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Social Network Composition and Sexual Risk-Taking among Gay and Bisexual Men in Atlanta, GA

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Abstract

Social network composition is known to effect patterns of reported sexual risk-taking among men who have sex with men (MSM); however, consensus as to the directionality and size of these effects is lacking. We examined the relationships between novel aspects of social network composition and sexual risk-taking using a cross-sectional survey of 870 MSM. Social network composition was found to have mixed effects on reported sexual risk-taking: reporting proportionally more LGB-identified friends and reporting friends who were on average significantly older than the respondent were both associated with reporting *increased* sexual risk, while reporting proportionally more LGB-identified friends in relationships and reporting a social network proportionally more aware of the respondent's homosexuality/bisexuality were both associated with reporting *decreased* sexual risk. The support structures created by differing social network compositions – and particularly the presence of LGB couples -- may be a potential area for targeting sexual risk-reduction interventions for MSM.

Background

From 2005 to 2009, HIV diagnoses increased 17% among men who have sex with men (MSM) in the U.S., cementing their status as the only risk group in the U.S. with increasing HIV incidence [1]. In 2010, MSM represented 78% of all new HIV infections among men in the U.S. [2]. Efforts to prevent the spread of the HIV epidemic in this population have focused on encouraging consistent condom use [3–5], testing for HIV regularly [6], avoiding sex while drunk or high [7, 8], and other individual-level behaviors that may shape risk for HIV infection [9–12]. However, emerging evidence shows the importance that influences beyond the individual level, such as peer group characteristics, may have on the factors influencing risk for HIV infection in MSM. For example, researchers have shown that social isolation, loneliness, and a lack of social support are significant risk factors for sexual risk-taking among MSM [13–16], but little research has focused on how the composition of their social networks shape sexual risk-taking. Additionally, studies have shown that gay/bisexual-identified men, largely due to their desire to avoid heterosexist stigma, experience barriers to social support from their families and peers that their heterosexual counterparts do not face [17–21].

The particular features of social networks are important to consider. They may influence MSM's sexual behaviors through several mechanisms, such as by creating constraints against risky sexual behavior, providing access to social support, modeling positive or negative sexual health behaviors, and/or increasing feelings of acceptance. Several studies have suggested that the types of social networks held by gay men influence their sexual risk-taking [22–27]; however, the directionality and magnitude of these influences are varied in the literature. Gay men whose social networks contain individuals with perceived or actual greater sexual risk-taking are themselves more likely to partake in high-risk behaviors [24, 25], while positive perceptions of peer's condom norms have been shown to positively influence condom use behavior among MSM [26, 28–31]. Increasing social support has been shown to be correlated with stronger condom norms and reduced unprotected anal intercourse among MSM living with HIV [32], whereas African-American gay men are more likely to engage in unprotected anal sex if they report receiving less social support from family and friends [33].

In cases in which social networks are comprised primarily of other gay and bisexual men, social networks may shape sexual risk by providing more opportunities for sexual partnering. For example, an overlap of an individual's social and sexual networks has shown to be a risk factor for HIV and STIs among MSM [23]. However, a notable study by Smith et al. (2004) found mixed effects of social network size and density on sexual-risk taking: while increasing network size was correlated with more oral sex partners, increasing network density was correlated with both fewer oral sex partners *and* more anal sex partners, suggesting that large, dense social networks may be strongly correlated to sexual risk-taking [24]. Alternatively, when there is less overlap between an MSM's social and sexual networks, networks that provide more forms of social support, greater access to resources, and positive role models may be protective of sexual risk-taking [32, 34].

The literature is further in dispute as to whether or not there is an association between increased involvement in the gay community and sexual risk-taking among MSM. Various researchers working in comparable populations have found evidence indicating that increased involvement in the gay community is not correlated with sexual risk-taking [35], increases sexual risk-taking [36, 37], and decreases sexual risk-taking: [38, 39]. Recently, a neighborhood-level analysis by Frye and colleagues (2010) demonstrated a correlation between an increasingly gay-friendly neighborhood environment and consistent condom use during anal sex [27], while Kelly et al. (2012) failed to replicate this neighborhood-level finding and found that MSM with predominately gay networks were more likely to engage in unprotected anal intercourse [34]. An increasingly homogenous social network may be advantageous to gay men's sexual health, however, in that having more openly gay friends has been shown to reduce feelings of isolation and depression [40, 41], provides access to information and services [42], increases the potential for association with positive role models of sexual risk-reduction [43], and reduces the impact of minority stress on health [40]. Public health interventionists, too, have begun to consider social network effects. Social network interventions have already been shown to have some positive effect in reducing the high-risk practices of unprotected anal intercourse and anal intercourse with

multiple concurrent partners [44, 45], though network-level interventions are few in number and relatively novel.

Much of this evidence regarding the impact of MSM's social networks on sexual risk behavior has been synthesized into the Network-Individual Resource (NIR) model of HIV risk reduction theorized by Johnson, Redding, DiClemente, Mustanski, et al. (2010) [46]. The NIR model postulates that although networks provide the interpersonal sexual connections through which HIV is often transmitted, the interplay of the individual-, intimate dyad-, community- and societal-level networks can act benevolently to reduce sexual risk-taking and therefore risk for HIV seroconversion. In particular, the NIR highlights the importance of social support as received from the dyad level (in addition to the social network level) as critical to HIV risk reduction. Empirically, an increasing body of scientific research demonstrates that same-sex relationships, particularly same-sex relationships that have been afforded legal recognition in the form of marriage, provide both mental and physical health benefits to LGB persons in same-sex relationships [47–51]. Same-sex partnerships appear to “buffer” minority stress processes [52]; in other words, although LGB persons in same-sex partnerships necessarily experience minority stressors in the forms of homophobia and heteronormativity, these effects are ameliorated through the social support the partnership provides. However, little empirical research has focused on all of these components simultaneously.

In this study, we use a cross-sectional survey to examine how the composition of social networks of gay and bisexual men who live in Atlanta, GA are associated with their reported sexual risk-taking. We hypothesized that sexual risk taking is influenced by both surface characteristics of a respondent's social network, such as its racial and age makeup, in addition to as-of-yet unexamined social network composition variables such as what proportion of the network is aware of the respondent's homosexuality or bisexuality. We hypothesize that individuals with networks that contain more openly gay people who share similar characteristics to themselves are less likely to feel isolated, and thus, less likely to engage in high-risk sexual activity. The analysis framework also includes the novel variable of the relationship status of those in the social network, hypothesizing that social networks comprising members who are in relationships provide more validity for gay relationships, thus lowering the potential for stress and sexual risk. Understanding the composition of social networks of gay and bisexual men could reveal new areas for intervention to reduce sexual risk-taking behaviors.

Methods

This study was approved by Emory University's Institutional Review Board. Between September – December 2011, participants were recruited into the study using venue-based sampling [53]. Venue-based sampling is a derivative of time-space sampling, in which sampling occurs within prescribed blocks of time at particular venues. In order to reach a diverse population of gay and bisexual men in the Atlanta area, the venue sampling frame used for this study consisted of a wide variety of gay-themed or gay-friendly venues within the Atlanta Metro area, including Gay Pride events, gay fundraising events, downtown areas, gay bars, bathhouses, an AIDS service organization, an MSM-targeted drop-in center,

gay bookstores, restaurants, and urban parks. The sampling frame used in this study contained over 160 venue-time units, and was updated monthly as venues closed or as new venues became available. A randomized computer program assigned venue-time units monthly, with at least one recruitment event per day.

During recruitment, two or more study recruiters wearing study t-shirts stood adjacent to the venue during the time period prescribed by the computer program. Recruiters then drew an imaginary line on the ground and then approached every n th man who crossed it; n varied between one and three depending on the volume of traffic at the venue. After introducing themselves, the recruiter would ask if the man was interested in seeing if he was eligible for a research study at Emory University. If he agreed to be screened, he was then asked a series of eight questions to assess his eligibility, including his sexual orientation, recent sex with a man, race, age, and residence in the Atlanta Metro Area. Responses for all persons were recorded on palm-held computers, including whether or not a person agreed to be screened for eligibility. Eligible men were then read a short script that described the study process: a web-based survey approximately 20 minutes in length that could be completed at home, or, in the case of five venues (the AIDS service organization, the drop-in center, Atlanta Pride, In the Life Pride, and a National Coming Out Day event), at the venue itself on a tablet computer. Men interested in study participation were then given a card with a web address and a unique identifier that would link their recruitment data to their survey data. Participants who completed the survey at the venue were compensated with a gift card; participants who completed the survey at home were compensated with the same value of gift card that was sent to them electronically.

The self-administered, web-based survey contained several domains of questions regarding demographics, recent sexual behavior with male partners, intimate partner violence (IPV) [54], couples coping and communication [55], social network composition, and minority stress (e.g., internalized homophobia [56]).

Measurements

Social Network Composition

Respondents were asked to first think of their five “closest friends,” that is, people they spoke to at least once per month, and assign non-identifying code names to these people. For each of these persons, the respondent was asked to characterize his relationship to that person (friend with whom he does not have sex, friend with whom he does have sex, family member, work colleague, or other), his/her age, gender, race/ethnicity, sexual orientation, relationship status, and whether or not the person knew the respondent identified as gay/bisexual. These data were collected only for as many friends as the respondent named [57]. From these data, several descriptive variables of a respondent’s networks were created, all considering the size of the network described: difference in respondent’s age and mean network age, proportion of network the same race as the respondent, proportion of respondent’s network that was lesbian-, gay-, or bisexual-identified, proportion of ratio aware of respondent’s sexuality, proportion of network comprised of LGB persons in relationships, and proportion of network comprised of non-LGB persons in relationships.

Sexual risk-taking

Three sexual risk-taking outcomes were measured through three questions: reporting having had sex while high in the past three months, reporting having had sex while drunk in the past three months, and number of male anal sex partners in the previous six months. These outcomes represented both direct forms of risk-taking (i.e., number of partners) [58] and indirect forms of risk-taking (i.e., having sex while high and having sex while drunk) [59–61].

Analysis

Differences in outcomes across group strata were assessed using chi-square and ANOVA testing at the $\alpha=0.05$ level. Three regression models were fitted using backwards stepwise elimination: (1) number of reported male anal sex partners in the previous six months (Poisson regression), (2) reporting having had sex while high in the previous three months (logistic regression), and (3) reporting having had sex while drunk in the previous three months (logistic regression). Backwards stepwise elimination was chosen as the study objective was to determine which social network characteristics impact which forms of sexual risk-taking. All models controlled for age (18–24, 25–34, 35–44, >44), race/ethnicity (white non-Hispanic, Black non-Hispanic, Hispanic/Latino/Other), education (completed or did not complete high school, some college or 2-year degree, college or more), employment (unemployed or employed either part- or full-time), HIV status (negative, positive, or never tested/unknown), sexual orientation (gay or bisexual), a dichotomous variable representing a respondent's complete (1) or incomplete (0) openness about his sexuality to his family, friends, and colleagues ("closetedness"), and whether or not the respondent reported having a main partner ("someone you feel committed to above all others...you might call this person a boyfriend, life partner, husband, or significant other"). Covariates considered included network proportions of LGB friends, LBG friends currently in relationships, non-LGB friends in relationships, network members racially different from respondent, network members of friends aware of respondent's homosexuality or bisexuality, and the difference between the respondent's age and mean network age.

Results

Of 4,903 men approached, 2,936 (59.9%) agreed to be screened for the study. Of these, 2,093 (71.3%) were eligible for study participation. Men were eligible for study participation if they reported being 18 years of age or older, being male, identifying as gay/homosexual or bisexual, living in the Atlanta Metro Area, and having had sex with a man in the previous six months. Of eligible participants, 1,965 (93.9%) were interested in study participation. A total of 1,075 men completed the survey; thus 21.9% of men approached and 51.4% of eligible men completed the survey. Approximately one-third (33.7%) completed the survey at a venue, while the remaining two-thirds (66.3%) of respondents completed the survey at home. A total of 870 men had complete data for all covariates of interest and were included in this analysis.

Demographic characteristics of the sample are summarized in Table 1. The sample was predominately young (51.8% under 35 years old), employed (78.7%), gay/homosexual-

identified (90.6%), and white non-Hispanic (59.7%). The majority of the sample reported some form of post-high school education (84.4%), and nearly one-third of the sample reported positive or unknown HIV status (29.9%). The sample was demographically similar to similarly recruited samples of MSM in the Atlanta area [62], especially in regards to the high reported HIV prevalence; however, this prevalence was significantly higher than the latest available National HIV Behavioral Surveillance System data from 2008 [63]. While nearly all respondents (97.1%) reported that someone other than their male sex partners was aware of their sexual orientation, 18.4% reported that their sexuality was hidden from either their family, friends, and/or work colleagues.

Network characteristics are summarized in Table 2. A majority (81.2%) of respondents provided information about five friends. In general, networks were racially similar to the respondent (79%, SD: 31%) and were aware of the respondent's homo- or bisexuality (97%, SD: 12%). While the mean LGB network ratio was 0.72 (SD: 0.32), a smaller proportion of an average network was characterized as comprising LGB persons in relationships (0.27 [SD: 0.27]). However, the average network ratio of LGB persons in relationships was higher than the average network ratio of non-LGB persons in relationships (0.15, SD: 0.22); in other words, respondent's social networks were on average comprised of more LGB-identified persons in relationships than non-LGB-identified persons in relationships.

Differences in outcomes by individual-level exposure strata and results of bivariate chi-square/ANOVA testing are summarized in Table 3. The mean reported number of anal sex partners in the past six months was 3.3 (SD: 5.3). Men who reported positive HIV status reported more anal sex partners within the past six months compared to men of reported negative or unknown HIV statuses ($F: 5.47, p < 0.0044$). Respondents who reported being open about their sexuality to their friends, families, and colleagues reported fewer anal sex partners in the previous six months (3.0, SD: 4.2) compared to respondents who reported not being open to one or more of these groups (4.8, SD: 9.1) ($F: 11.16, p < 0.0009$); however, reporting of either having sex while high or having sex while drunk did not vary by openness about sexuality. Overall, more respondents reported having sex while drunk in the past three months (46.0%) than reported having had sex while high in the past three months (19.3%). Increasing age was significantly associated with decreased reporting of having sex while drunk ($\chi^2: 15.3533, p < 0.002$), while increasing education level was significantly associated with decreased reporting of having sex while high ($\chi^2: 12.8441, p < 0.002$).

Little significant variation was found when comparing outcomes across crude network composition variables (Table 4). Number of reported anal sex partners in the past six months varied bimodally by number of partnered, non-LGB-identified network members ($F: 3.56, p < 0.0034$), with respondents with either zero partnered non-LGB network members or five partnered non-LGB network members reporting the most anal sex partners (mean 3.9 and 6.8, respectively).

The results of the backwards stepwise elimination regression are summarized in Table 5. Increasing age was associated with decreased odds of both having sex while high and having sex while drunk; for example, men aged >44 had odds of reporting having sex while drunk that were 0.25 (95% CI: 0.15, 0.43) times the odds of men aged 18–24. Increasing education

level was also correlated to reduced odds of reporting having sex while high (OR: 0.57, 95% CI: 0.35, 0.93) and reporting having sex while drunk (OR: 0.25, 95% CI: 0.15, 0.43). Non-white men were also significantly less likely to report recently having sex while drunk; however, reporting having sex while high was not significantly correlated with race/ethnicity. Compared to men who reported negative HIV status, men who reported positive HIV status reported significantly more anal sex partners within the past six months (β : 0.32, 95% CI: 0.23, 0.41) and were significantly more likely to report having had sex while high in the past three months (OR: 2.72, 95% CI: 1.80, 4.13).

Different social network variables were found to have different correlations to recent risky sexual behavior; two were found to have an association with number of reported anal sex partners in the past six months. While an increasing proportion of LGB persons in a respondent's social network was correlated to an *increased* number of reported anal sex partners in the past six months (β : 0.43, 95% CI: 0.29, 0.57), an increasing proportion of LGB social network members in relationships was correlated with a *decreased* number of reported anal sex partners in the past six months. (β : -0.39, 95% CI: -0.55, -0.24). Similarly, as the proportion of social network members aware of the respondent's homosexuality or bisexuality increased, the odds of reporting having had sex while high in the past three months decreased (OR: 0.20, 95% CI: 0.06, 0.74). Only one network variable was found to have significant associations with reporting recently having sex while drunk: odds of reporting having sex while drunk in the past three months increased as the difference between a respondent's age and his social network's mean age increased (OR: 1.04, 95% CI: 1.02, 1.07).

Discussion

These results mirror previous studies that have shown associations between social network composition and sexual risk-taking among MSM while clarifying the various specific social networks compositions that may impact sexual risk. Specifically, results provide what can be described as among the first empirical support for the Network-Individual Resource (NIR) model of HIV risk reduction. . For example, while study participants who reported social networks comprised of more LGB-identified persons reported significantly more anal sex partners in the previous six months (confirming findings by other researchers [23, 24, 27]), MSM who associated with proportionally more LGB persons in relationships reported significantly fewer anal sex partners in the same time period. Similarly, respondents whose networks included proportionally more persons aware of the respondent's homosexuality or bisexuality reported having sex while high less frequently. Thus, it is clear that associations between social network composition and sexual risk-taking among MSM are more complex than the literature currently suggests. While certain social network compositions may indeed increase HIV risk behavior (e.g., by an increased number of potential sex partners), other network compositions may reduce HIV risk by creating a social space of positive role modeling and mutual support. For example, the finding that respondents who were more open to their social networks about their sexuality had significantly reduced odds of recent sex while high suggests that LGB-affirming networks may provide social support for sexual risk-reduction.

The results draw attention to the possibility of using social networks and/or specific components of social networks to promote sexual risk-reduction among MSM. Social network interventions have already been shown to have some positive effect in reducing the high-risk practices of unprotected anal intercourse and anal intercourse with multiple concurrent partners [44, 45]. Programs such as Mpowerment [45, 64], a community-based action research project that engaged young MSM's social networks in outreach and education, further demonstrate the feasibility of such network-based, public health interventions. Group-level interventions have been shown to be effective in increasing condom use among MSM and may be more cost-effective than individual-level interventions [65], particularly as individual-level condom use norms have been shown to a poor indicator of future sexual risk-taking in the form of unprotected anal intercourse [66].

Specifically, LGB couples within social networks appear to play a pivotal role in providing social support and/or models of sexual risk-reduction. The finding that respondents with proportionally more LGB-identified persons in couples reported significantly fewer anal sex partners within the past six months, even when controlling for whether or not the respondent was currently in a primary partnership, suggests that the benefits of same-sex partnerships may transfer through social networks by providing models of sexual risk-reduction and/or buffering the respondent himself against minority stressors, although future research should attempt to determine by what exact mechanisms such benefits are transferred through networks.

Limitations

This study has several limitations, mainly stemming from its methodology. Although venue-based sampling has been shown to produce samples similar to other methods of recruitment [53], gay and bisexual men are nonetheless a difficult-to-reach population, and gay and bisexual men who did not access gay-themed or gay-friendly locations during the sampling time frame would necessarily have been excluded from the sample. Additionally, the cross-sectional design of this study means that causality cannot be inferred. As such, it remains unknown whether social networks produce these documented effects on sexual risk-taking or if persons with particular sexual norms form naturally protective social networks. Furthermore, social networks are likely dynamic entities; although recent recall periods were used, it is possible that social networks may shift with or against revised sexual risk-reduction strategies. Due to power limitations, we were unable to assess differences in sexual risk-taking depending on whether the network described by each respondent comprised members with whom he also had sex. Furthermore, the measurements of recent sexual risk-taking used are proxy measures that do not directly quantify the level of HIV/STI risk an individual respondent was subject to. Additionally, in order to obtain more in-depth data about each of the respondent's social network members, responses were limited to five persons within the social networks, preventing comparisons of overall social network sizes or densities.

Conclusion

This findings of this study help to clarify the varied relationships between social network composition and MSM's sexual risk-taking documented in the literature. While reporting a network with proportionally more LGB persons was indeed associated with reporting more recent anal sex partners, reporting a network comprised of LGB persons in relationships was simultaneously associated with reporting fewer recent anal sex partners, suggesting that the presence of same-sex partnerships in social networks may confer risk-reduction benefits to gay and bisexual men. Future research should focus on the ways in which same-sex partnerships confer these risk-reduction benefits in order to inform programmatic efforts that can harness these positive effects. Furthermore, public health interventionists should consider the unique impact that social networks have on gay and bisexual men's sexual risk-taking, for example, considering the effectiveness of interventions that link gay and bisexual men without partners to partnered gay and bisexual men as examples of sexual negotiation and risk reduction.

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Table 1

Sample characteristics (n=870)

	n	%
Age		
18 – 24	175	20.1
25 – 34	276	31.7
35 – 44	232	26.7
45+	187	21.5
Race		
White non-Hispanic	432	59.7
Black/African-American non-Hispanic	325	37.4
Latino/Hispanic/Other	113	13.0
Employed		
Yes	685	78.7
No	185	21.3
Education		
High School or less	144	16.6
Some College/2-year Degree	287	33.0
College or Higher	439	50.5
HIV Status		
Negative	610	70.1
Positive	200	23.0
Unknown	60	6.9
Sexual Orientation		
Gay/Homosexual	788	90.6
Bisexual	82	9.4
Entirely Open about Sexuality		
Yes	710	81.2
No	160	18.4
TOTAL	870	100

Table 2

Mean social network Characteristics (n=870)

	Mean (SD)
Number of network members reported	4.48 (1.17)
Number of LGB network members	3.14 (1.54)
Number of LGB persons in relationships	1.20 (1.12)
Number of non-LGB persons in relationships	0.69 (1.03)
Number of network members same race as respondent	3.53 (1.64)
Number of network members aware of respondent's sexuality	0.66 (1.25)
Network mean age difference	0.11 (6.67)

Table 3

Demographic exposures by outcome and results of chi-square and/or ANOVA testing.

	Number anal sex Partners mean (SD)	High Sex % (n)	Drunk Sex % (n)
Age Test statistic, p-value	0.29, 0.8337	4.4368, 0.218	15.3533, 0.002
18–24	3.4 (4.3)	24.6 (43)	51.4 (90)*
25–34	3.3 (4.6)	16.7 (46)	50.0 (138)*
35–44	3.5 (6.1)	18.5 (43)	47.0 (109)*
45+	3.0 (6.1)	19.3 (36)	33.7 (63)*
Race Test statistic, p-value	1.13, 0.3229	4.2858, 0.117	8.1307, 0.017
White	3.0 (5.2)	18.3 (79)	50.5 (218)*
Black	3.6 (5.7)	22.5 (73)	43.1 (140)*
Latino/Other	3.4 (4.7)	14.2 (16)	37.8 (42)*
Employed Test statistic, p-value	1.38, 0.2406	3.0177, 0.082	1.7945, 0.180
Yes	3.2 (5.2)	18.1 (124)	47.2 (323)
No	3.7 (5.8)	23.8 (44)	41.6 (77)
Education Test statistic, p-value	0.36, 0.7002	12.8441, 0.002	5.2739, 0.072
HS/Less	3.1 (5.1)	28.5 (41)*	53.5 (77)
Some College/2-year	3.5 (5.1)	20.9 (60)*	41.8 (120)
College/+	3.2 (5.5)	15.3 (67)*	46.2 (203)
HIV Test statistic, p-value	5.47, 0.0044	24.8075, 0.0000	1.2673, 0.531
Negative	3.2 (5.0)*	15.6 (95)*	47.1 (287)
Positive	4.2 (6.8)*	31.5 (63)*	42.5 (85)
Unknown	1.8 (2.0)*	16.7 (10)*	46.7 (28)
Sexual Orientation Test statistic, p-value	0.28, 0.6001	0.0602, 0.806	0.5899, 0.442
Gay/Homosexual	3.3 (5.5)	19.4 (153)	45.6 (359)
Bisexual	3.0 (3.8)	18.3 (15)	50.0 (41)
Entirely Open about Sexuality Test statistic, p-value	11.16, 0.0009	1.8310, 0.176	1.7637, 0.184
Yes	3.0 (4.2)*	18.5 (131)	47.1 (334)
No	4.6 (8.6)*	23.1 (37)	41.3 (66)
TOTAL	3.31 (5.3)	19.3 (168)	46.0 (400)

Significant differences at alpha = 0.05 are denoted with asterisks.

Table 4

Network characteristics by outcome.

	Number anal sex partners mean (sd)	High Sex % (n)	Drunk Sex % (n)
Number of network members reported Test statistic, p-value	1.66, 0.1582	7.4730, 0.113	4.9522, 0.292
1	2.6 (6.10)	8.0 (4)	34.0 (17)
2	3.9 (7.89)	22.5 (11)	40.8 (20)
3	2.3 (1.88)	26.3 (10)	42.1 (16)
4	5.3 (7.32)	29.6 (8)	55.6 (15)
5	3.3 (5.07)	19.1 (135)	47.0 (332)
Number of LGB network members Test statistic, p-value	1.35, 0.2427	10.5698, 0.061	2.0515, 0.842
0	2.3 (4.89)*	23.1 (9)	48.7 (19)
1	3.1 (7.11)*	10.4 (13)	40.8 (51)
2	2.7 (3.09)*	23.2 (33)	44.4 (63)
3	3.2 (4.46)*	18.8 (31)	47.8 (78)
4	3.5 (4.87)*	17.3 (29)	47.0 (79)
5	3.9 (6.14)*	22.9 (53)	47.6 (110)
Number of partnered LGB network members Test statistic, p-value	0.92, 0.4670	5.5589, 0.352	1.9433, 0.857
0	3.6 (5.96)	21.2 (65)	46.4 (142)
1	3.3 (4.93)	19.1 (52)	44.0 (120)
2	2.8 (3.28)	16.9 (27)	46.3 (74)
3	3.5 (7.53)	20.9 (18)	50.0 (43)
4	2.0 (3.71)	6.4 (2)	41.9 (13)
5	2.5 (2.59)	28.6 (4)	57.1 (8)
Number of partnered non-LGB network members Test statistic, p-value	3.56, 0.0034	9.2400, 0.100	3.6863, 0.595
0	3.9 (6.15)*	21.8 (113)	46.0 (238)
1	2.4 (3.13)*	14.2 (27)	44.2 (84)
2	2.5 (2.73)*	18.6 (18)	50.5 (49)
3	2.0 (2.02)*	13.6 (6)	38.6 (17)
4	3.5 (9.47)*	11.8 (2)	52.9 (9)
5	6.8 (11.5)*	50.0 (2)	75.0 (3)
Number same race as respondent Test statistic, p-value	0.68, 0.6372	10.8446, 0.055	9.8635, 0.079
0	2.9 (3.57)	16.4 (9)	38.2 (21)
1	4.1 (8.24)	14.3 (13)	38.5 (35)
2	3.0 (4.28)	19.3 (17)	39.8 (35)
3	3.1 (4.63)	30.3 (33)	56.0 (61)
4	3.6 (5.56)	16.9 (26)	49.4 (76)

	Number anal sex partners mean (sd)	High Sex % (n)	Drunk Sex % (n)
5	3.2 (4.95)	18.8 (70)	46.1 (172)
Number unaware of respondent's sexuality Test statistic, p-value	1.02, 0.4021	4.1888, 0.523	4.7854, 0.443
0	3.3 (5.13)	18.6 (118)	46.5 (296)
1	4.2 (5.98)	21.2 (14)	51.5 (34)
2	2.4 (2.13)	27.8 (15)	46.3 (25)
3	2.8 (3.94)	21.8 (12)	40.0 (22)
4	3.8 (8.88)	16.1 (9)	41.1 (23)
5	0.7 (1.15)	0 (0)	0 (0)
Network Mean Age Difference Test statistic, p-value	0.10, 0.9013	1.1997, 0.549	0.2558, 0.880
0–5 years	3.3 (5.31)	18.4 (110)	45.8 (274)
5–10 years	3.3 (6.64)	21.9 (43)	45.4 (89)
>10 years	3.0 (4.56)	19.7 (15)	48.7 (37)
TOTAL	3.3 (5.32)	19.3 (168)	46.0 (400)

Table 5

Results of linear and logistic regression modeling for three outcomes, with beta coefficients/odds ratios and 95% Confidence Intervals

	Number Anal Sex Partners	Sex While High	Sex While Drunk
Age			
18–24	1.0 (ref)	1.0 (ref)	1.0 (ref)
25–34	−0.1 (−0.21, 0)	0.57 (0.35, 0.93)	0.85 (0.57, 1.27)
35–44	−0.06 (−0.18, 0.05)	0.59 (0.34, 1)	0.57 (0.37, 0.9)
45+	−0.24 (−0.36, −0.11)	0.57 (0.32, 1.01)	0.25 (0.15, 0.43)
Race			
White	1.0 (ref)	1.0 (ref)	1.0 (ref)
Black	−0.15 (−0.24, −0.06)	0.87 (0.57, 1.32)	0.61 (0.43, 0.85)
Latino/Other	0.01 (−0.11, 0.12)	0.57 (0.31, 1.06)	0.47 (0.3, 0.73)
Education			
High School/Less	1.0 (ref)	1.0 (ref)	1.0 (ref)
Some college/2-year	0.1 (−0.02, 0.21)	0.66 (0.4, 1.07)	0.56 (0.37, 0.86)
College/College+	0.12 (0, 0.23)	0.51 (0.31, 0.85)	0.72 (0.47, 1.1)
Employment			
Employed	1.0 (ref)	1.0 (ref)	1.0 (ref)
Unemployed	0 (−0.09, 0.1)	0.88 (0.56, 1.37)	0.82 (0.57, 1.2)
HIV Status			
Negative	1.0 (ref)	1.0 (ref)	1.0 (ref)
Positive	0.32 (0.23, 0.41)	2.72 (1.8, 4.13)	1.09 (0.76, 1.57)
Never tested/unknown	−0.54 (−0.74, −0.35)	0.85 (0.41, 1.8)	0.82 (0.47, 1.43)
Sexual Orientation			
Homosexual	1.0 (ref)	1.0 (ref)	1.0 (ref)
Bisexual	−0.30 (−0.44, −0.17)	0.67 (0.35, 1.28)	1.44 (0.88, 2.37)
Completely Open about Sexuality			
Yes	1.0 (ref)	1.0 (ref)	1.0 (ref)
No	0.44 (0.35, 0.53)	1.22 (0.76, 1.97)	0.81 (0.55, 1.19)
Has a Main Partner			
No	1.0 (ref)	1.0 (ref)	1.0 (ref)
Yes	−0.41 (−0.49, −0.33)	0.89 (0.62, 1.28)	1.22 (0.91, 1.62)
Network LGB Ratio	0.43 (0.29, 0.57)	--	
Network Partnered LGB Ratio	−0.39 (−0.55, −0.24)	--	
Network Outness Ratio	--	0.20 (0.06, 0.74)	
Network Mean Age Difference	--		1.04 (1.02, 1.07)

Significant findings are shown in **bold italics**.