evaluated in various ways, including number of partners, type of partner or length of relationship, frequency of intercourse, consistency of condom use, and use of substances in general or prior to intercourse (DiClemente & Crosby, 2008). Each measure captures some of the variance in HIV risk but does not in itself completely capture the construct. An accurate assessment of HIV risk behavior always involves a combination of measures. The characteristics of this combination determine whether a particular pattern of behavior is safe or risky with regard to disease prevention. For example, the risk of STI acquisition from inconsistent condom use may be minimal with one partner in the context of a mutually exclusive relationship, if neither partner is infected. Risk becomes greater, however, with more partners because the risk of intercourse with an infected individual increases.

Although HIV/STI risk is known to be a complex and multidimensional phenomenon, relatively few studies attempt to capture this complexity. Newman and Zimmerman (Newman & Zimmerman, 2000) used cluster analysis to derive profile groups with a sample of 15- to 18-year-old African Americans. They identified four subgroups: low-risk youth who used condoms consistently and had few partners, high-risk youth who used condoms inconsistently with many partners, “monogamy strategy” youth who used condoms inconsistently but had few partners, and “condom strategy” youth who used condoms consistently with a moderate number of partners. Beadnell and colleagues (Beadnell et al., 2005) used LPA to investigate patterns of risk behavior. Their analysis revealed three groups among younger adolescents (Condom Users, Few Partners, and Risk-Takers) and four groups among older adolescents (Condom Users, One Partner, Two Partners, and Risk-Takers). The *person-centered* approaches used in these studies had two advantages. First, the researchers could observe combinations of risk behaviors in the sample without imposing possibly incorrect a priori assumptions. Second, examination of the subgroups informed researchers about the nature of the risks being taken and the risks’ relations to other variables. In the present study, we used Latent Profile Analysis to characterize HIV-related risk behaviors among rural African American young men. We selected a parsimonious set of HIV-related behaviors that are common among young adults: numbers of sexual partners during the past 3 months, frequency of sex during the past 3 months, consistency of condom use, and substance misuse (Santelli, Lindberg, Abma, McNeely, & Resnick, 2000).

Summary and Hypotheses

The present study focuses on a vulnerable though understudied population, African American young men living in resource-poor rural environments. To date, little or no research has empirically investigated the psychosocial mechanisms linking personal and contextual risk factors to HIV-related behavior among this population. In this study, HIV-related risk behavior was operationalized using LPA, a technique that develops profile groups that provide contextually sensitive information about risk behavior. Hypotheses are summarized in Fig. 1. We expected significant associations between each risk factor and the putative psychosocial mediators, impulsivity and negative relational schemas. Impulsivity and negative relational schemas were expected, in turn, to forecast risk profiles. We tested formally the extent to which each mechanism acts as a statistical mediator of risk factors for each profile group.

Methods

Sample

Hypotheses were tested with data from the African American Men’s Health Project (AMP). AMP is a study of health risk behavior, relationship development, and well-being among young African American men. The sample includes 505 men 19 to 22 years of age ($M = 20.29$, $SD = 1.10$) who were recruited from 11 contiguous rural counties in southern Georgia. These counties were selected based on their non-urban designation according to the Census Bureau; having a population density of less than 100 persons per square mile; and the population’s experiencing elevated rates of STIs. Eligibility criteria included self-

identification as African American, residence in the sampling area, male gender, and age of 19 to 22 years. Although the focus of the study was on heterosexual men, men who have sex with men were not screened out. Seven men reported only same-sex activity and were dropped from the analyses, resulting in a final sample size of 498.

Recruitment and Assessment Procedures

Participants were recruited using respondent-driven sampling (RDS), a chain-referral protocol designed to reduce biases commonly associated with network-based samples (Heckathorn, 1997). RDS is a preferred method for sampling interconnected but hard-to-reach populations (Malekinejad et al., 2008). such as African American young men whose employment and residential situations change frequently (Kogan, Wejnert, Chen, & Brody, 2010). Sampling proceeded as follows. Community Liaisons (CLs) recruited 45 initial “seed” participants from the 11 sampled counties. CLs are respected community members who serve as a bridge between participants and our research center. CLs identified young men through their own social networks and described the study to them. Project staff contacted interested men, described the project, determined eligibility, and set up a data collection visit at the participant’s home or a convenient community site (usually a private room in the public library). Upon completion of the data collection visits, each of the initial “seed” participants provided the names of three men in his personal network who met eligibility criteria. Project staff contacted these men regarding participation. As with the seeds, upon completion of data collection, these participants also provided referral information for three network members. For each network member successfully recruited into the study, the referring participant received \$25.00.

Self-report data were gathered from participants via audio computer-assisted self-interviews. The user-friendly program guided respondents through the survey; participants with low literacy were assisted through voice and video enhancements. Each participant received \$100 at the conclusion of the data collection visit. Data were gathered from January through August in 2013. All study protocols were approved by the University Institutional Review Board.

Measures

HIV-Related Risk Behaviors—Four HIV-related risk behaviors were assessed to construct latent risk profiles. Number of sexual partners was assessed with the item, “In the past 3 months, how many different women or girls have you had sex with?” The response set ranged from 0 (*none*) to 5 (*5 or more*). Participants recalled the number of times they had vaginal intercourse in the past 3 months on a six-point scale: 0, 1–5, 6–10, 11–20, 21–40, or 41 or more times. To accommodate the LPA procedure, these ranges were recoded into the following counts: 0, 3, 8, 15, 30, 41. Participants also reported their inconsistent condom use using the item, “Of the times you had vaginal sex in the past 3 months, how many times did you use a condom?” The responses were coded as 0 (*every time*), 1 (*almost every time*), 2 (*about half of the time*), 3 (*less than half of the time*), 4 (*rarely*), and 5 (*never*). Finally, substance use problems were assessed with a 10-item subscale of the Minnesota Substance Use Survey (Harrison, Fulkerson, & Beebe, 1998). Participants indicated the number of times during the past 3 months that they experienced specific problems from using alcohol

or other drugs. Example items include, “How many times have you spent all or most of the day using alcohol or other drugs, or getting over their effects?” and “How many times have you given up activities like sports, work, school, or being with friends or relatives in order to use alcohol or other drugs or get over their effects?” Participants responded to a seven-point scale: 0, 1, 2, 3, 4–6, 7–10, or 11 or more. To accommodate the LPA procedure’s sensitivity to normality, the responses were recoded as 0, 1, 2, 3 or more. Alpha for the scale was .86.

Personal and Contextual Risk Factors—*Incarceration*. Participants reported the numbers and durations of their incarceration experiences during their lifetimes. Incarceration duration was coded from 0 (*none*) to 7 (*1 year or more*). The two items were significantly associated; they were subsequently standardized and summed to form an incarceration history index.

Community disadvantage was assessed using two scales. The *community deviance* measure comprised eight items that addressed the occurrence of behaviors in the community such as drinking in public, rape or other sexual assault, and violent arguments between neighbors (Sampson, Raudenbush, & Earls, 1997). Participants reported the magnitude of each of these problems in their communities on a scale ranging from 0 (*not a problem*) to 2 (*a big problem*). Cronbach’s alpha for the scale was .88. The measure of *low levels of community resources* was a 12-item subscale from the Community Resources and Problems measure (Forehand et al., 2000). Participants responded to the stem, “How good is your community in terms of...” Example items included “finding full-time jobs,” “going to community college,” and “public transportation.” The response set ranged from 0 (*very good*) to 4 (*very poor*), and Cronbach’s alpha was .94. The two scales were significantly associated; they subsequently were standardized and summed to form a community disadvantage index.

Racial discrimination was measured by a subscale of the Schedule of Racists Events (Landrine & Klonoff, 1996) that included 9 items such as, “In the past year, how often have you been ignored, overlooked, or not given service because of your race?” and “In the past year, how often have you been treated rudely or disrespectfully because of your race?” The response set ranged from 0 (*never*) to 3 (*frequently*), and Cronbach’s alpha was .84.

Adverse childhood experiences were assessed using the Adverse Childhood Experiences measure (Dube et al., 2001). Participants reported the presence or absence of 10 types of adverse childhood experiences during their first 16 years of life. Adversities included experiencing physical abuse, neglect, or sexual abuse, and witnessing violence to one’s caregiver. Scores ranged from 0 to 10 adversities, with a mean of 2.23 ($SD = 2.09$).

Psychosocial Risk Mechanisms—*Impulsivity* was assessed via the Lack of Premeditation subscale of the UPPS-P Impulsive Behavior Scale (Miller et al., 2003). We used a brief, 4 item version of the subscale adapted from feedback with African American men for brevity and clarity (Kogan, Cho, Barnum, & Brown, in press). Example items included, “I usually think carefully before doing anything” and “Before making up my mind, I consider all the advantages and disadvantages.” The response set was 1 (*strongly agree*) to 4 (*strongly disagree*). Cronbach’s alpha for the subscale was .70.

Negative relational schemas were assessed with three scales: the Street Code scale, the Cynical Views of Relationships scale, and a measure of attachment style. The Street Code measure (Stewart & Simons, 2006) is a 7-item scale developed to assess the extent to which an individual believes that aggression is a means of gaining respect in relationships. Sample items were, “It is important not to back down from a fight or challenge because people will not respect you,” and “Being viewed as tough and aggressive is important for gaining respect.” Participants’ responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Cynical views of relationships were measured using a four-item scale (Simons & Burt, 2011) to assess the degree of suspicion that youth held toward people and relationships. An example item is, “When people are friendly, they usually want something from you.” Items were rated on a scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach’s alpha was .64. Attachment style was assessed with the short form of Experiences in Close Relationship Scale (Wei, Russell, Mallinckrodt, & Vogel, 2007). The scale was designed to yield Anxious and Avoidant scores; however, we were unable to replicate this factor structure or obtain reliable subscales as specified. Our factor analysis (available from the corresponding author) revealed a single “negative attachment style” scale that combined both avoidance and anxiety items. The resulting six-item scale yielded a Cronbach’s alpha of .74. Example items included, “I often worry that my partner will not want to stay with me” and “I try to avoid getting too close to my romantic partners.” The response set ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). The Street Code, Cynical Views, and Attachment scales were correlated significantly; they were standardized and summed to form a negative relational schemas index.

Demographic characteristics. During the transition to adulthood, employment status and school status are particularly transitory and difficult to interpret. Thus, scholars studying emerging adulthood suggest that the most important demographic characterization for young men involves simultaneous consideration of employment and student status (Wald & Martinez, 2003). The goal is to differentiate young people who are gainfully employed or going to school from those involved in neither. In this study, participants who were currently enrolled in school or another educational program or who were employed were coded as “1” and participants who were not enrolled or employed were coded as “0.”

Plan of Analysis

Initial analyses examined the RDS-derived network using the RDS Analysis Tool (Volz, Wejnert, Degani, & Heckathorn, 2007) to determine the effectiveness of the sampling procedure. The statistical theory upon which RDS is based suggests that, if peer recruitment proceeds through a sufficient number of waves, the sample composition will stabilize and become independent of the seeds with whom recruitment began. In this way, any bias the nonrandom choice of seeds may have introduced will be overcome. This stable sample composition is termed “equilibrium” and should occur within four recruitment waves. A second RDSAT analysis calculates post-stratification population weights for the outcome variable.

We used LPA, performed with Mplus Version 7 (Muthén & Muthén, 2012), to identify subgroups of men who showed similar patterns of HIV risk behaviors on the basis of their

consistency of condom use, numbers of partners during the last 3 months, and substance use. LPA models were fit in a series of steps that started with a one-profile model; the number of profiles was increased until the model improved no further. The implementation of LPA in this study allowed for missing data on the measured outcomes using full information maximum likelihood estimation. Model comparison was conducted using a series of standard fit indices. For the Bayesian Information Criterion (BIC), the sample-size-adjusted BIC (SSA BIC), and the Akaike Information Criterion (AIC), lower scores represent better-fitting models. The Lo–Mendell–Rubin (LMR) likelihood ratio test compares the estimated model with a model having one profile less than the estimated model. The LMR likelihood ratio test produces a p value that identifies the better fitting model. A p value less than .05 indicates that the model with one profile less should be rejected in favor of the estimated model. We also assessed entropy, which refers to average accuracy in assigning individuals to profiles. Entropy values ranged from 0 to 1, with higher scores reflecting greater accuracy in classification. Optimal models were chosen on the basis of goodness of fit and parsimony.

After the risk profiles were identified via LPA, we examined bivariate associations of profiles with risk factors and psychosocial risk mechanisms. Significant risk factors were examined in a multinomial logistic structural model to assess the risk factors' independent contributions to the profiles. Significant risk factors in the multinomial logistic analysis were retained for examination of the hypothesized pathways presented in Fig. 1. Indirect effects were calculated via bootstrapping. All logistic analyses were run with Mplus using full information likelihood estimation.

Results

RDS analyses on all study variables indicated that recruited participants were not biased by the initial seeds' characteristics; sample equilibrium on all study variables was achieved within two waves of recruitment. T -tests comparing, across all study variables, seed participants and participants who were part of networked referral chains were non-significant, supporting the acceptability of testing hypotheses with data combined from seeds and recruited participants.

An LPA was implemented using numbers of partners, frequency of sex, inconsistent condom use, and substance use. Fit indices for solutions ranging from one to four profiles are presented in Table 1. Fit indices converged to suggest the superiority of a three-profile solution. The three profile groups are presented in the top portion of Table 2. The *Safer* profile group included the majority of participants ($n = 265$, 53.2%). These men reported the fewest sexual partners, the least frequent sexual activity, the greatest consistency in condom use, and the least substance misuse. The second profile group, *Risk-Taking* ($n = 76$, 15.3%), reported more partners than the Safer profile group, the least consistent condom use among the profile groups, the most frequent sexual activity, and the greatest substance abuse among the profile groups. The third profile group, *Multiple Partners* ($n = 157$, 31.5%), reported the most partners, frequent sexual activity, relatively consistent condom use, and moderate substance use. Post-stratification RDS weights for the latent profiles were calculated: Population weights were 1.02 for the Safer group, .91 for the Risk-Taking group, and 1.01

for the Multiple Partners group. The following results were derived using the weighted scores.

The bivariate associations of profile membership with the risk factors and psychosocial risk mechanisms are presented in Table 2. Levels of adverse childhood experience, community disadvantage, racial discrimination, and incarceration history differed significantly among profile groups. For the risk mechanisms, the Risk-Taking group reported higher levels of impulsivity than did the Safer group. The Multiple Partners group reported a significantly higher level of negative relational schemas compared with the Safer group. The four risk factors were entered simultaneously into a multinomial structural equation logistic regression model; the reference group was the Safer group (see Table 3). Childhood adversity predicted inclusion in the Risk-Taking profile group ($OR = 1.89, p < .01$) and the Multiple Partner ($OR = 1.30, p < .05$) profile group; community disadvantage significantly predicted inclusion in the Multiple Partner profile group ($OR = 1.35, p < .05$); and incarceration significantly predicted membership in the Risk-Taking profile group ($OR = 1.26, p < .05$). In this multivariate context, racial discrimination was not an independent predictor of profile and was dropped from subsequent analyses.

Figure 2 presents the results of the evaluation of mediating hypotheses. The outcomes are operationalized as dummy variables, with one outcome representing the comparison of Risk-Taking vs. Safer group membership and the other one representing Multiple Partners vs. Safer group membership. The parameters predicting these dummy variables are expressed in odds ratios; predictors of psychosocial mechanisms are expressed in standardized betas. Among the risk factors, adverse childhood experiences was an independent predictor of negative relational schemas ($\beta = .20, p < .01$); community disadvantage was an independent predictor of both negative relational schemas ($\beta = .21, p < .01$) and impulsivity ($\beta = .10, p < .05$). Incarceration did not predict either mediator. Among the mediators, impulsivity was an independent predictor of inclusion in the Risk-Taking profile group ($OR = 1.28, p < .05$), and negative relational schemas was an independent predictor of inclusion in the Multiple Partners profile group ($OR = 1.33, p < .01$). In the context of the mediational model, adverse childhood experiences and incarceration evinced strong direct associations with the Risk-Taking profile group.

Indirect effect analysis revealed three significant mediational pathways (Table 4). Adverse childhood experiences predicted the Multiple Partnerships profile group via its influence on negative relational schemas ($b = .08, p < .01, 95\% CI = 0.019, 0.113$). Community disadvantage predicted the Multiple Partners profile group via men's reports of negative schemas ($b = .07, p < .05, 95\% CI = 0.014, 0.122$) and predicted the Risk-Taking profile group ($b = .04, p < .05, 95\% CI = 0.009, 0.083$) via heightened levels of impulsivity.

Discussion

We investigated HIV-related behavior among a sample of African American young men living in resource-poor rural areas of south Georgia. Results of a person-centered analysis of HIV-related behaviors yielded three profile groups: a Safer group at low risk for HIV/STIs and two higher-risk groups: a Multiple Partners group and a Risk-Taking group. Multivariate

analyses revealed that racial discrimination was not an independent predictor of the Risk-Taking or Multiple Partners profile groups. Adverse childhood experiences predicted both the Risk-Taking and Multiple Partners groups, whereas community disadvantage predicted the Multiple Partners group only and incarceration predicted the Risk-Taking group only. Analyses of the psychosocial mediators revealed that impulsivity predicted the Risk-Taking group, whereas negative relational schemas were associated with the Multiple Partners group. Structural equation modeling identified three significant mediational pathways: community disadvantage→ negative relational schemas→Multiple Partners group, adverse childhood experiences→ negative relational schemas →Multiple Partners group, and community disadvantage→impulsivity→Risk-Taking group.

LPA revealed that the majority of men (53%) evinced relatively low levels of HIV-related behavior. These men engaged infrequently in sexual activity, had few partners, used condoms consistently, and engaged in little or no substance misuse. Not surprisingly, this Safer group evinced low rates of self-reported STIs and low levels of risk factors and psychosocial mediators.

Two groups at risk for HIV/STIs emerged. The Multiple Partners group (32% of the sample) was characterized by high numbers of partners, relatively consistent condom use, and moderate substance misuse. Approximately 12% of men included in the Multiple Partner group reported an STI in the past year. The third group, Risk-Taking, evinced levels of sexual activity nearly as high as those of the Multiple Partners group, though with slightly fewer partners. This group evinced the highest levels of inconsistent condom use and substance misuse among the groups. Nearly 20% of the men in the Risk-Taking group reported having an STI during the past year. These profiles bear similarities to person-centered analyses of adolescents. Prior studies consistently revealed a large, normative group exhibiting low levels of risk behavior similar to the Safer group in our analyses. In studies with adolescents, however, multiple partners and inconsistent condom use clustered together into one high-risk group (Beadnell et al., 2005). In contrast, the profile groups that emerged with the present sample suggest that, as young men transition to adulthood, many of those with multiple partners will use condoms regularly to prevent STIs or pregnancy (Reece et al., 2010).

Examination of multivariate associations between risk factors and profile group membership revealed that racial discrimination was not a unique predictor of risk group. This is contrary to recent findings that linked racial discrimination to multiple sexual partnerships in African American male youth (Kogan et al., 2014) and to a risky sex index in another sample of African American youth (Roberts et al., 2011). Neither study, however, controlled for community disadvantage or childhood adversity; this may explain the disparate findings. Patterns of specificity were apparent in the unique predictors of profile groups. Community disadvantage predicted the Multiple Partner group but had no significant influence on inclusion in the Risk-Taking group. This pattern is generally inconsistent with past findings that link community disadvantage to risky sex and to substance use (Aral et al., 2008; Friedman et al., 2009; Harawa & Adimora, 2008). In contrast, consistent with our hypotheses, childhood adversity predicted inclusion in both the Multiple Partner and Risk-Taking groups. Incarceration significantly predicted inclusion in the Risk-Taking group only.

This result is consistent with prior research on the relation between incarceration histories and unprotected sex with multiple partners (Margolis et al., 2006).

Indirect effect analysis clarified the nature of these risk factors' effects on profile group inclusion. Community disadvantage, although not a direct predictor of inclusion in the Risk-Taking group, was an indirect predictor via its influence on impulsivity. This finding is consistent with studies from the adolescent literature linking low-SES community residence with self-regulation problems (Roy, McCoy, & Raver, 2014; Urban, Lewin-Bizan, & Lerner, 2010). Navigating challenging communities not only affects men's impulsivity but also predicts negative relational schemas. This finding is consistent with past studies linking challenging environments to defensive and mistrustful working models of relationships (Kogan et al., 2013; Simons, Simons, Lei, & Landor, 2012). For example, Kogan et al. (2013) found that life in violent communities forecast negative relational schemas in young African American adults, which affected the quality of their romantic relationships. Such influences may increase the likelihood that men will pursue multiple partnerships rather than serially exclusive relationships.

Interestingly, our analyses indicated that community disadvantage can affect HIV-related behaviors in two ways, by increasing impulsivity and influencing relational schemas. In turn, these pathways lead to specific effects. Impulsivity induced by community disadvantage predicts a risk-taking profile characterized by inconsistent condom use and elevated substance misuse. In contrast, the influence of community disadvantage on negative relational schemas predicts multiple partnerships but relatively consistent condom use and moderate substance misuse. These findings point to the importance of addressing risk factors' differential effects on men and designing interventions that address not only personal intentions and development of the self-regulatory skills needed to use condoms, but also young men's thoughts about their relationships. Stressful community life can make it difficult to draw on the self-regulation necessary to use condoms and avoid substances; it can also affect how men think about their relationships.

Whereas community disadvantage affects both psychosocial mechanisms, childhood adversity was associated primarily with relational schemas. Attachment and other theories specify that growing up in challenging circumstances leads to youth's internalization of an outlook on relationships as problematic, which provides a template for expectations of future relationships (Crick & Dodge, 1994). Our analysis suggests that adversity affects the likelihood that men will engage in multiple partnerships by affecting their relational schemas. Specifically, men with elevated childhood adversity reported schemas that were more defensive, mistrustful, avoidant, and anxious. Not surprisingly, such schemas were negatively associated with the Safer HIV risk profile.

Two risk factors demonstrated direct effects on profile group inclusion that were not mediated by either psychosocial mediator. Childhood adversity, although affecting multiple partnerships via relational schemas, also demonstrated a robust direct effect on inclusion in the Risk-Taking group. This suggests that other factors may be important in understanding how adversity affects HIV-related behavior. For example, childhood adversity is related to mental health and substance use problems that may be driving forces in men's engagement

in risky behavior (Schilling, Aseltine, & Gore, 2007). Incarceration also had a direct influence on men's inclusion in the Risk-Taking group but did not influence either mediator. Mental health and substance use problems are also elevated among men with an incarceration history (Johnson, 2010), suggesting avenues for future investigations of potential mediators of incarceration effects.

Taken together, the results of the study suggest that HIV prevention efforts may benefit from distinguishing between men who use condoms consistently with multiple partners and those whose overall approach to sexual safety is riskier. Although the Multiple Partners group had relatively lower rates of STIs, those rates remained elevated. Multiple sexual partnerships, though less of an STI risk in the context of consistent condom use, may indicate that men are on a developmental trajectory with other public health implications. Multiple partnerships rather than exclusive relationships may suggest an underlying difficulty with relationships that may forecast the low rates of marriage, high rates of single parenthood, and low levels of father involvement in the African American community (McLanahan, 2009). For the men in the Risk-Taking group, the challenges of living in a difficult community context may not only affect the self-regulation required to engage in safer sexual behavior but also encourage substance use, which complicates condom use behaviors considerably. Men in this group may also have been dealing since childhood with a history of adversity that is exerting a profound effect on their risky behaviors. Given the importance of childhood adversity in predicting both HIV-related profiles, attention needs to be directed not only to learning skills to prevent STIs but also to the biographical backgrounds that may exacerbate risky sexual behaviors.

From a policy perspective, findings suggest the importance of addressing the problem of rural poverty in the South. Poverty is a robust risk factor for adverse childhood experiences. Recent data suggest that such experiences occur with particular frequency among rural families (Health Resources and Services Administration, 2011) and influence strongly young men's development (Umberson & Slaten, 2000). The effects of growing up in poverty are further exacerbated in young adulthood, as life in a challenging environment is likely to persist (Sampson, 2008) and to continue its detraction from healthy development and positive decision making (Wodtke, Elwert, & Harding, 2012).

The findings suggest that public health interventions designed to address protective sexual health behaviors may be insufficient. Such interventions typically focus on cognitive and behavioral skills that lead to the consistent use of condoms. The effects of growing up and living in challenging circumstances, however, remain to be addressed. Prevention of risky sexual behavior among young adults likely should focus on empowering impoverished rural African American families with young children to limit those children's exposure to adversity as well as drawing on the protective influences of effective parenting practices to guide adolescents' sexual behavior (Kogan et al., 2012).

The majority of African American men engage in low levels of HIV-related behavior, an important situation to note. Typically, most research reports document African American men's struggles and poor health outcomes. The majority of young men from resource-poor rural communities, however, evinced healthy sexual decision making. This suggests that,

despite high poverty rates, many young men will “beat the odds.” Future research can benefit from a focus on the potential of a range of protective processes to ameliorate the risks associated with life in disadvantaged rural communities and the early adversity it occasions. These protective processes include neighborhood level social cohesion and support (Nebbitt, 2009; Ramirez-Valles, Zimmerman, & Juarez, 2002) which may buffer the influence of poverty, as may community mentors who promote young adult adjustment and deter risky behavior (Kogan & Brody, 2010; Kogan, Brody, & Chen, 2011; Rhodes, Ebert, & Fischer, 1992). Unfortunately, during the transition to young adulthood, the special assistance and concern that many communities provide for adolescents begins to be withdrawn. Many young men in these communities, however, remain at risk and require continuing support to pursue beneficial life paths (Halperin, 2009).

Several limitations in the present study should be noted. Participants were from resource-poor rural environments; thus, the generalizability of the findings to urban men is not known. The results also are cross-sectional, limiting inferences regarding the direction of causality. For example, substance use in the Risk-Taking group may exacerbate impulsivity. Childhood adversity was assessed with a retrospective measure and is subject to limitations in subject recall and to social desirability responding. This limitation is mitigated somewhat by the use of a well-established measure for indexing adversities and by research that supports participant recall of such events (Hardt & Rutter, 2004). Finally, the lack of a direct effect of racial discrimination may indicate a suppressor effect, such that the control variable in Table 3 pertaining to school enrollment and work status may mediate the influence of discrimination on other processes. Future research, particularly studies that use structural methods to index discrimination, is warranted. These limitations notwithstanding, the present research advances knowledge of HIV risk prevention with an understudied population, identifying key risk factors and mediational pathways that affect men’s inclusion in specific risk behavior profiles.

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Fig. 1.
Summary of hypotheses

Fig. 2.

Final structural model predicting pathways to profile group. Reference group is Safer. Non-significant pathways are not pictured. Pathways predicting impulsivity and relational schemas are standardized betas; pathways to profiles (risk-taking and multiple partners) are odds ratios. Target age and school enrollment/employment status were controlled. * $p < .05$. ** $p < .01$.

Table 1

Fit indices for general latent profile analysis

Latent profile number	AIC	BIC	SSA BIC	Entropy	LMR <i>p</i>
1	5566.449	5600.134	5574.742	–	-
2	5275.781	5330.519	5289.256	0.975	0.0000
3	5146.108	5221.899	5164.766	0.877	0.0000
4	5084.984	5081.827	5008.824	0.774	0.2971

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SSA = Sample-size-adjusted; LMR = Lo–Mendell–Rubin.

Table 2

Bivariate associations linking risk behaviors, risk factors, and risk mechanisms to men's HIV-related risk profiles

	Safer (<i>n</i> = 265) <i>M</i> (<i>SD</i>)	Risk-Taking (<i>n</i> = 76) <i>M</i> (<i>SD</i>)	Multiple Partners (<i>n</i> = 157) <i>M</i> (<i>SD</i>)	Total (<i>N</i> = 498) <i>M</i> (<i>SD</i>)	<i>p</i>
<i>Risk Behaviors</i>					
Sexual partner number	1.04 _a (.77)	2.20 _b (1.28)	3.80 _c (1.19)	2.07 (1.59)	< .01
Inconsistent condom use	.23 _a (.52)	4.34 _b (.72)	1.16 _c (.82)	1.44 (1.69)	< .01
Frequency of sex	2.18 _a (3.89)	18.94 _b (14.47)	17.76 _b (13.21)	11.60 (13.32)	< .01
Substance use problems	.36 _a (.65)	1.00 _b (1.07)	.60 _c (.92)	.53 (.84)	< .01
<i>Self-Reported STIs^a</i>					< .05
Yes	23 (8.7)	14 (18.4)	19 (12.1)	56 (11.2)	
No	242 (91.3)	62 (81.6)	138 (87.9)	442 (88.8)	
<i>Demographic Characteristics</i>					
Age	20.21 _a (1.10)	20.42 _a (1.13)	20.32 _a (1.07)	20.28 (1.10)	<i>ns</i>
School enrollment / Employment ^a					<i>ns</i>
Enrolled or Employed	196 (74.0)	54 (71.1)	105 (74.0)	355 (71.3)	
Not enrolled and employed	69 (26.0)	22 (28.9)	52 (26.0)	143 (28.7)	
<i>Past and Concurrent Risk Factors</i>					
Adverse childhood experiences	1.78 _a (1.91)	3.26 _b (2.40)	2.42 _c (2.00)	2.21 (2.09)	< .01
Community disadvantage	-.24 _a (1.48)	.34 _b (1.66)	.28 _b (1.43)	.00 (1.52)	< .01
Racial discrimination	7.30 _a (5.28)	9.38 _b (5.91)	7.52 _a (5.17)	7.69 (5.38)	< .05
Incarceration histories	-.22 _a (1.58)	.46 _b (2.07)	.18 _b (1.90)	.00 (1.77)	< .01
<i>Risk Mechanisms</i>					
Impulsivity	6.50 _a (2.07)	7.18 _b (2.06)	6.82 _{ab} (2.14)	6.71 (2.10)	< .05
Negative relational schema	-.42 _a (2.45)	.45 _b (2.09)	.46 _b (2.02)	.00 (2.31)	< .01

Note. Means designated with the same subscript are not significantly different based on least significant differences post hoc comparison ($p < .05$).

^a n (%). Based on χ^2 test of association.

Table 3

Multinomial logistic regression model predicting risk profile

Personal/Contextual Risk Factors	Risk-Taking		Multiple Partners	
	OR	95% CI	OR	95% CI
Adverse childhood experiences	1.89 **	1.42, 2.44	1.30 *	1.04, 1.63
Community disadvantage	1.08	0.80, 1.46	1.35 *	1.07, 1.69
Racial discrimination	1.17	0.89, 1.54	0.88	0.70, 1.10
Incarceration	1.26 *	1.01, 1.64	1.19	0.96, 1.47

Note. Reference group is Safer. Target age and school enrollment/employment status were controlled. OR = Odds Ratio. CI = Confidence Interval.

*
 $p < .05$.

**
 $p < .01$.

Table 4

Significant indirect effect pathways linking risk factors and profile membership

Predictor	Mediator	Profile	Indirect Effect	95% CI
Adverse childhood experiences	Relational schema	Multiple Partners	0.08 ^{**}	0.019, 0.113
Community disadvantage	Relational schema	Multiple Partners	0.07 [*]	0.014, 0.122
Community disadvantage	Impulsivity	Risk-Taking	0.04 [*]	0.009, 0.083

Note. CI = confidence interval.

^{*}
 $p < .05$.

^{**}
 $p < .01$.