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Disproportionate Exposure to Early-Life Adversity and Sexual Orientation Disparities in Psychiatric Morbidity

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Abstract

Objectives—Lesbian, gay, and bisexual (LGB) populations exhibit elevated rates of psychiatric disorders compared to heterosexuals, and these disparities emerge early in the life course. We examined the role of exposure to early-life victimization and adversity—including physical and sexual abuse, homelessness, and intimate partner violence—in explaining sexual orientation disparities in mental health among adolescents and young adults.

Methods—Data were drawn from the National Longitudinal Study of Adolescent Health, Wave 3 (2001–2002), a nationally representative survey of adolescents. Participants included gay/lesbian ($n=227$), bisexual ($n=245$), and heterosexual ($n=13,490$) youths, ages 18–27. We examined differences in the prevalence of exposure to child physical or sexual abuse, homelessness or expulsion from one's home by caregivers, and physical and sexual intimate partner violence according to sexual orientation. Next we examined the associations of these exposures with symptoms of psychopathology including suicidal ideation and attempts, depression, binge drinking, illicit drug use, tobacco use, alcohol abuse, and drug abuse. Finally, we determined whether exposure to victimization and adversity explained the association between sexual orientation and psychopathology.

Results—Gay/lesbian and bisexual respondents had higher levels of psychopathology than heterosexuals across all outcomes. Gay/lesbian respondents had higher odds of exposure to child abuse and housing adversity, and bisexual respondents had higher odds of exposure to child abuse, housing adversity, and intimate partner violence, than heterosexuals. Greater exposure to these adversities explained between 10–20% of the relative excess of suicidality, depression, tobacco use, and symptoms of alcohol and drug abuse among LGB youths compared to heterosexuals. Exposure to victimization and adversity experiences in childhood and adolescence significantly

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mediated the association of both gay/lesbian and bisexual orientation with suicidality, depressive symptoms, tobacco use, and alcohol abuse.

Conclusions—Exposure to victimization in early-life family and romantic relationships explains, in part, sexual orientation disparities in a wide range of mental health and substance use outcomes, highlighting novel targets for preventive interventions aimed at reducing these disparities.

Introduction

Lesbian, gay, and bisexual (LGB) populations exhibit markedly elevated rates of psychiatric disorders compared to heterosexuals (Cochran & Mays, 1994; Fergusson, Horwood, & Beautrais, 1999; Gilman, Cochran, Mays, Ostrow, & Kessler, 2001; Sandfort, de Graaf, Bijl, & Schnabel, 2001). These disparities emerge early in the life course; higher rates of both internalizing and externalizing psychopathology have been documented among LGB adolescents relative to their heterosexual peers, including depression, anxiety, and substance abuse (Corliss, Rosario, Wypij, Fisher, & Austin, 2008; Fergusson et al., 1999; Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008; Russell, Driscoll, & Truong, 2002; Russell & Joyner, 2001; Safren & Heimberg, 1999; Ziyadeh et al., 2007). Population-based data indicate that adolescents who identify as gay, lesbian, or bisexual are between 3 and 4 times more likely to meet the diagnostic criteria for an internalizing disorder and between 2 and 5 times more likely to meet the criteria for an externalizing disorder than heterosexual adolescents (Fergusson et al., 1999). Rates of suicidal ideation and suicide attempt are also notably elevated among LGB adolescents as compared to heterosexuals, with most studies suggesting that at least one-third of sexual minority adolescents have contemplated suicide or made a suicide attempt (D'Augelli, Hershberger, & Pilkington, 2001; Fergusson et al., 1999; Garofalo, Wolf, Wissow, Woods, & Goodman, 1999; Mustanski, Garofalo, & Emerson, 2010; Russell & Joyner, 2001). Despite the consistency of evidence regarding sexual orientation disparities in mental health, the mechanisms that explain the higher rates of psychiatric problems among LGB youths and adults have only recently become the focus of systematic empirical investigation (Hatzenbuehler, 2009). Indeed, the Institute of Medicine (2010) recently issued a report calling for increased research attention to the health of sexual minorities.

The most frequently invoked explanation for sexual orientation disparities in mental health is social stress, or the increased exposure to stressful social experiences related to membership in a socially disadvantaged and marginalized group (Meyer, 1995, 2003a, 2003b; Radkowsky & Siegel, 1997). Central to the social stress theory is the assertion that aspects of the social environment that foster and perpetuate stigma against sexual minority populations compromise their mental health (Hatzenbuehler, 2010; Meyer, 2003b). Indeed, LGB individuals experience high levels of discrimination at both individual (Diaz, Ayala, Bein, Henne, & Marin, 2001; Mays & Cochran, 2001; McLaughlin, Hatzenbuehler, & Keyes, 2010) and institutional levels (Hatzenbuehler, Keyes, & Hasin, 2009; Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010), including verbal and physical assaults, unfair treatment in housing and employment, and discriminatory marriage policies. Adolescents with same-sex attraction are more likely than adolescents with opposite-sex attraction to be victims of violence at school and in their communities (Faulkner & Cranston, 1998; Robin et al., 2002; Russell, Franz, & Driscoll, 2001). Exposure to stigma, discrimination, and victimization are robust predictors of mental health problems and suicide attempts among LGB individuals (D'Augelli et al., 2005; Diaz et al., 2001; Hatzenbuehler, 2010; McLaughlin, Hatzenbuehler, et al., 2010; Rosario, Schrimshaw, Hunter, & Gwadz, 2002).

Emerging evidence suggests that LGB youths may also experience disproportionate victimization within their family and romantic relationships, and these early-life exposures are likely to further increase their risk for psychopathology. Several studies have observed higher levels of child physical and sexual abuse, as well as intimate partner violence (IPV), among LGB individuals relative to heterosexuals (Balsam, Rothblum, & Beauchaine, 2005; Corliss, Cochran, & Mays, 2002; Matthews, Hughes, Johnson, Razzano, & Cassidy, 2002; Tjaden, Thoennes, & Allison, 1999). LGB adolescents are also at elevated risk of experiencing homelessness (Cochran, Stewart, Ginzler, & Cauce, 2002; Fournier et al., 2009; Kruks, 1991; Van Leeuwen et al., 2006) partially due to expulsion following disclosure of their sexual orientation (Kruks, 1991). Homelessness may also result from victimization by caregivers or romantic partners (Cochran et al., 2002). Although these types of adverse childhood experiences are known risk factors for psychopathology among general population samples (Buckner & Bassuk, 1997; Campbell, 2002; Green et al., 2010; Kessler, Davis, & Kendler, 1997; McLaughlin et al., 2010), few studies have examined whether exposure to early-life adversity and victimization explains, at least in part, the associations between sexual orientation and psychopathology. The one previous study examining this question found that exposure to child abuse partially explained sexual orientation disparities in tobacco and alcohol use in lesbian and bisexual women (Jun et al., 2010). This study provided important insights, but examined only two substance use outcomes using data from a community-based sample of female nurses, limiting generalizability of the results. Moreover, prior research has largely relied on convenience samples of LGB youths, which can cause biased inferences regarding the prevalence and mental health consequences of early-life adversities among LGB populations.

In the current report, we examine whether the prevalence of child abuse, housing adversity, and IPV is elevated among LGB youths relative to heterosexuals in a national sample of adolescents and young adults. We further evaluate whether exposure to these sorts of adverse early-life experiences is related to mental health problems in LGB youths. We hypothesized that greater exposure to these adversities would partially explain sexual orientation disparities in psychopathology.

Methods

Sample

Data are drawn from the National Longitudinal Study of Adolescent Health (Add Health), a longitudinal study of a nationally-representative adolescent sample (Bearman, Jones, & Udry, 1995). The first wave was conducted in 1995 and included adolescents in grades 7–12 (N=90,118) selected using a multi-stage stratified cluster sampling strategy. Adolescents completed in-school interviews, and a core sub-sample (n=20,745; response rate 78.9%) completed in-depth home interviews. Adolescents in this core Wave 1 sub-sample were contacted to complete additional in-home interviews at Wave 2 in 1996 (N=14,738; response rate 88.2%) and Wave 3 in 2001–2002 (N=15,197; response rate 76.0%). The current study utilizes Wave 3 data; sample characteristics are shown in Table 1. Institutional Review Board approval was granted by the University of North Carolina for field procedures and by the Harvard School of Public Health for analysis.

Measures

Sexual orientation—Self-identified sexual orientation was first assessed at Wave 3 with a single item asking respondents to “Please choose the description that best fits how you think about yourself.” Five response options were given: 100% heterosexual (straight) (n=13,490); mostly heterosexual but somewhat attracted to people of your own sex (n=1,019, excluded); bisexual (n=245); mostly homosexual, but somewhat attracted to people of the opposite sex

(n=96); and 100% homosexual (n=131). Respondents who indicated that they were not attracted to either males or females (n=76) or did not answer this item (n=140) were excluded. Consistent with prior studies, the “mostly homosexual” and 100% homosexual groups were combined to increase power (n=227) (Austin et al., 2004; Corliss et al., 2008).

Significant differences in gender and race/ethnicity were observed among respondents who identified as sexual minority versus heterosexual (Table 1). A greater number of males identified as “mostly homosexual” or “100% homosexual” (n=115) than females (n=92). Approximately two-thirds of the homosexual group was male (61.7%). In contrast, a greater number of females identified as bisexual (n=196) as compared to males (n=49), consistent with previous studies (e.g., Austin et al., 2009; Hatzenbuehler, 2011). Slightly more than three-quarters of the bisexual group were female (81.3%). The mean age of respondents was similar for heterosexual (21.8 years), bisexual (21.3), and homosexual (22.1) respondents. Bisexual participants were more likely to be White (75.2% versus 66.1% for gay/lesbian and 65.4% for heterosexual adolescents, respectively) and less likely to be Black (7.2% versus 12.5% for gay/lesbian and 15.9% for heterosexual adolescents, respectively). We also observed marginally significant differences in educational attainment as a function of sexual orientation (Table 1). No differences in nativity were observed according to sexual orientation. To adjust for sociodemographic differences across sexual orientation groups, all analyses controlled for gender, race/ethnicity and educational attainment.

Exposure to adversity—Physical abuse by parents or caregivers prior to grade 6 was assessed with an item that asked respondents to indicate how often their parents or caregivers slapped, hit, or kicked them. Physical abuse was coded as present for respondents who reported more than 5 instances of caregiver physical maltreatment. Sexual abuse prior to grade 6 was assessed with an item that assessed whether parents or caregivers touched the respondent in a sexual way, forced the respondent to touch them in sexual way, or forced them to have sexual intercourse. This item was dichotomized, with respondents reporting 1 or more incidents of sexual abuse coded as exposed. The child maltreatment items used in Add Health have adequate convergent validity and in previous studies have demonstrated expected associations with psychosocial functioning and mental health (Fletcher, 2009; Shin, Edwards, & Heeren, 2009).

Two items were used to assess housing-related adversity. The first item determined whether respondents had ever been homeless. This item assessed whether respondents had slept in a homeless shelter or in a place “*where people weren't meant to sleep*” for 1 week or longer. The second item assessed whether the respondent had ever been forced out of their house by their parents or caregivers. Each of these items was coded dichotomously in the survey as either present or absent. No information on the timing of exposure to housing adversity was collected in the survey; as such, we only know that the respondent experienced homeless or was forced out of their home by a parent or caregiver *prior* to the Wave III survey on which these analyses are based. However, evidence suggests that even very brief periods of homelessness are associated with increases in mental health problems and that “*unsafe, chaotic, unpredictable shelter placements are not conducive to normal psychological development*” (Rafferty & Shin, 1991, p. 1175).

IPV was assessed with three items. Respondents indicated first how often a romantic partner had threatened them with violence, pushed or shoved them, or threw something at them that could result in injury. Second, respondents indicated how frequently a romantic partner forced them to have sexual relations against their will. A third item determined whether the respondent had ever been injured as a result of a fight with a romantic partner. We created a dichotomous IPV variable such that respondents who endorsed any of these experiences were coded as having experienced IPV. Importantly, this variable captured only experiences

of IPV victimization and not perpetration of IPV by the respondent, which was assessed in a separate set of items not included in our analysis. These IPV variables have been used in prior studies of adolescent relationship quality and health (Adam et al., 2011; Fang, Massetti, Ouyang, Grosse, & Mercy, 2010). Similar to the items assessing housing-related adversity, the survey did not collect information on the timing of exposure to IPV. These items therefore focus on lifetime occurrence prior to the Wave III survey.

Finally, we created an aggregate dichotomous variable for exposure to any of these adverse childhood experiences. Respondents who endorsed any of these experiences were coded positively on this aggregate adversity measure.

Mental health—Depressive symptoms were assessed using a 9-item version of the Center for Epidemiological Studies Depression Scale, a widely used measure of depression symptomatology developed for use in general population samples (Radloff, 1977). Respondents indicated the severity of depressive symptoms in the past week on a scale ranging from “never or rarely” to “most/all of the time.” The scale has sound psychometric properties and is a valid measure of adolescent depression (Radloff, 1977; Roberts, Lewinsohn, & Seeley, 1991). The short form of the CES-D used in the Add Health survey has demonstrated adequate reliability (Cronbach’s $\alpha=0.79$) and has been utilized in numerous studies examining the correlates and consequences of adolescent depressive symptoms (Fletcher, 2009; Gerard & Buehler, 2004; Paschall, Freisthler, & Lipton, 2005). Past-year suicidal ideation was assessed with the following item: “During the past 12 months, did you ever seriously think about committing suicide?” An additional item assessed the number of times each respondent attempted suicide in the past year. Drawing on the coding used in previous studies with this sample, suicidality was coded as present if respondents endorsed either past-year suicidal ideation or attempt (Bearman & Moody, 2004; Thompson, Kuruwita, & Foster, 2009).

Substance misuse was assessed in three ways. First, we created indicators of problematic use of tobacco and illicit drugs. The frequency (number of days out of the past 30 that the respondent smoked) and quantity (number of cigarettes smoked on those days) of tobacco use was assessed, and the product of these values was calculated to create a summary measure. A similar summary measure of tobacco use has been used in previous studies utilizing Add Health data (Russell et al., 2002). Dichotomous items assessed the use of illicit drugs, including cocaine, crystal methamphetamine, and injection drugs since the baseline survey in 1995. We created a dichotomous variable to reflect endorsement of any illicit drug use since the baseline survey. This measure has been used in previous studies of adolescent and early-adult drug use (Humensky, 2010). Second, past-year binge drinking was assessed with an item regarding whether the respondent had 4 or more drinks (females) or 5 or more drinks (males) in 1 setting over the past year. This measure of binge drinking has been used in numerous previous studies (Marshall, Friedman, Stall, & Thompson, 2009; Shin et al., 2009). Third, symptoms of both alcohol and drug abuse were assessed. Respondents indicated the number of times in the past year that their alcohol use had caused them problems in 7 life domains (e.g., problems at school or work) and whether they had driven while intoxicated since the baseline assessment. The same set of items assessed symptoms of drug abuse. These items were summed separately for alcohol and drug abuse. These measures also have been used in prior research (Watt, 2004).

Data analysis

We investigated whether exposure to early-life adversity explained elevated rates of psychopathology among LGB individuals relative to heterosexuals using standard tests of statistical mediation. To provide evidence for mediation, four criteria must be met (Baron &

Kenny, 1986; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). First, an association between the exposure and outcome must be established. Here, we examined sexual-orientation disparities in psychopathology using logistic regression for binary outcomes and linear regression for continuous outcomes. Because the continuous symptom measures (depressive symptoms, tobacco use, and symptoms of alcohol and drug abuse) were not normally distributed, we conducted a log transformation on each of these variables prior to conducting linear regression analysis. Second, the exposure must be associated with the putative mediator. We evaluated the association between sexual orientation and adversity using logistic regression. Third, the mediator must be associated with the outcome. Associations between early-life adversity and psychopathology were examined using logistic regression for binary outcomes and linear regression for continuous outcomes, controlling for sexual orientation. The final test of mediation evaluates the degree of attenuation in the association between the exposure and outcome after adjustment for the mediator (Baron & Kenny, 1986; MacKinnon et al., 2002). We examined the attenuation in the association between sexual orientation and psychiatric outcomes after controlling for exposure to adversity. To evaluate the statistical significance of the mediating effect, we used methods outlined by MacKinnon and Dwyer (1993) for mediation analysis involving a combination of dichotomous and continuous mediators and outcomes. All models controlled for gender, race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, Other), nativity (U.S.-born versus all others), and educational status (enrolled/completed post-secondary education versus all others). Statistical analyses were conducted using SUDAAN 10 to adjust for the complex survey design (Research Triangle Institute, 2008). Statistical significance was evaluated using .05-level, 2-sided tests.

Results

Sexual orientation and mental health

The prevalence or mean value of each mental health outcome among heterosexual, homosexual, and bisexual respondents is shown in Table 2. Elevated rates of every psychiatric outcome considered here were observed among LGB respondents relative to heterosexuals.

Associations between sexual orientation and mental health were examined in a series of multivariable regression models that adjusted for socio-demographics (see first column of Table 4). Lesbian/gay respondents were more likely to experience suicidality, engage in binge drinking, tobacco use, and illicit drug use, and reported higher levels of depressive symptoms and alcohol abuse than heterosexual respondents. Elevations in psychiatric morbidity were also observed among bisexual respondents, who were more likely to experience suicidality and to engage in binge drinking and illicit drug use than heterosexual respondents. Bisexual respondents also endorsed higher levels of depressive symptoms, tobacco use, and both alcohol and drug abuse than heterosexuals.

Sexual orientation and adversity

The prevalence of early-life adversity among heterosexual, homosexual, and bisexual respondents is shown in Table 3. Higher rates of exposure to all types of adversity were evident among LGB respondents as compared to heterosexuals, including child physical and sexual abuse, homelessness, being kicked out of one's house, and both physical and sexual IPV, although physical IPV was higher only among bisexual respondents. Approximately half of gay/lesbian (45.3%) and bisexual (51.6%) respondents were exposed to at least 1 of these adverse experiences. In contrast, exposure to adversity was less common among heterosexuals, with approximately one-third of respondents reporting exposure to at least 1 adverse childhood experience (33.8%).

Associations between sexual orientation and each type of adversity were examined in logistic regression models that adjusted for socio-demographics. Both gay/lesbian (OR=1.7, 95% CI: 1.2–2.4) and bisexual (OR=2.2, 95% CI: 1.5–3.1) respondents had elevated odds of experiencing any adversity compared to heterosexuals. The odds of exposure to child abuse were elevated among both gay/lesbian (OR=2.2, 95% CI: 1.4–3.4) and bisexual respondents (OR=1.6, 95% CI: 1.1–2.4), whereas the odds of exposure to IPV were heightened only among bisexual respondents (OR=1.7, 95% CI: 1.1–2.5). The odds of exposure to housing adversity were elevated among both gay/lesbian (OR=1.8, 95% CI: 1.1–2.8) and bisexual (OR=2.4, 95% CI: 1.6–3.7) respondents.

Adversity and mental health

Greater exposure to any early-life adversity was associated with elevated odds of every mental health outcome examined here, including suicidality (OR=3.1, 95% CI: 2.5–3.9), depression ($\beta=0.5$, 95% CI: 0.4–0.5), tobacco use ($\beta=1.22$, 95% CI: 1.0–1.4), binge drinking (OR=1.3, 95% CI: 1.1–1.5), alcohol abuse symptoms ($\beta=0.5$, 95% CI: 0.4–0.6), illicit drug use (OR=2.5, 95% CI: 2.1–3.0), and drug abuse symptoms ($\beta=0.3$, 95% CI: 0.3–0.4). When we examined different types of adversity separately in predicting mental health outcomes, each type was associated significantly with each psychiatric outcome (detailed results not shown but available on request).

Mediation models

The association between sexual orientation and each mental health outcome before and after adjustment for various adversities is shown in Table 4, separately for gay/lesbian and bisexual respondents. Among gay/lesbian respondents, the greatest reductions in the association between sexual orientation and psychiatric morbidity (differences in associations between models 1 and 5) were observed for tobacco use (19.2%), depressive symptoms (18.2%), alcohol abuse (10.9%), and suicidality (10.7%) after accounting for exposure to all early-life adversities. The association between gay/lesbian sexual orientation and tobacco use was no longer significant after controlling for adversity exposure. Attenuations of the associations with illicit drug use and binge drinking were less marked (7.3% and 3.0%, respectively).

Exposure to any childhood adversity was a significant mediator of the association between gay/lesbian orientation and suicidality ($z = 4.04$, $p = .004$), depressive symptoms ($z = 4.17$, $p = .002$), tobacco use ($z = 4.08$, $p = .004$), and symptoms of alcohol abuse ($z = 3.79$, $p = .002$).

The associations between sexual orientation and psychiatric morbidity were also attenuated among bisexual respondents. Sizeable reductions in the association between bisexual orientation and psychopathology were observed for tobacco use (21.5%), suicidality (16.4%), depressive symptoms (13.8%), alcohol abuse (12.9%), illicit drug use (12.9%), and drug abuse (10.9%) after accounting for exposure to any childhood adversities. Attenuation of the association between bisexual orientation and binge drinking was smaller in magnitude (5.0%).

Exposure to any early-life adversity was a significant mediator of the association between bisexual orientation and suicidality ($z = 3.06$, $p = .005$), illicit drug use ($z = 3.04$, $p = .003$), depressive symptoms ($z = 3.11$, $p = .002$), tobacco use ($z = 3.07$, $p = .004$), symptoms of alcohol abuse ($z = 2.94$, $p = .002$), and symptoms of drug abuse ($z = 3.04$, $p < .001$).

Discussion

Gay/lesbian and bisexual individuals are more than twice as likely to meet the diagnostic criteria for a psychiatric disorder as compared to heterosexuals (Meyer, 2003b). Chronic experiences of stigma and discrimination have frequently been invoked as explanations for sexual orientation disparities in mental health (Meyer, 1995, 2003a, 2003b; Radkowski & Siegel, 1997). In addition to these social stressors, research has also shown that LGB populations have higher rates of victimization experiences stemming from family and romantic relationships in childhood and adolescence (Balsam et al., 2005; Corliss et al., 2002; Matthews et al., 2002; Tjaden et al., 1999). With rare exception (e.g., Jun et al., 2010), however, studies have not evaluated the extent to which exposure to a wide array of early-life adversities play a role in explaining sexual orientation-related health disparities. Using data from a nationally representative sample, we find that LGB youths experience disproportionate exposure to childhood physical and sexual abuse, homelessness and being expelled from their homes, and physical and sexual victimization by intimate partners. Together, these victimization experiences explain, in part, elevations in a wide range of psychiatric outcomes among LGB youths.

Approximately half of the sexual minority adolescents in this study have been exposed to adverse childhood experiences related to victimization by family members or romantic partners, and the prevalence of exposure to these childhood adversities is considerably higher among LGB youths as compared to their heterosexual peers. These findings are consistent with several studies in adults documenting elevated rates of childhood physical and sexual abuse as well as intimate partner violence among LGB individuals relative to heterosexuals (Balsam et al., 2005; Corliss et al., 2002; Matthews et al., 2002; Tjaden et al., 1999). Importantly, we provide the first nationally representative estimates of homelessness among sexual minority youths. Our findings suggest that approximately 1 in 10 LGB adolescents has experienced homelessness, which is more than twice the rate among heterosexuals in Add Health. Moreover, most previous studies have not had adequate sample sizes to examine exposure to adversity separately among gay/lesbian and bisexual individuals. Here, we find that the patterning of exposure to early-life adversity differs somewhat for gay/lesbian and bisexual respondents, demonstrating the importance of such an approach. Although exposure to housing adversity and child abuse is elevated among all LGB youths relative to heterosexuals, only bisexual adolescents are more likely to experience IPV. One possible explanation for this pattern is that a greater proportion of bisexual respondents in this sample are female, whereas a greater proportion of respondents identifying as homosexual are male. Although the literature on gender differences in exposure to IPV has produced inconsistent results, meta-analytic findings suggest that men and women are equally likely to perpetrate IPV, but women are more likely to be injured as a result of violence perpetrated by intimate partners (Archer, 2000). The applicability of this literature to LGB individuals is unknown, however, given that most previous research on IPV has focused on heterosexual couples (Archer, 2000). Although high rates of exposure to IPV have been documented in adult same-sex couples (Balsam & Szymanski, 2005; Houston & McKirnan, 2007), we are unaware of prior research examining gender differences in rates of exposure.

Consistent with an extensive literature on sexual orientation-based disparities in psychiatric morbidity among both adolescents and adults (Cochran & Mays, 1994; Fergusson et al., 1999; Gilman et al., 2001; Russell & Joyner, 2001; Sandfort et al., 2001; Ziyadeh et al., 2007), we find that the prevalence of a wide range of mental health problems—including suicidality, depressive symptoms, and substance abuse—is higher among LGB youths than heterosexuals. The results of our mediation analysis suggest that exposure to victimization, in both family and romantic relationships, partially explains these disparities. Adverse

childhood experiences are a significant partial mediator of the association between sexual orientation and suicidality, depressive symptoms, tobacco use, and symptoms of drug and alcohol abuse. The mediating role of these experiences was most marked for tobacco use, explaining approximately 20% of the excess use of tobacco among sexual minority youths. If our findings reflect true associations, this pattern suggests that preventing exposure to violence and other adverse environments in LGB youths could lead to meaningful reductions in smoking in this population. Adverse childhood experiences also account for approximately 10 to 20% of the relative excess of suicidality, depression, and alcohol and drug abuse among LGB youths relative to heterosexuals. Our findings are consistent with 1 prior study documenting child abuse as a partial mediator of disparities in smoking and alcohol use in lesbian and bisexual women (Jun et al., 2010).

Study results provide, to our knowledge, the first evidence documenting the role of exposure to victimization by parents and romantic partners in explaining sexual orientation disparities across a wide range of mental health outcomes, including depression, suicidality, and problematic alcohol and substance use. Victimization experiences likely engender feelings of hopelessness and low self-worth that increase risk for depression and suicidality (Plöderl & Fartacek, 2005; Safren & Heimberg, 1999). Moreover, adolescents may turn to substances as a coping strategy to manage the negative affect elicited by victimization experiences (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Carpenter & Hasin, 1998; Cooper, Frone, Russell, & Mudar, 1995; Ham & Hope, 2003). Exposure to victimization early in life may also set in motion a cascade of psychological, physiological, and social processes that increase the likelihood of being exposed to other stressful life events, further compounding the mental health risks associated with these experiences. For example, an adolescent who is kicked out of their home by caregivers and forced to live on the street or in a homeless shelter is likely to experience food insecurity and financial strain, develop relationships with deviant peer groups, have greater access to illicit drugs, and be exposed to high levels of violence, all of which contribute to elevated risk for psychopathology.

Our findings highlight at least three potential strategies for reducing disparities in psychiatric morbidity among LGB youths. First, individual-level interventions targeting the psychosocial pathways linking stress exposure to the wide range of mental health problems associated with minority sexual orientation may prevent the onset of psychopathology among victimized LGB youths. Prior research suggests specific targets for such interventions, including emotion regulation skills (Hatzenbuehler, 2009; Hatzenbuehler, et al., 2008; McLaughlin & Hatzenbuehler, 2009; McLaughlin, Hatzenbuehler, & Hilt, 2009), social isolation (Hatzenbuehler, 2009; Pachankis, 2008), and hopelessness (Hatzenbuehler, 2009; Russell & Joyner, 2001; Safren & Heimberg, 1999). Second, because adolescents often rely on parents—who also may be perpetrators—for health care, implementing screening programs within schools to identify LGB youths experiencing victimization within the family and referring them to appropriate mental health intervention may improve access to services and reduce psychiatric morbidity in this population. Recent evidence suggests that school policies promoting a supportive atmosphere for LGB students can have a marked effect on mental health outcomes (Hatzenbuehler, 2011), highlighting the important role of school climate in shaping mental health outcomes in LGB youths. Future research is needed to evaluate whether schools that create supportive environments for LGB youths mitigate the impact of exposure to victimization within family and romantic relationships. Finally, the most promising strategy is to reduce exposure to victimization experiences in the first place. Developing family and community-level interventions specifically for LGB populations exposed to early-life adversity remains an important public health priority. Additionally, the high prevalence of IPV victimization among bisexual youths indicates the importance of addressing the unique needs of this population in partner

violence prevention programs, the majority of which target males in heterosexual relationships (Babcock, Green, & Robie, 2004).

These findings should be interpreted in light of study limitations. First, these analyses utilize cross-sectional data, because Add Health assessed sexual orientation only at Wave 3. Future prospective data in which exposure to adverse experiences is assessed prior to mental health outcomes is needed to establish clearer causal inferences. Second, we relied on retrospective reports of exposure to victimization, which are associated with recall bias. However, prior research suggests that under-reporting of adverse events is most common in retrospective studies and that retrospective recall does not inflate associations between adversity and mental health (Brewin, Andrews, & Gotlib, 1993; Hardt & Rutter, 2004; Scott, Smith, & Ellis, 2010). Third, the number of LGB respondents was not large enough to examine gender differences in the associations of adversity with psychopathology. The mental health risks associated with minority sexual orientation differ for gays and lesbians and for bisexual women and men (Conron, Mimiaga, & Landers, 2010; Russell, et al., 2002; Ziyadeh, et al., 2007), pointing to the importance of examining the mediating role interpersonal victimization separately for these groups in future studies. Additionally, respondents who reported being “mostly homosexual” were combined with those who identified as “100% homosexual” as another strategy for increasing statistical power. This analytic approach has been used in other studies (Austin et al., 2004; Corliss et al., 2008) but may obscure important subgroup differences. Fourth, psychopathology was assessed with brief screening measures, precluding our ability to make inferences about the mediating role of adverse experiences in the onset of psychiatric disorders among LGB populations. Investigation of these associations in national samples that included measures of psychiatric disorders represents an important goal for future research. Moreover, the time period during which psychopathology was assessed varied somewhat across the different outcomes. For most outcomes, a time period of 1 year was used to assess the presence of symptomatology (suicidality, binge drinking, alcohol, and drug abuse). In contrast, depressive symptoms were assessed during the past 2 weeks, tobacco use was assessed during the past 30 days, and use of illicit drugs was assessed during the time period elapsing between the Wave I Add Health survey and the Wave III survey (1995–2001/2002). Finally, we examined only a subset of the range of early-life adverse experiences that are likely to underlie sexual orientation disparities in mental health (Faulkner & Cranston, 1998; Radkowsky & Siegel, 1997; Robin et al., 2002; Russell et al., 2001). Indeed, these exposures were only partial mediators of the association between minority sexual orientation and most mental health outcomes. The extent to which other types of adversity including peer victimization, experiences of discrimination, and violence outside the home mediate the associations between sexual orientation and mental health remains to be characterized in future work.

In addition to experiencing stigma, discrimination, and victimization by peers, LGB youths are exposed to high levels of victimization within their families and romantic relationships. These adverse experiences explain, in part, elevated psychiatric morbidity among sexual minority adolescents and young adults. These findings highlight the importance of not only developing and implementing programs to identify and provide mental health services to LGB youths exposed to early-life adversity but also of reducing exposure to victimization in this population.

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Table 1

Socio-demographic characteristics by sexual orientation of respondents in the National Longitudinal Study of Adolescent Health (n=15,197), 2001–2002

	Heterosexual		Gay/Lesbian		Bisexual	
	%	(SE)	%	(SE)	%	(SE)
Male	53.4	(0.7)	61.7	(4.1)	18.8	(3.5)
Female	46.6	(0.7)	38.3	(4.1)	81.3	(3.5)
	$\chi^2(2) = 233.3, p < .0001$					
Non-Hispanic White	65.4	(2.9)	66.1	(5.0)	75.2	(4.0)
Non-Hispanic Black	15.9	(2.1)	12.5	(3.3)	7.2	(1.9)
Hispanic	11.7	(1.8)	14.4	(3.5)	12.5	(2.8)
Other	7.0	(0.9)	7.0	(1.9)	5.2	(1.8)
	$\chi^2(6) = 3.0, p = .01$					
Foreign Born	5.9	(0.9)	7.3	(2.2)	4.4	(1.7)
U.S. Born	94.1	(0.9)	92.7	(2.2)	95.6	(1.7)
	$\chi^2(2) = 0.9, p = .40$					
Enrolled or Completed College	52.3	(1.8)	62.3	(4.7)	48.4	(5.1)
No College	47.7	(1.8)	37.7	(4.7)	51.6	(5.1)
	$\chi^2(2) = 2.8, p = .07$					

Table 2

Mental health outcomes by sexual orientation (n=15,197) in the National Longitudinal Study of Adolescent Health, 2001–2002

Binary Outcomes	Heterosexual		Gay/Lesbian		Bisexual	
	%	(SE)	%	(SE)	%	(SE)
Suicidality	5.4	(0.3)	15.5	(3.0)	17.7	(3.5)
Binge Drinking ¹	34.2	(1.1)	48.4	(5.2)	41.8	(5.0)
Illicit Drug Use	11.8	(0.6)	29.9	(5.1)	28.2	(4.0)
Continuous Outcomes (log-transformed) ²	M	(SE)	M	(SE)	M	(SE)
Depressive Symptoms	0.8	(0.02)	1.1	(0.12)	1.5	(0.10)
Tobacco Use ³	0.3	(0.09)	0.9	(0.34)	1.5	(0.38)
Alcohol Abuse Symptoms	-0.5	(0.05)	0.2	(0.17)	0.04	(0.18)
Drug Abuse Symptoms	-1.9	(0.02)	-1.8	(0.11)	-1.5	(0.13)

¹ Binge drinking defined whether the respondent had more than 5 drinks (males) or 4 drinks (females) in one setting over the past year.

² Respondents who reported 0 symptoms were assigned a value of 0.1 and therefore have a negative value for this outcome after log transformation. For some outcomes, the mean level is negative (e.g., alcohol abuse symptoms for heterosexuals), because the majority of that group reported no symptoms.

³ Tobacco use defined as the number of days out of the past 30 days that the respondent smoked multiplied by the number of cigarettes smoked on those days.

Table 3

Exposure to early-life adversity by sexual orientation (n=15,197) in the National Longitudinal Study of Adolescent Health, 2001–2002

	Heterosexual		Gay/Lesbian		Bisexual	
	%	(SE)	%	(SE)	%	(SE)
Child Abuse	10.8	(0.4)	20.9	(3.5)	15.1	(2.5)
Physical Abuse	7.8	(0.3)	16.1	(3.3)	11.2	(2.4)
Sexual Abuse	4.2	(0.3)	8.0	(2.6)	8.4	(2.2)
Housing Adversity	12.4	(0.5)	18.4	(3.4)	24.1	(3.8)
Homelessness	3.5	(0.3)	8.6	(2.3)	12.4	(2.5)
Kicked Out [†]	10.5	(0.5)	17.7	(3.3)	17.9	(3.4)
Intimate Partner Violence	19.6	(0.6)	18.6	(3.6)	29.4	(4.1)
Physical Violence	17.4	(0.6)	16.9	(4.4)	25.3	(4.1)
Sexual Violence	11.3	(0.5)	15.5	(3.6)	15.3	(3.4)
Injured	8.1	(0.4)	8.0	(2.6)	13.6	(3.5)
Any Adversity	33.8	(0.7)	45.3	(4.2)	51.6	(4.3)

[†] Item assessed whether respondent had ever been forced out of the house by their parents.

Table 4

Associations between sexual orientation and mental health after accounting for early-life adversity (n=15,197) in the National Longitudinal Study of Adolescent Health, 2001–2002

		Gay/Lesbian										
		Model 1 (Adjusted for Socio- Demographics) ¹		Model 2 (Controlling Child Abuse) ²		Model 3 (Controlling Housing Adversity) ³		Model 4 (Controlling IPV) ⁴		Model 5 (Controlling All Adversities) ⁵		
Binary Outcomes	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Suicidality	3.19*	(2.0, 5.2)	2.86*	(1.8, 4.6)	3.03*	(1.8, 5.0)	3.24*	(1.9, 5.4)	2.85*	(1.7, 4.7)	2.85*	(1.7, 4.7)
Binge Drinking	1.69*	(1.1, 2.6)	1.67*	(1.1, 2.5)	1.66*	(1.1, 2.5)	1.69*	(1.1, 2.6)	1.64*	(1.1, 2.5)	1.64*	(1.1, 2.5)
Illicit Drug Use	3.14*	(1.9, 5.2)	3.00*	(1.8, 5.0)	3.06*	(1.8, 5.1)	3.20*	(1.9, 5.4)	2.91*	(1.7, 4.9)	2.91*	(1.7, 4.9)
Continuous Outcomes (log-transformed)	β	(95% CI)	β	(95% CI)	β	(95% CI)	β	(95% CI)	β	(95% CI)	β	(95% CI)
Depressive Symptoms	0.33*	(0.1, 0.6)	0.29*	(0.1, 0.5)	0.30*	(0.1, 0.5)	0.33*	(0.1, 0.6)	0.27*	(0.1, 0.5)	0.27*	(0.1, 0.5)
Tobacco Use	0.78*	(0.1, 1.5)	0.71*	(0.1, 1.4)	0.66	(-0.0, 1.3)	0.78*	(0.1, 1.5)	0.63	(-0.1, 1.3)	0.63	(-0.1, 1.3)
Alcohol Abuse Symptoms	0.55*	(0.2, 0.9)	0.52*	(0.2, 0.9)	0.52*	(0.2, 0.9)	0.55*	(0.2, 0.9)	0.49*	(0.1, 0.8)	0.49*	(0.1, 0.8)
Drug Abuse Symptoms δ	0.09	(-0.1, 0.3)	--	--	--	--	--	--	--	--	--	--
		Bisexual										
		Model 1 (Adjusted for Socio- Demographics) ²		Model 2 (Controlling Child Abuse)		Model 3 (Controlling Housing Adversity)		Model 4 (Controlling IPV)		Model 5 (Controlling All Adversities)		
Binary Outcomes	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Suicidality	3.78*	(2.3, 6.2)	3.61*	(2.2, 6.0)	3.41*	(2.0, 5.7)	3.47*	(2.1, 5.7)	3.16*	(1.9, 5.2)	3.16*	(1.9, 5.2)
Binge Drinking	1.81*	(1.2, 2.8)	1.79*	(1.2, 2.8)	1.75*	(1.1, 2.7)	1.75*	(1.1, 2.8)	1.72*	(1.1, 2.7)	1.72*	(1.1, 2.7)
Illicit Drug Use	3.80*	(2.5, 5.8)	3.73*	(2.4, 5.7)	3.47*	(2.2, 5.4)	3.55*	(2.3, 5.6)	3.31*	(2.1, 5.2)	3.31*	(2.1, 5.2)
Continuous Outcomes (log-transformed)	β	(95% CI)	β	(95% CI)	β	(95% CI)	β	(95% CI)	β	(95% CI)	β	(95% CI)

Depressive Symptoms	0.58*	(0.4, 0.8)	0.56*	(0.4, 0.7)	0.30*	(0.1, 0.5)	0.55*	(0.4, 0.7)	0.50*	(0.3, 0.7)
Tobacco Use	1.07*	(0.4, 1.8)	1.03*	(0.3, 1.7)	0.85*	(0.2, 1.6)	0.97*	(0.3, 1.7)	0.84*	(0.1, 1.5)
Alcohol Abuse Symptoms	0.62*	(0.3, 1.0)	0.61*	(0.2, 1.0)	0.58*	(0.2, 1.0)	0.57*	(0.2, 1.0)	0.54*	(0.2, 0.9)
Drug Abuse Symptoms	0.55*	(0.3, 0.8)	0.53*	(0.3, 0.8)	0.50*	(0.3, 0.7)	0.51*	(0.3, 0.8)	0.49*	(0.2, 0.7)

* Significant at the .05 level, 2-sided test. Confidence intervals that do not include 1 are statistically significant for binary outcomes; confidence intervals that do not include 0 are significant for continuous outcomes.

¹ Model includes controls for gender, race/ethnicity, nativity, and enrollment or completion in post-secondary education.

² Model includes controls for socio-demographics included in Model 1 and dummy variable for exposure to child physical or sexual abuse.

³ Model includes controls for socio-demographics included in Model 1 and dummy variable for exposure to homelessness or being kicked out by parents.

⁴ Model includes controls for socio-demographics included in Model 1 and dummy variable for exposure to physical or sexual intimate partner violence.

⁵ Model includes controls for socio-demographics included in Model 1 and dummy variable for exposure to any of the three types of adversity.

⁶ Because gay/lesbian sexual orientation had no association with drug abuse symptoms ($p > .4$), mediation models were not examined for the outcome of drug abuse symptoms.