Substance Use and Mental Health Disorders Among Heterosexual Identified Men and Women Who Have Same-Sex Partners or Same-Sex Attraction: Results from the National Epidemiological Survey on Alcohol and Related Conditions

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Abstract

This study examined sexual orientation discordance, a mismatch between self-reported sexual identity and sexual behavior or sexual attraction, by describing the characteristics, substance use disorders, and mental health risks of heterosexual identified individuals who endorsed this pattern of sexual identification, behavior, and attraction. Using data from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC), we created three groups based on participants' reported sexual identity and either their sexual behavior or sexual attraction: heterosexual concordant, homosexual concordant, and heterosexual discordant. Bivariate models assessed the relationship of discordant status and demographic correlates, lifetime substance use disorders, and mental health diagnoses. Logistic regression models tested associations between both behavior discordance and attraction discordance and the likelihood of having lifetime disorders of substance use, major depression, and generalized anxiety. Results of this study provided evidence of varying levels of substance use and mental health disorder risk by gender, discordance status, and discordance type. Behavioral discordance was associated with increased risk of mental health and substance use disorder among women (compared to heterosexual concordance). Findings among men were less consistent with heightened risk of alcohol and inhalant use only. Attraction discordance was notably different from behavioral discordance. The odds of substance use and mental health disorders were the same or lower compared with both the heterosexual and homosexual concordance groups. Future research should begin to test theoretical explanations for these differences.

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Keywords

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Introduction

Several recent epidemiological studies have examined the relationship between sexual orientation and substance abuse and psychiatric disorders in United States adolescent and adult population-based samples (Bostwick, Boyd, Hughes, & McCabe, 2010; Cochran & Mays, 2000; McCabe, Hughes, Bostwick, West, & Boyd, 2009; Russell & Joyner, 2001; Silenzio, Pena, Duberstein, Cerel, & Knox, 2007; Trocki, Drabble, & Midanik, 2009). Current research findings suggest that sexual minorities have a higher risk of psychiatric and substance use disorders compared with heterosexuals when sexuality is measured unidimensionally using either behavior, self-identification or, to a lesser extent, attraction to the exclusion of using other dimensions of sexuality.

In terms of mental health disorders, a growing body of research points to higher risk of mood disorders, anxiety disorders, and suicidality among homosexual individuals compared to heterosexuals. For example, one nationally representative study found that lesbian, gay or bisexual identity was associated with higher odds of mood and anxiety disorders (Bostwick et al., 2010). Cochran, Sullivan, and Mays (2003) found that men aged 17–39 years who reported same-sex partners exhibited a greater number of suicide symptoms compared to men who reported exclusively opposite sex partners, but no significant differences were identified in lifetime diagnosis of affective disorders. In a meta-analysis of studies conducted in the United States and internationally, King et al. (2008) identified a two-fold greater risk of suicide attempts, depression, and anxiety disorders (past 12 months and lifetime) among gay and bisexual identified people compared to heterosexual identified individuals.

Researchers have also identified higher risk of substance use disorders in a plurality of epidemiological and community samples (McCabe et al., 2009; McKirnan & Peterson, 1989; Skinner, 1994; Stall et al., 2001). McCabe et al. (2009) examined substance use disorder and dependence prevalence rates using three dimensions of sexual orientation (identity, attraction, and behavior) in a nationally representative sample. Self-identified lesbians displayed greater odds of past-year marijuana use, drug use, alcohol dependence, marijuana dependence, and other drug dependence than heterosexual women did, and bisexual women displayed greater odds of past-year heavy drinking, marijuana use, other drug use, and alcohol dependence compared to heterosexual women. Differences among men were less pronounced. Men who identified as homosexual had higher odds of past year marijuana use, other drug use, alcohol dependence, and other drug dependence compared to heterosexual men. Adjusted odds of past-year other drug use, alcohol dependence, and other drug dependence among homosexual identified men were more than three times that of heterosexually identified men.

Using sexual behavior as a measure, McCabe et al. (2009) found that women who reported exclusively female lifetime sexual partners did not differ in drug use from women who reported exclusively lifetime male sexual partners. Women who had never engaged in sexual behavior reported lower odds of past-year heavy quantity drinking and marijuana use compared to women who have only had sex with men in their lifetimes. Women who reported sexual activity with both men and women had higher odds of all substance use and dependence outcomes except marijuana and other drug dependence compared to women who had only male sexual partners. Men who reported having sex exclusively with men were not different from men who reported having sex exclusively with women regarding substance use and substance dependence. Men who have had sex with men and women had greater odds of past year marijuana, other drug use, and alcohol dependence compared to men who reported exclusively female sexual partners. Men who reported never having sex had lower odds of all outcomes with the exception of past-year marijuana and other drug dependence compared to men who reported having sex exclusively with women.

Regarding attraction, McCabe et al. (2009) reported that females who reported being attracted to mostly males, males and females equally, mostly females, and only females had greater odds of negative outcomes on a variety of substances compared to females attracted to males only. Men who reported being attracted only to males had higher odds of marijuana use, other drug use, and alcohol dependence compared to men who reported being attracted to females only. In addition, men who reported being attracted mostly to men had higher odds of past-year marijuana use, but no additional outcomes compared to men who reported being exclusively attracted to females. Men who reported being attracted mostly to females had higher odds of substance use and dependence outcomes except for heavy drinking and alcohol dependence compared to men who reported being attracted only to females. The study did not consider how patterns of self-identification, behavior, and attraction might be related to substance use and mental health disorders in unique ways.

King et al. (2008), in their recent meta-analysis of research in this area, found a somewhat higher risk of alcohol and drug dependence among homosexual and bisexual individuals compared to heterosexuals, but particularly high risk for women. Drabble, Midanik, and Trocki (2005) found similar risk among women. In their study, they identified lower rates of alcohol abstention and higher odds of alcohol-related consequences, alcohol dependence, and past help seeking for alcohol problems among homosexual and bisexual women. Other studies have identified higher levels of drinking and substance use among sexual minorities in both men and women (Cochran, Keenan, Schober, & Mays, 2000; Hughes & Eliason, 2002).

Discordance and Substance/Mental Health Risk

In this emerging area of research, measurement of sexuality is evolving. Studies have generally utilized a unidimensional approach for measuring sexuality, focusing on sexual identity, sexual behavior or sexual attraction (Midanik, Drabble, Trocki, & Sell, 2006). As models of measuring sexuality change, using a variety of dimensions (Pathela, Blank, Sell, & Schillinger, 2006a; Sell & Becker, 2001), there has been increasing attention to understanding behavioral outcomes (e.g., substance use) among individuals whose self-

reported sexual identity does not match (i.e., is discordant) with their sexual behavior (Jeffries, 2009; Pathela et al., 2006b). This nuanced approach may reveal important differences in individual outcomes based on the combination of sexual identity, attraction, and behavior that can inform prevention and intervention efforts.

Much of this research has focused on sexual risk behavior and demographic correlates of discordance. Using data from a national probability sample, Jeffries (2009) assessed risk behaviors of heterosexually identified men who have sex with men. It was found that sexual identity and behavior discordant men had higher odds of having sex during the past year while under the influence of drugs or alcohol compared to sexual identity and behavior concordant men. Pathela et al. (2006b) examined discordance between sexual behavior and sexual identity in a population-based sample of men in New York. Findings indicated that men who identified as heterosexual, but had sex exclusively with men, were less likely to have been tested for HIV and less likely to have used a condom during their last sexual encounter. Trocki et al. (2009) examined substance related correlates of discordance in the 2000 National Alcohol Survey. Results indicated that sexual identity and behavior discordant women were approximately four times as likely to use marijuana compared to heterosexual women, but no significant differences were found among men.

Limitations of Current Research

Overall, few population-based studies have explored discordance, which may be a result of the measurement of sexual orientation using a single behavioral item and not having a sexual identity item to compare it to for consistency or inconsistency in such studies (Midanik et al., 2006). Much of the extant research on discordance has focused on health behavior (Bond et al., 2009; Kerker, Mostashari, & Thorpe, 2006) and description of this subpopulation as a sexual minority group (e.g., Ross, Essien, Williams, & Fernandez-Esquer, 2003), neglecting potential substance use and mental health factors that are unrelated to sexual behavior. To our knowledge, no studies have examined substance use (excluding marijuana) and mental health correlates as they relate to combined reported sexual behaviors and sexual identity in a nationally representative sample of men and women. Discordance has typically been defined as a mismatch between sexual behavior and sexual identity, but investigators have not explored discordance of sexual identity and sexual attraction.

In the present study, we excluded discordant behavior among self-identified homosexual persons for both substantive and statistical reasons. First, attraction discordance was extremely rare among those who self-identified as gay/lesbian in the NESARC survey. Only 11 individuals in the NESARC sample who identified as gay were only or mostly attracted to those of the opposite sex.

Secondly, gay/lesbian and bisexual men and women live in a society where heterosexuality is normative; therefore, it is not surprising for them to have engaged in at least one opposite-sex sexual encounter, particularly if it occurred before coming out. Although the research on male heterosexual identity development as it relates to discordance is scant, 53% of men reported questioning their sexual orientation in a study designed to examine the process of sexual orientation questioning among heterosexual men (Morgan, Steiner, & Thompson,

2010). Heterosexual questioning men reported very little same-sex experience and heterosexual non-questioning men reported almost no same-sex experience (Morgan et al., 2010). In the NESARC study, 85% of self-identified bisexual or homosexual women and 64% of self-identified bisexual or homosexual men reported having had at least one opposite sex experience in their lifetimes.

This study aims to extend our understanding of discordance by describing the characteristics, substance use disorders, and mental health risks of heterosexual identified individuals who have also engaged in sex with persons of the same sex. Hence, this study asks: Do heterosexual identified individuals with discordant identity and behavior have significantly different risk of lifetime substance use and mental health disorders compared to concordant heterosexual and gay/lesbian/bisexual identified individuals?

Meyer (2003) proposed minority stress as a conceptual framework that explains the disparate outcomes regarding mental health diagnoses between sexual minorities and non-sexual minorities. Our study aims to extend this framework to include substance use disorders. According to the model, the stigma associated with being a sexual minority, as well as associated discrimination and prejudice, create an unsupportive and hostile social environment that increases the risk of mental health problems among minority group members. Therefore, in extending the framework, we hypothesize that substance use disorders may be associated with coping with the realities of living in a non-affirming society. The stressors of the environment can include internalized homophobia, expectations of rejection, hiding, concealing, and experiencing discrimination. Discordant heterosexually identified individuals may be dealing with some of the effects (e.g., hiding and concealing) of the minority stress model, although not the full effects because of not identifying as a member of the minority group.

Using this theory as a guide (Meyer, 2003), we hypothesized that discordant heterosexually identified individuals would display lower risk of lifetime substance use disorders and mental health problems compared with concordant heterosexual and gay/lesbian/bisexually identified individuals. For the purposes of this study, we use the term heterosexual concordance to refer to individuals who report heterosexual identity and report being attracted to people of the opposite sex (attraction) or individuals who report heterosexual identity and report having sex with people of the opposite sex (behavior).We use the term *gay/lesbian concordance* for individuals who identify as gay/ lesbian and who either report being attracted to people of the same sex (attraction) or who reports having sex with people of the same sex. We use the term *heterosexual discordance* to describe individuals who identify as heterosexual, yet who also report being attracted to people of the same sex (attraction) or report having sex with people of the same sex (behavior).

Method

Participants

The National Epidemiologic Survey of Alcohol and Related Conditions (NESARC) study collected data from individuals in all 50 states and the District of Columbia in 2001–2002 (Wave 1) and again in 2004–2005 (Wave 2) (Grant, Kaplan, & Moore, 2007). For this study,

we analyzed data only from Wave 2. The NESARC was designed to estimate the prevalence of alcohol consumption, alcohol use disorders, associated comorbidities, and treatment in the general population. Individuals met in person with U.S. Census workers using a computer assisted personal interview format. Each survey took approximately 1 hour and participants received $80 as an incentive.

The NESARC utilized a multistage sampling structure, over-sampling Hispanics and African Americans to obtain precise statistical estimation in these populations, and ensured representation of racial and ethnic subgroups (Grant, Kaplan, Shepard, & Moore, 2003; Grant et al., 2007). The response rate for NESARC Wave 2 was 86.7%, with an overall response rate of 70.2% (Grant et al., 2007). Because sexual orientation, behavior, and identity (Ruan et al., 2008) were measured in Wave 2 only, our analysis was limited to the 2004–2005 Wave 2 data.

Measures

In Wave 2, individuals were asked about various dimensions of sexuality, including sexual identity, sexual behavior, and sexual attraction (Midanik et al., 2006; Sell & Petrulio, 1996). Sexual orientation was categorized using the following question, "Which of the categories best describes you?" Participants were given the options *heterosexual (straight), gay or lesbian, bisexual, and not sure*. Study participants were also asked about their sexual history with the following question: "In your lifetime, have you had sex with only males, only females, both males and females, or have you never had sex?" Survey researchers also asked about attraction with the following question: "People are different in their sexual attraction to other people. Which category on the card best describes your feelings?" Using a response card, participants were given the following options: *only attracted to females, mostly attracted to females, equally attracted to females and males, mostly attracted to males, and only attracted to males*.

We recoded these responses to develop subgroups of both behavioral concordance and attraction concordance. For behavioral concordance, participants were coded "Homosexual Concordant" (N=531; men=253; women=278) if they labeled themselves as homosexual and participated in same sex behavior in their lifetime (regardless of whether they participated in sexual relations with members of the opposite sex). In the (behavioral) category, 25% of men (N=70) and 51% of women (N=135) self-identified as bisexual. If individuals reported heterosexual identity and same sex sexual behavior (lifetime), they were coded "Heterosexual Discordant" (N=681; men=366; women=315). Individuals were coded "Heterosexual Concordant" if they labeled themselves as heterosexual and participated in opposite sex sexual behavior only (N=32,846; men=13,718; women=19,128).

For sexual attraction, participants who reported being either homosexual or bisexual and having "*equal*," "mostly," or "only" attraction to the same sex were considered "Homosexual Concordant" (N=476; men=244; women=232). In the (attraction) category, 23% of men (N=63) and 41% of women (N=92) self-identified as bisexual. If an individual reported "mostly" or "only" same sex attraction and reported "Heterosexual" identity, they were coded as "Attraction Discordant" (N=539; men=185; women=354). Opposite sex

attraction ("*mostly*" or "*only*") combined with "Heterosexual Identity" was considered "Heterosexual Concordant" (*N*=32,997; men=13,911; women=19,086).

Participants who answered "*not sure*" (*N*=170; men=69; women=101) of their sexual identity were excluded from the analysis of behavior and attraction discordance. We decided to exclude the not sure group because we are emphasizing discordance based on defined sexual identity labels. We recognize that a source of the uncertainty may be because of discordance between their identity and the sex of their partners or the lack of a certain identity. Although these persons may reflect a distinct subpopulation of sexual identity, they do not display discordance because they do not report an identity that is inconsistent with attraction and behavior. Any person who did not respond to one of the items or was missing on a single question was considered missing for that type of discordance. For example, an individual who endorsed the attraction question, but not the identity question was considered missing on attraction discordance.

Lifetime substance use disorders were assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV version (AUDADIS-IV), shown to be reliable in assessing DSM-IV alcohol and drug use disorders (American Psychiatric Association, 1994) and consumption in the general population (Grant, Harford, Dawson, Chou, & Pickering, 1995). Drug use disorders were grouped by drug class, including alcohol, narcotics, depressants, stimulants, and hallucinogens. Additionally, information on average daily consumption in the past year and National Institute on Alcohol Abuse and Alcoholism (NIAAA) defined risk drinking (for men, drinking more than 14 standard drinks per week or 5 or more standard drinks on any day, and for women, drinking more than seven standard drinks per week or 4 or more standard drinks on any day) was collected.

Mental Health Disorders, Health, and Social Measures—Major depression, post-traumatic stress disorder, and generalized anxiety disorder were also assessed using the AUDADIS instrument, which displays fair to good reliability for Generalized Anxiety Disorder (*k*=.42), Major Depression (*k*=.65) (Grant et al., 2003), and Post-Traumatic Stress Disorder (*k*=.64) (Ruan et al., 2008). The Short Form-12 Health Survey (SF-12) measured self-rated disability (Ware, Kosinski, & Keller, 1996) and components of self-rated health using 12 items. Main subscales include the physical health component scale (PCS) and the mental health component scale (MCS).

Self-reported experiences of discrimination in the past 12 months and prior to 12 months was measured using the Experiences with Discrimination (EOD) scale (Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005). In the NESARC sample, discrimination questions were asked of all individuals who endorsed any same-sex attraction, behavior, and/or orientation (*N*=3,023). Participants reported on discrimination they experienced in a variety of settings, including health care, public settings, work, and school settings with specific questions focused on name calling and threats of harm. There were a total of six questions with the following response options: *never, almost never, sometimes, fairly often, and very often* (Ruan et al., 2008). A dichotomous variable was created to describe percentages of gay, lesbian, bisexual, and unsure individuals who had experienced discrimination in any form during their lifetimes and in the past-year.

Measures of social support and perceived stress were also included in this analysis. The Perceived Stress Scale (PSS-4) is a 4-item scale that measures subjective stress. The response scale ranges from 0 to 4 with 0="never" and 4="very often." The Interpersonal Support and Evaluation List 12 (ISEL-12) was used to measure perceived social support. It contains 12 items measuring the perceived availability of social resources (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The response scale ranged from 0 to 3, with 0="definitely false" and 3="definitely true." Recent research using Wave 2 of NESARC has found good reliability for the PSS-4 and ISEL-12 instruments (Ruan et al., 2008). Church attendance was assessed using a single dichotomous item and city residence was measured by whether an individual resided in a Metropolitan Statistical Area (MSA) defined central city (Spotila, 2000).

Sociodemographic covariates included gender, marital status, age, race/ethnicity, education, and income. Gender was measured as male or female and marital status was defined using three levels: married or cohabitating, divorced/widowed/separated, and never married. Income was measured using the following categories:<$25,000, $25,000–$49,999, $50,000–$100,000, and +$100,000. Race/ethnicity was defined using the following categories: Black, American Indian, Asian American, White, and Latino/Hispanic. Education was represented as three categories: less than a high school education, high school education only, and education beyond high school.

Statistical Analysis

Bivariate models tested associations between groups based on behavior discordance and attraction discordance and sociodemographic variables, social measures (e.g., church attendance) and mental health/substance use disorders. Logistic regression models tested associations between both behavior discordance and attraction discordance and the likelihood of having a lifetime alcohol or drug use disorder, lifetime Major Depressive Disorder, and Lifetime Generalized Anxiety Disorder adjusting for demographic covariates. As noted, covariates included race, age, marital status, household income, race/ethnicity, and education. The SUDAAN statistical package was used for all analyses to adjust estimates and standard errors to account for the complex survey design of the NESARC sample (Research Triangle Institute, 2008).

Results

Behavioral Discordance

In the interest of clarity, we outline results by the two types of discordance identified. In Table 1, sociodemographic information is shown for participants in the behaviorally discordant and concordant groups stratified by sex.

As one might expect given the legal status of gay marriage at the time of the NESARC study data collection, fewer gay/lesbian/bisexual men and women were married and had a higher likelihood of having never been married. Notably, discordant individuals of both sexes were married at comparable rates to heterosexual concordant persons. Among females, discordant and gay/lesbian/bisexual people were younger than heterosexual persons. Among both men

and women, gay/lesbian/bisexual persons and discordant persons were more highly educated than their heterosexual concordant peers. Differences in income were slight with significant findings only for males. Both discordant and gay men earned $25,000–49,999 at higher rates than heterosexual men did. We found significant differences in measures of discrimination (past-year and lifetime) and church attendance. A majority of heterosexual and discordant people attended church regularly, while approximately a third of gay/lesbian males and females attended church. Gay/lesbian/bisexual persons of both genders reported discrimination at much higher rates than discordant and heterosexual persons.

Men—Differences in lifetime diagnosis of substance use and mental health disorders (see Table 2) based on behavioral discordance status were identified. Rates of lifetime alcohol dependence were lower among discordant men than among both heterosexual and gay men. Significant differences were identified for depressants, stimulants, cannabis, hallucinogens, and inhalants among the behavioral discordance groups, although the most pronounced differences were seen for Cannabis Disorder. A stairstep pattern was seen, with the lowest rates among heterosexuals and progressively higher rates among discordant and gay/ bisexual men. Discordant males had lower rates of having a lifetime depressive episode, generalized anxiety disorder, and post-traumatic stress disorder than gay individuals, but higher than heterosexual participants.

Social support and perceived stress differences were also found. Heterosexual men had the highest levels of social support and lowest stress, while discordant men had lower support and higher stress, and gay/bisexual men had the highest levels of stress and the lowest levels of social support. The same trend was evident for mental health disability in that gay men had the lowest SF-12 scores and heterosexual men had the highest scores. SF-12 scores for discordant men fell in between heterosexual men and gay men.

Women—Among women, group differences in behavioral concordance/ discordance were more pronounced. Substance use disorders were present in higher percentages in the discordant women than in heterosexual women; lesbians or bisexual women experienced lifetime SUDs at the highest rates. Rates of major depressive episode showed a similar pattern, but discordant women experienced lifetime Generalized Anxiety Disorder and PTSD at lower rates than both heterosexual and lesbian/bisexual women did.

Average daily alcohol consumption and rates of exceeding drinking guidelines also varied by discordance status. Both discordant women and lesbians drank almost twice as much on average as heterosexual women did. Additionally, women in these groups were more likely to exceed healthy drinking guidelines. Discordant women reported higher levels of stress than heterosexual women did, but lesbian women had the highest mean levels of stress. Unlike in men, we did not identify differences in social support among concordance/ discordance groups. Overall, mental health functioning was the lowest among lesbians with progressively higher levels in discordant and heterosexual women.

Multivariate Models—In multivariate models (Table 3), covariates were added to derive adjusted odds ratios (OR) for substance use and mental health disorders by behavioral concordance/discordance group by gender. Behavioral discordance was compared to both

heterosexual and gay/lesbian/bisexual concordance in logistic regression models. Among males, discordant persons had lower odds of alcohol use disorder than both gay/bisexual and heterosexual men. Discordant men had higher odds of inhalant disorder than heterosexual men did, but lower odds than gay men did. Odds of lifetime Generalized Anxiety Disorder were significantly lower among discordant men than gay men, but they had more than twice the odds of PTSD than heterosexual men. Findings for behavioral discordance among women were more consistent. Discordant women had at least three times the odds of lifetime alcohol, stimulant, hallucinogen, and inhalant disorders than heterosexual women. They also had more than twice the odds of PTSD (lifetime) than heterosexual women, but were at slightly decreased risk for a lifetime Major Depressive Episode than lesbians.

Attraction Discordance

Consistent with analysis for behavioral discordance, bivariate and multivariate models were estimated for attraction related discordance. In Table 4, we show sociodemographic information by attraction discordance. Discordance groups showed significant differences in age; gay/lesbian concordant individuals were youngest and the heterosexual discordant individuals were oldest. Rates of current marriage were higher for heterosexual and discordant men and women, while gay/lesbian individuals of both sexes displayed higher rates of never being married. Some racial/ethnic differences were present in the groups in that discordant men were less often White. Significant differences were present in education levels. Gay/bisexual men were more likely to have had education beyond high school and lower rates of high school level education. Rates of dropout were the lowest for gay/bisexual men and the highest among discordant men. Income differences were also present in the attraction discordance groups. Among men, discordant and gay/bisexual individuals included higher percentages of persons at the lowest two income levels and slightly higher percentages at the highest income level. Lesbians displayed the highest percentage of those reporting income in the highest two income categories and discordant women displayed the highest percentage in the lower two income levels. In both sexes, rates of church attendance were lower and discrimination was more common among gay/lesbian individuals.

Men—In Table 5, we assessed differences in mental health and substance use disorders. Discordant men had lower rates of lifetime substance use disorders than both heterosexual and gay/ bisexual men. Rates of mental health diagnoses were lower among heterosexual men and discordant men including lifetime major depressive episode, generalized anxiety disorder, and PTSD; higher rates were present among gay/bisexual men.

Among the attraction concordance/discordance groups, differences were present on a variety of health measures (Table 5). Discordant men drank less on average and exceeded drinking guidelines at lower rates than both the heterosexual and gay/ bisexual men. Stress and social support followed the pattern found in behavioral concordance–discordance. Discordant and gay men reported higher levels of perceived stress and lower levels of social support than heterosexual men. Similarly, gay/bisexual men had the lowest SF-12 mental health scores with progressively higher scores among discordant and heterosexual men.

Women—Discordant women had significantly lower rates of alcohol, stimulant, cannabis, and inhalant disorders (lifetime) than heterosexuals and lesbians. The same pattern was found in mental health. Discordant women had the lowest rates of Major Depressive Episode, Generalized Anxiety Disorder, and PTSD, and few differences were found on health measures. Only alcohol consumption and exceeding recommended drinking guidelines were different among the groups. Average daily use was lowest among heterosexual women, higher among discordant women, and the highest among lesbians or bisexual women; the same pattern was found relative to exceeding consumption guidelines. Levels of perceived stress, interpersonal support, and mental health disability varied in the groups. Discordant women had lower support and perceived stress, but less mental health disability.

Multivariate Models—In Table 6, we present multivariate models based on attraction discordance, compared with both heterosexual and gay/lesbian/ bisexual individuals. Among discordant men, risk of Alcohol Use Disorders was much lower than among gay/bisexual men and heterosexual men. Lower odds for discordant men were also identified for stimulant and hallucinogen disorders than among homosexual men. Odds of lifetime Generalized Anxiety Disorder were also lower among discordant men than gay men. Lower odds were also present for a number of disorders among discordant women (Table 6). These women had lower lifetime odds of Alcohol, Depressant, Stimulant, and Hallucinogen Use Disorders compared to heterosexual and lesbian or bisexual women. Odds of lifetime PTSD were lower among discordant women than heterosexual and lesbian/bisexual women, and discordant women had lower odds of lifetime Generalized Anxiety Disorder.

There is a more clear finding for attraction concordance/discordance than for behavioral concordance/discordance. Specifically, when significance in OR were observed, those who were discordant in attraction had a lower risk of substance use disorders and mental health disorders than the concordant groups. This was especially evident among discordant males and females (vs. their gay/lesbian concordant counterparts) for most substance use disorders. With respect to substance use disorders, only for generalized anxiety disorder did discordant males (vs. gay/lesbian concordant) have significantly lower risk. However, discordant females had a significantly lower risk for generalized anxiety (vs. heterosexual concordant) and PTSD (vs. heterosexual and gay/lesbian concordant counterparts).

However, when considering behavioral concordance/discordance, results for discordant females were much more striking than for discordant males. Specifically, discordant females (vs. heterosexual concordant) had a significantly higher risk of all substance use and all mental health disorders assessed, yet a lower risk for major depression (vs. gay/lesbian concordant counterparts). Males who were discordant in behavior (vs. gay/lesbian concordant counterparts) were more similar to males who were discordant in attraction in their lower risk for alcohol and inhalant use and generalized anxiety.

Discussion

Based on our hypothesis that discordant individuals are at lower risk compared to sexual minorities, our findings were inconsistent. Results of this study provide evidence of varying

levels of substance use and mental health disorder risk by gender, discordance status, and type of discordance. Behavioral discordance rather that heterosexual concordance was associated with increased risk of mental health and substance use disorders among women. Findings among men were less consistent with heightened risk of alcohol and inhalant use only. Behavioral discordance was notably different from attraction discordance. For both men and women, attraction discordance appeared to be associated with lower risk. We found the odds of substance use and mental health disorders were the same or lower compared with both the heterosexual and homosexual concordance groups.

The different findings between the groups suggest differential influences of contextual factors among the groups. Minority stress theory may provide some useful insights into important mediators that vary within the subpopulations of sexual minorities (Meyer, 2003; Meyer, Schwartz, & Frost, 2008; Thoits, 1995). Stress theory posits that those with disadvantaged social status experience more stress and have fewer coping resources (Pearlin, 1989). It is possible that higher perceived stress and lower social support mediate the relationship of discordant group status and psychopathology (Meyer et al., 2008). Results from a study of men who identified as heterosexual who have sex with men (Reback & Larkins, 2010) indicated that many participants expressed guilt and shame when discussing their same-sex experiences and blamed substance use for the sexual behavior with men.

It is plausible that the social context experienced by discordant heterosexuals is distinct from concordant heterosexuals and homosexuals. Discordant individuals may have expectations of rejection, concealment, and internalized homophobia (which can occur in discordant individuals because they are aware of their same sex behaviors) without experiencing the distal minority stress processes, such as prejudice, violence, and discrimination that may be experienced as a results of identifying as a member of a sexual minority (Meyer, 2003). Therefore, they may experience more stress and have fewer coping resources than heterosexuals, but not all of the stress associated with public identification as a sexual minority.

Similarly, the social networks of discordant individuals may differ from concordant persons in terms of social norms. Those who are behaviorally or attraction discordant may be less connected with gay culture and avoid venues that are perceived to be gay/lesbian (Reback & Larkins, 2010). Recent research suggests that social norms among homosexual men are significantly associated with composite health risks of smoking, unsafe sex, alcohol, and drug use (Hamilton & Mahalik, 2009). It is also possible that discordant individuals spend less time in settings where alcohol use is a norm, such as bars. One study suggested that homosexual and bisexual men and women spend more time in heavier drinking contexts than heterosexual individuals (Trocki, Drabble, & Midanik, 2005).

Sociodemographic differences, such as church attendance and age, may also help explain relationship of sexual orientation/ behavior and mental health. In this study, lower percentages of male and female concordant persons endorsed church attendance (see Tables 1 and 2). A study of gay and lesbian youth and young adults found a relationship between religiosity and alcohol use among adolescents (Ziyadeh et al., 2007), although other research

has not found this relationship (Rostosky, Danner, & Riggle, 2007, 2008). Although multivariate models adjusted for age, it is possible that much of the difference between the groups is a function of developmentally specific risk factors among young adults (Bybee, Sullivan, Zielonka, & Moes,2009).

These results should be interpreted with caution in light of a number of study limitations. The NESARC survey did not include items regarding disclosure. We were unable to determine whether individuals who were discordant were open about their same-sex sexual encounters despite identifying as heterosexual. We do not know if study participants would have identified differently had they been given a broader range of options to represent the possible range of sexual orientations, such as the inclusion of a "mostly heterosexual" category as used in the Add Health survey (Udry, 1998). Additionally, data on the recency of sexual experiences was not included, which would provide insight into whether or not same-sex behavior happened early in life or if it was the last sexual encounter and possibly the beginning of exclusively same-sex sexual behaviors. There are additional factors that may explain discordant behavior identity, such as a forced sexual experience, which was not included in the analysis.

Despite these limitations, our study identified differences between concordant and discordant persons present in both men and women in a nationally representative sample. Future research should begin to test theoretical explanations for these differences. Particularly, research should examine contextual factors, such as social stress, social networks, social support, and alcohol/drug related social norms among discordant and concordant individuals. Moreover, longitudinal research beginning in adolescence may help to identify specific developmental risk and protective factors associated with self-identifying as gay/ lesbian in early adulthood. Consistent with previous research, continued use of multiple dimensions of sexual orientation in population-based studies is warranted (Pathela et al., 2006a; Ross et al., 2003).

Acknowledgments

References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th. Washington, DC: Author; 1994.

Bond L, Wheeler D, Millett G, LaPollo A, Carson L, Liau A. Black men who have sex with men and the association of down-low identity with HIV risk behavior. American Journal of Public Health. 2009; 99:S92–S95. [PubMed: 19218177]

Bostwick WB, Boyd CJ, Hughes TL, McCabe SE. Dimensions of sexual orientation and the prevalence of mood and anxiety disorders in the United States. American Journal of Public Health. 2010; 100:468–475. [PubMed: 19696380]

Bybee J, Sullivan E, Zielonka E, Moes E. Are gay men in worse mental health than heterosexual men? The role of age, shame and guilt, and coming-out. Journal of Adult Development. 2009; 16:144–154.

Cochran SD, Keenan C, Schober C, Mays VM. Estimates of alcohol use and clinical treatment needs among homosexually active men and women in the U.S. population. Journal of Consulting and Clinical Psychology. 2000; 68:1062–1071. [PubMed: 11142540]

Cochran SD, Mays VM. Relation between psychiatric syndromes and behaviorally defined sexual orientation in a sample of the US population. American Journal of Epidemiology. 2000; 151:516–523. [PubMed: 10707921]

Cochran SD, Sullivan JG, Mays VM. Prevalence of mental disorders, psychological distress, and mental services use among lesbian, gay, and bisexual adults in the United States. Journal of Consulting and Clinical Psychology. 2003; 71:53–61. [PubMed: 12602425]

Cohen, S.; Mermelstein, R.; Kamarck, T.; Hoberman, HM. Measuring the functional components of social support. In: Sarason, IG.; Sarason, BR., editors. Social support: Theory, research, and applications. New York: Springer; 1985. p. 73-94.

Drabble L, Midanik LT, Trocki K. Reports of alcohol consumption and alcohol-related problems among homosexual, bisexual and heterosexual respondents: Results from the 2000 National Alcohol Survey. Journal of Studies on Alcohol. 2005; 66:111–120. [PubMed: 15830911]

Grant BF, Dawson DA, Stinson FS, Chou PS, Kay W, Pickering RP. The Alcohol Use Disorder and Associated Disorder Interview Schedule-IV (AUDADIS-IV): Reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. Drug and Alcohol Dependence. 2003a; 71:7–16. [PubMed: 12821201]

Grant BF, Harford TC, Dawson DA, Chou PS, Pickering RP. The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): Reliability of alcohol and drug modules in a general population sample. Drug and Alcohol Dependence. 1995; 39:37–44. [PubMed: 7587973]

Grant, BF.; Kaplan, K.; Moore, T. Wave 2 National Epidemiologic Survey of Alcohol and Related Conditions: Source and accuracy statement. Bethesda, MD: National Institute on Alcoholism and Alcohol Abuse; 2007.

Grant, BF.; Kaplan, K.; Shepard, J.; Moore, T. Source and accuracy statement for wave 1 of the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2003b.

Hamilton C, Mahalik J. Minority stress, masculinity, and social norms predicting gay men's health risk behaviors. Journal of Counseling Psychology. 2009; 56:132–141.

Hughes TL, Eliason M. Substance use and abuse in lesbian, gay, bisexual and transgender populations. Journal of Primary Prevention. 2002; 22:263–298.

Jeffries WI. Sociodemographic, sexual, and HIV and other sexually transmitted disease risk profiles of nonhomosexual-identified men who have sex with men. American Journal of Public Health. 2009; 99:1042–1045. [PubMed: 19372533]

Kerker B, Mostashari F, Thorpe L. Health care access and utilization among women who have sex with women: Sexual behavior and identity. Journal of Urban Health. 2006; 83:970–979. [PubMed: 16897415]

King M, Semlyen J, Tai SS, Killaspy H, Osborn D, Popelyuk D, et al. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. BMC Psychiatry. 2008; 8:1–17. [PubMed: 18173833]

Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: Validity and reliability of a self-report measure for population health research on racism and health. Social Science and Medicine. 2005; 61:1576–1596. [PubMed: 16005789]

McCabe SE, Hughes TL, Bostwick WB, West BT, Boyd CJ. Sexual orientation, substance use behaviors and substance dependence in the United States. Addiction. 2009; 104:1333–1345. [PubMed: 19438839]

McKirnan DJ, Peterson PL. Alcohol and drug use among homosexual men and women: Epidemiology and population characteristics. Addictive Behaviors. 1989; 14:545–553. [PubMed: 2589133]

Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. Psychological Bulletin. 2003; 129:674–697. [PubMed: 12956539]

Meyer IH, Schwartz S, Frost DM. Social patterning of stress and coping: Does disadvantaged social statuses confer more stress and fewer coping resources? Social Science and Medicine. 2008; 67:368–379. [PubMed: 18433961]

Midanik LT, Drabble L, Trocki K, Sell RL. Sexual orientation and alcohol use: Identity versus behavior measures. Journal of LGBT Health Research. 2006; 3:25–35. [PubMed: 18029313]

Morgan EM, Steiner MG, Thompson EM. Process of sexual orientation questioning among heterosexual men. Men and Masculinities. 2010; 12:425–443.

Pathela P, Blank S, Sell RL, Schillinger JA. The importance of both sexual behavior and identity. American Journal of Public Health. 2006a; 96:765. [PubMed: 16571688]

Pathela P, Hajat A, Schillinger J, Blank S, Sell R, Mostashari F. Discordance between sexual behavior and self-reported sexual identity: A population-based survey of New York City men. Annals of Internal Medicine. 2006b; 145:416. [PubMed: 16983129]

Pearlin LI. The sociological study of stress. Journal of Health and Social Behavior. 1989; 30:241–256. [PubMed: 2674272]

Reback C, Larkins S. Maintaining a heterosexual identity: Sexual meanings among a sample of heterosexually identified men who have sex with men. Archives of Sexual Behavior. 2010; 39:766–773. [PubMed: 19030977]

Research Triangle Institute. SUDAAN language manual, Release 10. Research Triangle Park, NC: Research Triangle Institute; 2008.

Ross MW, Essien EJ, Williams ML, Fernandez-Esquer ME. Concordance between sexual behavior and sexual identity in street outreach samples of four racial/ethnic groups. Sexually Transmitted Diseases. 2003; 30:110–113. [PubMed: 12567166]

Rostosky S, Danner F, Riggle E. Is religiosity a protective factor against substance use in young adulthood? Only if you're straight! Journal of Adolescent Health. 2007; 40:440–447. [PubMed: 17448402]

Rostosky S, Danner F, Riggle E. Religiosity and alcohol use in sexual minority and heterosexual youth and young adults. Journal of Youth and Adolescence. 2008; 37:552–563.

Ruan WJ, Goldstein RB, Chou SP, Smith SM, Saha TD, Pickering RP, et al. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): Reliability of new psychiatric diagnostic modules and risk factors in a general population sample. Drug and Alcohol Dependence. 2008; 92:27–36. [PubMed: 17706375]

Russell ST, Joyner K. Adolescent sexual orientation and suicide risk: Evidence from a natural study. American Journal of Public Health. 2001; 91:1276–1281. [PubMed: 11499118]

Sell RL, Becker JB. Sexual orientation data collection and progress toward Healthy People 2010. American Journal of Public Health. 2001; 91:876–882. [PubMed: 11392926]

Sell RL, Petrulio C. Sampling homosexuals, bisexuals, gays, and lesbians for public health research: A review of the literature from 1990 to 1992. Journal of Homosexuality. 1996; 30:31–48. [PubMed: 8738743]

Silenzio VM, Pena JB, Duberstein PR, Cerel J, Knox KL. Sexual orientation and risk factors for suicidal ideation and suicide attempts among adolescents and young adults. American Journal of Public Health. 2007; 97:2017–2019. [PubMed: 17901445]

Skinner WF. The prevalence and demographic predictors of illicit and licit drug use among lesbians and gay men. American Journal of Public Health. 1994; 84:1307–1310. [PubMed: 8059891]

Spotila, JT. Standards for defining metropolitan and micropolitan statistical areas. Washington, DC: National Archives and Records Administration; 2000.

Stall R, Paul JP, Greenwood G, Pollack LM, Bein E, Crosby GM, et al. Alcohol use, drug use and alcohol-related problems among men who have sex with men: The Urban Men's Health Study. Addiction. 2001; 96:1589–1601. [PubMed: 11784456]

Thoits PA. Stress, coping, and social support processes: Where are we? What next? Journal of Health and Social Behavior. 1995; 35:53–79. [PubMed: 7560850]

Trocki KF, Drabble L, Midanik L. Use of heavier drinking contexts among heterosexuals, homosexuals and bisexuals: Results from a national household probability survey. Journal of Studies on Alcohol. 2005; 66:105–110. [PubMed: 15830910]

Trocki KF, Drabble LA, Midanik LT. Tobacco, marijuana, and sensation seeking: Comparisons across gay, lesbian, bisexual, and heterosexual groups. Psychology of Addictive Behaviors. 2009; 23:620–631. [PubMed: 20025368]

Udry, J. The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994–1996. Chapel Hill, NC: Carolina Population Center, University of North Carolina; 1998.

Ware JE, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. Medical Care. 1996; 34:220–233. [PubMed: 8628042]

Ziyadeh NJ, Prokop LA, Fisher LB, Rosario M, Field AE, Camargo CA, et al. Sexual orientation, gender, and alcohol use in a cohort study of U.S. adolescent girls and boys. Drug and Alcohol Dependence. 2007; 87:119–130. [PubMed: 16971055]

Table 1

Sociodemographic characteristics by sex and group for behavior

| | Males | | | | | | | Females | | | | | | |
| | Heterosexual concordant | | Gay/lesbian concordant | | Heterosexual discordant | | | Heterosexual concordant | | Gay/lesbian concordant | | Heterosexual discordant | | |
	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Age (in years)	47.19	(7.92)	45.87	(5.74)	48.98	(6.69)	<1	49.13	(9.30)	38.21	(6.40)	44.93	(7.77)	−11.39***
	N	%	N	%	N	%	χ²	N	%	N	%	N	%	χ²
Marital status														
Married	8,426	68.39	47	24.70	225	66.43	27.29***	9,768	61.38	63	26.53	149	57.19	28.97***
Formerly married	2,518	12.67	44	16.13	81	15.36	1.55	6,157	24.36	59	20.79	99	24.55	<1
Never married	2,774	18.94	162	59.17	60	18.21	24.16***	3,203	14.27	156	52.69	67	18.26	26.65***
Race														
Black	2,196	10.00	29	7.08	61	12.40	2.32	4,081	11.95	56	14.76	57	10.38	1.25
Native American	222	2.03	7	3.73	6	2.19	<1	312	2.25	8	4.41	10	3.64	1.36
White	8,334	71.30	170	75.52	224	70.07	1.11	10,761	70.80	164	69.74	188	68.82	<1
Latino	2,566	12.33	43	12.13	65	11.38	<1	3,477	10.90	46	10.22	49	11.73	<1
Asian	400	4.34	4	1.55	10	3.96	2.93	497	4.10	4	.87	11	5.43	11.08***
Education														
<High School	2,164	14.30	6	1.65	53	12.90	21.98***	3,090	13.84	23	8.46	42	11.04	3.51*
HS graduate	3,709	27.26	36	15.28	76	22.73	7.50**	5,324	28.04	52	16.89	65	17.89	11.81***
College	7,845	58.43	211	83.08	237	64.37	16.10***	10,714	58.14	203	74.65	208	71.07	14.12***
Income														
$0–$24,999	3,219	20.09	70	26.24	91	21.80	3.33**	6,755	29.40	82	26.09	89	24.58	<1
$25,000–$49,999	3,945	27.79	76	32.67	109	29.29		5,332	27.60	81	29.44	107	32.09	
$50,000–$99,999	4,413	34.48	60	22.17	101	28.55		4,997	29.74	79	29.95	84	28.64	
$100,000+	2,141	17.64	47	18.92	65	20.36		2,044	13.27	36	14.51	35	14.68	
Social measures														
Attend church	6,688	48.74	86	33.18	179	45.99	7.93***	11,653	58.85	75	23.87	141	43.91	29.52***
Urban MSA	4,504	32.35	89	33.51	123	32.45	<1	6,430	33.14	94	34.08	92	26.63	2.58

	Males								Females							
	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant				Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		
	M	(SD)	M	(SD)	M	(SD)	t		M	(SD)	M	(SD)	M	(SD)	t
Disc.-PY[a]	4	.65	105	42.98	5	2.24	18.36***		17	.08	98	34.50	12	3.07	27.99***
Disc.-LT[b]	6	.04	134	57.42	9	2.94	19.94***		22	.10	110	41.17	19	4.86	31.44***

[a] Past year discrimination;

[b] Lifetime discrimination

*
$p<.05$;

**
$p<.01$;

***
$p<.001$

Table 2

Substance use and mental health disorders and scales by sex and group status for behavior

	Males							Females						
	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		χ^2	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		χ^2
	N	%	N	%	N	%		N	%	N	%	N	%	
Lifetime SUDs														
Alcohol	6,557	47.89	141	59.44	162	41.19	6.25***	3,994	21.64	153	58.65	153	47.66	35.57***
Narcotics	344	2.83	11	5.45	12	3.56	1.29	248	1.27	17	8.10	20	5.98	9.08***
Depressants	304	2.43	18	8.93	11	2.51	3.51*	221	1.13	13	5.68	16	4.96	6.62***
Stimulants	718	5.36	29	14.09	30	7.25	4.31*	510	2.65	45	15.07	46	15.44	20.68***
Cannabis	1,778	13.25	58	25.96	71	18.16	7.21***	1,027	5.62	69	28.74	58	18.34	24.73***
Hallucinogens	339	2.64	16	7.23	15	3.57	3.19*	145	.92	16	8.46	17	4.74	6.51**
Inhalants	76	.57	9	4.61	6	1.55	3.86*	24	.13	1	.56	6	1.12	2.37
MH disorders														
MDE-LT	2,146	15.16	83	36.41	95	25.38	15.90***	5,222	27.17	131	46.00	108	34.26	11.88***
GAD-LT	668	4.76	39	17.19	22	6.27	9.27***	1,877	10.07	43	20.29	25	6.52	5.22**
PTSD-LT	892	5.73	33	13.07	40	11.36	8.28***	2,517	12.74	49	22.54	26	7.94	14.79***
Alcohol use	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Average daily use	.77	(.79)	1.44	(2.30)	.71	(.80)	1.79	.27	(.35)	.56	(.37)	.63	(.70)	5.24***
	N	%	N	%	N	%	χ^2	N	%	N	%	N	%	χ^2
Exceeded-PY	5,176	53.79	113	56.20	114	46.77	1.86	4,317	39.42	136	61.02	154	64.92	24.05***
Health measures	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Perceived stress[a]	3.56	(1.35)	4.07	(1.31)	4.11	(1.33)	3.74***	4.10	(1.34)	4.93	(1.36)	4.44	(1.71)	3.31**
Interpersonal support[b]	42.54	(2.51)	41.69	(2.80)	41.76	(2.51)	−3.15**	42.66	(2.81)	42.76	(2.43)	42.44	(3.10)	<1
SF-12 physical	51.01	(5.33)	50.47	(5.14)	50.86	(3.99)	<1	49.71	(6.07)	49.97	(5.00)	50.32	(5.54)	<1

	Males							**Females**						
	Heterosexual concordant		**Gay/lesbian concordant**		**Heterosexual discordant**		χ^2	**Heterosexual concordant**		**Gay/lesbian concordant**		**Heterosexual discordant**		χ^2
	N	*%*	*N*	*%*	*N*	*%*		*N*	*%*	*N*	*%*	*N*	*%*	
SF-12 mental	52.67	(4.46)	49.72	(4.27)	50.68	(3.76)	−5.54***	50.54	(5.44)	47.67	(4.72)	49.75	(4.68)	−3.78***

[a] Range, 0–16;

[b] Range, 12–48

*
$p<.05$;

**
$p<.01$;

***
$p<.001$

Table 3

Adjusted[a] odds ratios (OR) for lifetime substance use and mental health disorders by sex and behavioral discordance

	Males		Females	
	Discordant vs. heterosexual concordant	Discordant vs. gay/lesbian concordant	Discordant vs. heterosexual concordant	Discordant vs. gay/lesbian concordant
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Lifetime substance use disorders				
Alcohol	.76 (.76, .98)[*]	.54 (.36, .81)[**]	3.25 (2.47, 4.29)[***]	.81 (.53, 1.23)
Narcotics	1.31 (.63, 2.69)	.81 (.30, 2.20)	4.89 (2.80, 8.53)	.78 (.35, 1.76)
Depressants	1.07 (.51, 2.23)	.32 (.12, .83)	4.35 (2.33, 8.13)	.96 (.39, 2.34)
Stimulants	1.41 (.86, 2.30)	.57 (.29, 1.11)	6.54 (4.52, 9.47)[***]	1.16 (.65, 2.08)
Hallucinogen	s 1.40 (.81, 2.44)	.72 (.31, 1.67)	4.65 (2.21, 9.79)[***]	.69 (.26, 1.86)
Inhalants	2.96 (1.11, 7.88)[*]	.29 (.08, .98)[*]	8.34 (2.98, 23.56)[***]	2.52 (.26, 24.62)
Mental health disorders				
MDE-LT	1.89 (1.40, 2.54)	.74 (.47, 1.17)	1.36 (1.01, 1.84)[*]	.65 (.43, .97)[*]
GAD-LT	1.30 (.71, 2.37)	.36 (.18, .71)[**]	1.53 (1.06, 2.19)[*]	.82 (.50, 1.35)
PTSD-LT	2.05 (1.37, 3.07)[***]	.88 (.52, 1.50)	2.42 (1.76, 3.34)[***]	1.07 (.64, 1.79)

SUD substance use disorder; *MDE-LT* major depressive disorder-lifetime; *GAD-LT* generalized anxiety disorder-lifetime; *PTSD-LT* post-traumatic stress disorder-lifetime

[a] Adjusted for age (years), race/ethnicity, marital status, education, and income

[*] *p*<.05;

[**] *p*<.01;

[***] *p*<.001

Table 4

Sociodemographic characteristics by sex and group for attraction

	Males							Females						
	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant			Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		
	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Age (in years)	47.15	(7.89)	44.72	(5.25)	55.09	(5.55)	18.01***	48.87	(9.29)	39.90	(7.02)	57.80	(7.99)	68.59***
	N	%	N	%	N	%	χ^2	N	%	N	%	N	%	χ^2
Marital status														
Married	8,541	68.28	41	21.75	117	72.64	26.93***	9,761	61.48	45	23.07	156	54.82	25.71***
Formerly married	2,558	12.68	38	14.18	42	16.11	<1	6,110	24.14	46	19.55	136	31.70	4.22*
Never married	2,812	19.04	165	64.07	26	11.24	26.47***	3,215	14.38	141	57.38	62	13.40	20.96***
Race														
Black	2,219	10.00	28	7.69	38	13.89	1.99	4,075	11.97	49	14.53	65	10.25	<1
Native American	224	2.03	7	3.75	4	2.37	<1	311	2.24	7	4.69	8	2.51	<1
White	8,478	71.42	162	73.68	90	59.16	3.63*	10,745	70.83	133	66.60	202	67.71	1.08
Latino	2,589	12.25	42	12.03	43	15.99	<1	3,467	10.93	37	10.42	57	10.63	<1
Asian	410	4.30	5	2.85	10	8.59	1.38	488	4.04	6	3.77	22	8.91	1.97
Education														
<High School	2,181	14.24	3	.62	40	20.19	28.43***	3,054	13.72	18	9.18	72	16.99	2.78
HS graduate	3,745	27.24	37	17.02	43	20.37	6.28**	5,275	27.81	42	15.25	111	30.67	8.81***
College	7,985	58.52	204	82.37	102	59.45	14.30***	10,757	58.47	172	75.57	171	52.34	10.89***
Income														
$0–$24,999	3,258	20.09	69	28.77	55	24.15	4.04**	6,686	29.16	72	26.45	150	36.35	2.64*
$25,000–$49,999	3,997	27.73	72	31.08	55	33.05		5,332	27.64	59	26.67	107	29.98	
$50,000–$99,999	4,475	34.49	55	19.73	45	24.51		5,021	29.92	68	30.68	63	20.54	
$100,000+	2,181	17.69	48	20.42	26	18.29		2,047	13.28	33	16.20	34	13.13	
Social measures														
Attend church	6,788	48.69	81	33.02	107	55.22	9.57***	11,588	58.67	71	27.44	200	54.61	18.16***
Urban MSA	4,571	32.37	85	32.67	58	29.87	<1	6,398	33.01	81	37.28	125	33.22	<1

	Males							Females						
	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant			Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		
	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Disc.-PY[a]	8	.06	104	44.90	1	1.14	17.70***	24	.09	94	42.41	4	.39	23.06***
Disc.-LT[b]	16	.12	132	59.04	0	0	19.00***	36	.17	101	45.64	4	.42	23.40***

[a] Past year discrimination;

[b] Lifetime discrimination

*
p<.05;

**
p<.01;

***
p<.001

Table 5

Substance use and mental health disorders and scales by sex and group for attraction

	Males							Females						
	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		χ²	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		χ²
	N	%	N	%	N	%		N	%	N	%	N	%	
Lifetime substance use disorders														
Alcohol	6,666	47.94	133	57.48	53	25.01	13.87***	4,076	22.09	116	53.99	70	19.38	15.14***
Narcotics	353	2.86	11	6.41	2	1.11	3.37*	263	1.35	9	3.94	5	1.13	1.27
Depressants	314	2.45	17	8.33	0	0	25.57***	234	1.19	10	5.50	3	.86	2.31
Stimulants	744	5.44	28	13.23	3	1.09	17.97***	547	2.87	30	11.24	9	2.08	5.28**
Cannabis	1,840	13.45	54	25.38	8	4.39	15.80***	1,065	5.83	46	20.07	20	5.50	7.73**
Hallucinogens	352	2.68	17	7.60	1	.45	12.63***	158	.98	12	7.96	4	.91	2.57
Inhalants	82	.60	8	4.27	0	0	18.72***	29	.14	0	0	1	.22	7.60**
MH disorders														
MDE-LT	2,205	15.36	81	37.01	37	19.92	12.93***	5,277	27.55	109	46.66	56	14.04	20.58***
GAD-LT	676	4.77	36	16.05	14	6.08	7.76**	1,877	10.07	43	20.29	25	6.52	6.23**
PTSD-LT	916	5.84	30	11.75	15	6.40	3.61*	2,517	12.74	49	22.54	26	7.94	7.80***
Alcohol use	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Average daily use	.77	(.79)	1.34	(2.32)	.42	(.14)	11.04***	.28	(.35)	.50	(.22)	.40	(.54)	2.91**
	N	%	N	%	N	%	χ²	N	%	N	%	N	%	χ²
Exceeded-PY	5,261	53.83	113	57.71	30	26.35	13.16***	4,398	39.84	98	55.67	77	43.20	4.66*
Health measures	M	(SD)	M	(SD)	M	(SD)	t	M	(SD)	M	(SD)	M	(SD)	t
Perceived stress[a]	3.56	(1.35)	4.15	(1.22)	4.12	(1.33)	3.37**	4.11	(1.58)	4.81	(1.31)	3.83	(1.38)	3.95*
Interpersonal support[b]	42.52	(2.52)	41.54	(2.43)	41.41	(2.30)	4.36*	42.68	(2.81)	42.57	(2.40)	41.60	(2.72)	5.12**
SF-12 physical	51.04	(5.30)	50.50	(4.72)	48.29	(5.27)	3.82*	49.76	(6.04)	50.05	(4.70)	48.75	(6.37)	<1

	Males							Females						
	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		χ²	Heterosexual concordant		Gay/lesbian concordant		Heterosexual discordant		χ²
	N	%	N	%	N	%		N	%	N	%	N	%	
SF-12 mental	52.63	(4.45)	49.44	(3.98)	51.63	(4.29)	−4.55***	50.50	(5.45)	47.36	(4.61)	51.96	(4.36)	11.29***

[a]Range, 0–16;

[b]Range, 12–48

*
$p<.05$;

**
$p<.01$;

***
$p<.001$

Table 6

Adjusted[a] odds ratios (OR) for lifetime substance use and mental health disorders by attraction discordance

	Males		Females	
	Discordant vs. heterosexual concordant OR (95% CI)	**Discordant vs. gay/lesbian concordant OR (95% CI)**	**Discordant vs. heterosexual concordant OR (95% CI)**	**Discordant vs. gay/lesbian concordant OR (95% CI)**
Lifetime substance use disorders				
Alcohol	.39 (.28, .54)***	.29 (.19, .46)***	.93 (.68, 1.28)	.29 (.18, .46)***
Narcotics	.38 (.08, 1.75)	.21 (.04, 1.11)	.81 (.30, 2.18)	.30 (.07, 1.19)
Depressants	Not admissible	Not admissible	.68 (.20, 2.28)	.16 (.04, .70)*
Stimulants	.20 (.06, .68)	.09 (.03, .29)***	.72 (.31, 1.68)	.20 (.08, .50)***
Hallucinogens	.18 (.02, 1.35)	.09 (.01, .65)**	.94 (.29, 3.05)	.17 (.04, .68)*
Mental health disorders				
MDE-LT	1.40 (.83, 2.37)	.54 (.27, 1.13)	.42 (.30, .59)	.20 (.12, .32)
GAD-LT	1.27 (.64, 2.49)	.38 (.17, .81)***	.61 (.37, .99)*	.26 (.14, .49)
PTSD-LT	1.06 (.53, 2.11)	.50 (.32, .76)	.58 (.37, .91)*	.28 (.15, .53)***

SUD substance use disorder; *MDE-LT* major depressive disorder-lifetime; *GAD-LT* generalized anxiety disorder-lifetime; *PTSD-LT* post-traumatic stress disorder-lifetime

[a]Adjusted for age (years), race/ethnicity, marital status, education, and income

*
  p<.05;

**
  p<.01;

***
  p<.001