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Relationship dynamics in the context of binge drinking and polydrug use among same-sex male couples in Atlanta, Boston, and Chicago

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Abstract

Background: An estimated one- to two-thirds of incident HIV infections among US men who have sex with men (MSM) occur within the context of a primary relationship. The existing, yet limited, literature on sexual risk behavior among same-sex couples suggests that MSM with main partners are more often to report having lower perceived HIV risk, higher unrecognized HIV infection, and increased frequency of condomless anal intercourse (CAI) with their primary partner. Furthermore, numerous studies document the strong relationship between polydrug use and binge drinking with HIV infection among MSM. However, more research is needed that

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review boards of The Fenway Institute, Boston, MA, Brown University, Providence, RI, Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL and Emory University, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

identifies how individual- and relationship-level factors are related to polydrug use and binge drinking in the context of same-sex male relationships.

Methods: We used baseline data collected as part of a prospective randomized controlled trial of 160 same-sex male couples (total N = 320 individuals). In 2015, recruitment commenced in three U.S. cities: Atlanta, GA, Boston, MA and Chicago, IL. Participants completed a self-report assessment using an audio-computer assisted self-interview (ACASI) system during their baseline enrollment visit. We collected information on participants' socio-demographic characteristics (e.g., race/ethnicity, age, employment/student status, etc.), drug and alcohol use, individual- and relationship-level variables of interest, as well as relationship quality. Multinomial logistic regression models were fit for three different categories of polydrug use (using 3 or more drugs) and of binge drinking (consuming six or more alcoholic beverages on one occasion, at least once per month) for which 1) both partners exhibit the behavior, 2) only the respondent exhibits the behavior, or 3) only the partner exhibits the behavior.

Results: Participants' age ranged from 18 to 69 (mean = 35.9). The sample majority (77.5%) was White (248/320), with 12.2% Black (39/320), and 10.3% multiracial (33/320); 68.4% had completed a college degree; and 9.6% were unemployed. A high proportion (62.2%) reported any drug use, including marijuana; 45% reported using drugs other than marijuana and 18.1% reported polydrug use. Overall, 22.2% reported current binge drinking. Age discordance and being in a long-term relationship (six or more years) were associated with a decreased odds of polydrug use among couples; being in an interracial dyad, recent history of arrest, living with HIV, and self-reported clinically significant depressive symptoms were associated with an increased odds of polydrug use. Additionally, being the older partner and reporting higher levels of internalized homophobia decreased odds for binge drinking, while recent history of arrest, living with HIV, and feeling more loved in their relationship were associated with an increased odds of binge drinking.

Discussion: Findings have implications for developing interventions to reduce substance use and promote health among same-sex male couples. Future research would benefit by using longitudinal study designs to understand the individual-, relationship-, and structural-level factors that potentiate polydrug use and binge drinking among same-sex male couples.

Keywords

Same-sex male couples; MSM; HIV; polydrug use; alcohol; binge drinking

INTRODUCTION

In the United States (US), male-to-male sexual contact continues to represent a major channel of HIV transmission, with men who have sex with men (MSM) comprising 67% of all new HIV infections observed in 2014 (Centers for Disease Control and Prevention, 2016). Moreover, estimates of new HIV diagnoses among US MSM continue to increase annually (CDC, 2016). Among MSM, most new HIV infections (between 52% and 74%) occur between primary partners (Sullivan, Salazar, Buchbinber & Sanchez, 2009). The existing, yet limited, data on sexual risk behavior among same-sex couples suggest that MSM with main partners are more likely to have lower perceived HIV risk, higher unrecognized HIV infection (Stephenson et al., 2015), and increased frequency of

condomless anal sex with their primary partners (Mustanski, Newcomb, & Clerkin, 2011; Newcomb, Ryan, Garofalo, & Mustanski, 2014; Sullivan et al., 2009). However, more research is needed that identifies how individual- and relationship-level factors are related to polydrug use and binge drinking in the context of same-sex male relationships.

Historically, polydrug use (i.e., the combined use of 3 or more psychoactive substances) and binge drinking (i.e., drinking an excessive amount of alcohol in a single occasion) have been associated with increased risk of HIV transmission (Ostrow et al., 2009) and sexual risk behaviors (Baliunas et al., 2010; Hess et al., 2015; Mimiaga et al., 2008; 2010; 2015a; 2015b; Santos et al., 2015; Shuper et al., 2010; Wen et al., 2012; Skeer et al., 2012; Woolf & Maisto, 2009), particularly among MSM (Blashill et al., 2014; Daskalopoulou et al., 2014; Fernandez et al., 2005; Hoff et al., 2016; Mimiaga et al., 2008; 2010; 2015a; 2015b; Parsons & Starks, 2014; Patterson et al., 2005; Santos, Jin & Raymond, 2015), to whom these issues are endemic (Gallagher, Sullivan, Lanksey & Onorat, 2007; Halkitis et al., 2008; Halkitis, Palamar, & Mukherjee, 2007; Hess et al., 2015; Santos et al., 2015). Most research on the factors that shape polydrug use and binge drinking has focused on individual-level factors, with little attention given to relationship-level factors associated with these outcomes (Hoff et al., 2016).

The few dyadic studies on drug and alcohol use among same-sex male couples suggests that MSM in seroconcordant relationships (i.e., both HIV positive or both HIV negative) were more likely to engage in drug use during sex with their primary partners than were MSM in serodiscordant relationships (Mitchell 2016a). Additionally, among same-sex male couples, use of party drugs (e.g., cocaine, ecstasy, crystal methamphetamine) during sex with outside partners was significantly associated with lower levels of trust within primary relationships (Mitchell 2016b). Another study found that same-sex male couples more often report using substances than those without a primary partner; substance use was also associated with main partners having had condomless anal sex outside of their relationship (Mor, Davidovich, McFarland, Feldshtein, & Chemtob, 2008). Other research has noted that MSM who reported being in a monogamous relationship were less likely to have used substances with sex compared to those who were either single or in a relationship but having sex with other men (either together or separately) (Mor et al., 2008; Parsons & Starks, 2014; Parsons, Starks, DuBois, Grov, & Golub, 2013). These studies provide some insight about male couples' use of substances in the context of sexual behavior. Finally, MSM who experience and/or perpetrate intimate partner violence (IPV) in their current relationship were significantly more likely to use drugs and alcohol (Duncan et al., 2016; Stults et al., 2016; Wu et al., 2014), as the use of drugs and alcohol in relationships have been shown to be triggers for IPV within same-sex male relationships (Finneran and Stephenson, 2014).

Another developing area of dyadic research with MSM couples has been the exploration of how sexual agreements (i.e., the set of formal or informal rules related to sex with outside partners) are used and related to sexual risk. Early findings indicate that HIV status beliefs were associated with sexual agreement type, with open relationships more common among MSM who believed that over 10% of their male sex partners were HIV positive than MSM who perceived that fewer than 10% of their sex partners were HIV positive (Stephenson, White, & Mitchell, 2015). Investment in a sexual agreement was also associated with

engaging in less condomless anal sex among seroconcordant couples (Darbes et al., 2014). Existing studies have also identified a significant relationship between substance use and sexual agreements (Mitchell et al., 2014; Parsons & Starks, 2014). Established sexual agreements were significantly associated with greater levels of marijuana and amyl nitrate use during sex with a primary partner (Mitchell et al., 2014), and couples who reported having an open relationship were significantly more likely to engage in the use of marijuana and other drugs than couples who reported a monogamous relationship (Parsons & Starks, 2014).

Because of the strong predictive relationship between substance use and HIV risk among same-sex male couples, as well as research that shows that the majority of MSM are exposed and acquire HIV in the context of a primary partnership, more dyadic studies are needed to identify factors that potentiate risk and are unique to same-sex male relationships; these formative data will help in developing innovative and effective interventions to reduce substance use and promote sexual health among this group (Sullivan et al., 2009). The conceptual model guiding our analysis is an adapted social-ecological model, which integrates individual and relationship perspectives and acknowledges the importance of structural factors to develop new insights into the determinants of health behaviors (Bronfenbrenner, 1989; Baral, Logie, Grosso, Wirtz, & Beyrer, 2013). The adapted social-ecological model provides a framework for understanding binge drinking and polydrug use dynamics among same-sex male couples and is contextualized using three dimensions: 1) individual-level (e.g., depression, internalized homophobia) and 2) relationship-level (e.g., sexual agreement descriptions, history of IPV, communication patterns, love, trust, and dyadic adjustment) factors, and 3) acknowledges the importance of structural-level influence (e.g. local laws/policies, availability of services, political climate [conservative/liberal]). A bidirectional relationship exists between dimensions such that structural factors can influence interpersonal interactions, which can in turn shape individual behaviors and vice versa. As such, the current analysis aims to identify potential polydrug use and binge drinking related risk factors unique to same-sex relationships.

METHODS

Study Sites and Recruitment.

Ethical approval for the study was obtained from the Institutional Review Boards at Emory University, Fenway Health/Brown University, and Northwestern University. The data presented in this article come from the baseline assessment of “Stronger Together”, a randomized controlled trial of a dyadic intervention that combines couples’ HIV testing and dyadic adherence counseling to improve treatment adherence and engagement in care among HIV sero-discordant male couples in the United States ([clinicaltrials.org](https://clinicaltrials.org/ct2/show/study/NCT01772992) #NCT01772992) (Stephenson et al., 2017). Couples were recruited from the Atlanta, Boston, and Chicago metro areas via a multi-modal recruitment strategy. Recruitment took place through physical and online/virtual spaces. Online sources included advertising on social media (e.g., Facebook and Twitter) and on geospatial sexual partner seeking apps (e.g., Grindr and Scruff). In-person recruitment was achieved by study staff attending LG events, visiting venues (e.g., bars, nightclubs, coffee shops), meeting potential participants at clinic

appointments, and posting flyers in lesbian, gay, bisexual, transgender, and questioning (LGBTQ) service organizations and other gay-themed venues. All recruitment and other study materials were reviewed by the corresponding site's community advisory board (CAB), which provided a mechanism for community members to have representation in research activities and provide advice to the study investigators on aspects of the study (e.g., cultural appropriateness of images and text used for recruitment materials).

All recruitment activities provided individuals with the study uniform resource locator (URL). The online screener could also be administered by study staff in-person or over the phone. When men visited the URL, a page was populated containing a short description of study activities; if they expressed an interest in participating and provided the metro area they lived in, potential participants were taken to the study consent form, and if they consented, are directed to a short eligibility screener. Men who (1) did not consent or (2) did not meet the eligibility criteria were taken to a screen thanking them for their interest. Eligible men were directed to a registration process. During the registration process individuals provided their name, email address, and a phone number. Participants were also given the option to provide their main partner's email address and/or phone number so the main partner could be contacted and screened to enroll the couple in the study together. Once both partners had (1) completed the consent forms, (2) finished the screening questionnaire, (3) met eligibility criteria for the study, and (4) provided contact information, a staff member contacted the couple to schedule the couple for an in-person baseline visit.

Study Sample.

Eligible participants were cis-gender male couples in which: (1) two men report having been in a relationship with each other for greater than one month, with a relationship defined as, "having a male partner who you are committed to above all others"; (2) both men were 18 or higher years of age; (3) have lived in the Atlanta, Boston, or Chicago metro areas for greater than 3 months; and (4) had not tested for HIV in the 6 months prior to study enrollment. Couples who presented for participation were provided informed consent and \$50 compensation for completion of the baseline assessment visit. Of the 411 participants who presented for participation and completed the check-in survey, a total of 13 participants (3.2%) were excluded because they declined to consent or did not meet eligibility criteria. Of the remaining 398 who completed the baseline assessment, 78 participants (19.6%) had missing data relevant to the current analysis. There were no statistically significant differences on socio-demographic and outcome variables between those with complete baseline assessment data and those who were removed from the analysis due to missing data. As such, all analyses were restricted to complete cases, resulting in a final sample size of 320 participants (160 same-sex male couples).

Overview of Study Assessment.

Participants completed a self-report assessment using an audio-computer assisted self-interview (ACASI) system during their baseline enrollment visit. We collected information on participants' socio-demographic characteristics (e.g., race/ethnicity, age, employment/student status, etc.), drug and alcohol use, individual- and relationship-level variables of interest, as well as relationship quality.

Dependent Variables.

This study analyzed polydrug use and binge drinking behavior in same-sex male couples as main outcomes of interest. Binge drinking and polydrug use were measured using behavioral self-reports.

Binge drinking.—Participants selected response options ranging from “never” to “daily or almost daily” on a five-point Likert scale to respond to the question “How often did you have 6 or more drinks on one occasion in the past year?” For analysis, binge drinking was restricted to consuming 6 or more drinks on one occasion at least once a month (Peacock et al., 2015; Rowe et al., 2016; Santos et al., 2015).

Polydrug use.—Participants reported a “yes” or “no” response to the question “Which of the following drugs did you use in the past year?”, accompanied by a list of 16 “club drugs”, injection drugs, inhalants, and hallucinogens (Daskalopoulou et al., 2014; Yu et al., 2015). Polydrug use was coded as a binary variable (1 = participant indicated using three or more of the drugs listed; 0 = participant indicated using two or less of the drugs listed).

Independent Variables.

Independent variables, reviewed below, included internalized homophobia, depressive symptoms, experience of intimate partner violence (IPV), communication patterns, perceived love and trust within the dyad, relationship quality, and sexual agreement description. Scales used have shown to be reliable and valid for use with the sample population (Salazar et al., 2013). Internalized homophobia and depression were used as measures of individual-level characteristics, while relationship-level characteristics included sexual agreement description.

Internalized homophobia.—Participants completed 20 items, a subset of the Gay Identity Scale (Brady and Busse, 1994), which has a five-point Likert scale (strongly disagree to strongly agree) regarding statements about homosexual identity. Responses were added to create total scores and a binary variable was generated to indicate whether or not respondents scored in the top 20th percentile (Cronbach $\alpha=0.78$).

Depressive symptoms.—Using the short form Center for Epidemiologic Studies Depression Scale (CES-D) (Carpenter et al., 1998; Kohout et al., 1993), participants were asked to respond to 11 questions with response options ranging from “hardly ever or never” to “much or most of the time”, on a three-point Likert scale; possible range of scores is 0 to 33. Total scores were calculated and a binary variable was generated to indicate whether or not the respondent displayed clinically significant depressive symptoms at a cut-off of 8 points or higher (Carpenter et al., 2010) (Cronbach $\alpha = 0.88$).

Intimate Partner Violence.—Participants completed the IPV among Gay and Bisexual Men (IPV-GBM) Scale, which was adapted from the Center for Disease Control and Prevention’s definition of IPV and the Conflict Tactics Scale (Stephenson and Finneran, 2013). Scale items encompass five distinct types of IPV: physical and sexual, emotional, controlling, monitoring, and HIV-related. The scale measured victimization by asking

participants to indicate how often their partner perpetrated a form of IPV against them. The same questions were then reversed to determine respondent's IPV perpetration against his partner. A categorical variable was generated to indicate whether the respondent experienced IPV, perpetrated IPV or both experienced and perpetrated IPV within the past 12 months (Cronbach $\alpha = 0.90$).

Communications patterns.—The short form Communications Patterns Questionnaire assessed the degree to which participants use constructive communication behaviors when a problems arise in their partnership (Heavey et al., 1996). Communication patterns were assessed using a nine-point Likert scale (very unlikely to very likely) for a series of five statements. A categorical variable was to represent dyadic differences (e.g. “Respondent scores higher”) (Cronbach $\alpha = 0.87$).

Perception of love.—Respondent's perception of love within the relationship was measured through a 19-item scale examining intimacy, passion, and commitment (Lemieux and Hale, 1999). Participants were asked to respond to statements (e.g. “[Partner] understands how you feel”, and “Sex is important in your relationship”) with response options ranging from “strongly disagree” to “strongly agree” on a five-point Likert scale. A categorical variable was generated to represent dyadic differences (e.g. “Respondent scores higher”) (Cronbach's α for the intimacy subscale was .87, and was .89 for the passion subscale and .80 for the commitment subscale).

Relationship trust.—Using a relationship trust scale developed by Larzelere and Huston (Larzelere and Huston, 1980), participants were asked to respond to eight statements, with response options ranging from “strongly disagree” to “strongly agree” on a five-point Likert scale. A categorical variable was generated to represent dyadic differences (e.g. “Respondent scores higher”) (Cronbach $\alpha = 0.81$).

Relationship quality.—Dyadic quality was assessed using the Dyadic Adjustment Scale examining dyadic satisfaction, cohesion, and consensus, and affectional expression (Spanier, 1976). Respondents were asked to respond to 32 items with Likert scale responses tailored to each question. Continuous scores were used to generate a categorical dyadic comparison variable (Cronbach $\alpha = 0.96$).

Agreement type.—Agreement type was evaluated using two questions: “Do you and [partner] currently have an agreement about whether or not you can have sex with people besides each other?” and “What is the current agreement that you and [partner] have about having sex with partners outside your relationship?” Response options included “no sex with outside partners, sex with outside partners without restrictions, sex with outside partners with restrictions, and no agreement”. A categorical variable was generated to represent dyadic differences in reported agreement type (e.g., “discordant agreement”).

Covariates of Interest.

Covariates included age (continuous variable for respondent and categorical dyadic comparison variable), race (categorical white, black, multiracial/other); interracial dyad

binary variable [defined as both men do not self-report the same racial category: 1) White (Latino and non-Latino), 2) Black/African American (Latino and non-Latino), and 3) Multiracial (Latino and non-Latino)]; sexual orientation (concordant/discordant orientations), education attainment (high school, some college, college or higher), employment status, arrest history, HIV status (categorical dyadic comparison variable), and cohabitation.

Analysis Plan:

Data were analyzed as individuals and compared to the partner's responses. For example, partner A (referred to as "respondent") answered his polydrug use and binge drinking behavior, and these answers were compared to partner B's (referred to as "partner") answers to the same questions. The outcomes of interest were two categorical variables. The first measured polydrug use and was categorized as: neither partner reports using (referent), both partners report using, one partner reports using but his partner does not, or vice versa. Similarly, the categorical outcome variable for binge drinking was categorized as: neither partner reports binge drinking (referent), both partners report binge drinking, one partner reports binge drinking but the other partner does not, and vice versa. We examined bivariate associations between our outcome variables (polydrug use and binge drinking) and specified independent variables. Multinomial logistic regression models were fit for the two outcomes of binge drinking and polydrug use. Given the data are from dyads, the models included a random effect for the dyad to adjust for the clustering of the data. All models were adjusted for sociodemographic variables and city recruited from; statistical analyses were carried out using STATA 14.

RESULTS

Descriptive characteristics of the study sample at baseline are presented in Table 1. Participants ages ranged from 18 to 69 (mean = 35.9), with a large portion (39.4%) of the sample between the ages of 25 and 34. The study sample was predominantly white (77.5%), college educated (68.4% earned a college degree or higher), and reported current employment or student status (88.8%). A majority of the sample (89.7%) self-identified as gay or homosexual, with 10.3% reporting an "other" orientation. A high proportion (62.2%) of participants reported any drug use. After excluding marijuana from the any drug use variable this proportion fell to 45.0%; 18.1% reported polydrug use (3 drugs used, past year). Further, 22.2% reported binge drinking (6 drinks on one occasion, at least monthly). A substantial proportion of participants (35.6%) reported experiencing any type of IPV within 12 months prior to baseline; 9.7% reported physical IPV, 6.9% reported controlling IPV, 20.3% reported monitoring IPV, and 33.8% reported emotional IPV. Relationship quality data presented in Table 2 reflects participant scores on average in the population on scaled questionnaires.

The analysis presented in Table 3 presents risk ratios relative to the referent group "neither respondent nor partner uses", by sample characteristics and key covariates. Age discordance between partners was associated with significantly reduced RRR for both using drugs (respondent older than partner: relative risk ratio (RRR) = .11, 95% CI .02-.7, $p < .05$;

partner being older than respondent $RRR = .13$, 95% CI .02-.85, $p < .05$). Respondents who were part of an interracial dyad were more than six times more likely to report polydrug use while their partner does not ($RRR = 6.16$, 95% CI 1.84-20.64, $p < .01$). The respondent reporting a history of arrest was significantly associated with the dyad reporting polydrug use nearly five-fold ($RRR = 4.86$, 95% CI 1.56-15.13, $p < .01$). Respondent's HIV-positive status has a similar magnitude of association on both partners reporting polydrug use ($RRR = 4.77$, 95% CI 1.06-21.43, $p < .05$). Being in a long-term relationship of six or more years significantly reduces the likelihood of both partners reporting polydrug use ($RRR = .1$, 95% CI .01-.84, $p < .05$). Respondents who scored higher on the CES-D depression scale were more likely report being in a relationship with a partner who reported polydrug use, even when the respondent does not ($RRR = 1.16$, 95% CI 1.04, 1.3, $p < .01$). Higher scores on the internalized homophobia scale was significantly associated with the respondent reporting polydrug use ($RRR = .9$, 95% CI .83-.97, $p < .01$). Reporting no sexual agreement also significantly associated with the respondent reporting polydrug use ($RRR = .04$, 95% CI .01-.35, $p < .01$).

Multinomial logistic regression analysis of dyadic binge drinking patterns followed the same analytic procedure conducted in the analysis of dyadic polydrug use. The analysis presented in Table 4 displays risk ratios relative to the referent group “neither respondent nor partner binge drinks” by sample characteristics and key covariates. Older respondents tended to report less binge drinking while their partner does not ($RRR = .93$, 95% CI .88-.98, $p < .01$), as well as less for the inverse (partner binges, respondent doesn't; $RRR = .95$, 95% CI .90-.99, $p < .05$). Respondents who had previously been arrested more often reported binge drinking while their partner does not ($RRR = 1.25$, 95% CI 1.08–6.70, $p < .05$). Being in a relationship where there is an HIV-positive partner more than doubles the magnitude of the association of both partners binge drinking (respondent is positive $RRR: 3.94$, 95% CI 1.52-10.22, $p < .01$; partner is positive $RRR: 2.68$, 95% CI 1.14-6.31, $p < .05$). Higher scores on the internalized homophobia scale, however, is associated with both partners binge drinking ($RRR: .96$, 95% CI .92-1.0, $p < .01$). Respondents who reported feeling more love in the relationship were more likely to have a partner who binge drinks while the respondent does not ($RRR: 3.85$, 95% CI 1.24-5.46, $p < .05$). The random effects for the dyad were not statistically significant in either model, indicating that there was not a dyadic effect on the outcomes after controlling for the variables in the models.

DISCUSSION

This study found high rates of any drug use (62.2%), polydrug use (18.1%), binge drinking (22.0%) and IPV (35.6%) among participants. The analysis also found that age discordance and being in a long-term relationship (six or more years) were significantly associated with less self-reported drug use among couples; however, being in an interracial dyad [defined as a same-sex male couple in which both individuals do not fall into the same racial category: 1) White (Latino and non-Latino), 2) Black/African American (Latino and non-Latino), and 3) Multiracial (Latino and non-Latino)], recent history of arrest, HIV-positive status and self-reported depressive symptoms were significantly associated with more self-reported drug use. Additionally, being the older partner and reporting higher levels of internalized homophobia was associated with significantly lower reported binge drinking, while history

of arrest, HIV-positive status and feelings of being more loved in a relationship was associated with binge drinking. These findings are in line with findings from other studies that have demonstrated significant effect of relationship-level factors on drug use and binge drinking in MSM couples (Martinez et al., 2016; Mitchell et al., 2015; Mitchell et al., 2016).

The above findings suggest that having an older partner might help dissuade drug use or reduce opportunities for use among younger partners. This may be due to the older partner having prior exposure and increased knowledge of the effects (positive and negative) of substance use and subsequent risk mitigation in the context of a romantic partnership. Age of partner was associated with reduced binge drinking for the respondent. Prior work has documented high prevalence of binge drinking among young MSM (Baiooco et al., 2010; Wong et al., 2008) and similar to drug use, our findings suggest that having an older partner might dissuade unhealthy behaviors such as binge drinking. Also, involvement in a longterm relationship might result in concordance of beliefs, values, and behaviors, which may include the couple making a conscious decision not to use drugs. This finding is consistent with prior research that demonstrated a negative association between relationship length and substance use (heavy drinking and marijuana) (Fleming et al., 2010). Conversely, history of arrest, HIV-positive status and depressive symptoms were associated with higher propensity for drug use. These findings are supported by previous studies that have shown these factors to be associated with drug use (Fleming et al., 2010). However, the persistence of these associations demonstrates their importance and significance in addressing substance use within same-sex partnerships. Lastly, previous research with male dyads has identified associations between being in an interracial dyad and increased risks of reporting IPV (Stephenson et al., 2013). Broadly consistent with the minority stress model (Meyer, 2003), the increased risk of IPV among same sex male interracial dyads was suggested to be linked to the experiences of racism from within the LGBT community or homophobia. The minority stress model argues that stressors associated with sexual minority status produce external and internal stress processes (e.g., homosexual prejudice, discrimination, expectations of rejection) that contribute to mental health and substance use problems later in life. In the Stephenson et al., study (Stephenson et al., 2013). IPV was suggested to be a negative response to stress. Similarly, in this study, interracial dyads experiencing heightened stress may adopt substance use as a negative coping behavior.

Furthermore, the finding that internalized homophobia marginally was associated with less binge drinking is in line with other studies that found no significant association between binge drinking and internalized homophobia (Amadio and Chung, 2004; Baiocco et al., 2010; Ross et al., 2001). History of arrest, having an HIV-positive partner, and reporting feeling more loved in the relationship were all associated with more frequent binge drinking behavior. This suggests that individual (arrest history and HIV-status) and interpersonal (love scale) factors influence drinking behavior within male-male dyadic relationships. As such, interventions aimed at reducing problem drinking in MSM couples must address both personal and relationship-level precipitants of binge drinking.

The findings of this study must be interpreted in light of limitations. Baseline cross-sectional data were used for these analyses and hence the nature of the study design precludes our ability to draw casual conclusions. Furthermore, although the sample represents a diverse

group of MSM from three distinct urban regions of the U.S. – Atlanta, Boston, and Chicago – the results may not be generalizable to MSM in smaller urban or rural parts of the United States. The majority of study participants had completed college and were currently employment, and likely experience different (and potentially fewer) barriers to HIV prevention services (e.g., couples-based HIV counseling and testing services) and treatment options for problematic substance use. In addition, the sample may be representative of MSM who engage in positive health-seeking behavior since some participants were recruited through primary care and HIV service organizations.

Despite these limitations, the results of this study have implications for designing intervention programs aimed at decreasing unhealthy substance use among MSM couples. Relationship problems often underlie addiction issues and equivalently, addiction problems always affect the quality of a relationship. Healthcare and community-based organizations that provide addiction treatment programs to sexual minority populations might consider offering services (or referrals to organizations that do), such as individualized or couples-based counseling, in conjunction with substance use treatment. Individualized counseling might focus on individual partner-specific issues, such as depression, anxiety, or internalized homophobia, and teach problem solving skills and functional ways of coping. For couples-based counseling, the goal would be to help both partners become aware of the dynamics between addiction and relationship problems and vice versa, help the couple develop a new relationship standard, including new ways of communicating and behaving that support each other to live and spend time together without substance use. Future research should examine these relationships in the context of a longitudinal cohort and expand these findings by detailing how individual-, relationship-, and structural-level factors predict problematic substance use overtime among same-sex male couples.

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Table 1.

Demographic and other sample characteristics of participants (individual level factors) and dyadic differences in characteristics (relationship level factors) among same-sex male couples (N = 320).

Demographic and Other Sample Characteristics		
	N	%
Age Group		
18-24	46	14.4%
25-34	126	39.4%
35-44	69	21.6%
45+	79	24.7%
Race/ethnicity		
White (Latino & non-Latino)	248	77.5%
Black/African American (Latino & non-Latino)	39	12.2%
Multiracial/Other (Latino & non-Latino)	33	10.3%
Sexual Orientation		
Homosexual/gay	287	89.7%
Other	33	10.3%
HIV Status		
HIV Negative	270	84.4%
HIV Positive	50	15.6%
Employment status		
Employed/student	284	88.8%
Unemployed/retired	36	11.2%
Education level		
High school or less	24	7.5%
Some college	77	24.1%
College or higher	219	68.4%
Arrest history		
Ever arrested	87	27.2%
Never arrested	233	72.8%
Internalized homophobia		

Demographic and Other Sample Characteristics		
	N	%
80 th percentile (yes)	66	20.6%
< 80 th percentile (no)	254	79.4%
Polydrug use*		
Yes (3 drugs used, past year)	58	18.1%
No (< 3 drugs used, past year)	262	81.9%
Binge drinking		
Yes (6 drinks on one occasion, at least monthly)	71	22.2%
No (< 6 drinks on one occasion, at least monthly)	249	77.8%
Relationship length		
Less than 1 year	82	25.6%
1 year	53	16.6%
2 years	48	15.0%
3-5 years	57	17.8%
6-9 years	35	10.9%
10+ years	45	14.1%
Cohabiting		
Yes	276	86.3%
No	44	13.7%
Sexual agreement type		
No sex with outside partners	118	36.9%
Sex with outside partners (with restrictions)	120	37.5%
Sex with outside partners (no restrictions)	14	4.4%
No agreement	68	21.2%
	Mean (range)	SD
Clinically significant depressive symptom	5.2 (0, 21)	4.4
Dyadic Differences		
	N	%

Demographic and Other Sample Characteristics	
	%
Age (based on age groups above)	
Same age group	194 60.6%
Different age group	126 39.4%
Race/ethnicity (based on the race/ethnicity groups above)	
Interracial dyad (both partners in a different group)	230 71.9%
Non-interracial dyad (both partners in the same group)	90 28.1%
HIV serostatus	
Seroconcordant (both HIV+ or both HIV-)	220 68.8%
Serodiscordant (one is HIV+ and one is HIV-)	100 31.2%
Sexual orientation	
Concordant orientations	268 83.8%
Discordant orientations	52 16.2%
Employment status	
Same employment status	260 81.3%
Discordant employment status	60 18.7%
Education level (based on education groups above)	
Same education level	118 36.8%
Different education levels	202 63.2%
Arrest history (ever)	
Neither arrested	178 55.6%
Both arrested	32 10.0%
Discordant arrest history	110 34.4%
Sexual agreement (based on sexual agreement groups above)	
Concordant sexual agreement	204 63.7%
Discordant sexual agreement	116 36.3%
Internalized homophobia	
Both above 80 th percentile	28 8.7%
Neither above 80 th percentile	216 67.5%
Discordant internalized homophobia	76 23.8%

Demographic and Other Sample Characteristics	
	%
	N
Clinically significant depressive symptoms	
Both have symptoms of clinical depression	18 5.6%
Neither have symptoms of clinical depression	182 56.9%
Discordant symptoms of clinical depression	120 37.5%
Polydrug use	
Neither polydrug use	230 71.9%
Both polydrug use	26 8.1%
Discordant polydrug use	64 20.0%
Binge drinking	
Neither binge drinking	148 46.3%
Both binge drinking	76 23.7%
Discordant binge drinking	96 30.0%

Table 2.

Average relationship quality scores among same-sex male couples (N = 320)

Relationship Quality Scales	Mean (range)	SD
Intimate partner violence Scale (past year)		
Physical/Sexual IPV	.10 (0, 1)	.30
Emotional IPV	.34 (0, 1)	.47
Controlling IPV	.07 (0, 1)	.25
Monitoring IPV	.20 (0, 1)	.40
Any form IPV	.36 (0, 1)	.48
Happiness scale *	4.94 (1, 7)	1.50
Love scale *	75.66 (0, 95)	14.70
Trust scale *	33.46 (0, 40)	5.80
Communications patterns scale *	35.08 (0, 45)	6.61
Conflict style inventory		
Avoiding	20.63 (6, 30)	5.23
Accommodating	15.95 (3, 30)	4.58
Contending	17.80 (6, 28)	4.62
Compromising	21.06 (10, 30)	3.98
Collaborating	24.07 (6, 30)	4.0
Total conflict style inventory score	90.37 (0, 137)	22.80
Communal coping scale		
Communication	28.73 (0, 35)	7.52
Joint effort	26.37 (0, 35)	7.70
Planning and decision-making	28.72 (0, 35)	6.92
Total communal coping score	82.35 (0, 105)	24.07
Dyadic adjustment scale *	79.10 (0, 98)	19.04

* Higher scores = the latent construct for the given scale is in greater magnitude (e.g., higher scores on the happiness scale = increased happiness).

Multinomial logistic regression analysis of polydrug use in relation to individual- and relationship-level factors among same-sex male couples (N = 320).

Table 3.

Characteristics and key covariates	Both use RRR, SE (95% CI)	Respondent uses; not partner RRR, SE (95% CI)	Partner uses; not respondent RRR, SE (95% CI)
Age			
Respondent's age	1.0, .03 (.94, 1.06)	.99, .03 (.93, 1.05)	.97, .03 (.92, 1.03)
Respondent is older than partner	.11, .1 (.02, .7) *	1.78, .97 (.61, 5.16)	.44, .35 (.09, 2.09)
Partner is older than respondent	.13, .13 (.02, .85) *	.3, .25 (.06, 1.51)	1.9, 1.03 (.66, 5.5)
Race/ethnicity			
Black/African American	.34, .41 (.03, 3.65)	.16, .17 (.02, 1.23)	.38, .38 (.06, 2.67)
Multiracial/other	.85, .85 (.12, 6.02)	.3, .27 (.05, 1.75)	4.17, 3.3 (.88, 19.64)
Interracial dyad	1.76, 1.31 (.41, 7.54)	6.16, 3.8 (1.84, 20.64) **	1.71, 1.11 (.48, 6.07)
Sexual orientation			
Discordant orientation	.48, .43 (.08, 2.76)	.77, .53 (.2, 2.99)	.69, .45 (.19, 2.5)
Highest education level			
Some college	5.46, 6.38 (.55, 53.99)	1.69, 1.87 (.19, 14.71)	4.81, 1.21 (2.6, 6.83)
College or higher	2.5, 2.99 (.24, 26.02)	1.36, 1.41 (.18, 10.43)	6.81, 1.43 (1.91, 10.21)
Employment status			
Unemployed	.61, .56 (.1, 3.7)	-	.08, .11 (.01, 1.19)
Arrest history			
Ever arrested	4.86, 2.82 (1.56, 15.13) **	2.33, 1.31 (.77, 7.03)	.71, .45 (.21, 2.45)
HIV Status			
Respondent only is positive	4.77, 3.66 (1.06, 21.43) *	2.63, 1.95 (.62, 1.121)	.91, .93 (.12, 6.79)
Partner only is positive	3.89, 2.83 (.94, 16.18)	.27, .28 (.04, 2.09)	3.16, 1.88 (.98, 10.14)
Clinically significant depressive symptoms			
	1.08, .07 (.95, 1.22)	1.1, .07 (.97, 1.24)	1.16, .07 (1.04, 1.3) **
Internalized homophobia			
	.97, .03 (.91, 1.04)	.9, .03 (.83, .97) **	.98, .03 (.93, 1.03)
Sexual agreement type			
Sex with outside partners (no restrictions)	1.16, 1.5 (.09, 14.74)	1.21, 1.39 (.13, 11.57)	.5, .71 (.03, 7.92)
Sex with outside partners (with restrictions)	1.78, 1.09 (.54, 5.91)	.51, .3 (.16, 1.62)	.54, .31 (.18, 1.68)
No agreement	.6, .5 (.12, 3.03)	.04, .05 (.01, .35) **	.69, .44 (.2, 2.41)

Characteristics and key covariates	Both use RRR, SE (95% CI)	Respondent uses; not partner RRR, SE (95% CI)	Partner uses; not respondent RRR, SE (95% CI)
Agreement type (dyadic descriptions)			
Discordant agreement description	.45, .28 (.14, 1.51)	1.38, .73 (.49, 3.88)	1.22, .62 (.45, 3.29)
Cohabiting			
Currently cohabitating	1.78, 1.51 (.34, 9.34)	.59, .45 (.13, 2.63)	1.99, 1.35 (.52, 7.54)
Relationship length			
1-2 years	1.11, .84 (.25, 4.85)	.54, .41 (.12, 2.41)	.4, .28 (.1, 1.57)
3-5 years	1.02, .87 (.19, 5.47)	1.17, 1.07 (.19, 7.02)	.33, .28 (.06, 1.72)
6+ years	.1, .11 (.01, .84)*	.9, .79 (.16, 12.67)	.99, .81 (.2, 4.95)
Love scale			
Respondent reports higher love	1.65, 2.05 (.14, 18.81)	1.44, 1.6 (.16, 12.67)	2.71, 2.99 (.31, 23.58)
Partner reports higher love	1.63, 1.99 (.15, 17.86)	3.03, 3.49 (.32, 28.96)	.74, .77 (.09, 5.7)
Trust scale			
Respondent trusts more	.27, .28 (.03, 2.11)	5.71, 7.49 (.44, 74.75)	1.22, 1.52 (.11, 14.04)
Partner trusts more	.29, .3 (.04, 2.17)	2.41, 3.16 (.18, 31.54)	3.33, 4.07 (.3, 36.53)
Communication patterns scale			
Respondent scores higher	-	4.88, 5.68 (.5, 47.75)	1.93, 2.24 (.2, 18.78)
Partner scores higher	-	1.86, 2.2 (.18, 18.81)	4.9, 5.57 (.53, 45.47)
Dyadic Adjustment Scale			
Difference of scores (respondent-partner)	1, .01 (.98, 1.02)	.99, .01 (.97, 1.01)	1.01, .01 (1, 1.03)
Intimate partner violence			
Respondent experiences	.45, .61 (.03, 6.39)	2.13, 1.84 (.39, 11.61)	.98, .86 (.17, 5.52)
Respondent perpetrator	1.16, .79 (.31, 6.39)	1.07, .68 (.31, 3.69)	.4, .3 (.09, 1.77)
Respondent both victim & perpetrator	2.7, 1.86 (.7, 10.43)	1.82, 1.19 (.51, 6.56)	1.75, .98 (.59, 5.23)

*
p .05;

**
p .01;

p .001

Multinomial logistic regression analysis of binge drinking in relation to individual- and relationship-level factors among same-sex male couples (N = 320).

Table 4.

Characteristics and key covariates	Both use RRR, SE (95% CI)	Respondent uses; not partner RRR, SE (95% CI)	Partner uses; not respondent RRR, SE (95% CI)
Age			
Respondent's age	1.01, .02 (.98, 1.05)	.93, .02 (.88, .98)**	.95, .02 (.90, .99)*
Respondent is older than partner	.76, .32 (.33, 1.74)	1.71, .88 (.62, 4.69)	1.61, .79 (.62, 4.19)
Partner is older than respondent	.90, .39 (.39, 2.09)	.89, .43 (.36, 2.46)	9.7, .48 (.37, 2.58)
Race/ethnicity			
Black/African American	1.51, .80 (.53, 4.28)	1.29, .82 (.37, 4.47)	.57, .41 (.14, 2.31)
Multiracial/other	1.37, .81 (.43, 4.37)	.17, .16 (.02, 1.12)	1.66, 1.23 (.39, 7.12)
In an interracial dyad	1.5, .64 (.66, 3.50)	1.11, .55 (.42, 2.93)	.66, .36 (.23, 1.93)
Sexual orientation			
Discordant orientation	.42, .20 (.16, 1.07)	.82, .44 (.29, 2.36)	.95, .49 (.34, 2.61)
Highest education level			
Some college	2.46, 1.95 (.52, 11.63)	.30, .26 (.05, 1.68)	1.21, 1.02 (.23, 6.26)
College or higher	2.39, 1.84 (.53, 10.83)	.75, .60 (.16, 3.60)	1.37, 1.08 (.29, 6.40)
Employment status			
Unemployed	1.50, .74 (.58, 3.92)	.31, .25 (.06, 1.56)	.95, .63 (.26, 3.47)
Arrest history			
Ever arrested	.87, .33 (.41, 1.82)	2.68, 1.25 (1.08, 6.70)*	.62, .30 (.24, 1.64)
HIV Status			
Respondent only is positive	3.94, 1.91 (1.52, 10.22)**	1.77, 1.16 (.48, 6.43)	2.85, 1.95 (.75, 10.87)
Partner only is positive	2.68, 1.17 (1.14, 6.31)*	1.55, .99 (.44, 5.43)	1.92, 1.09 (.64, 5.82)
Clinically significant depressive symptoms			
Internalized homophobia	1.00, .04 (.92, 1.08)	.95, .05 (.85, 1.05)	1.01, .05 (.91, 1.11)
Sexual agreement type			
Sex with outside partners (no restrictions)	.96, .02 (.92, 1.00)*	.98, .02 (.93, 1.02)	1.01, .02 (.96, 1.05)
Sex with outside partners (with restrictions)	.69, .48 (.17, 2.73)	.67, .83 (.06, 7.46)	--
No agreement	.72, .28 (.34, 1.56)	1.39, .65 (.55, 3.49)	.95, .43 (.39, 2.32)
	.52, .24 (.21, 1.30)	.77, .43 (.25, 2.33)	.99, .52 (.35, 2.79)

Characteristics and key covariates	Both use RRR, SE (95% CI)	Respondent uses; not partner RRR, SE (95% CI)	Partner uses; not respondent RRR, SE (95% CI)
Agreement type (dyadic descriptions)			
Discordant agreement description	1.92, .66 (.98, 3.78)	1.31, .56 (.57, 3.05)	1.26, .53 (.55, 2.87)
Cohabiting			
Currently cohabitating	.55, .26 (.21, 1.41)	.90, .53 (.28, 2.85)	.62, .34 (.21, 1.82)
Relationship length			
1-2 years	1.30, .64 (.50, 3.40)	.60, .36 (.19, 2.00)	.99, .55 (.33, 2.95)
3-5 years	2.03, 1.18 (.65, 6.36)	1.42, .98 (.37, 5.51)	1.23, .87 (.31, 4.95)
6+ years	1.00, 6.0 (.30, 3.27)	2.08, 1.47 (.52, 8.34)	2.34, 1.60 (.61, 8.94)
Love scale			
Respondent reports higher love	1.94, 1.30 (.52, 7.25)	9.02, 10.79 (.87, 93.92)	3.85, 0.75 (1.24, 5.46)*
Partner reports higher love	1.75, 1.18 (.47, 6.5)	11.25, 13.40 (1.09, 116.11)	8.55, 10.59 (.75, 96.87)
Trust scale			
Respondent trusts more	.66, .43 (.19, 2.34)	.91, .71 (.20, 4.15)	.31, .24 (.07, 1.39)
Partner trusts more	.69, .44 (.20, 2.40)	.30, .23 (.07, 1.39)	.82, .60 (.19, 3.42)
Communication patterns scale			
Respondent scores higher	.57, .36 (.16, 2.0)	.47, .35 (.10, 2.08)	1.22, .91 (.28, 5.28)
Partner scores higher	.53, .34 (.15, 1.87)	.71, .54 (.16, 3.13)	.80, .60 (.18, 3.51)
Dyadic Adjustment Scale			
Respondent scores higher	2.02, 2.11 (.26, 15.67)	.22, .23 (.03, 1.66)	.25, .25 (.03, 1.77)
Partner scores higher	3.20, 3.37 (.41, 25.16)	.34, .35 (.05, 2.52)	.33, .33 (.05, 2.29)
Intimate partner violence			
Respondent experiences	1.45, .82 (.48, 4.40)	.13, .16 (.01, 1.31)	2.22, 1.45 (.62, 7.96)
Respondent perpetrator	.68, .30 (.28, 1.61)	.68, .36 (.24, 1.92)	.40, .25 (.11, 1.37)
Respondent both victim & perpetrator	1.58, .68 (.68, 3.67)	1.36, .65 (.54, 3.47)	1.91, .91 (.75, 4.88)

*
p .05;**
p .01;***
p .001