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Sexual negotiation skills and risky behavior on sexual partnerships, HIV knowledge, and risk perception among urban youth of color: A latent class analysis

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Abstract

Adolescents of color in urban communities are at high risk for contracting HIV, unlikely to have access to HIV testing services, or any other form of screening services. Using latent class analysis among a sample of African American/Black (48.1%) and Hispanic/Latina(o) (42%) youth ($N = 668$; $M_{\text{age}} = 16.30$; 51% female), this study examined the association cluster group membership, based on sexual negotiation skills and risk behavior, had on HIV knowledge, perception of risk, and the number of sexual partners. Five distinct cluster groups emerged, with significant heterogeneity observed between cluster groups on select dependent variables. A larger proportion of the study participants were in cluster groups that identified higher levels of sexual negotiation skills; however, variation was present based on risk behaviors. Results provide useful recommendations for research on HIV/AIDS and risk behaviors, as well prevention-intervention programming among urban youth of color.

Keywords

sexual negotiation skills; risky behavior; HIV knowledge; sexual partners; youth of color

The National HIV/AIDS Strategy for the United States (NHAS) provided recommendations in July 2015, which include (a) reducing new infections, (b) improving access to care and health outcomes, and (c) reducing HIV-related disparities (White House Office of National AIDS Policy, 2015). Yet, racial-ethnic minority individuals who are at high risk for

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contracting HIV continue to have minimal access to HIV testing services or any other form of screening services, as well as lower knowledge of HIV transmission (Kerr et al., 2014; Reid, Lardier, Garcia-Reid & Yu, 2016). Both greater understanding of and access to HIV prevention-intervention programming is critical to increase HIV/AIDS knowledge and decrease risky behaviors (e.g., unsafe sexual activities and using drugs and alcohol). Such work would assist along the continuum of providing resources to youth who would otherwise not have access and decrease the probability of engaging in risky behavior and contracting HIV.

Despite recent advancements in HIV prevention and treatment, racial, gender, age, and socioeconomic disparities in HIV diagnoses and related deaths due to AIDS are still present in the United States (Raiford, Seth, & DiClemente, 2013). Adolescents of color are particularly at risk of contracting HIV due to inadequate sexual health education, limited access to quality health care and prevention-intervention services, and peer pressure to engage in sexual risky behaviors (Reid et al., 2016). Recent data indicates that although Hispanic/Latino(a) (18%) and African American/Black (12%) youth represent less than 30% of the U.S. population, these youth account for 24% and 45% of all new diagnoses of HIV diagnoses, respectively (CDC, 2016). Driving these rates in part is structural discrimination and segregation from resources, as well as the stigma that surrounds HIV/AIDS, lack of knowledge, and testing. Other determinants at the individual level include risky behaviors that are tied to transmission such as unprotected sex, having sex while under the influence of drugs and alcohol, and needle sharing (Raiford et al., 2013).

Recent studies have shown that racial-ethnic minority youth living in under-resourced, urban communities are more likely to engage in sexually risky behavior and other risk behaviors such as substance use (Reid, Yu, & Garcia-Reid, 2014; Reid et al., 2016). This is largely due to limited access to contraceptives, prevention education that discusses the importance of preventative methods, and increased access to substances, when compared to non-Hispanic White youth (Oshri, Tubman, & Burnette, 2012). Kerr et al. (2014) found that unsafe sexual behaviors among adolescents of color are exacerbated while under the influence of drugs and alcohol, decreasing condom use or other forms of contraception among these youth. Elsewhere, studies have shown that illicit drug and alcohol use among youth of color decreased youth's perception of risk (Zimmerman & Farrell, 2017) and their perceived ability to use sexual negotiation skills—that is, the ability to have discussions with one's sexual partner about safe sex practices (Fairbairn, Wood, Dong, Kerr, & DeBeck, 2017). The existing research also indicates that illicit drug and alcohol use among youth of color increased youth's engagement in sexual activity with multiple partners (Benotsch, Snipes, Martin, & Bull, 2013). It is important to note that greater use of sexual negotiation skills limited sexually risky behaviors, and greater HIV knowledge was also associated with less drug and alcohol use (Schwitters et al., 2015).

While significant barriers are present in urban communities and among youth of color, access to HIV/AIDS prevention-intervention information has been found to reduce participation in risky behaviors and increase risk perception, one's perceived ability to use sexual negotiation skills, and receive HIV testing services (Kerr et al., 2014; Kiviniemi, Orom, Waters, McKillip, & Hay, 2018; Mahat & Scoloveno, 2010; Reid et al., 2014, 2016).

For instance, in a study conducted in New York City, Gromadzka et al. (2015) found among youth of color that greater sexual health knowledge was associated with more conversations about sexual health and behavior with caregivers, which was also linked with lower levels of risky behaviors. Reid et al. (2016) also found among youth of color from a northeastern urban community that HIV/AIDS knowledge and access to prevention information was associated with more HIV testing. Studies have further shown that while direct education is critical, access to social media information regarding HIV/AIDS education is an innovative and beneficial method to increasing knowledge (Garcia-Reid, Reid, Lardier, & Mandrillo, 2016). Yet, macro-level structural factors (e.g., poverty, limited prevention-intervention funding for HIV/AIDS) contribute to not only the HIV epidemic broadly, but specifically contribute to the perpetuated stigma of HIV and limited access to health literacy information (Mahat & Scoloveno, 2010), which interferes with HIV knowledge. Taken together, there is a need to uncover points of support and prevention-intervention to increase negotiation skills and reduce behaviors that are contributing to HIV epidemic.

This study is part of a broader university-community partnership known as Project C.O.P.E. (Communities Organizing for Prevention and Empowerment). This project provides comprehensive CDC and CSAP (Center for Substance Abuse Prevention) evidence-based prevention protocols to youth in an economically deprived, northeastern U.S. community (Reid & Garcia-Reid, 2013). One of the primary goals of Project C.O.P.E. is to increase HIV/AIDS knowledge, as well as knowledge associated with substance use and abuse and other risky behaviors among urban minority adolescents. To further refine our prevention-intervention protocols, this exploratory study used person-centered analysis to consider differences among subgroups of individuals, particularly on how groups of individuals function relative to others within the sample population (Howard & Hoffman, 2017). Person-centered analyses, which include latent class analyses (LCA), categorize participants into subgroups and simultaneously examines the relationship these subgroups have with conceptually related variables (Howard & Hoffman, 2017). Person-centered methodological techniques permitted the research team to examine factors at the individual level that influenced the number of sexual partners, as well as having greater HIV knowledge and risk perception. Using LCA, we examined subgroups of youth based on perceived sexual negotiation skills and risk behaviors (e.g., substance use and sexual risk) on HIV knowledge, perception of risk, and the number of sexual partners.

Methods

Recruitment and sample

Data were collected as part of a federally-funded Minority AIDS Initiative (MAI) substance abuse and HIV/AIDS prevention grant targeting racial-ethnic minority adolescents in an under-resourced, impoverished urban locale in the northeastern United States. Our study sample was derived from health education classes in the local high school in grades 9 through 12, and summer camp programs throughout the target community. Approval from school and camp administration were obtained at each of the sites before recruiting students. Students participated in a 50-min baseline and follow-up questionnaire to answer 100 self-administered questions, in English, which assessed several risk and protective factors

associated with HIV/AIDS and substance abuse. For the current exploratory study, student baseline responses were examined to develop a comprehensive understanding of knowledge and behavior. All study protocols were approved by University's Institutional Review Board (IRB). Students who returned signed parental informed consent and student assent forms participated in the survey.

The sample for the current exploratory study comprised of racial-ethnic minority youth ($N = 668$) who were predominantly African American/Black (48.1%) and Hispanic (42%). At the time of the investigation, adolescents were near evenly split between male (48.1%) and female (51%), with 0.9% identifying as having a gender nonconforming identity, with an average age of 16.30 years ($SD = 1.26$). The largest proportion (82%) of adolescents identified as having a non-LGBQ (lesbian, gay, bisexual, queer) identity; however, approximately 18% identified as either bisexual (8.2%), gay or lesbian (2.9%), or queer (7.2%). This disclosure of LGBQ identity is higher than most U.S. national averages, which indicates that roughly 10% of individuals identify as LGBQ (Bostwick et al., 2014).

Measures

A total of three variables were included in the LCA to identify latent classes (LC) of individuals. These classification variables were chosen to represent a range of HIV risk factors to identify comprehensive risk profiles. Study measures were designed by the federal funding agency to help capture information pertaining to HIV knowledge, risk factors, and prevention of risky behaviors. Confirmatory factor analysis (CFA) was undertaken to establish support for the factor structure of each of the three variables included in the LCA. Chi Square (χ^2) test, Comparative Fit Index (CFI), Goodness of fit indices (GFI), and Root Mean Square Error of Approximation (RMSEA) (West, Taylor, & Wei, 2012). Nonsignificant χ^2 values indicate acceptable model fit. Second, higher values (i.e., greater than .95) on the CFI and GFI, and smaller RMSEA (i.e., less than .08) are desirable. Last, RMSEA that are .05 = good fit, .05–.08 = acceptable fit and .08 –.10 = unacceptable fit (West et al., 2012). See Table 1 for descriptive statistics.

Thirty-day substance use was assessed using 14-items based on questions from the Youth Risk Behavioral Surveillance Survey (YRBSS; Kann et al., 2016). The YRBSS measures adolescent's use of drugs and, or alcohol during the previous 30 days to being surveyed (sample items: During the past 30 days, how many days did you drink one or more alcoholic beverages?). Participant responses were recorded using a scale from *zero days* (0) to *all 30-days* (30). CFA was undertaken to establish support for the factor structure of the *thirty-day substance use* measure. Results indicate that this 14-item measure had adequate model-to-data fit: $\chi^2 = 31.96$ [24], $p = .13$; CFI = .99; TLI = .98; GFI = .99; RMSEA = .02 [90% CI = .00, .04]), supporting that these questions loaded onto a single *thirty-day substance use* latent variable or that one factor was extracted, with an Eigenvalue of 7.58 and explained 80% of the variance. The overall measure had a mean score of 1.28 ($SD = 1.62$; Cronbach's $\alpha = .90$). A lower overall mean response rate is not atypical when considered alongside other studies that found significant and important results (Lardier, 2019; Reid et al., 2016). For the purposes of LCA, and to retain ordinal response category, responses were transformed into a dichotomous variable with zero-days designated as "0" and 1–30 days of use designated as

“1” (Vermunt & Magidson, 2013). The transformed ordinal variable was highly correlated ($r = .89, p < .001$) with the original continuous variable, indicating a highly collinear relationship.

Sexually risky behavior was assessed using three items (sample items: In the last 3 months, have you had sex after getting drunk or high?) that examined adolescents' likelihood of engaging sexually risky behavior. Responses were recorded using a dichotomous response category of either *Yes* (1) or *No* (0), with responses coded and totaled toward greater risky behavior. CFA was conducted to establish support for the factor structure of the *sexually risky behavior* measure. Results indicate that this three-item measure had adequate model-to-data fit: $\chi^2 = 1.72$ [2], $p = .17$; CFI = .97; TLI = .98; GFI = .99; RMSEA = .05 [90% CI = .00, .08]), supporting that these questions loaded onto a single *sexually risky behavior* latent variable or that one factor was extracted, with an Eigenvalue of 1.68 and explained 70% of the variance. The overall scale had a mean score of .55 ($SD = 1.19$; Cronbach's $\alpha = .71$). For the purposes of LCA, and to retain ordinal response category, responses were transformed into a dichotomous variable with *no* participation in sexually risky behavior as “0” and “1” or more designated as *yes* “1” (Vermunt & Magidson, 2013). The transformed ordinal variable was highly correlated ($r = .95, p < .001$) with the original continuous variable, indicating a highly collinear relationship.

Sexual negotiation skills were assessed using six items that examined participants' perceived ability to engage in sexual negotiation (sample items: I could say no if someone pressured me to have sex when I did not want to.). Responses were recorded using a four-point Likert scale ranging from *Strongly Agree* (4) to *Strongly Disagree* (1), with responses totaled to reflect greater ability to engage in sexual negotiation. CFA was conducted to establish support for the factor structure of the *sexual negotiation skills* measure. Results indicate that this three-item scale had adequate model-to-data fit: $\chi^2 = 25.67$ [7], $p = .17$; CFI = .98; TLI = .98; GFI = .99; RMSEA = .05 [90% CI = .00, .08]), supporting that these questions loaded onto a single *sexual negotiation skills* latent variable or that one factor was extracted, with an Eigenvalue of 3.68 and explained 70% of the variance. The overall measure had a mean score of 13.38 ($SD = 2.58$; Cronbach's $\alpha = .81$). For the purposes of LCA, the combined continuous variable was transformed into quartiles, so data retained ordinal response scales (Vermunt & Magidson, 2013). The transformed ordinal variable was highly correlated ($r = .93, p < .001$) with the original continuous variable, indicating a highly collinear relationship.

Outcome variables

HIV knowledge was assessed using seven items that measured participants' HIV knowledge (sample item: Only people who look sick can spread the HIV/AIDS virus.). Responses were recorded using *True* (1) or *False* (0) and summed to reflect greater HIV knowledge or more correct responses on questions. CFA was undertaken to establish support for the factor structure of the *HIV knowledge* measure. Results indicate that this three-item measure had adequate model-to-data fit: $\chi^2 = 8.07$ [6], $p = .23$; CFI = .99; TLI = .99; GFI = .99; RMSEA = .02 [90% CI = .00, .05]), supporting that these questions loaded onto a single HIV knowledge variable or that one factor was extracted, with an Eigenvalue of 3.98 and

explained 74% of the variance. The overall scale had a mean score of 5.87 ($SD = 1.41$; Cronbach's $\alpha = .83$).

Number of sexual partners in the last 3 months was assessed using a single item that asked: "During the last 3 months with how many people did you have sex"? Responses were recorded on a scale from *0 people* (0) to *6 or more people* (6). Participants responded with a mean score of .36 ($SD = .85$).

Perception of risk was assessed using five items that measured participants' perception of sexual risk (sample item: How much do you think people risk harming themselves physically if they have sex without a condom or dental dam?) and substance use risk (sample item: How much do people risk harming themselves physically or in other ways when they smoke marijuana once or twice a week?). Item responses were recorded using a four-point Likert scale ranging from *no risk* (1) to *greater risk* (4) and summed to reflect greater perceived risk. CFA was done to establish support for the factor structure of the *perception of risk* measure. Results indicate that this three-item scale had adequate model-to-data fit: $\chi^2 = 1.57$ [4], $p = .53$; CFI = .99; TLI = .99; GFI = .99; RMSEA = .01 [90% CI = .00, .04]), supporting that these questions loaded onto a single HIV knowledge variable or that one factor was extracted, with an Eigenvalue of 2.98 and explained 68% of the variance. Participants responded with a mean score of 24.39 ($SD = 3.79$; Cronbach's $\alpha = .75$).

Data analyses and results

All main analytic variables were correlated, except for HIV knowledge and number of sexual partners during the previous 3 months of being surveyed (see Table 1). LCA was used to examine heterogeneity among participants on observed risk and protective factors of HIV risk and perceived sexual negotiation skills. Analyses were conducted using Latent Gold v.5.1 statistical software (Vermunt & Magidson, 2013). Multiple, generated, latent clusters were examined (1 through 10 latent clusters), which is consistent with recommendations put forward by Vermunt and Magidson (2013). Following standard practice, model-fit was assessed to determine the most parsimonious model, capturing the largest amount of total association between observed indicators. We used the likelihood-ratio chi-squared statistic (L^2), the Bayesian Information Criterion (BIC), and the Akaike Information Criterion (AIC). Large L^2 and associated *degrees of freedom* (df), and a significant p -value indicate poor model-to-data fit, or more highly negative than maximum precision can indicate, rendering values meaningless (Vermunt & Magidson, 2013). Smaller BIC and AIC, in relation to a smaller L^2 and the associated df , and a nonsignificant p -value, indicate parsimony in the model or better model-to-data fit (Vermunt & Magidson, 2013). The most parsimonious and best-fitting model was examined for subsequent analyses.

Based on the criterion to assess the best model-to-data fit, we determined that the five-cluster model provided the best model-to-data fit to the sample data (see Table 2). Bootstrap procedures were performed to identify optimal fit estimates (Vermunt & Magidson, 2013). The bootstrap difference in log-likelihood value ($-2LL$ -difference statistic), which compares models with different number of LC (Lo, Mendell, & Rubin, 2001; Vermunt & Magidson, 2013; Vuong, 1989), yielded a significant p -value ($p = .01$) between the five-cluster model and the four-cluster model, indicating that there is a difference between models; however,

the $-2LL$ -difference statistic yielded a p -value of .54 between the six-cluster model and the five-cluster model, indicating that the five-cluster model is more parsimonious. Taken together, with the associated model-fit criterion, we retained that the five-cluster model as it provided the most adequate model-to-data fit. For the five-cluster model, fit statistics were: $L^2 = 45.66$ (35), bootstrap p -value = .16; BIC = 3233.35; AIC = 3120.59, indicating adequate model-to-data fit. The standard Entropy R^2 value of .71 indicates that the five LC model accounts for a larger proportion of the variance in the scales used.

Individual cases from the sample were assigned using modal classification, which is a standard procedure in Latent Gold v.5.11 (Vermunt & Magidson, 2013). Complete cases with complete data were included in the model ($N = 661$). See Figure 1 for the profile plot of the means of the scales used to create latent profiles (Vermunt & Magidson, 2013). A total of 297 (45%) were classified in cluster group 1, which is labeled “high negotiation skills and low risk,” reflecting higher overall perceived negotiation skills ($M = 2.85$, $SD = 1.01$), lower scores on 30-day substance use ($M = .03$, $SD = .16$), and lower scores on sexually risky behavior ($M = .09$, $SD = .26$). A total of 123 participants (18.4%) were in cluster 2, labeled “high negotiation skills, high substance use, and moderate sexual risk.” This cluster reflects high scores on negotiation skills ($M = 2.95$, $SD = .85$), higher scores on 30-day substance use ($M = .95$, $SD = .19$), and moderate scores on sexually risky behavior ($M = .41$, $SD = .49$) — that is, when compared to cluster group 3, which had higher overall scores on sexually risky behavior and cluster group 1 that had lower scores. A total of 135 participants (20.4%) were in cluster 3, labeled “high negotiation skills, low substance use, and high sexual risk.” This cluster reflects higher scores on perceived negotiation skills ($M = 2.68$, $SD = 1.04$), low scores on 30-day substance use ($M = .01$, $SD = .10$), and high scores on sexually risky behavior ($M = .86$, $SD = .34$). A total of 66 participants (10%) were in cluster 4, labeled “moderate negotiation skills, low substance use, low sexual risk.” This cluster reflects moderate perceived negotiation skills ($M = 2.11$, $SD = 1.11$) — that is, when compared to high perceived negotiation skills in cluster 1 and cluster 2—, low scores on 30-day substance use ($M = .11$, $SD = .31$), and low scores on sexually risky behavior ($M = .11$, $SD = .32$). Last, a total of 40 participants (6.2%) in cluster 5, labeled “low negotiation skills and high risk.” This cluster reflects low scores on perceived negotiation skills ($M = 1.10$, $SD = .32$), higher scores on 30-day substance use ($M = .98$, $SD = .20$), and higher scores on sexually risky behavior ($M = .81$, $SD = .43$).

Next, we tested membership of the five clusters for differences on demographic characteristics including gender, sexual orientation-identification, African American/Black racial identity, and Hispanic/Latinx ethnic identity. Significant differences were noted between cluster groups and sexual orientation-identification ($\chi^2(12) = 732.67$, $p < .001$). The majority of LGBQ or queer-identifying youth were distributed between cluster 1 “high negotiation skills and low risk” (47%) and cluster 2 “high negotiation skills, high substance use, and moderate sexual risk” (27%), when compared to non-LGBQ youth who were largely in cluster 1 (80%).

Table 3 presents the MANCOVA, with LCA clusters as the group factor, the number of sexual partners, HIV knowledge, and perception of risk as the dependent variables, and sexual-orientation identification as the covariate. Results indicated that significant

differences existed between LCA clusters on the number of sexual partners, HIV knowledge, and perception of risk. Post hoc analysis further revealed several interesting findings. For example, latent class cluster group 5 had a significantly greater mean on the number of sexual partners, when compared to cluster groups 1 “high negotiation skills and low risk” through 4 “moderate negotiation skills, low substance use, low sexual risk”; yet, cluster group 2 “high negotiation skills, high substance use, and moderate sexual risk” and cluster group 3 “high negotiation skills, low substance use, and high sexual risk” also had a significantly greater mean on the number of sexual partners when compared to cluster group 1 “high negotiation skills and low risk.”

Latent cluster group 1 “high negotiation skills and low risk” also had a greater mean value when compared to cluster group 3 “high negotiation skills, low substance use, and high sexual risk,” cluster group 4 “moderate negotiation skills, low substance use, low sexual risk,” and cluster group 5 “low negotiation skills and high risk” on both HIV knowledge and perception of risk. Cluster group 4 “moderate negotiation skills, low substance use, low sexual risk” had a significantly greater mean value on HIV knowledge when compared to cluster group 2, cluster group 3, and cluster group 5, as well as on perception of risk when compared to cluster group 5 “low negotiation skills and high risk.” Cluster group 3 “high negotiation skills, low substance use, and high sexual risk” had a significantly greater mean value on risk perception, when compared to cluster group 2 “high negotiation skills, high substance use, and moderate sexual risk” and cluster group 5 “low negotiation skills and high risk.”

Discussion

Using LCA, this study examined subgroups of youth based on perceived sexual negotiation skills and risk behaviors (e.g., substance use and sexual risk) on HIV knowledge, perception of risk, and number of sexual partners. Results from this exploratory study mirror previous research indicating that sexually risky behaviors and experiencing lower perceived sexual negotiation skills may be associated with lower HIV knowledge and risky behavior (Schwitters et al., 2015), as well as having more sexual partners, which can lead to acquiring and transmitting HIV and other STIs (Fairbairn et al., 2017). For instance, those in cluster group 5 “low negotiation skills and high risk” reported more sexual partners and lower HIV knowledge and risk perception, which based on previous scholarship presents a cascading effect (Benotsch et al., 2013), wherein limited HIV knowledge increases the likelihood of experiencing lower perception of risk, and the potential for engagement in risky sexual behaviors and with multiple sexual partners. Scott-Sheldon et al. (2016) also found in a meta-analysis of 30 experimental studies that participants randomly assigned to consume alcohol had stronger intentions of engaging in unprotected sex and less perceived ability of engaging in sexual negotiation skills.

Furthermore, youth in cluster group 1 “high negotiation skills and low risk” identified greater HIV knowledge and greater perception of risk, as well as identified a lower number of sexual partners. These results point toward the connection between high negotiation skills and low risk behavior, on mechanisms associated with HIV knowledge, greater perceptions of risk, and less sexual engagement with multiple partners. This is an interesting finding, as

recent studies have shown that greater HIV knowledge is associated with both greater perceptions of risk (Kiviniemi et al., 2018) and the use of sexual negotiation skills (Closson et al., 2018). As Kiviniemi et al. (2018) state, “populations who display a lack of risk knowledge are exactly those populations who suffer a greater burden from many chronic and infectious diseases” (p. 430). Therefore, empowering youth to feel in control, participate in less risky behaviors, and engage in less sexual activities with multiple partners, the intersection of increasing HIV knowledge and risk perception may be critical (Pulerwitz, Mathur, & Woznica, 2018).

Interestingly, findings generated in this study provide some insight into the experiences of queer or LGBQ youth. While more LGBQ youth were identified within cluster group 1 “high negotiation skills and low risk,” roughly 27% were within cluster group 2. This finding is intriguing because although youth in this group felt that they had greater perceived sexual negotiation skills, they were likely to identify higher substance use and moderate sexually risky behaviors. One possibility as to why nearly 30% of queer youth were in cluster 2 may have to do with navigating a terrain where social stigma, biases, and oppression intersect with barriers to resources and information that increase HIV knowledge and awareness of the association between risky behaviors and transmission of HIV and STIs (Zellner et al., 2009). Furthermore, minoritized youth may feel that they can engage in and use sexual negotiation skills, but the social pressures of identifying as a LGBQ youth in a community of color may lead to poor mental health outcomes that increase the use of drugs and alcohol (Bogart et al., 2011).

Limitations

Several limitations should be considered. First, our study was cross-sectional as we only examined data that were completed previous to the completion of the prevention classes to assess baseline levels of HIV knowledge, risk behaviors, and perceived sexual negotiation skills. Future studies should examine these findings pre and post-intervention to assess if exposure to prevention-intervention information had an impact on knowledge and behavior. Second, we were required to use a survey that was designed by a federal funding agency, which was outcome-driven—for example, substance use and risky behaviors. The questionnaire would have benefited from the inclusion of validated scales that assessed some contextual factors related to risky behavior such as family discord and social disorganization and buffering mechanisms such as sense of community, youth programming participation, and youth empowerment.

Implications for research

Despite these limitations, these findings have several implications for research on HIV and associated risk and protective factors among youth of color, as well as the content and delivery of prevention-intervention programming. This study provides some evidence on the value of employing person-centered analyses to study mechanisms related to HIV prevention, particularly in providing a nuanced examination of how LCA can be used to inform HIV, substance abuse, and STI youth-based prevention-intervention programs. Results point toward the importance topics such as HIV knowledge, risk perception, and perceived negotiation skills can have in HIV and substance use programming for ethnic

minority youth. Considering that such youth belong to backgrounds that have been historically marginalized, interventionists who pay special attention to empowering youth (Lardier, 2019) to feel more confident in negotiating safe sexual behavior may be an effective strategy in prevention.

Implications for HIV prevention-intervention programing

Findings from this study suggest that HIV prevention-intervention programing may hope to consider the importance of increasing youth HIV knowledge and risk perception to increase youth sexual negotiation skills and limit youth engagement in risky sexual behavior, particularly with multiple sexual partners. Previous research has also highlighted, while not tested in this study, that such avenues for prevention-intervention also increase awareness and motivation to receive HIV testing services (Reid et al., 2014, 2017). This is important as such methods of prevention-intervention may reduce the transmission of HIV and associated STIs, as well as reduce disparities among urban youth of color who are unduly impacted by this epidemic. Furthermore, in line with findings from this study, previous research has recommended that educational and behavioral skills programs address both substance use and abuse and HIV prevention, which may result in behavioral change related to substance use and HIV risk (Garcia-Reid et al., 2016; Reid et al., 2014, 2017).

It is also imperative that HIV and substance abuse prevention-intervention programs be tailored to the culture of the targeted group. For instance, results in this study indicated that LGBQ or queer youth of color were near evenly split between cluster group 1 and cluster group 2, pointing toward the complexity of these youth's lived realities. Such findings suggest the need for tailored and targeted programing that considers sexual negotiation skills for LGBQ or queer youth of color, as well as substance use prevention-intervention programing that speaks to these young people's lived realities. The intersection of racial-ethnic and sexual-minority statuses places these youth in a risky space where support and targeted intervention are crucial.

The NHAS for the United States recommends that HIV information should be integrated into appropriate education access points that makes it easy-to-access and readily available (White House Office of National AIDS Policy, 2015). The NHAS for the United States also acknowledged the need to reduce HIV-related disparities and health inequities, which specifically affect youth of color, and queer youth of color (White House Office of National AIDS Policy, 2015). Increased funding that targets racial-ethnic minority youth and LGBQ youth of color is needed to put forward structural approaches that reduce the risk of HIV transmission and related risky behaviors, particularly in communities that are at an increased odds of being plagued by these concerns. Programs funded through the MAI grant mechanisms can work toward empowering youth to engage in and design youth-driven prevention-intervention programs that are both culturally-responsive and age-appropriate (Opara, 2018).

Conclusion

The NHAS for the United States put forward a vision that by 2020 “The United States will become a place where new HIV infections are rare, and when they do occur, every person,

regardless of age, gender, race/ethnicity, sexual orientation, gender identity, or socioeconomic circumstance, will have unfettered access to high quality, life-extending care, free from stigma and discrimination” (White House Office of National AIDS Policy, 2015, p. ii). Four years later and closer to 2020, the United States still finds itself in a crisis, wherein new HIV diagnoses are not necessarily rare, particularly in the United States’ most vulnerable urban communities of color (CDC, 2016). It is critical that more widespread linkages of care be provided to communities at risk, particularly under-resourced urban communities of color. Tailored and targeted programming that is racially, ethnically, culturally, and gender-responsive needs to be implemented (Walker, Longmire-Avital, & Golub, 2015). Such programming also needs to meet the various and intersecting identities individuals, youth, families, and communities carry with them (Walker et al., 2015). Our findings emphasize how groups of youth with various levels of risk and perceived negotiation skills match up with HIV knowledge, risk perception, and the number of sexual partners. These findings provide insight into the role of that HIV knowledge and perception of risk have in youth’s participation in positive and negative behaviors. Practitioners on the frontlines need to be equipped with the necessary resources to implement evidence-based programming to a target audience, but more importantly, evidence-based programming that improves HIV knowledge and can uplifts youth’s confidence in order to curtail negative behaviors and perceptions.

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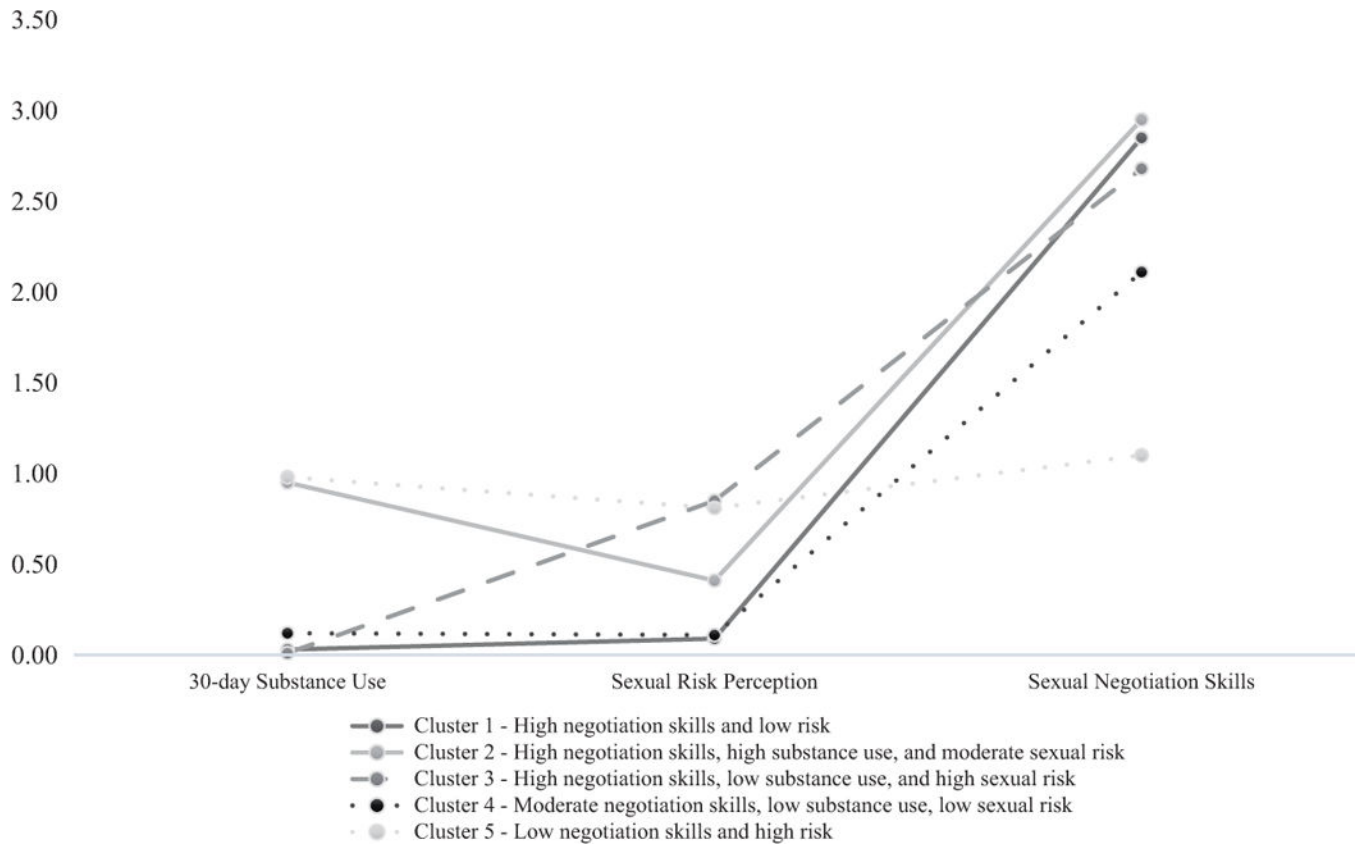


Figure 1. Sexual negotiation skills and risk behaviors response probabilities by latent cluster.

Table 1.Correlation matrix and descriptive statistics for main study variables ($N = 668$).

	1	2	3	4	5	6	7
1. Thirty-day substance use	—	.32**	-.12**	-.24**	.34**	-.197**	.05
2. Sexually risky behavior		—	-.10*	-.17*	.45**	-.13**	-.01
3. Sexual negotiation skills			—	.27**	-.14**	.10*	.73
4. HIV knowledge				—	-.18**	-.03	-.15**
5. Number of sexual partners					—	-.11**	-.09
6. Perception of risk						—	-.11*
7. LGBQ identity = 1							—
Mean	1.65	.47	13.51	5.87	.36	24.39	—
<i>SD</i>	.67	1.11	2.43	1.41	.85	3.78	—
Cronbach's α	.90	.71	.81	.83	—	.75	—

*
 $p < .05$,**
 $p < .01$.

Table 2.

Latent class analysis model fit statistics for the intersection between sexual negotiation skills and risk behaviors.

	LL	BIC(LL)	AIC(LL)	Npar	L ²	df	p-value
1-Cluster	-1576.6331	3185.8175	3163.2662	5	128.3282	55	8.5e-8
2-Cluster	-1563.4704	3192.0433	3146.9407	10	102.0027	50	2.0e-5
3-Cluster	-1544.0261	3185.7060	3118.0522	15	63.1142	45	0.038
4-Cluster	-1536.9064	3204.0179	3113.8127	20	48.8747	40	0.16
5-Cluster	-1535.2992	3233.3548	3120.5984	25	45.6604	35	0.11
6-Cluster	-1534.8407	3264.9891	3129.6814	30	44.7434	30	0.04
7-Cluster	-1529.2405	3286.3401	3128.4811	35	33.5431	25	0.12
8-Cluster	-1525.7008	3311.8119	3131.4015	40	26.4635	20	0.15
9-Cluster	-1524.3972	3341.7560	3138.7944	45	23.8564	15	0.06
10-Cluster	-1523.1233	3371.7595	3146.2466	50	21.3086	10	0.01

Note. Bold text indicates the preferred model.

BIC: Bayesian information criterion; AIC: Akaike information criterion; LL: log likelihood; L²: likelihood ratio chi-square statistic.

Table 3.

MANCOVA results between sexual negotiation skills and risk behaviors.

	Number of sexual partners in the last 30-days		HIV knowledge		Perception of risk	
	Mean (95% CI)	SE	Mean (95% CI)	SE	Mean (95% CI)	SE
1. Cluster 1: High negotiation skills and low risk (45%)	.05	.02	3.62	.05	28.87	.21
2. Cluster 2: High negotiation skills, high substance use, and moderate sexual risk (18.4%)	.68	.07	2.54	.14	22.09	.47
3. Cluster 3: High negotiation skills, low substance use, and high sexual risk (20.4%)	.50	.21	2.75	.31	25.25	.98
4. Cluster 4: Moderate negotiation skills, low substance use, and low sexual risk (10%)	.01	.02	3.40	.20	24.20	.89
5. Cluster 5: Low negotiation skills and high risk (6.2%)	3.50	.84	2.50	.28	17.00	.98
Univariate F (3, 826)	4.33 ^{***}	1.25 ^{**}			59.63 ^{***}	
Mean difference, $p < .05$	2 > 1, 4; 3 > 1; 5 > 1, 2, 3, 4		1 > 2, 3, 4, 5; 4 > 2, 3, 5		1 > 3, 5; 3 > 2, 5; 4 > 5	

Overall MANCOVA: Wilks' Lambda = .38; $F(16, 413) = 9.58^{***}$.

Covariate: LGBQ (Queer) Identity.

^{**}
 $p < .01$,^{***}
 $p < .001$.