Explaining the Mental Health Disparity by Sexual Orientation: The Importance of Social Resources

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Ning Hsieh
University of Pennsylvania

Abstract

This study examines the role of social integration and social support, a significant yet under-investigated factor in mental health disparities by sexual orientation. By analyzing National Health and Nutrition Examination Survey data from a representative sample of the middle-aged U.S. population, the study shows that bisexual-identified individuals have the lowest levels of social resources and the poorest mental health status of all sexual orientation groups. Lesbian/gay-identified individuals and heterosexual-identified individuals with same-sex sexual experience are less socially integrated or perceive less emotional support than the sexual majority, but do not report poorer mental health. Moreover, social integration and social support jointly mediate the link between sexual orientation and mental distress: sexual minorities are less socially integrated, which is related to a lower level of social support, and, in turn, a higher level of mental distress. Additionally, minority-identified individuals reap more health benefits from confidants and emotional support. These findings suggest that sexual minorities are among those who most need and most benefit from supportive social relationships. The study therefore reveals the importance of social resource interventions in narrowing the mental health gap by sexual orientation.

Introduction

A large body of research has shown that sexual minority group members experience a higher risk of mental distress and related conditions, for example depression, substance abuse, and suicide attempts, than individuals in the sexual majority (e.g., Bostwick et al. 2010; Conron, Mimiaga, and Landers 2010; Gilman et al. 2001; Institute of Medicine 2011).[1] Many studies have also argued that the higher rates of mental distress among sexual minorities are partially explained by elevated levels of stress due to, for example, discrimination and victimization experiences, internal homophobia, the concealment of sexual orientation, and expectations of rejection (Hatzenbuehler 2009; Lehavot and Simoni 2011; Mays and Cochran 2001; Meyer 2003; Pachankis 2007; Williams et al. 2005).

In contrast, another determinant of mental health disparities that has been identified as an important coping asset—social resources—has not been sufficiently studied. Lower levels of social resources may mediate the link between sexual minority status and mental distress. Specifically, due to family and peer rejection, sexual minorities may be more likely to have restricted social networks, reduced levels of social support, and subsequently an elevated risk of psychopathology (Hatzenbuehler 2009; Ueno 2005, 2010; Williams et al. 2005). In addition, social isolation and the lack of social support may do more harm to the mental health of sexual minorities partly because of their disadvantageous social positions and higher exposure to stressful experiences (Cassel 1976; Cobb 1976; Turner and Brown 2010).

This study fills a gap in the existing research on the role of social resources in mental health disparities across sexual orientation groups. Building on the literature on social relationships and mental health, the study tests both the mediating and the moderating effects of social integration and social support on the association between sexual orientation and mental

health. These two effects have often been overlooked and untested in empirical research even though they provide insights into the use of social resource interventions to reduce the current mental health disparities in U.S. society. Specifically, the presence of mediating effects would suggest that programs that target social isolation and the lack of social support for sexual minorities might inhibit the accumulation of additional mental distress among this group. The presence of moderating effects would indicate that such programs might be particularly useful for ameliorating any minority distress that does occur.

In addition, the study addresses several common concerns found in the literature. In particular, many studies have focused on the relationship between social cohesion/support and mental health only among sexual minorities, and have failed to address how disadvantageous social positions compromise health status. In contrast, this study examines disparities in social and mental well-being between sexual minorities and the sexual majority as well as between sexual minority subgroups. Moreover, unlike many studies that rely on non-probability samples drawn from a wide array of geographical areas or social venues (Institute of Medicine 2011), this study uses a sample from the National Health and Nutrition Examination Survey (NHANES) that is representative of the middle-aged U.S. population. Finally, most research has considered only one dimension of sexual orientation (e.g., sexual identity, behavior, or attraction), thus overlooking the psychosocial well-being of minority groups with discordance among sexual orientation dimensions. This study examines two major dimensions simultaneously: sexual identity (self-identification as heterosexual/straight, lesbian/gay, or bisexual) and sexual behavior (whether the respondent has ever had same-sex sexual intercourse). It improves our understanding of identity-behavior discordance that is relevant to individuals' access to social resources and mental health.

In response to the Institute of Medicine's (2011) recent call for research on protective factors for the health of sexual minorities, this study argues that both social integration and social support are important factors in the mental health of sexual minorities, including both individuals who self-identify as lesbian, gay, or bisexual and heterosexual-identified individuals with same-sex sexual experience. The findings reveal the important role of supportive social relationships in bridging the mental health gap between sexual orientation groups.

BACKGROUND

Social Relationships and Mental Health: The Main versus Moderating Effects of Supportive Relationships

Numerous studies have demonstrated that social bonds and supportive relationships are associated with better mental health outcomes (e.g., Berkman and Glass 2000; House, Landis, and Umberson 1988; Lin, Ye, and Ensel 1999; Turner and Brown 2010). Overall, research has demonstrated that social relationships are beneficial to mental health because they provide individuals with emotional, instrumental, and informational assistance; foster a sense of meaning and belonging; and facilitate health-promoting behaviors such as exercise, diet, and adherence to medical regimens. The term "social relationships" is used as an umbrella term to refer to a variety of related constructs, including the ones examined in this study—social integration and social support (Berkman and Glass 2000; House, Umberson, and Landis 1988).

Researchers have argued that both social integration (i.e., the existence and quantity of relationships) and social support (i.e., the content and quality of relationships) are important for mental health (Berkman and Glass 2000; House et al.1988; Vaux 1988). One of the major pathways through which social integration and social support are linked to health is their joint

influence on health outcomes. In particular, social integration may promote mental health through the provision of social support.

Despite the scholarly consensus about the benefits of social relationships, a major debate remains about specifically how supportive relationships affect mental health, particularly the relative strength of main versus moderating effects. Cassel (1976) and Cobb (1976) argued that because social support helps individuals cope with crises and adapt to life transitions, it is more important in stressful circumstances than in unchallenging circumstances. This notion implies that supportive relationships may benefit the mental health of disadvantaged social groups more because of their higher exposure to stressful experiences. Nevertheless, there is still little research on how the benefits of social relationships vary across social groups (Umberson and Montez 2010). In more recent work, Turner and Brown (2010) argued that the relative importance of the main and moderating effects is complex and conditional—it may vary according to social position (e.g., class) and the type of social resource assessed (e.g., social integration versus perceived support). Acknowledging that the benefits of social relationships vary across population subgroups and levels of stress, the authors argued that it is crucial to identify those who most need and will most benefit from interventions that augment social resources. Given limited resources, this identification will point to the most effective ways to ameliorate psychological distress and thus reduce the current mental health disparities in U.S. society.

Social Relationships and Mental Health across Sexual Orientation Groups

In light of the benefits of social relationships, some studies have examined their influence on the mental health of sexual minorities. For example, Grossman, D'Augelli, and Hershberger

(2000) found that elderly lesbian, gay, and bisexual individuals with domestic partners had better mental health than those living alone. Based on a study of self-identified Latino lesbians and gay men, Zea, Reisen, and Poppen (1999) suggested that social support and identification with the Latino gay and lesbian community were positively related to psychological well-being. Further, Blair and Holmberg (2008) found that perceived support for one's romantic relationship predicted positive mental health outcomes for both homosexuals and heterosexuals. However, this line of research has not considered social resources as a potential factor in mental health disparities by sexual orientation. In particular, many of these studies have focused only on sexual minorities and have not attempted to explain health disparities between sexual minorities and the majority.

Moreover, research on the link between sexual orientation, social relationships, and mental health has rarely looked into the distribution of social resources and mental distress across sexual minority subgroups. While several studies have suggested that higher rates of mental distress experienced by bisexual-identified individuals (relative to lesbian- and gay-identified individuals) may be partially attributed to the lack of an identifiable, resourceful, and supportive community (Bostwick et al. 2010; Conron et al. 2010; Israel and Mohr 2004), few of them have empirically tested this statement. Further, when defining sexual minorities, most studies have considered only one dimension of sexual orientation, usually either sexual identity or sexual behavior. Such definition overlooks the psychosocial well-being of certain minority groups, particularly heterosexual-identified individuals with same-sex experience. Studies have stressed that compared to those who identify as a sexual minority group member, individuals who engage in same-sex sexual behavior but do not embrace a sexual minority identity are more likely to be closeted and thus have a weaker connection to any sexual minority communities

(Knight and Hope 2012; Reback and Larkins 2010; Schrimshaw et al. 2013). Specifically, identity and behavior do not always overlap and that minority identity, rather than minority behavior, carries connotations of community and group resources (Bauer and Jairam 2008; Herek and Garnets 2007; Young and Meyer 2005). Adopting a minority identity is related to more frequent participation in a minority community, which provides instrumental and emotional support for responding to challenges created by sexual stigma; it is also linked to less negative self-evaluation and lower level of internalized homophobia (Herek and Garnets 2007; Reback and Larkins 2010).

In general, heterosexual-identified individuals are more likely to perceive negative consequences of identity-inconsistent sexual behavior than lesbian- and gay-identified individuals, including change of social networks and physical harm (Preciado and Johnson 2013). Researchers have also noted that because heterosexual-identified individuals with same-sex experience are more likely to be concealing their true sexual orientation, they may be less likely to elicit emotional support from friends and family, which may compromise their mental health to a certain extent (Gattis, Sacco, and Cunningham-Williams 2012; Knight and Hope 2012; Reback and Larkins 2010; Schrimshaw et al. 2013). Nevertheless, members of this group may still have a lower risk of mental distress than lesbian-, gay-, and bisexual-identified individuals because they experience less frequent sexuality-based discrimination and victimization (in contrast, they have a higher risk of mental distress than heterosexual-identified individuals who have no same-sex experience) (Bauer, Jairam, and Baidoobonso 2010; Chae et al. 2010; Gattis et al. 2012). For all these reasons, it is necessary to examine heterosexual-identified individuals with same-sex experience as a separate sexual minority group, and only considering the

intersection of sexual identity and sexual behavior will allow scholars to understand the risk of mental distress for members of this group.

Finally, although social resources may have stronger health-promoting effects for disadvantaged social groups (Cassel 1976; Cobb 1976; Turner and Brown 2010), few studies have tested or discussed whether these resources benefit sexual minorities more than the sexual majority. Meanwhile, little is known about whether the benefit of social resources varies across sexual minority subgroups. Accordingly, examining the moderating effects of social integration and social support may help identify members of minority groups who most benefit from the intervention of social resources. In particular, bisexual-identified individuals may benefit from social resources the most because of the "double stigma" they face—the pervasive stereotypes and negative attitudes about bisexuality from both heterosexual-identified and lesbian/gay-identified communities (Bostwick et al. 2010; Israel and Mohr 2004; McLean 2007). In contrast, heterosexual-identified individuals with same-sex experience may benefit from social resources less than lesbian-, gay-, and bisexual-identified individuals because they experience less frequent sexuality-based discrimination and victimization (Bauer et al. 2010; Chae et al. 2010; Gattis et al. 2012).

HYPOTHESES

Hypothesis I. Social integration and social support *mediate* the relationship between sexual orientation and mental health status. In particular, due to social disadvantage, sexual minorities are less socially integrated (more likely to be single, live alone, and have fewer confidants) than the sexual majority, which is related to insufficient social support and, in turn, higher rates of mental distress (Figure 1, Path (1)). In addition, with regard to sexual minority subgroups, I hypothesize that bisexual-identified individuals have fewer social resources than lesbian/gay-

identified individuals (partly because of their "double stigma" and lack of a resource-rich community), which places them at greater risk of mental distress. Similarly, heterosexual-identified individuals with same-sex experience may also have fewer social resources than lesbian/gay-identified individuals, particularly in the form of confidants and emotional support (because they are more likely to be concealing their sexual orientation); however, because the concealment of sexual orientation may protect these individuals from victimization and discrimination, it is unclear whether their mental health will be better or worse than individuals who identify as lesbian or gay.

Hypothesis II. Social integration and social support *moderate* the relationship between sexual orientation and mental health status (Figure 1, Path (2)). Specifically, sexual minorities may reap more benefits from the available social resources than the sexual majority. In addition, among minority subgroups, bisexual-identified individuals may benefit from social resources the most due to their extra hardships; in contrast, heterosexual-identified individuals with same-sex experience may benefit from social resources the least because they may face less frequent sexuality-based discrimination and victimization.

[Figure 1 about here]

DATA AND METHODS

Data and Sample

The current study uses data from three waves (2003-2008) of the National Health and Nutrition Examination Survey (NHANES). Because sexual minorities account for a very small proportion of the sample in each wave, the three waves of cross-sectional data are pooled to increase the power of the statistical analyses. Only individuals aged 40-59 were asked to complete both the section on sexual behavior and the section on social support in these three

waves. After excluding respondents who had never had sex, reported "not sure" or "something else" in response questions about their sexual identity, or had missing values on the covariates, the analytical sample includes 3,615 individuals.[2] In the final sample, 96.7% of respondents self-identified as heterosexual or straight, including 93.4% never having same-sex sexual intercourse and 3.3% having same-sex sexual intercourse; 1.7% self-identified as lesbian or gay; and 1.6% self-identified as bisexual.

Measures

Mental health is measured by "the number of days the respondent reported her/his mental health was not good during the past 30 days" (hereafter described as "the number of days with mental distress"). The survey question specifies that poor mental health can include stress, depression, and any problems with emotions. The measure was developed by the Centers for Disease Control and Prevention as one of four core indicators of health-related quality of life (HRQOL-4); it has been validated in various populations, including the U.S. non-institutionalized adult population, and has been widely used in population-level surveys, including the Behavioral Risk Factor Surveillance System (BRFSS) and NHANES (Moriarty, Zack, and Kobau 2003). Numerous studies in the scientific literature have used this measure (e.g., Drum, Horner-Johnson, and Krahn 2008; Ford et al. 2001; Hassan et al. 2003).

Sexual orientation is a composite variable based on sexual identity and lifetime sexual behavior. In terms of sexual identity, NHANES participants were asked: "Do you think of yourself as: heterosexual or straight; homosexual, lesbian, or gay; bisexual; or something else?" Regarding sexual behavior, participants were asked: "In your lifetime, with how many males have you had vaginal, anal, or oral sex?" and "In your lifetime, with how many females have you had vaginal, anal, or oral sex?" Based on these three measures, I created a composite variable

including four major categories of sexual orientation: heterosexual or straight identity *with no* same-sex sexual experience; heterosexual or straight identity *with* same-sex sexual experience; lesbian or gay identity *with or without* same-sex sexual experience; and bisexual identity *with or without* same-sex sexual experience (hereafter referred to as heterosexual with no same-sex experience, heterosexual with same-sex experience, lesbian and gay, and bisexual).[3]

Social resources include two components: social integration and social support. Social integration is measured by three variables: marital status, residential status, and number of confidants. Marital status indicates whether an individual is currently married/cohabiting or not. Residential status reflects whether an individual lives alone. The number of confidants, including "relatives or non-relatives that the respondent feels at ease with, can talk to about private matters, and can call on for help," represents the size of strong social networks on which an individual can rely. Social support is measured by two variables: emotional support and financial support, both of which are perceived support. Emotional support indicates whether an individual has access to sufficient "emotional support such as talking over problems or helping make difficult decisions" in the last 12 months. Financial support indicates whether or not, when a respondent "needs some extra help financially" s/he "could count on anyone to help him/her; for example, by paying any bills, housing costs, hospital visits, or providing him/her with food or clothes."

Control variables include race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other race including multiracial), gender, age, education (having at least some college education or not), and the year of the survey. According to previous research, these socio-demographic variables are relevant to mental health status and/or access to social resources. In particular, although racial/ethnic minorities inhabit disadvantageous positions in the social structure, many have lower rates of mental disorders than whites; some studies suggest that

stronger family support and religious participation play a crucial role in buffering the negative effects of racial/ethnic minority stress (Williams, Costa, and Leavell 2010). Moreover, women tend to have higher rates of mental distress than men, particularly depression and anxiety, partly due to greater constraints on personal advancement (e.g., family-work tensions); fortunately, women also perceive higher levels of social support, which may alleviate some of their distress (Mirowsky 1996; Mirowsky and Ross 1995; Turner and Marino 1994). In addition, age is positively associated with mental well-being until late adulthood; the association corresponds to life-cycle stages such as career establishment, economic security, and marriage and family relationships (Mirowsky and Ross 2010). Further, it is widely recognized that higher socioeconomic status, such as higher levels of education, is related to lower rates of psychiatric disorders, larger and more diverse social networks, and greater social support (Turner and Brown 2010; William, Muntaner, and Sapag 2010). Finally, because the study pools data from multiple survey years, the year of the survey variable helps control for period effects of survey administration and social change.

Analytical Strategy

I first used bivariate analysis to examine the non-standardized relationships between sexual orientation and mental health, social integration, social support, and socio-demographic characteristics. I then conducted a joint significance test to examine whether social integration and social support jointly mediate the relationship between sexual orientation and mental health status. In particular, the test requires that the following three regression equations be estimated:

$$M1 = a_1 + b_1X + c_1Z + \varepsilon_1 \quad (1)$$

$$M2 = a_2 + b_2M1 + b_4X + c_2Z + \varepsilon_2 \quad (2)$$

$$Y = a_3 + b_3M2 + b_5M1 + b_6X + c_3Z + \varepsilon_3 \quad (3)$$

In these equations, *X* is sexual orientation, *Y* is mental health, *M*1 and *M*2 are the mediating variables (social integration and social support, respectively), and Z represents the socio-demographic control variables. $a_1, a_2,$ and a_3 are the intercepts in Equations 1, 2, and 3, respectively. b_1 represents the relationship between sexual orientation (*X*) and social integration (*M*1) adjusted for socio-demographic characteristics (*Z*) in Equation 1. b_2 represents the relationship between social integration (*M*1) and social support (*M*2) adjusted for the effects of sexual orientation and socio-demographic characteristics in Equation 2. b_3 represents the relationship between social support (*M*2) and mental health (*Y*) adjusted for the effects of social integration, sexual orientation, and socio-demographic variables in Equation 3. $b_4, b_5, b_6, c_1, c_2,$ and c_3 are the marginal effects of the adjustment variables, and $\varepsilon_1, \varepsilon_2,$ and ε_3 are the residuals. Finally, the equations were estimated using logistic, OLS, or negative binomial regression models, depending on the properties of the dependent variable in question.

To claim evidence for the mediating effects of social integration and social support, the joint significance test requires that three hypotheses, $H_0: b_1 = 0, H_0: b_2 = 0,$ and $H_0: b_3 = 0$, be simultaneously rejected. The test results in a better balance of statistical power and the likelihood of Type I errors than other approaches to testing for mediation effects, including the most widely used method (Baron and Kenny 1986), methods based on the difference in coefficients, and methods based on the product of coefficients (MacKinnon et al. 2002, MacKinnon, Fairchild, and Fritz 2007, Taylor, MacKinnon, and Tein 2008).

I also tested the moderating effects of social integration and social support by interacting sexual orientation variables with social integration and social support variables. Specifically, the following equation was estimated:

$$Y = \beta_0 + \beta_1 X + \beta_2 S + \beta_3 S \cdot X + \beta_4 Z + \varepsilon_4 \qquad (4)$$

where Y is mental health, X is sexual orientation, S is social integration or social support, $S \cdot X$ is the interaction between sexual orientation and social integration/support, and Z represents the socio-demographic control variables. The beta coefficients represent the intercept and the marginal effects of each independent variable. Because Y is a count variable, a negative binomial regression model was used to estimate this equation (The likelihood-ratio test for over-dispersion confirms that negative binomial regression performs better than Poisson regression). To claim evidence for moderating effects, the hypothesis $H_0: \beta_3 = 0$ must be rejected. Lastly, all analyses are adjusted to account for oversampling on African Americans and Hispanics, survey non-response, post-stratification to match the 2000 U.S. population, and data-pooling across three survey waves.

RESULTS

Bivariate Relationships

According to the bivariate analysis, there are significant differences in mental health status, social integration, social support, and socio-demographic characteristics by sexual orientation (Table 1). Specifically, sexual minorities have poorer mental health than heterosexuals with no same-sex experience; on average, heterosexuals with same-sex experience report having 0.1 more days of mental distress, lesbians and gays report having 0.2 more days, and bisexuals report having 3.3 more days. Correspondingly, sexual minorities are less likely to report 0 days of mental distress during the past 30 days.

Sexual minorities also report being less socially integrated and having lower levels of social support. In particular, these individuals are much less likely to be married or in a cohabiting relationship; they are also more likely to live alone. Additionally, sexual minorities report having fewer confidants than heterosexuals with no same-sex experience: heterosexuals

with same-sex experience had 1.8 fewer confidants and bisexuals had 2.8 fewer confidants; in contrast, lesbians and gays had only a slightly smaller number of confidants. Likewise, heterosexuals with same-sex experience and bisexuals are less likely to report having sufficient amount of emotional support; in contrast, the proportion of lesbians and gays who report having sufficient emotional support is not significantly different from that of heterosexuals with no same-sex experience. Lastly, bisexuals are the least likely to report having access to financial support while the other three groups perceive equivalent chances of receiving such support. Overall, sexual minorities tend to have a lower level of social resources than heterosexual-identified individuals with no same-sex experience. However, the variation among minority groups suggests that lesbians and gays are relatively advantaged in terms of the number of confidants and the perceived level of social support; bisexuals, in contrast, are the most socially isolated and perceive the lowest level of support; heterosexuals with same-sex experience, while more often living in a marriage/cohabiting relationship, have fewer confidants and perceive less emotional support than lesbians and gays.

In addition to mental health status and social resources, some of the socio-demographic characteristics in the analysis also vary by sexual orientation. In particular, heterosexuals with same-sex experience are mostly female while the group of lesbians and gays are mostly male. In addition, sexual minorities are more educated than heterosexuals with no same-sex experience: both heterosexuals with same-sex experience and lesbians and gays are relatively more likely to have received college or postgraduate education. In contrast, racial/ethnic composition and average age are very similar across the sexual orientation groups.

[Table 1 about here]

Mediating Effect Analysis

Table 2 presents results from the joint significance tests of mediating effects. The results indicate that social integration and social support jointly mediate the relationship between sexual orientation and mental distress. Overall, sexual minorities are less socially integrated, which is related to a lower level of perceived support that, in turn, is associated with more days of mental distress. Specifically, heterosexuals with same-sex experience, lesbians and gays, and bisexuals are all less likely to be married or in a cohabiting relationship than heterosexuals with no same-sex experience (Model sets 1 and 2). Because living in a partnership is associated with higher levels of emotional support and financial support, both of which are further linked to fewer days of mental distress, the results suggest that being married or in a cohabiting relationship, as well as emotional and financial support, mediate the relationship between sexual orientation and mental distress. Similarly, members of all sexual minority groups are more likely to live alone, which is associated with lower levels of emotional and financial support, and, in turn, mental distress (Model sets 3 and 4). Therefore, residential arrangement and emotional and financial support also jointly mediate the relationship between sexual orientation and mental health status.

Lastly, both heterosexuals with same-sex experience and bisexuals have fewer confidants than heterosexuals with no same-sex experience (Model sets 5 and 6). Because number of confidants is positively related to emotional and financial support, which is associated with lower levels of mental distress, the results suggest that number of confidants and social support jointly mediate the relationship between sexual minority status and mental distress for heterosexuals with same-sex experience and bisexuals. In contrast, lesbians and gays do not have fewer confidants than heterosexuals with no same-sex experience, which indicates that number of confidants does not mediate the effects of minority status on mental distress among lesbians and gays.

[Table 2 about here]

Moderating Effect Analysis

In addition to confirming the mediating effect of social resources, the results also suggest that social resources moderate the relationship between minority status and mental distress for certain minority groups. In particular, having more confidants significantly buffers the harmful health effects related to minority status among lesbians, gays, and bisexuals. This moderating effect is clearly demonstrated in the results for the predicted number of days with mental distress (Figure 2). Specifically, among respondents who have no confidants, lesbians and gays report 13 days of mental distress during the past 30 days and bisexuals report about 12 days of distress; in contrast, their heterosexual counterparts with no same-sex experience report only about 4 days of mental distress. When the number of confidants increases to more than 6, however, the mental health gap almost disappears. This pattern suggests that confidants may be more beneficial for the mental health of lesbians, gays, and bisexuals than for the mental health of those in the sexual majority.

Having a sufficient amount of emotional support also buffers the deleterious health effects related to minority status among lesbians and gays. Among those who report having insufficient emotional support, lesbians and gays report many more days of mental distress than their heterosexual counterparts with no same-sex experience (Figure 3). However, among those with sufficient emotional support, the level of mental distress does not differ across these two groups. In other words, having access to sufficient emotional support is more beneficial for lesbians and gays (whose number of days with mental distress is reduced by 12) than for heterosexuals with no same-sex experience (whose number of days with mental distress is reduced by 4).

Notably, social resources do not have a moderating effect for all sexual minority groups and the effect does not hold for all types of social integration and social support. Although having more confidants benefits lesbians, gays, and bisexuals more than heterosexuals with no same-sex experience, it does not have the same moderating effects for heterosexuals with same-sex experience. In addition, having sufficient emotional support buffers mental distress for lesbians and gays but not the other two minority groups. The results also indicate that, unlike number of confidants and emotional support, being married/cohabiting, living alone, and financial support do not moderate the link between sexual orientation and mental health (test results are available upon request).

[Figure 2 about here]

[Figure 3 about here]

DISCUSSION

Building on the literature on social relationships and mental health, the current study examines the role of social integration and social support in mental health disparities by sexual orientation. By analyzing a representative sample of the middle-aged U.S. population, the study shows that individuals with a bisexual identity have the poorest mental health and the least social resources among all sexual orientation groups. In contrast, lesbians and gays, heterosexuals with same-sex experience, and the sexual majority have comparable levels of mental well-being, even though, compared to the majority, both lesbians and gays and heterosexuals with same-sex experience are less socially integrated and heterosexuals with same-sex experience also perceive lower levels of emotional support. Moreover, the study tests the mediating and moderating effects of social resources. Specifically, it demonstrates that sexual minorities are less socially integrated, which is related to a lower level of social support, and, in turn, more days of mental

distress. In addition, the benefits of social resources vary across sexual orientation groups: having confidants or a sufficient amount of emotional support shows stronger health-promoting effects among lesbians, gays, and bisexuals than among the sexual majority.

These findings have several implications. First, the higher rates of mental distress among bisexual-identified individuals correspond to the general thesis of the stress process model and the minority stress theory: disadvantaged social groups have poorer mental health due to the stress and powerlessness induced by marginalization and discrimination (Meyer 2003; Pearlin et al. 1981). Indeed, bisexuals not only face negative attitudes from both heterosexual-identified and lesbian/gay-identified communities, but their marginalized social position is also manifested in their relatively low levels of social resources compared to any other sexual orientation groups, which perhaps reflects the lack of an identifiable and resource-rich community (Bostwick et al. 2010; Conron et al. 2010; Israel and Mohr 2004). Further, results from the descriptive statistics and the mediating effect analysis together suggest that bisexuals are the least socially integrated, which is linked to their lowest level of emotional and financial support, and, in turn, the most days of mental distress. In contrast, minority status does not always restrict social networks for lesbians and gays. Lesbians and gays not only have a number of confidants comparable to what the sexual majority have, but they also have an advantage in emotional and financial support over other sexual minority groups. These findings are consistent with the notion that lesbians and gays, relative to other minority groups, generally have a more resourceful and supportive community they can turn to (Israel and Mohr 2004; Riggle et al. 2008).

Further, the argument that bisexuals face extra hardships due to the "double stigma" raises the possibility that social resources will benefit their health more than the health of other

groups (Cassel 1976; Cobb 1976). However, results of the moderating effect analysis indicate that none of the social integration or social support variables has more health-promoting effects among bisexuals than among other minority groups. In particular, number of confidants seems equally beneficial to lesbians/gays and bisexuals, and emotional support significantly buffers mental distress only among lesbians and gays. Alternatively, the findings suggest that the benefit of social resources may also depend on whether these resources are ones that can help sexual minorities cope with the distress related to sexual stigma. Because lesbian and gay communities are larger and more resource-rich than the communities of the other sexual minority groups, lesbians and gays may have easier access to support that is tailored to their needs; therefore, social resources may benefit their mental health the most. As Riggle et al. (2008) suggested, belonging to a community and forging strong connections with others are two positive aspects of being a lesbian or gay man. Likewise, none of the social resources significantly moderate the mental health effects related to minority status among heterosexuals with same-sex experience. This result may be explained by the fact that these individuals are less likely to seek social support specifically related to minority stress, due to both a reluctance to disclose their sexual orientation and the lack of a collective identity and supportive community (Gattis et al. 2012; Herek and Garnets 2007; Reback and Larkins 2010; Schrimshaw et al. 2013). However, the result may also be attributed to their lower exposure to stressful experiences, particularly sexuality-based discrimination and victimization (Chae et al. 2010). Future research should further examine factors that lead to the presence and the strength of moderating effects in the context of the stress process (Aneshensel 2009; Pearlin et al. 1981; Thoits 1995; Turner and Lloyd 1999). Incorporating sexuality-related stressors into the analysis, such as exposure to

episodes of discrimination, will help elaborate the influence of social resources on mental health outcomes across sexual orientation groups.

Additionally, the moderating effect analysis demonstrates that of the indicators of social integration and social support, only number of confidants and emotional support mitigate mental distress among sexual minorities. Marriage/cohabitation, living arrangements, and financial support, in contrast, do not have significant moderating effects. This inconsistency may reflect the distinctive functions of these forms of social resources. Specifically, both number of confidants and emotional support, in comparison to the other three measures, emphasize trusting, understanding, and discussing private matters or difficult decisions, which may be particularly important when coping with the stress induced by sexual stigma. The findings suggest that both perceived support and the structural aspects of relationships may ameliorate the mental distress related to sexual minority status as long as their content is related to the specific needs of sexual minorities.

Finally, the finding that social resources have both mediating and moderating effects has several policy implications. The presence of a mediating effect indicates that programs targeting social isolation, such as those that support and legalize same-sex partnerships, may increase marriage/cohabitation rates and reduce rates of living alone among sexual minorities, which will generate social support and in turn promote minority health. In addition, programs that directly or indirectly increase the number of confidants for bisexuals, such as programs that correct negative stereotypes about bisexuals (e.g., disloyalty and untrustworthiness), may significantly enhance their mental well-being (Israel and Mohr 2004). Because having a higher number of confidants is particularly beneficial for bisexuals (manifested by its moderating effect), such

programs are potentially a highly efficient method of narrowing the mental health gap between bisexuals and heterosexuals with no same-sex experience. Finally, the varying strength of the moderating effect, as well as the unequal distribution of social resources across sexual minority groups may reflect the different capacity of each minority group to serve their members. These patterns also demonstrate the risk of collapsing all sexual minorities into a single "non-heterosexual" group, which may inflate health risks or benefits among some groups but mask them among others (Bostwick et al. 2010; Herek and Garnets 2007). The current results enhance the literature by confirming that sexual identity and sexual behavior are not always identical, and that discordance between identity and behavior influences psychosocial well-being (Bauer and Jairam 2008; Herek and Garnets 2007; Young and Meyer 2005). In particular, heterosexual-identified individuals with same-sex experience differ significantly from either heterosexual-identified individuals with no same-sex experience or bisexual-identified individuals with respect to level of social integration, social support, and mental distress. The findings, therefore, highlight the need for health promotion programs for sexual minorities to be tailored to specific groups.

Several limitations of the current study should be acknowledged. First, because the analyses use cross-sectional data, the study cannot make causal interpretations regarding the relationship between sexual orientation, social integration and support, and mental distress. Indeed, there are concerns about reverse causation and selection effects. Regarding reverse causation, mental distress may weaken an individual's ability or willingness to maintain social ties; it may also change one's perception of social support (House et al. 1988; Turner and Brown 2010). This possibility challenges the argument that social integration and social support mediate the relationship between sexual orientation and mental health outcomes. In addition, selection

effects such as the influence of early-life events may in part drive the link between sexual orientation, social relationships, and mental health. For example, several studies have shown that self-identified lesbians, gays, and bisexuals are more likely than their heterosexual-identified counterparts to report experiences of physical and sexual abuse during childhood and adolescence (Austin et al. 2008; Austin and Irwin 2010; Balsam, Rothblum, and Beauchaine 2005; Saewyc et al. 2006). Further, while heterosexual-identified individuals with same-sex behavior may be concealing their true sexual orientation due to stigma and shame, it is also likely that some of them report discordance between sexual identity and sexual behavior simply due to the experience of enforced sex (Bauer et al. 2010; Reback and Larkins 2010). Because maltreatment in early life may shape personality development and interpersonal relationships in later life (e.g., Bowlby 1988; Turner and Brown 2010), and because maltreatment is related to poorer mental health outcomes in adulthood (e.g., Aaron and Hughes 2007; Feldman and Meyer 2007), it is possible that the (unobserved) experiences of early-life abuse contribute to some of the correlation between sexual orientation, social relationships, and mental distress. Improvements in data and methods are necessary to address concerns about reverse causation and selection effects and to truly argue for the mediating and moderating effects of social resources.

Another research limitation is the lack of analysis of gender differences. Indeed, gender may shape social relationships and health outcomes across sexual orientation groups; for example, male same-sex sexuality is more stigmatized and more severely sanctioned than female same-sex sexuality (Bauer et al. 2010; Bostwick et al. 2010; Knight and Hope 2012). This relative disadvantage may restrict social resources and strengthen the effects of these resources for sexual minority men. However, because the sample size of each sexual minority group

(particularly lesbians, gays, and bisexuals) is small, stratifying the analysis by gender results in some groups, including lesbians, bisexual women, and bisexual men, having a sample size of less than 30. Therefore, in tests of the mediating and moderating effects of social resources (which further stratify the sample by level of resources) many estimates have extremely wide confidence intervals and thus it is difficult to determine whether any gender differences are real (results not shown). Nevertheless, a test of the interaction effect of sexual orientation and gender on mental distress suggests that the effects of sexual orientation on mental distress do not differ significantly between men and women (results are available upon request). Future research should incorporate more nuanced tests of whether the mediating and moderating effects of social resources on minority health differ by gender.

Lastly, data constraints limit the sample to individuals aged 40-59 years old, and therefore the results may not be applicable to other age groups. Increasing levels of social acceptance of sexual minorities in the United States may have led to significant variation in the experiences of sexual minorities across generations (Institute of Medicine 2011). Younger sexual minorities who grew up in a more LGBT-friendly climate most likely received more social support as a result of, for example, being less closeted and being able to elicit support from both minority communities and straight alliances, sometimes including original family members. Therefore, the mental health disparity between sexual minorities and the majority may be smaller among younger age groups. In addition, the mediating effects of social resources found in this study may have been weaker (stronger) if the sample had included younger (older) age groups. Further, the moderating effects of social resources might have also been weaker (stronger) in a younger (older) sample because of the presumably lower (higher) level of stress exposure induced by sexual stigma. Future research should include a sample with a wider age range in

order to test whether the functions of social resources follow a particular pattern with regard to age or cohort.

Despite these limitations, the study fills an important gap in the literature on the mental health and social resources of sexual minorities. Unlike studies that focus solely on sexual minorities, the current study compares minorities with the majority group in order to address the central concern of minority health research in sociological perspective: disadvantageous social positions jeopardize minorities' social and mental well-being. Further, by examining the mediating and moderating effects of social relationships, the study shows that both effects reveal important mechanisms through which social resources affect mental distress related to sexuality. Finally, the study makes two methodological improvements: considering sexual identity in conjunction with sexual behavior and using a probability sample to ensure that the results are generalizable to the middle-aged U.S. population.

In conclusion, the study suggests that sexual minorities are among those who most need and most benefit from supportive social relationships. Accordingly, building a friendly and supportive environment in which all sexual minorities have access to at least some high-quality social resources is essential for improving minority health and closing the gap in mental health by sexual orientation.

NOTES

1. According to the Institute of Medicine (2011), sexual orientation refers to "an enduring pattern of or disposition to experience sexual or romantic desires for, and relationships with, people of one's same sex, the other sex, or both sexes." In most research, sexual orientation has been operationalized in terms of sexual identity, sexual behavior, and/or sexual attraction (desire)

(Herek and Garnets 2007; Institute of Medicine 2011; Laumann et al. 1994). In this study, I use the term "sexual orientation" to refer to a concept that includes more than one of these dimensions (identity, behavior, and attraction). Because the study uses both sexual identity and sexual behavior to measure sexual orientation, the term "sexual orientation" is also used to refer to the variable in the analyses and the discussion of the results. Otherwise, the more specific terms "identity," "behavior," and "attraction" would be preferable to the general term "sexual orientation." Finally, the term "sexual minorities" is used to capture a diverse population of individuals who have non-heterosexual sexual identity, behavior, *or* attraction. In contrast, the term "sexual majority" refers to a group of individuals who have heterosexual sexual identity, behavior, *and* attraction. In this study, sexual minorities include lesbian/gay-identified individuals, bisexual-identified individuals, and heterosexual-identified individuals with same-sex sexual experience; the sexual majority includes heterosexual-identified individuals with no same-sex sexual experience.

2. In the original sample, 57 individuals reported being "not sure" and 19 individuals reported being "something else" with regard to their sexual identity. Similar results were obtained whether or not these individuals were included in the sample. In particular, models that excluded this group from the analysis and models that treated them as an independent sexual orientation group generated similar results. The results presented here are those based on the model that excluded these individuals from the sample.

3. Only 15 respondents identified as lesbian/gay or bisexual but reported not having had any same-sex sexual experience. Because of the small size of this group, it was not possible to examine results for the group in the multiple regression models. Therefore, I combine lesbian/gay-identified individuals with no same-sex experience and lesbian/gay-identified

individuals with same-sex experience into a single group (n=63). I followed the same procedure for bisexual-identified individuals (n=57). Excluding these 15 individuals from the analyses did not change the results significantly.

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Table 1: Descriptive Statistics by Sexual Orientation

Variable	Heterosexual with no same-sex experience	Heterosexual with same-sex experience	Lesbian/gay	Bisexual
Number of days with mental distress***[a]				
Mean	4.2	4.3	4.4	7.5
S.D.	.2	.7	.9	1.9
Zero days of distress (%)+[a]	58.5	47.1	50.5	49.0
Married/cohabiting (%)***[b]	74.7	59.5	42.1	42.6
Living alone (%)***[a]	10.6	19.1	27.4	33.0
Number of confidants***[b]				
Mean	6.8	5.0	6.7	4.0
S.D.	.2	.3	.9	.7
Emotional support (%)***[c]	74.9	60.2	78.4	49.5
Financial support (%)+[d]	78.8	79.1	86.1	63.2
Race/Ethnicity (%)				
Non-Hispanic white	76.4	79.9	83.6	79.3
Non-Hispanic black	10.7	11.0	3.3	11.8
Hispanic	8.7	4.9	8.5	6.9
Others	4.2	4.2	4.7	2.0
Female (%)***[e]	52.4	70.9	31.5	58.7
Age				
Mean	48.8	48.1	47.7	48.3
S.D.	.2	.7	1.2	.8
Some college or more education (%)***[e]	62.2	73.5	88.2	63.4
N	3376	119	63	57

Note: Differences by sexual orientation are tested using Pearson Chi-squared statistics for categorical variables, t statistics for continuous variables (age), and Kruskall-Wallis statistics for count variables (number of days with mental distress and number of confidants). [a] Each sexual minority group is significantly different from heterosexual with no same-sex experience, but the three minority groups are not significantly different from one another. [b] Each sexual minority group is significantly different from heterosexual with no same-sex experience, and the minority groups are significantly different from one another. [c] Each sexual minority group, except for lesbian and gay, is significantly different from heterosexual with no same-sex experience, and the minority groups are significantly different from one another. [d] Only bisexual is significantly different from the other groups. [e] Each sexual minority group, except for bisexual, is significantly different from heterosexual with no same-sex experience, and the minority groups are significantly different from one another.

+ $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$ (two-tailed).

Table 2: Joint Significance Tests of Mediating Effects of Social Integration and Social Support

Model set [a]	Social integration		Social support		Mental distress		Test result [b]
1	Effects of sexual orientation on marital status (married/cohabiting): [c]		Effects of marital status on emotional support:		Effects of emotional support on mental distress:		Evidence for mediating effects exists.
	Heterosexual with same-sex experience	-0.67*	Being married /cohabiting	0.76***	Having emotional support	-0.81***	
	Lesbian/gay	-1.68***					
	Bisexual	-1.41***					
2	Effects of sexual orientation on marital status (married/cohabiting):		Effects of marital status on financial support:		Effects of financial support on mental distress:		Evidence for mediating effects exists.
	Heterosexual with same-sex experience	-0.67*	Being married /cohabiting	0.40**	Having financial support	-0.33***	
	Lesbian/gay	-1.68***					
	Bisexual	-1.41***					
3	Effects of sexual orientation on residential status (living alone):		Effects of residential status on emotional support:		Effects of emotional support on mental distress:		Evidence for mediating effects exists.
	Heterosexual with same-sex experience	0.69*	Living alone	-0.87***	Having emotional support	-0.83***	
	Lesbian/gay	1.22**					
	Bisexual	1.44***					
4	Effects of sexual orientation on residential status (living alone):		Effects of residential status on financial support:		Effects of financial support on mental distress:		Evidence for mediating effects exists.
	Heterosexual with same-sex experience	0.69*	Living alone	-0.20+	Having financial support	-0.34***	
	Lesbian/gay	1.22**					
	Bisexual	1.44***					
5	Effects of sexual orientation on number of confidants:		Effects of number of confidants on emotional support:		Effects of emotional support on mental distress:		Mediating effects exist for heterosexual with same-sex experience and bisexual
	Heterosexual with same-sex experience	-1.84***	Number of confidants	0.04**	Having emotional support	-0.85***	
	Lesbian/gay	-0.37					
	Bisexual	-2.74***					

(continued)

Table 2: (continued)

Model set	Social integration		Social support		Mental distress		Test result
6	Effects of sexual orientation on number of confidants:		Effects of number of confidants on financial support:		Effects of financial support on mental distress:		Mediating effects exist for heterosexual with same-sex experience and bisexual
	Heterosexual with same-sex experience	-1.84***	Number of confidants	0.07**	Having financial support	-0.34***	
	Lesbian/gay	-0.37					
	Bisexual	-2.74***					

Note: [a] Each model set includes three regression equations. First, the equation of social integration measures the effects of sexual orientation on a social integration variable, controlling for socio-demographic characteristics including race/ethnicity, gender, age, education, and the year of survey. Second, the equation of social support measures the effects of the social integration variable on a social support variable, controlling for sexual orientation and socio-demographic characteristics. Finally, the model of mental distress measures the effects of the social support variable on number of days with mental distress, controlling for the social integration variable, sexual orientation, and socio-demographic characteristics. [b] To claim evidence for the mediating effects of social integration and social support, the joint significance test requires the following effects be simultaneously significant in each model set: the effects of sexual orientation on social integration, the effects of social integration on social support, and the effects of social support on mental distress. [c] The reference group of sexual orientation is heterosexual with no same-sex experience. + $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$ (two-tailed).

Figure 1: Conceptual Diagram of the Mediating and Moderating Effects of Social Resources

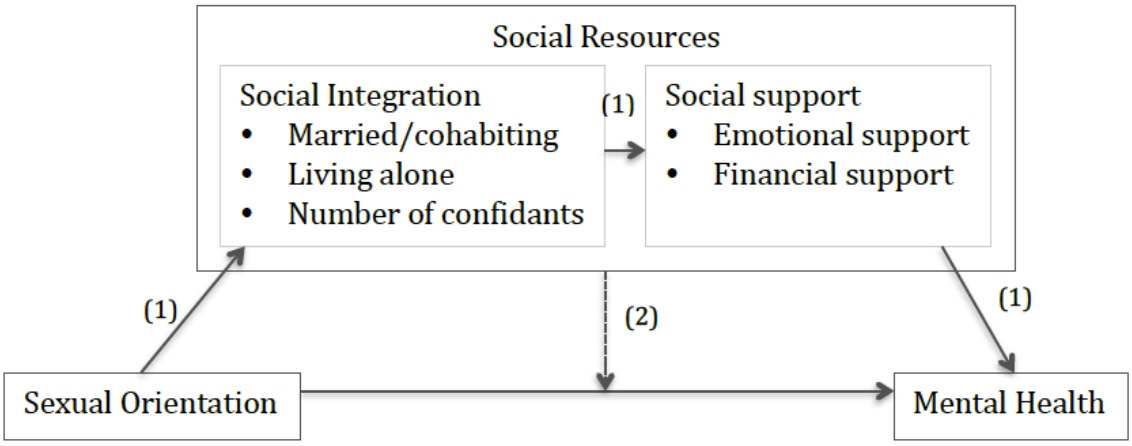
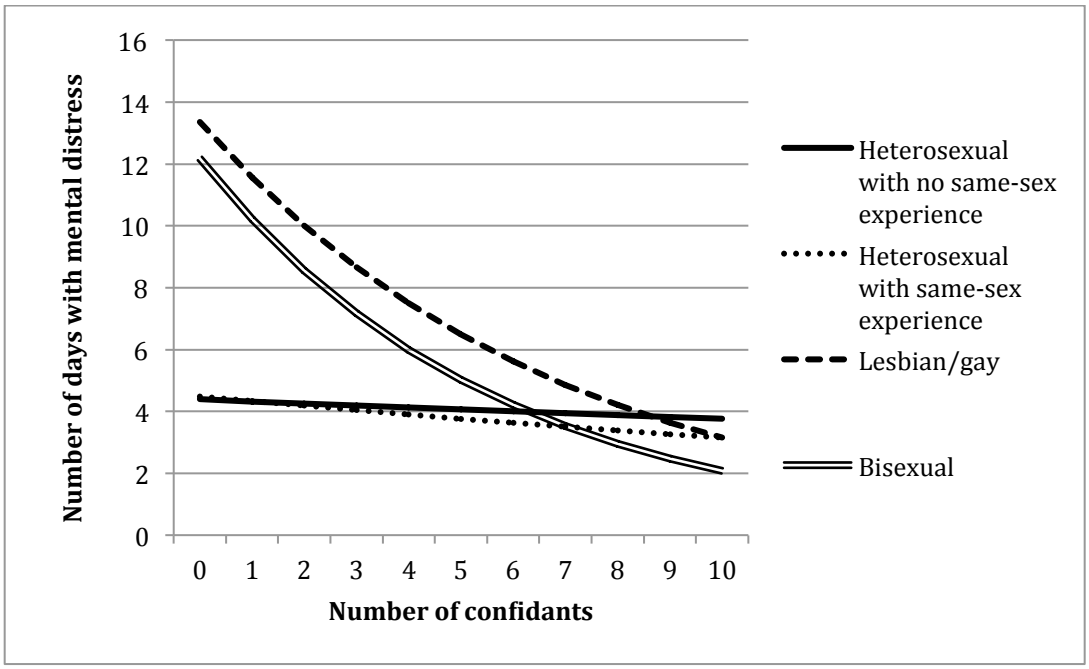
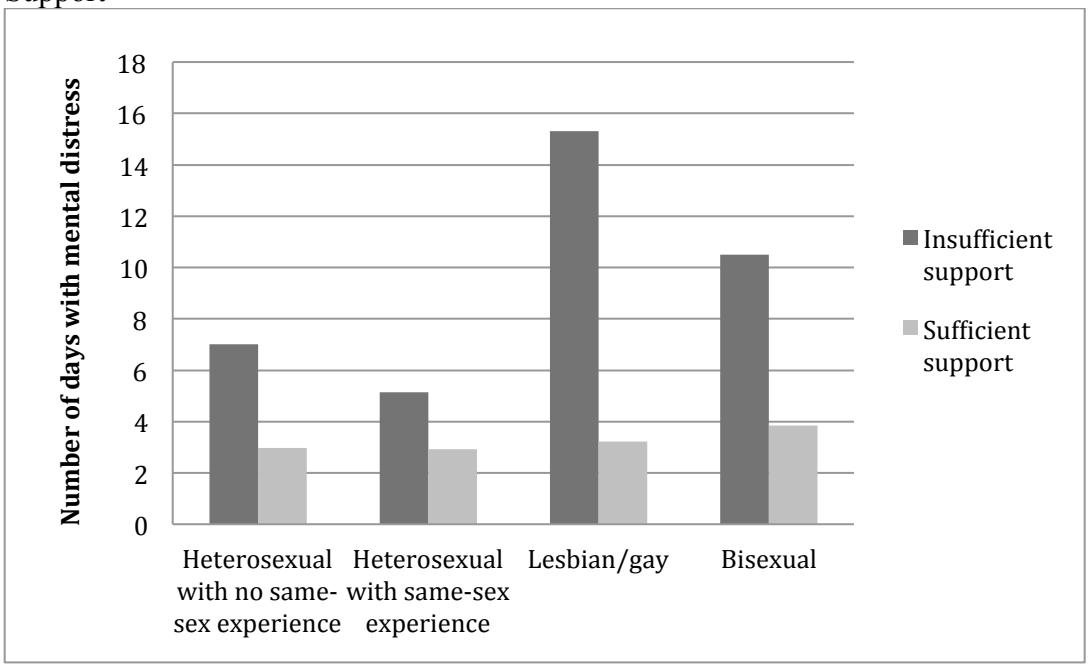


Figure 2: Predicted Number of Days with Mental Distress by Sexual Orientation and Number of Confidants



Note: The predicted number of days with mental distress is calculated from a negative binomial regression model at the means of covariates. The interaction between number of confidants and sexual orientation is significant at the 5% level for bisexual and at the 10% level for lesbian and gay.

Figure 3: Predicted Number of Days with Mental Distress by Sexual Orientation and Emotional Support



Note: The predicted number of days with mental distress is calculated from a negative binomial regression model at the means of covariates. The interaction between emotional support and sexual orientation is significant at the 10% level for lesbian and gay.