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# Minority Stress and Physical Health Among Sexual Minorities

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## Abstract

Lesbian, gay, and bisexual (LGB) individuals suffer serious mental health disparities relative to their heterosexual peers, and researchers have linked these disparities to difficult social experiences (e.g., antigay victimization) and internalized biases (e.g., internalized homophobia) that arouse stress. A recent and growing body of evidence suggests that LGB individuals also suffer physical health disparities relative to heterosexuals, ranging from poor general health status to increased risk for cancer and heightened diagnoses of cardiovascular disease, asthma, diabetes, and other chronic conditions. Despite recent advances in this literature, the causes of LGB physical health problems remain relatively opaque. In this article, we review empirical findings related to LGB physical health disparities and argue that such disparities are related to the experience of minority stress—that is, stress caused by experiences with antigay stigma. In light of this minority stress model, we highlight gaps in the current literature and outline five research steps necessary for developing a comprehensive knowledge of the social determinants of LGB physical health.

## Keywords

minority stress; health disparities; lesbian, gay, and bisexual (LGB) health; sexual minority health

In recent years, lesbian, gay, and bisexual (LGB) civil rights have become a topic of intense sociopolitical debate. These debates have resulted in notable improvements for LGB individuals around the world, including the extension of partner benefits to same-sex couples and legal protections for LGB individuals who face hate crimes. In stark contrast to these legal successes is continued social prejudice against LGB individuals, evidenced by high suicide rates among LGB adolescents and social policies that espouse the death penalty for LGB adults (e.g., the Ugandan Anti-Homosexuality Bill). Although these incidents bring much-needed attention to LGB suicide and homicide, public and academic discourses have paid surprisingly little attention to the fact many LGB individuals also suffer disparities in everyday physical health relative to their heterosexual peers. These health difficulties are more common than suicide or homicide and incur serious costs to personal well-being and global public health, yet their determinants remain largely unstudied. In this review, we summarize the growing literature on LGB physical health disparities, outline the social determinants of those disparities, and provide a detailed agenda for future research on these important topics.<sup>1</sup>

## LGB Lives in Public and Scientific Discourse

Recent political debates have brought LGB people to the forefront of public sentiment, and their frequent experiences with prejudice and discrimination have received careful attention. Indeed, numerous scholarly reports have detailed high rates of antigay victimization, with one meta-analysis estimating that as many as 80% of LGB individuals experience some form of harassment throughout their lives (Katz-Wise & Hyde, 2012; see also Balsam, Rothblum, & Beauchaine, 2005; Berrill, 1992; Herek, Cogan, & Gillis, 2002). The public is increasingly aware of these sobering statistics: In the past several years, Internet users have posted over 50,000 *It Gets Better* videos describing instances of violence against LGB individuals, and viewers have watched these videos more than 50 million times (Savage & Miller, 2012).

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LGB victimization has become such a prominent topic in part because it is associated with significant functional impairment. Indeed, an extensive literature on minority stress suggests that LGB individuals face mental health disparities due to their frequent experiences with antigay stigma (Hatzenbuehler, 2009; Meyer, 2003). These disparities range from heightened odds of major depression and generalized anxiety (Cochran, Sullivan, & Mays, 2003; Gilman, Cochran, Mays, Ostrow, & Kessler, 2001) to disproportionate alcohol, tobacco, and illicit drug use (Burgard, Cochran, & Mays, 2005; Cochran, Keenan, Schober, & Mays, 2000) and heightened risk for both attempting (Cochran & Mays, 2000; Garofalo, Wolf, Wissow, Woods, & Goodman, 1999; Hatzenbuehler, 2011) and completing suicide (Richardson, 1995) relative to population averages.

Despite strong evidence of mental health difficulties in LGB communities, studies of physical health have lagged behind. Of nearly 4 million studies about physical health published in English between 1980 and 1999, only 0.1% reported effects for LGB participants (Boehmer, 2002), and few explored LGB health outcomes unrelated to HIV/AIDS (Harcourt, 2006). By the year 2000, research on LGB physical health was so sparse that the U.S. Department of Health and Human Services identified LGB health as a primary focus of its Healthy People initiative through the year 2020 (U.S. Department of Health and Human Services, 2010). In the wake of the Healthy People initiatives, nearly two dozen rigorous empirical studies have compared non-HIV-related physical health outcomes between LGB and heterosexual adults. Although knowledge of LGB physical health outcomes has begun to coalesce, extant findings span disciplines ranging from epidemiology to health psychology, medicine, and public health. Consequently, syntheses of relevant literature are lacking. Furthermore, comprehensive theories that incorporate previous findings about the causes and correlates of such disparities are practically nonexistent (Meads, Carmona, & Kelly, 2012).

In this article, we offer a detailed review highlighting both the existence of LGB physical health disparities and their social determinants. We situate our review within a minority stress framework, arguing that difficult social experiences arouse stress for LGB people, in turn altering psychological processes, health behaviors, and physiological functioning, which ultimately compromise physical health. We should note at the outset that there has been one other major effort to review the literature on LGB health, which documented mental as well as physical health problems in LGB communities, including those related to HIV/AIDS (Institute of Medicine, 2011). In contrast, our review focuses on physical health disparities that are not directly related to sexual activity, highlighting LGB health problems that have received limited attention

in previous work. Our review also includes research published after the Institute of Medicine report, and therefore incorporates the most current evidence in this burgeoning field. Perhaps most importantly, the Institute of Medicine report listed minority stress as one of four frameworks for understanding LGB physical health, but its breadth precluded a detailed analysis of the ways in which minority stress gets under the skin to affect long-term physical health for LGB individuals. Our research pinpoints specific processes that may uniquely and interactively link social experiences to LGB physical health. As such, we view this article as an extension of previous work and an answer to recent calls for more detailed theorizing about the causes of physical health disparities related to sexual orientation (Harcourt, 2006; Institute of Medicine, 2011; Meads et al., 2012).

## **LGB Physical Health**

Despite early inattention, research on LGB physical health has recently gained momentum. At present, there are a sufficient number of studies to reach preliminary conclusions about physical health difficulties in LGB communities. We briefly synthesize these findings below, limiting our analysis to research published in English that describes health outcomes unrelated to sexually transmitted infections, which have already received considerable attention. At times, we do discuss studies that reveal damaging physiological effects of minority stress for HIV-positive gay men; however, HIV infection was not the outcome of interest in these studies. Rather, they addressed basic questions about the physiological correlates of minority stress, which are relevant to the LGB community at large and therefore important for our review.

### ***Evidence of LGB physical health disparities***

A growing body of research indicates that LGB people are at risk for a wide array of physical health difficulties, ranging from poor overall health status to heightened incidence of specific diseases (see Table 1 for summaries of results). The findings reveal that, relative to heterosexuals, sexual minority individuals generally rate their own health to be poor (Fredriksen-Goldsen, Kim, & Barkan, 2012; Frost, Lehavot, & Meyer, 2011), report a higher number of acute physical symptoms and chronic health conditions (Sandfort, Bakker, Schellevis, & Vanwesenbeeck, 2006), report that their health status curtails their ability to engage in everyday physical activities (Conron, Mimiaga, & Landers, 2010; Fredriksen-Goldsen, Kim, et al., 2012; Kim & Fredriksen-Goldsen, 2012), and exhibit a higher prevalence and younger onset of disabilities such as use of a walking assistant (e.g., cane,

*(text continues on p. 7)*

**Table 1.** Summary of Previous Studies Demonstrating Physical Health Disparities Between LGB and Heterosexual Individuals

Study	Country	Sampling Method	Sample Size	Findings
Koblin et al. (1996)	USA	Convenience	15,565 gay men	Gay men had heightened rates of non-Hodgkin's lymphoma, Hodgkin's disease, and anal cancer. Rates of anal cancer were unrelated to HIV diagnoses.
Lock & Steiner (1999)	USA	Community sample of California high schools	1,439 heterosexual 106 LGB 224 unsure	LGB participants had more eating and dieting problems, as well as more general health problems than did heterosexuals.
Kavanaugh-Lynch, White, Daling, & Bowen (2002)	USA	Population-based case-control	912 heterosexual 59 lesbian Note: Sample size varied depending on the definition of sexual orientation (e.g., behavior vs. self-identification). On average, the samples included 912 heterosexual and 59 lesbian women.	Women defined as lesbians based on their marital status and number of sexual partners had increased risk of invasive breast cancer compared to heterosexuals. Women defined as lesbians based on contraceptive use had no differences in invasive breast cancer compared to heterosexuals.
Diamant & Wold (2003)	USA	Local probability (California)	4,023 heterosexual 69 bisexual 43 lesbian	Lesbian/bisexual women had higher rates of heart disease than did heterosexuals. Bisexual women had more days of poor physical health in the past month than did heterosexuals. Lesbians were less likely than heterosexuals to report excellent health.
Roberts, Dibble, Nussey, & Casey (2003)	USA	Convenience with matched controls (sisters)	324 heterosexual 324 lesbian	Lesbian women were at higher risk for cardiovascular disease than were heterosexuals due to greater abdominal/visceral adiposity.
Case et al. (2004)	USA	National cohort	89,812 heterosexual 317 bisexual 694 lesbian	Lesbian/bisexual women were at higher risk for breast cancer and cardiovascular disease than were heterosexuals.
Dibble, Roberts, & Nussey (2004)	USA	Convenience with matched controls (sisters)	324 heterosexual 324 lesbian	Lesbians were at higher risk for 5-year and lifetime breast cancer than were heterosexuals, despite no differences in overall rates of breast cancer screening.
Heck & Jacobson (2006)	USA	National probability	128,677 heterosexual 430 men in same-sex relationship 387 women in same-sex relationship	Both men and women in same-sex relationships had more lifetime diagnoses of asthma than did people in different-sex relationships. Women and men in same-sex relationships were more likely to experience asthma within the past 12 months than were those in different-sex relationships.

(continued)

Table 1. (continued)

Study	Country	Sampling Method	Sample Size	Findings
Sandfort, Bakker, Schellevis, & Vanwesenbeeck (2006)	Netherlands	National probability	9,278 heterosexual 90 bisexual 143 lesbian/gay	Lesbian/gay participants reported more acute physical symptoms in the past 2 weeks and more chronic conditions than did heterosexuals, including more respiratory problems, itching, pain in neck/shoulders, dizziness followed by falling, osteoarthritis in the hip or knee, intestinal problems, severe headaches, and urinary incontinence. Bisexual men reported fewer chronic conditions than did heterosexual men, but they reported no differences in specific chronic health conditions.
Cochran & Mays (2007)	USA	Local probability (CA)	1,999 heterosexual 67 bisexual 158 lesbian/gay 51 homosexually experienced heterosexual	Bisexual women reported more health conditions than did heterosexuals, including digestive problems, back problems, chronic fatigue, functional health limitations, and poor overall health. Lesbians were more likely to report arthritis than were heterosexuals, and both lesbian and bisexual women were more likely to receive disability income than were heterosexuals. Homosexually experienced heterosexual women were more likely than heterosexuals to report asthma and back problems. After controlling for HIV status, gay men were more likely than heterosexuals to report headaches. Homosexually experienced heterosexual men were more likely than heterosexuals to report liver disease, digestive problems, headaches, heart disease, asthma, and chronic fatigue.
Wang, Hausemann, Counatsou, Aggleton, & Weiss (2007)	Switzerland	Venue-based probability with matched controls	477 heterosexual men 477 gay men	Gay men were more likely to report common physical symptoms, moderate/severe physical symptoms, and a higher number of symptoms than were heterosexuals. Gay men were more likely than heterosexuals to have been treated for bronchitis in past 12 months; to have clinically elevated levels of cholesterol, blood pressure, or glucose; to have activity limitations due to a physical condition, common sickness symptoms, and moderate/severe sickness symptoms in the past 4 weeks after controlling for demographic factors.
Brandenburg, Matthews, & Johnson, & Hughes (2007)	USA	Convenience	279 heterosexual 550 lesbian	Lesbian women had heightened risk for 5-year and lifetime breast cancer, despite no differences between lesbian and heterosexual women in cancer screening behaviors.

(continued)

**Table 1.** (continued)

Study	Country	Sampling Method	Sample Size	Findings
Sandfort, Bakker, Schellevis, & Vanwesenbeeck (2009)	Netherlands	National probability	4,140 heterosexual men 25 bisexual men 64 gay men 5,138 heterosexual women 65 bisexual women 79 lesbian women	Gay men reported more acute physical complaints during previous 14 days and more chronic conditions than did heterosexual men. Bisexual women had more chronic conditions than did heterosexual women, but bisexual men had fewer chronic conditions than did heterosexual men.
Steele, Ross, Dobinson, Veldhulzen, & Timmouh (2009)	Canada	National probability	60,937 heterosexual women 424 bisexual women 354 lesbian women	Bisexual women reported more respiratory disorders, higher rates of poor/fair physical health and higher rates of hypertension (once adjusted for other variables) than did heterosexuals.
Dilley, Simmons, Boysun, Pizacani, & Stark (2010)	USA	Local probability (WA)	30,112 heterosexual men 235 bisexual men 498 gay men 47,505 heterosexual women 561 bisexual women 589 lesbian women	Lesbian/bisexual women reported poorer physical health and more asthma than did heterosexuals; bisexual women reported higher rates of diabetes and increased odds for hypertension than did heterosexuals. Gay/bisexual men reported more activity limitations due to poor health than did heterosexuals.
Conron, Mimiaga, & Landers (2010)	USA	Local probability (MA)	25,387 heterosexual men 194 bisexual men 926 gay men 39,701 heterosexual women 432 bisexual women 719 lesbian women	Overall, LGB participants reported more activity limitations and asthma than did heterosexuals. Bisexual women reported higher rates of fair/poor health and activity limitations than did heterosexuals. Lesbian/gay participants were more likely than heterosexuals to report activity limitations. Lesbian/bisexual participants were more likely than heterosexuals to have multiple CVD risks.
Landers, Mimiaga, & Conron (2011)	USA	Local probability (MA)	65,088 heterosexual 2,271 LGB	LGB participants had more lifetime diagnoses of asthma than did heterosexuals, despite being significantly younger.
McNair, Szalacha, & Hughes (2011)	Australia	Longitudinal probability	8,083 exclusively heterosexual women 568 mainly heterosexual women 100 bisexual women 99 lesbian women	Lesbians reported more cancer diagnoses than did heterosexual women. Bisexual women reported poorer physical health than did heterosexual and lesbian women. Bisexual and mainly heterosexual women reported more asthma than did heterosexual women after controlling for smoking behavior.
Wallace, Cochran, Durazo, & Ford (2011)	USA	Local probability (CA)	Unreported	Older gay/bisexual men had higher rates of hypertension, diabetes, physical disability, and fair/poor health than did heterosexuals. Older lesbian/bisexual women had higher rates of physical disability and fair/poor health than did heterosexuals.

(continued)

**Table 1.** (continued)

Study	Country	Sampling Method	Sample Size	Findings
Fredriksen-Goldsen, Kim, et al. (2012)	USA	Local probability (WA)	31,509 heterosexual men 239 bisexual men 529 gay men 49,092 heterosexual women 536 bisexual women 626 lesbian women	LGB participants reported a higher prevalence of disability than did heterosexuals, despite being younger and matched for health behaviors. Even after adjusting for age differences, lesbian/bisexual women reported heightened rates of arthritis and bisexual women reported heightened rates of lifetime asthma and frequent poor health in comparison with heterosexuals. Gay/bisexual men reported more frequent poor physical health than did heterosexuals.
Kim & Fredriksen-Goldsen (2012)	USA	Local probability (WA)	4,506 heterosexual 60 Hispanic bisexual 41 Hispanic lesbian 936 non-Hispanic White lesbian 795 non-Hispanic White bisexual	Hispanic lesbian/bisexual women reported more asthma and higher rates of disability than did Hispanic heterosexuals. Hispanic bisexual women also reported more arthritis and poor general health than did Hispanic heterosexuals.

Note: This table excludes studies of LGB health without a heterosexual comparison group. The studies are presented in chronological order and alphabetically within each year. CVD = cardiovascular disease.

wheelchair; Fredriksen-Goldsen et al., 2012). Alongside these general indices of poor health, sexual minority individuals evidence heightened rates of specific health conditions. For example, people who identify as LGB (Conron et al., 2010; Landers, Mimiaga, & Conron, 2011) and those who report being in a same-sex relationship (Heck & Jacobson, 2006) report more asthma diagnoses than do people who identify as heterosexual or report being in a different-sex relationship. Self-identified LGB individuals also report more headaches (Cochran & Mays, 2007; Lock & Steiner, 1999), chronic diseases and allergies (Lock & Steiner, 1999), and osteoarthritis and serious gastro-intestinal problems (Sandfort et al., 2006) than do their heterosexual peers. Collectively, these findings reveal notable physical health problems among LGB adults in general.

Whereas the above findings broadly demonstrate physical health disparities related to sexual orientation, other studies reveal disparities in specific subpopulations of LGB individuals. For example, lesbian and bisexual women commonly report poorer overall physical health than do heterosexuals (Cochran & Mays, 2007; Kim & Fredriksen-Goldsen, 2012). Furthermore, sexual minority women—especially bisexual women—report heightened rates of asthma, urinary tract infections, and Hepatitis B and C (McNair, Szalacha, & Hughes, 2012; see also Kim & Fredriksen-Goldsen, 2011). In one early study, proxy measures of female sexual orientation (e.g., unmarried women with no history of male sex partners) were associated with heightened risk of invasive breast cancer (Kavanaugh-Lynch, White, Daling, & Bowen, 2002); self-defined lesbian and bisexual women also report heightened risk for (Brown & Tracy, 2008; Cochran et al., 2001; Rankow, 1995) and diagnosis of some cancers (McNair, Szalacha, & Hughes, 2011). One particularly compelling study revealed heightened breast cancer risk among lesbians in comparison with their biological sisters (Dibble, Roberts, & Nussey, 2004). Finally, a smaller body of work revealed that sexual minority women exhibit more cardiovascular disease risk factors (Case et al., 2004; Conron et al., 2010) and higher rates of cardiovascular disease diagnoses (Diamant & Wold, 2003) than do heterosexual women.

Sexual minority men display similar patterns of health difficulties. In comparison with heterosexual men, gay men are at elevated risk for cardiovascular disease (Wang, Hausermann, Counatsou, Aggleton, & Weiss, 2007), and they report a higher total number of acute and chronic health conditions (Sandfort, Bakker, Schellevis, & Vanwesenbeeck, 2009), as well as more activity limitations due to debilitating physical conditions, greater risk for chronic disease (e.g., high blood pressure, high blood glucose), and more frequent reports of moderate/severe

pain and fatigue (Wang et al., 2007). Gay men also report more headaches and urinary incontinence than do straight men (Sandfort et al., 2006). Moreover, gay men receive more cancer diagnoses (Koblin et al., 1996) and have lower cancer survival rates (Dean et al., 2000) relative to heterosexuals.

Thus, research over the past decade has revealed that LGB people in general, and subgroups of the LGB population in particular, suffer serious physical health disparities in comparison with their heterosexual peers (for a detailed review, see Institute of Medicine, 2011; for details of each study described above, see Table 1). These findings span both community-based and population-based samples from diverse geographic locations, offering compelling evidence of physical health problems in LGB communities.

### ***Minority stress and LGB health***

Evidence of LGB physical health disparities has grown rapidly over the past decade, but theories about the causes and correlates of these disparities remains sparse. In line with recent reports (Institute of Medicine, 2011) and previous theorizing in the domain of mental health (Meyer, 2003), we propose that LGB physical health disparities are related to minority stress processes that follow exposure to social stigma. Indeed, several recent studies have linked minority stress to physical health complaints. In one study, LGB young adults' reports of headaches increased as a function of self-reported exposure to homophobic remarks (Woodford, Howell, Kulick, & Silverschanz, 2012). In another, LGB adults who experienced high rates of minority stress (i.e., reports of discrimination, rejection, internalized homophobia, and identity concealment) reported more total physical health problems (e.g., chronic diseases) and poorer overall health than those who experienced less minority stress (Frost et al., 2011). In a large convenience sample, expectations of rejection, internalized homophobia, and recalled experiences with victimization predicted physical symptom severity among lesbians and gay men (Denton, 2012). Finally, a recent cross-sectional study found that reports of lifetime victimization and financial barriers to healthcare predicted poor physical health and disability among LGB older adults (Fredriksen-Goldsen, Kim, et al., 2012). Whereas these findings forged an association between social stigma and physical health complaints among LGB individuals, the mechanisms linking sexual orientation-related stigma to physical health outcomes remain poorly articulated. In the next section, we provide a brief overview of minority stress as it relates to LGB mental health and present a theoretical model that extends these concepts to LGB physical health.



**Minority stress and LGB mental health.** Previous research has documented epidemic rates of antigay stigma around the world. Upwards of 94% of LGB adults report experiencing verbal harassment related to their sexual orientation (Herek et al., 2002), with 17%–28% reporting physical assault and property damage (Berrill, 1992; Katz-Wise & Hyde, 2012). There have been more than 15,000 federally reported hate crimes against sexual minority individuals in the United States since 1998, making sexual orientation the second most frequent category of single-incident hate crimes after race (Federal Bureau of Investigation, 2011). Moreover, reports of hate crimes against all racial, ethnic, and religious groups decreased from 2010 to 2011, but reports of hate crimes against LGB individuals increased, making sexual minorities the only group assessed by the U.S. Department of Justice to experience a recent upsurge in reported victimization (Federal Bureau of Investigation, 2011).

Thus, researchers have highlighted the existence of both health difficulties and frequent experiences with stigma among LGB individuals. These two observations may be causally related. Indeed, minority stress theory (Meyer, 2003, 2007) suggests that experiencing or even fearing antigay stigma arouses feelings of distress that can have profound consequences for personal well-being. More specifically, the theory proposes that LGB individuals face two types of stressors related to their sexual orientation. *Distal stressors* are external events that are psychologically taxing, including discrete encounters with victimization and structural forms of stigma (e.g., marriage inequality; Meyer, 2003, 2007). *Proximal stressors* are conflicts internal to the LGB individual triggered by experiences with victimization. These conflicts include concealment of one's minority identity (Frale, Blackstone, & Scherbaum, 1990; Pachankis, 2007), anxiety about future experiences with prejudice (Burns, Kamen, Lehman, & Beach, 2012; Meyer, 2007; Pachankis & Goldfried, 2006), and negative feelings about one's own sexual orientation (i.e., internalized homophobia; Meyer, 2003; M. E. Newcomb & Mustanski, 2010; Shidlo, 1994). Minority stress is the accrual of distal and proximal stressors over the life span that may eventually overwhelm coping resources and compromise well-being.

Minority stress theory has enjoyed widespread empirical support as a framework for understanding LGB mental health disparities. In a seminal study on this topic, gay men who reported high levels of minority stress were three times more likely to report elevated psychological symptoms (e.g., anxiety, hopelessness, poor self-esteem) in comparison with peers who reported lower levels of minority stress (Meyer, 1995). Subsequent studies have buttressed this negative association between minority stress and psychological well-being in LGB communities (DiPlacido, 1998; Hatzenbuehler, Nolen-Hoeksema, &

Erickson, 2008; Kimmel & Mahalik, 2005; Kuyper & Fokkema, 2010, 2011; Lehavot & Simoni, 2011). Others have demonstrated that LGB people who live in stigmatizing social environments report frequent experiences with distal stressors (Lick, Tornello, Riskind, Schmidt, & Patterson, 2012; Oswald, Cuthbertson, Lazarevic, & Goldberg, 2010) and that living in such negative environments is associated with high rates of psychological distress, depressive symptoms, and negative affect (Goldberg & Smith, 2011; Lick et al., 2012), as well as suicide attempts (Hatzenbuehler, 2011). Overall, these studies have demonstrated associations among antigay stigma, minority stress, and mental health outcomes within LGB communities. Though less common, several studies have linked minority stress to differences in mental health between LGB and heterosexual communities (Hatzenbuehler, Corbin, & Fromme, 2008; Lewis, 2009). For example, in a nationally representative sample, LGB individuals reported more numerous and frequent victimization experiences than did heterosexuals, and experiences with victimization fully mediated the association between sexual orientation and psychological distress (Mays & Cochran, 2001). Collectively, these findings have provided robust empirical support for minority stress as a way of understanding poor mental health outcomes among LGB individuals.

**Minority stress and LGB physical health.** In light of strong evidence linking minority stress to LGB mental health disparities, it seems plausible that minority stress is also associated with LGB physical health disparities. Indeed, mental and physical health are intricately related to one another (Cohen & Herbert, 1996; Salovey, Rothman, Detweiler, & Steward, 2000). For example, psychological stress is associated with dysregulated immune functioning (Miller & Chen, 2010), poor antibody response following vaccine (Segerstrom & Miller, 2004), acute health problems (e.g., susceptibility to common cold, flu, headache; Cohen, Tyrrell, & Smith, 1991; DeLongis, Folkman, & Lazarus, 1988), and chronic disease (e.g., cardiovascular disease, cancer; Cohen, Janicki-Deverts, & Miller, 2007) in the general population. Also, a growing body of evidence suggests that LGB physical health problems are correlated with experiences of minority stress (Denton, 2012; Frost et al., 2011; Woodford et al., 2012). In spite of these links, several alternative explanations have also been proposed to account for physical health problems observed among LGB people. Before detailing our minority stress theory of LGB physical health, it is important to consider these alternatives.

First, many of the health disparities described in previous research could be related to the high prevalence of HIV/AIDS among gay men, as those conditions compromise the immune system and lead to opportunistic infections that generally hinder physical health. Consistent with

this possibility, one previous study found that controlling for HIV status nullified disparities in heart disease, liver disease, digestive problems, and urinary incontinence between gay and heterosexual men (Cochran & Mays, 2007). However, comorbid physical health conditions do not account for all of the observed disparities. Indeed, gay men were still more likely to report migraine headaches after controlling for HIV status in Cochran and Mays (2007). Moreover, evidence of physical health difficulties among sexual minority women, who are not at heightened risk for HIV/AIDS, suggests that immunodeficiency cannot fully explain the health issues facing LGB adults. Thus, HIV/AIDS diagnoses may explain some disparities, but they do not account for all of the variance in physical health outcomes related to sexual orientation.

Second, any study examining links between social stigma and sexual minority health must contend with the fact that disparities could be due to either *social causation* or *social selection*. Social causation is the explanation espoused by minority stress theory—namely, that difficult social experiences cause stress and result in poor health outcomes. Though numerous findings are consistent with this hypothesis, associations between antigay stigma and poor health may also be explained by social selection—the idea that well-adjusted LGB individuals voluntarily select more supportive environments, whereas poorly adjusted LGB individuals remain in more stigmatizing environments. Systematic data on this issue are sparse, but there is some reason to believe that social selection does not fully explain LGB physical health disparities. First, migration patterns of LGB people do not differ markedly from those of heterosexual people (Gates, 2007), suggesting that health disparities linked to antigay stigma are not simply caused by well-adjusted individuals leaving stigmatizing environments and poorly adjusted individuals remaining in stigmatizing environments. Moreover, qualitative researchers have noted that many factors other than a desire to flee stigma may drive LGB migration, including pursuit of a spouse who moves for occupational reasons and relocation to be a family caregiver (Howe, 2007). Thus, although we cannot rule out social selection as a factor contributing to LGB health, it is not likely to provide a full explanation of the observed disparities.

Finally, some researchers have suggested that LGB health disparities might be an artifact of the sampling techniques and self-report format characterizing most work in this field. Indeed, the vast majority of studies have relied on self-reports of both exposure to minority stress and health outcomes, resulting in potential same-source reporting biases. Relying on self-report may yield other biases as well. For example, gay men who participate in surveys may exhibit high rates of neuroticism (e.g., Bailey, 1999; Van den Aardweg, 1985), which may lead to overreporting

of the incidence and severity of health problems that do not actually exist. However, it remains unclear whether minority stress is a cause or a consequence of such potentially heightened rates of neuroticism among gay men. Moreover, only those LGB people who are open about their sexual orientation respond to surveys; individuals who are open about their sexuality may also be open about other aspects of their lives that are considered difficult and personal (e.g., health problems), resulting in an overestimation of health problems among LGB individuals (Savin-Williams, 2008). This hypothesis is certainly important to consider, but it does not appear to account for the health disparities observed in the current literature, insofar as studies that control for socially desirable responding have still revealed notable physical and mental health difficulties among LGB individuals (Rosario, Schrimshaw, & Hunter, 2009; Sandfort, Bos, Collier, & Metselaar, 2010). Finally, studies of the general population have revealed that negative affect confounds self-reports of both physical health and perceived stress (Watson & Pennebaker, 1989), suggesting that LGB physical health disparities may be related to heightened levels of negative affect at baseline among sexual minority individuals. It is important to note, however, that negative affect is associated with self-reported health outcomes but not with actual health outcomes (Watson & Pennebaker, 1989). As new population-level datasets that include measures of sexual orientation and objective indices of physical health become available (e.g., National Health and Nutrition Examination Survey, Add Health Wave IV), researchers can address these concerns directly. For now, we note that several studies have uncovered significant associations between sexual minority status, stressful social encounters, and physical health with objective outcome measures (e.g., medical records, Hatzenbuehler et al., 2012; biomarkers, Huebner & Davis, 2005), allaying some concerns about reporting bias.

Thus, although they may have some influence on LGB health, comorbid disease, social selection, and sampling biases are each insufficient to account for the widespread disparities noted in the existing literature. We propose that minority stress provides an important additional explanation of LGB physical health disparities for several reasons. First, minority stress is strongly related to other measures of well-being—most notably to mental health (Meyer, 2003, 2007). Second, previous theorizing suggests an association between minority stress and LGB physical health (Institute of Medicine, 2011). Third, several recent studies provided evidence linking minority stress to physical health complaints including headaches, chronic diseases, poor general health, disability, and symptom severity among LGB individuals (Denton, 2012; Fredriksen-Goldsen, Kim, et al., 2012; Frost et al., 2011; Woodford et al., 2012).

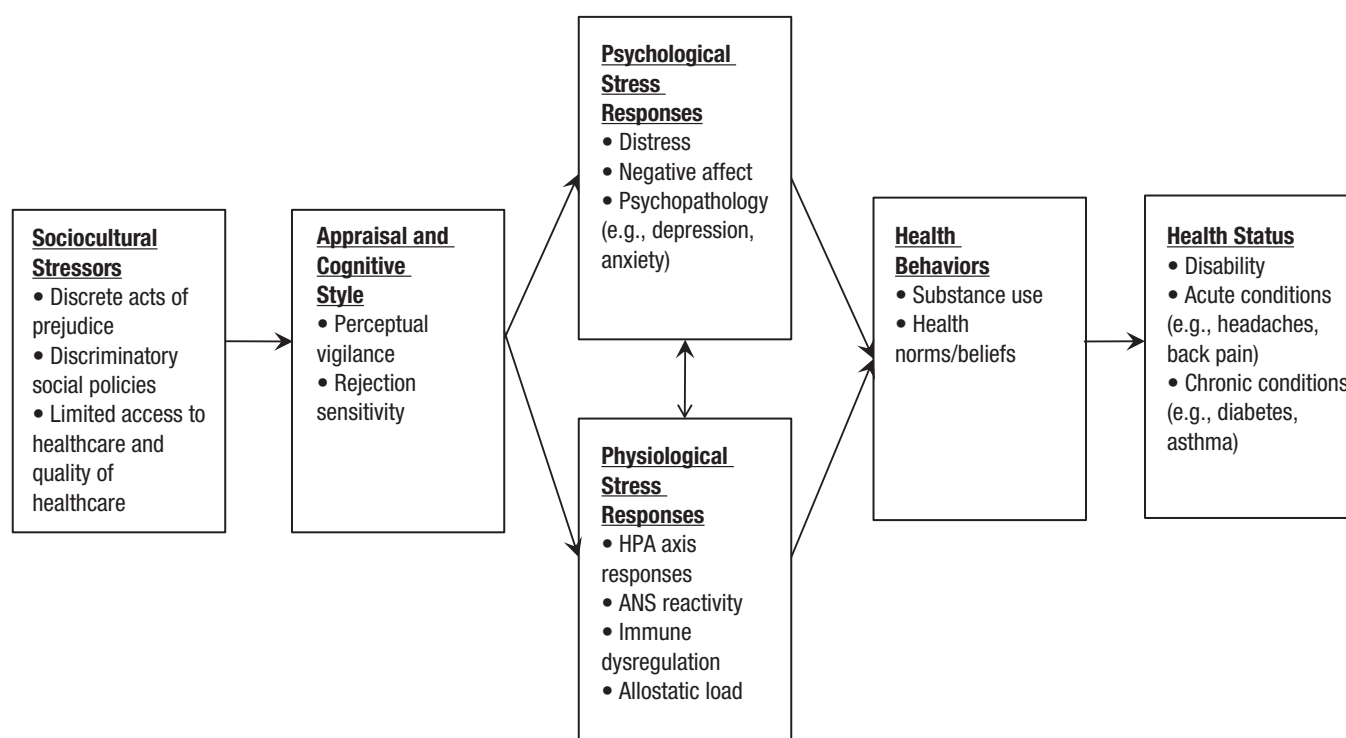
Although recent research has forged a tenable association between minority stress and LGB physical health, the specific mechanisms linking antigay stigma, stress processes, and health remain unclear. Below, we highlight several ways in which social experiences set into motion a cascade of health-relevant events that may culminate in physical health disparities for LGB individuals (see Fig. 1).<sup>2</sup> At the sociocultural level, LGB individuals face frequent stigma and discrimination related to their sexual orientation, which can result in high levels of minority stress. Furthermore, discriminatory social policies preclude LGB individuals from receiving adequate medical attention, limiting preventative care and exacerbating existing health conditions in the sexual minority community at large. At the individual psychological level, experiences with such sociocultural stressors arouse feelings of distress (e.g., anxiety, hopelessness), which may alter physical functioning by way of harmful cognitions (e.g., hypervigilance) and poor health behaviors (e.g., substance use). Finally, at the microbiological level, stressful events alter the functioning of immune, neuroendocrine, and autonomic nervous systems (ANS), eventually leading to wear and tear on the body that may be manifested in physical health difficulties. As shown in Figure 1, we conceptualize these factors as being systematically related, such that stressful events (i.e., sociocultural stressors) are linked to LGB health outcomes by way of appraisal

processes, psychological and physiological stress responses, and health behaviors. Reviewing empirical evidence for each of these mechanisms will substantiate our and others' claims that minority stress helps to explain physical health outcomes in LGB communities, thereby providing a more nuanced theoretical understanding of the social determinants of LGB health.

### ***Determinants of LGB physical health disparities***

#### ***Sociocultural stressors and LGB physical health.***

Sociocultural stressors are the first factors that we propose help to explain LGB physical health disparities. Researchers have long recognized that stigma and health disparities are not equally distributed across social ecologies—that is, some areas are more stigmatizing than others, and stigma-rich environments may be especially stressful for minority inhabitants (Link & Phelan, 2001). In line with this observation, we define sociocultural stressors as social trends that vary as a function of the attitudes prevalent in a given geographic location and affect the well-being of LGB inhabitants. Previous research on this topic has pinpointed three levels of analysis relevant to LGB physical health: (a) interpersonal stressors, (b) institutional stressors, and (c) broader structural stressors. In the following sections, we review



**Fig. 1.** Conceptual model illustrating proposed mechanisms underlying LGB physical health disparities. The model indicates that the association between sociocultural stressors and sexual minority health is mediated through appraisal processes, psychological and physiological stress responses, and health behaviors. This model is meant to be conceptual; some of the associations have not been tested empirically.

findings at each of these levels of analysis to clarify the ways in which sociocultural factors are associated with LGB physical health.

*Interpersonal stressors: Discrete acts of prejudice and discrimination.* The unequal distribution of stigma throughout society manifests in higher rates of victimization against some people and in some areas than others. Indeed, LGB individuals are among the most frequent targets of interpersonal stigma (Herek, 1992), and LGB people who live in stigma-rich environments face especially high rates of victimization (Herek, Chopp, & Strohl, 2007; Lick et al., 2012). We propose that such frequent experiences with antigay stigma result in psychological distress that ultimately hinders the physical health of LGB individuals.

In line with our proposal, LGB individuals frequently experience discrete acts of prejudice and discrimination (Katz-Wise & Hyde, 2012), and these experiences are associated with psychological distress (Mays & Cochran, 2001; Meyer, 1995, 2003, 2007). Furthermore, LGB adults who live in stigmatizing environments (e.g., states with discriminatory social policies and few pro-LGB organizations) report facing higher rates of interpersonal stigma (Lick et al., 2012) and also report greater psychological distress (Hatzenbuehler, Keyes, & Hasin, 2009; Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010) than do those living in environments with more favorable climates. The psychological distress associated with such frequent victimization likely helps to explain disparities in LGB physical health (Pascoe & Smart-Richman, 2009), as distress is associated with poor physical health outcomes in the general population (McEwen, 2006; McEwen & Stellar, 1993; Seeman, Singer, Rowe, Horwitz, & McEwen, 1997). We are not aware of evidence specifically linking victimization to psychological distress and physical health in sexual minority communities, but existing findings suggest that LGB individuals who live in stigmatizing environments are frequently exposed to interpersonal prejudice and discrimination, which are associated with psychological distress that in turn may hinder physical health.

Aside from the more direct psychological and physiological impacts of discrete interpersonal stressors, LGB individuals who live in stigma-rich environments may also face health concerns because they conceal their sexual identity in order to prevent future victimization (Pachankis, 2007). Such concealment can serve as a positive coping strategy in the short-term by helping LGB individuals to avoid victimization (Jones et al., 1984), but it is associated with a host of psychological consequences in the long-term, including depressive symptoms (Frost & Bastone, 2008; Frost, Parsons, & Nanin, 2007), negative affect and anxiety (Frale, Platt, & Hoey, 1998), poor

self-esteem and elevated psychiatric symptoms (Frale, Wortman, & Joseph, 1997), and psychological strain (Ragins, Singh, & Cornwell, 2007). As mentioned above, findings from the general population indicate that such heightened distress hinders physical functioning (McEwen, 2006; McEwen & Stellar, 1993; Seeman et al., 1997). In fact, several previous studies uncovered associations between sexual orientation concealment and physical health outcomes among HIV-positive gay men, linking concealment to increased diagnoses of cancer and infectious diseases (e.g., bronchitis, tuberculosis; Cole, Kemeny, Taylor, & Visscher, 1996), dysregulated immune function (i.e., decreased CD4 T lymphocytes; Cole, Kemeny, & Taylor, 1997; Cole, Kemeny, Taylor, Visscher, & Fahey, 1996), and even mortality (Cole et al., 1997). Collectively, these findings suggest that LGB individuals who live in stigmatizing environments may face frequent victimization that leads them to conceal their sexual orientation, with negative implications for long-term health.

*Structural stressors: Discriminatory social policies.* Aside from interpersonal experiences with prejudice and discrimination, structural factors may also act as stressors that impact LGB physical health. Much of the work on this topic has focused on marriage equality within the United States, and current findings suggest three specific ways in which marriage rights (or lack thereof) may affect LGB health. First, public debates about marriage benefits are associated with heightened feelings of distress among LGB individuals (e.g., anxiety, mood, and substance use disorders; Hatzenbuehler et al., 2010; Riggle, Rostosky, & Horne, 2010; Riggle, Thomas, & Rostosky, 2005), perhaps because the rhetoric surrounding marriage debates often characterizes sexual minority individuals as immoral, sexually promiscuous, and noncommitted. These feelings of distress disrupt physiological functioning and ultimately compromise physical health (Cohen et al., 2007; McEwen, 2006; Seeman et al., 1997). Associations among same-sex marriage debates, psychological distress, and physical health have not been directly tested among LGB individuals, but two recent studies provide suggestive evidence linking marriage policy to physical health. In the first, Stotzer (2011) documented a significant increase in hate crimes related to sexual orientation during years in which the public debated granting partner benefits to same-sex couples (e.g., during and after the Proposition 8 decision in California). Physical injuries sustained from these hate crimes may help to explain some LGB physical health complaints. In a second study, Hatzenbuehler et al. (2012) found that 12 months after marriage was legalized for same-sex couples in Massachusetts, gay and bisexual men showed a significant decrease in medical care visits, as indicated

by medical records. These effects were significant among both partnered and nonpartnered men, suggesting that supportive marriage policies carry notable benefits for the sexual minority community at large, including individuals who are not in long-term partnerships.

Marriage rights may also affect LGB physical health by conferring relational benefits. In particular, marriage offers increased social support and relationship satisfaction to LGB individuals who might otherwise be single or cohabiting (Hardie & Lucas, 2010; Liu, Wang, Keesler, & Schneider, 2011). These relational benefits are associated with physical health in the general population (Wilson & Oswald, 2005), insofar as married individuals have significantly lower mortality (Brockmann & Klein, 2004; Mete, 2005), fewer diagnoses of cardiovascular disease and lung cancer (Hibbard & Pope, 1993), lower rates of Alzheimer's disease (Helmer et al., 1999), and better self-rated health (Joung, Van De Mheen, Stronks, Van Poppel, & Mackenbach, 1998) relative to single or cohabiting individuals. Although these effects have not been replicated in LGB samples, the findings highlight a general pathway by which the benefits of marriage—or the consequences of marriage denial—may contribute to LGB physical health (Buffie, 2011; Herdt & Kertzner, 2006).

Finally, marriage confers tangible benefits relevant for health—most notably, insurance coverage for wedded partners (Institute of Medicine, 2011; U.S. Department of Health and Human Services, 2011). For example, 35 states currently do not offer legal recognition to same-sex couples, thereby limiting insurance coverage available to partners of sexual minority individuals (Ash & Badgett, 2006; Human Rights Campaign, 2013). Such benefit denials are important because more than 60% of insured Americans obtain healthcare coverage through their spouse or family members (Badgett, 2004). Indeed, one study estimated that same- and different-sex unmarried couples were 2 to 3 times more likely to be uninsured than were different-sex married couples (Ash & Badgett, 2006). LGB people may therefore have poorer health outcomes than heterosexuals because discriminatory social policies prohibit them from receiving adequate insurance to cover the costs of medical care. We discuss the implications of limited insurance benefits for LGB individuals in greater detail in the next section.

Aside from marriage rights, other social policies may also act as structural stressors that limit access to medical care and affect subsequent health outcomes among LGB individuals. For example, it is currently legal in 29 U.S. states to fire someone on the basis of their actual or perceived sexual orientation (Human Rights Campaign, 2013). Without employment nondiscrimination policies, LGB individuals have no legal recourse to cope with job loss. These considerations increase anxiety about sexual orientation disclosure in the workplace (Ragins et al.,

2007) and therefore may heighten psychological distress (Pachankis, 2007) and health difficulties. Furthermore, LGB people experience frequent discrimination in hiring practices and compensation (Badgett, 2001; Badgett, Lau, Sears, & Ho, 2007; Tilcsik, 2011), which may lead to financial hardship. Financial hardship is a general stressor affecting many millions of people (Ahmed, Mohammed, & Williams, 2007; Haan, Kaplan, & Camacho, 1987; Leon & Walt, 2001), but it is especially common in sexual minority communities (Badgett, 2001), despite LGB individuals' generally high levels of education (Black, Sanders, & Taylor, 2007). Indeed, LGB adults—especially lesbian women—are more likely to fall below the poverty line and use government assistance programs than are their heterosexual counterparts (Albelda, Badgett, Schneebaum, & Gates, 2009). Thus, sexual minority individuals may be especially likely to live in poverty, which is associated with serious health disparities in the population, generally (see Ahmed et al., 2007; Haan et al., 1987; Leon & Walt, 2001), and underutilization of medical care in LGB communities, specifically (Fredriksen-Goldsen, Emler, et al., 2012).

*Institutional stressors: Limited access to and quality of healthcare.* Finally, features of the medical institution itself limit LGB individuals' access to and receipt of quality care. The first important pathway here involves health insurance. As noted above, many LGB individuals lack insurance coverage due to limited partner benefits (Cochran et al., 2001), and for some people this renders medical care prohibitively expensive (Badgett, 2004). Indeed, numerous studies have pinpointed a lack of insurance coverage as a barrier to receiving adequate medical care among LGB individuals (Cochran, 2001; Diamant, Wold, Spritzer, & Gelberg, 2000; Lauver et al., 1999; Marrazzo, 2004; A. K. Matthews, Brandenburg, Johnson, & Hughes, 2004; Trippet & Bain, 1992), which may result in untreated or poorly managed health conditions.

Even among LGB individuals with adequate insurance benefits, prejudice among healthcare workers may compromise the quality of care they receive. These concerns are so prevalent, in fact, that fears of discrimination are listed as a primary reason why LGB individuals avoid healthcare settings altogether (Petroll & Mosack, 2011) and/or conceal their sexual orientation from healthcare providers (Bergeron & Senn, 2003; Eliason & Schope, 2001; Stein & Bonuck, 2001). Concealment not only harms physical health by altering physiological functioning among LGB individuals (Cole, Kemeny, et al., 1996; Cole et al., 1997), but it also disrupts physical health more indirectly by affecting the care provided by medical professionals. Indeed, LGB adults have special medical needs (e.g., anal pap smears among sexually active gay men) that likely go unmet when patients conceal their

sexual orientation from healthcare workers (Bergeron & Senn, 2003; Cochran et al., 2001; Diamant et al., 2000; Moran, 1996; Petroll & Mosack, 2011; Tjepkema, 2008; White & Dull, 1997). Thus, fears of discrimination stemming from previous experiences with antigay stigma may lead LGB adults to avoid healthcare settings or to conceal their sexual orientation from medical providers, resulting in a low standard of care that contributes to long-term physical health problems (Hutchinson, Thompson, & Cederbaum, 2006; Stevens, 1996; Stevens & Hall, 1988).

Alongside negative health outcomes for LGB adults who conceal their sexual orientation from medical providers, structural aspects of the medical institution itself limit the quality of care offered to LGB adults. In particular, medical providers lack confidence in their knowledge of sexual minority health (McNair, Anderson, & Mitchell, 2001; Trippet & Bain, 1992), with nearly half of all medical students reporting unease when treating LGB clients (Obedin-Maliver et al., 2011). One reason for such discomfort is that medical students receive an average of only 2.5 to 5 hours of training about LGB health (McGarry, Clarke, Cyr, & Landau, 2002). In fact, one recent study revealed that one third of medical schools provided zero hours of clinical training related to LGB health (Obedin-Maliver et al., 2011). Providers' insecurities about treating LGB clients adversely affect the doctor-patient relationship and may limit quality of care, insofar as LGB patients who perceive their doctors to be unknowledgeable about sexual minority issues schedule fewer medical visits, are less compliant with treatment, and undergo fewer preventative tests in comparison with those who perceive their doctors to be more culturally competent (Rankow & Tessaro, 1998; Stevens, 1996; Wang et al., 2007). Thus, even among LGB individuals who have insurance benefits and who disclose their sexual orientation to healthcare providers, doctors' limited training and lack of confidence regarding LGB health issues may result in poor healthcare for sexual minorities, compromising their overall health.

*Conclusions and research gaps.* As reviewed here, sociocultural factors act as distal stressors that may play an important role in the health of LGB individuals. First, many social environments stigmatize homosexuality. LGB individuals who live in such negative environments face high rates of victimization, arousing psychological distress that may compromise physiological functioning. Discriminatory social policies expose LGB individuals to additional stigma and block them from receiving benefits that are important for maintaining good health (e.g., relational satisfaction). Finally, institutional factors within the healthcare system, including a lack of appropriate training and limited insurance coverage for same-sex partners, affect the quality of healthcare available to LGB

people, ultimately damaging their health. Collectively, these stressors may create new health problems or exacerbate existing ones, and they must be addressed as we hone our knowledge of LGB physical health disparities.

Overall, data linking sociocultural stressors to LGB physical health are fairly strong. Indeed, a growing number of studies have explored objective measures of social climate (e.g., Hatzenbuehler et al., 2009; Hatzenbuehler et al., 2010; Lick et al., 2012) and structural barriers to healthcare (e.g., Obedin-Maliver et al., 2011; Wang et al., 2007), allaying concerns about biased reporting. Furthermore, researchers in this area have begun to employ population-based methods to examine sociocultural stressors underlying LGB health (e.g., Hatzenbuehler et al., 2009; Hatzenbuehler et al., 2012), resulting in large samples with few self-selection concerns.

Despite increasingly rigorous studies linking sociocultural stressors to LGB physical health outcomes, several notable omissions deserve mention. One such omission is a lack of diversity in study samples. For example, many studies of healthcare utilization have explored outcomes among White lesbian and bisexual women. It is important for researchers to replicate these findings among sexual minority men and LGB people of color, especially in light of mounting evidence that individuals with multiple minority identities (e.g., Black and gay) face especially poor outcomes (Albelda et al., 2009; Balsam, Molina, Beadnell, Simoni, & Walters, 2011). Furthermore, investigations of insurance coverage among sexual minority adults have focused primarily on LGB couples. It is critical for future researchers to extend these findings to single LGB people, who may also face barriers to obtaining adequate insurance. Also, despite multiple studies demonstrating high rates of distress among LGB people who live in stigmatizing social environments (e.g., Hatzenbuehler et al., 2009), many fewer studies have explored the basic link between social climate and experiences of antigay victimization. Additional research on this topic will be important in the coming years. Finally, and perhaps most importantly, previous work in this area has linked sociocultural stressors to factors that are theoretically related to LGB physical health (e.g., psychological distress) based on data from the general population. Few studies have directly linked sociocultural factors to feelings of stress and physical health outcomes among LGB individuals. Additional data on these topics will allow for even stronger conclusions about the role of sociocultural stressors in LGB physical health.

***Psychological stress processes and behavioral factors linking minority stress and LGB physical health.*** The second set of factors that we propose link social experiences to LGB physical health are psychological and behavioral in nature. These factors are

functionally related to the sociocultural stressors we described previously, as they are a primary means by which socially patterned stigma gets under the skin to affect individual health outcomes. In the language of minority stress theory, psychological and behavioral processes are the proximal stressors triggered by experiences with distal stressors. The extant literature has highlighted three such processes that may link social experiences to LGB physical health: (a) psychological distress, (b) cognitive appraisal style, and (c) health behaviors and beliefs.

*Psychological distress and physical health.* Work on mind–body interaction suggests that psychological and physiological states are intricately connected (Cohen & Herbert, 1996; Salovey et al., 2000). Indeed, hundreds of studies in the general population have revealed negative health implications of psychological stress (McEwen, 2006; McEwen & Stellar, 1993; Pascoe & Smart-Richman, 2009; Seeman et al., 1997). These studies have linked psychological stress to dysregulated immune function (Miller & Chen, 2010), poor antibody response following vaccine (Segerstrom & Miller, 2004), acute health problems (e.g., susceptibility to the common cold, flu, sore throat, headache; Cohen et al., 1991; DeLongis et al., 1988), and chronic disease (e.g., cardiovascular disease, cancer; Cohen et al., 2007).

In light of this evidence, we propose that psychological distress following experiences with stigma is a primary pathway leading to LGB health deficits. In line with this hypothesis, several large studies have linked high rates of psychological distress to physical health outcomes among LGB individuals. For example, in a study of the U.S. population, sexual minority participants reported higher levels of psychological distress than did exclusively heterosexual participants; these differences in psychological distress fully explained most health disparities observed between lesbian and heterosexual women (e.g., digestive complaints, chronic fatigue syndrome, arthritis), and some, but not all, disparities observed between gay and heterosexual men (e.g., heart disease, liver disease, back pain; Cochran & Mays, 2007). In the Netherlands, lesbian/gay participants reported more acute mental health problems and poorer psychological well-being overall than did heterosexuals. Controlling for these markers of psychological distress eradicated associations between sexual orientation and the total number of both acute and chronic physical health conditions reported by LGB participants (e.g., respiratory problems, osteoarthritis, headache; Sandfort et al., 2006). These data do not permit causal claims, but they suggest that high levels of stress due to antigay stigma may help to explain physical health difficulties in sexual minority communities.

*Cognitive appraisal and appraisal style.* Maladaptive cognitive styles may also arise from stigmatizing experiences and affect physical health among LGB individuals. Previous research has pinpointed two such cognitive styles, both of which are related to fears of future victimization: *perceptual vigilance* and *rejection sensitivity*. With regard to perceptual vigilance, many researchers have theorized that experiences with stigma make minority individuals hyperconscious of their social environment in order to anticipate and avoid stigmatizing encounters in the future (Allport, 1954; Crocker et al., 1998; Meyer, 2003). Such persistent alertness is associated with negative health outcomes in diverse populations (Schnittker & McLeod, 2005). For example, Williams and Neighbors (2001) reviewed evidence of perceptual vigilance among Black individuals, who are frequent targets of prejudice. They argued that such constant vigilance alters physiological functioning—especially of the ANS—and that this helps to explain heightened rates of cardiovascular disease in Black communities. Studies in the general population have supported this link between perceptual vigilance and cardiovascular functioning, demonstrating heightened systolic and diastolic blood pressure among participants who were vigilant to negative social messages (Gump & Matthews, 1998). Although similar associations have not been tested in LGB communities, researchers have demonstrated that experiences with antigay victimization make LGB individuals vigilant to threats in their social environment (Pachankis, Goldfried, & Ramrattan, 2008). Collectively, these data suggest that vigilance may be an important psychological factor affecting LGB cardiovascular health.

Experiences with victimization may not only make targets vigilant to potentially harmful social situations, but also sensitive to future rejection. Research in the general population has revealed that some individuals are highly anxious about social rejection (Downey & Feldman, 1996). Such heightened anxiety interferes with physiological functioning, as indicated by dysregulated inflammatory (Slavich, Way, Eisenberger, & Taylor, 2010) and hypothalamic–pituitary–adrenal (HPA) axis responses (Tops, Riese, Oldehinkel, Rijdsdijk, & Ormel, 2008), as well as by upregulated indicators of physical pain (Way, Taylor, & Eisenberger, 2009) among rejection-sensitive adults. Rejection sensitivity and concomitant physiological problems may be especially pronounced among sexual minority individuals. Indeed, two studies have uncovered higher rates of social anxiety among LGB adults relative to heterosexual adults (Pachankis & Goldfried, 2006; Safren & Pantalone, 2006). Other studies have linked such elevated rates of rejection sensitivity to physical health outcomes among gay men. For example, one early study demonstrated faster disease progression and greater rates of mortality among HIV-positive gay

men who were high in rejection sensitivity than in those who were lower in rejection sensitivity (Cole et al., 1997). A subsequent study argued that rejection-sensitive gay men become socially inhibited after experiencing social rejection in order to avoid future stigma, which has negative implications for their health. In that study, HIV-positive gay men who were highest in social inhibition showed the poorest responses to antiretroviral treatment, even after controlling for demographics, duration of HIV infection, and relevant health behaviors (Cole, Kemeny, Fahey, Zack, & Naliboff, 2003). Thus, sexual minority individuals may be prone to rejection sensitivity due to previous experiences with stigma, and this sensitivity is associated with dysregulated physiological functioning and poorer health outcomes in the community at large.

*Health behaviors and beliefs.* Social experiences may also affect LGB physical health by altering health behaviors and beliefs. Specifically, LGB people may engage in unhealthy behaviors in order to reduce psychological discomfort following experiences with antigay stigma. If many LGB individuals experience victimization and engage in such risky behaviors to cope with psychological distress, their peers may come to view such behaviors as normative, leading to harmful behaviors and poor health outcomes even among those who do not personally face prejudice. Evidence for these links between social experiences and health behavior is quite robust, providing a solid foundation for this portion of our theory about the determinants of LGB physical health disparities.

Many studies have indicated that LGB people frequently use substances that put their health at risk. For example, LGB individuals report high rates of tobacco, alcohol, and illicit drug use relative to heterosexuals (Beatty, Madl, & Bostwick, 2006; Cochran, Ackerman, Mays, & Ross, 2004; Hatzenbuehler, Corbin, et al., 2008; Hughes & Eliason, 2002; King et al., 2008; McCabe, Boyd, Hughes, & d'Arcy, 2003; McCabe, Hughes, & Boyd, 2004; Ortiz-Hernández, Gómez, & Valdés, 2009). In fact, one meta-analysis reported 190% greater odds of any substance use for LGB youth than for heterosexual youth, with even higher odds for lesbian and bisexual individuals (340% and 400%, respectively; Marshal et al., 2008). These heightened odds of substance use among sexual minorities were most pronounced for injection drugs (odds ratio = 7.23), followed by cigarettes (odds ratio = 4.23) and cocaine (odds ratio = 3.09).

Other evidence suggests that such high rates of substance abuse are associated with difficult social experiences among LGB people. In one large sample, LGB adults' experiences with antigay victimization and internalized homophobia were positively associated with alcohol and drug use (Weber, 2008). In a population-based study, LGB adults who reported multiple

experiences with discrimination had nearly four times greater odds of experiencing a substance use disorder in the past year (McCabe, Bostwick, Hughes, West, & Boyd, 2010). In other studies, the amount of antigay rejection reported by LGB participants explained individual differences in tobacco, alcohol, and illicit drug use, even after controlling for demographic factors and social desirability (Rosario et al., 2009). Finally, in a prospective study, self-reports of internalized homophobia, discrimination, and rejection sensitivity were positively associated with substance use among gay men (Hatzenbuehler, Nolen-Hoeksema, et al., 2008). Collectively, these findings reveal that experiences with minority stress predict substance use among LGB individuals, which has clear links to physical health problems (McBride, 1992; P. A. Newcomb & Carbone, 1992; Rehm et al., 2009; Ronksley, Brien, Turner, Mukamal, & Ghali, 2011). For example, LGB people who experience minority stress are at heightened risk for smoking tobacco (Hamilton & Mahalik, 2009). Smoking is unambiguously linked to asthma, some cancers, and cardiovascular disease (McBride, 1992; P. A. Newcomb & Carbone, 1992), all of which are more prevalent in LGB relative to heterosexual samples (see Diamant & Wold, 2003; Heck & Jacobson, 2006; Landers et al., 2011; McNair et al., 2011).

Thus far, we have argued that experiences with minority stress lead to poor health behaviors among LGB people, which directly harm their physical health. The link between minority stress and health behaviors may also affect LGB health outcomes more indirectly by altering perceptions of health norms. Specifically, LGB individuals who do not experience minority stress may witness unhealthy behaviors among their peers and come to view them as normative (i.e., pluralistic ignorance; Prentice & Miller, 1993), increasing the probability that they will engage in similar behaviors in the future (Hamilton & Mahalik, 2009). In line with this hypothesis, a prospective study found that lesbian women drank more alcohol than did straight women during high school and that gay men increased their alcohol consumption at a faster rate than did straight men during the transition from high school to college (Hatzenbuehler, Corbin, et al., 2008). The perception that alcohol consumption was normative for their peer group drove such heightened drinking behavior among sexual minority youth; that is, perceptions of social norms mediated the association between sexual orientation and substance abuse. Another study showed that individual health beliefs and peer group norms both predicted psychological distress, engagement in positive health behaviors (e.g., exercise), and risk for drug use among young men who have sex with men (Traube, Holloway, Schrage, & Kipke, 2012). Thus, minority stress may increase risky behaviors among LGB people by altering perceived norms in the LGB community.



**Conclusions and research gaps.** Existing data suggest that stigmatizing social experiences affect psychological and behavioral processes that in turn hinder the health of sexual minority individuals. In particular, experiences with prejudice and discrimination are associated with psychological distress, which portends poor physical health in both general and LGB populations. Minority stress also involves maladaptive cognitive appraisals, such as vigilance to interpersonal threats and rejection sensitivity, which have negative health consequences. Finally, exposure to minority stress is associated with increased substance use among LGB people. Such risky health behaviors are so common that members of the LGB community view them as normative, increasing the likelihood that they will engage in similar behaviors in the future, thereby compromising the health status of the LGB community at large.

Several notable gaps exist in this otherwise robust literature. First, evidence linking individual psychological and behavioral responses to LGB physical health relies almost entirely on cross-sectional designs and self-reports. Studies that explore psychological and behavioral sequelae of minority stress with experimental manipulations and objective measures could rule out potentially confounding factors (e.g., social desirability) and clarify the causal directions of these effects. Furthermore, many of the health-compromising processes described here rely on data from non-LGB minority groups or the general population (e.g., perceptual vigilance among African Americans). In the future, it will be important to replicate these effects with LGB samples. It is also worth noting that most work in this area concerns gay men; far fewer studies examine lesbian and bisexual individuals. To gain a more comprehensive understanding of population-level associations between psychological and behavioral stress responses and sexual minority health, researchers should aim to explore these underrepresented groups more fully.

Finally, although researchers have paid a great deal of attention to LGB health behaviors, substance abuse has been the primary focus of this work. Other behaviors, such as binge eating and physical inactivity, are also associated with experiencing stigma (Durso, Latner, & Hayashi, 2012; Puhl & Heuer, 2010; Puhl, Moss-Racusin, & Schwartz, 2007). Indeed, internalized homophobia is associated with bulimic behavior among gay men (Reilly & Rudd, 2006), and lesbian women report restricted access to family plans at fitness centers as a reason for physical inactivity (Brittain, Baillargeon, McElroy, Aaron, & Gyurcsik, 2008). Future studies should extend these investigations to clarify the behavioral antecedents of LGB health disparities.

**Physiological factors linking minority stress and LGB physical health.** Finally, physiological factors are

critical for understanding LGB health disparities, because they describe how stressors “get under the skin” to affect physical functioning. Despite the importance of this topic, the ways in which psychological and behavioral processes affect physiological functioning among LGB people remain largely unclear. Based on several studies from LGB populations and many from the general population, we have identified three physiological pathways that may link minority stress to LGB physical health: (a) altered functioning of the HPA axis, (b) dysregulated immunity, and (c) exaggerated ANS reactivity. In the short term, these physiological responses help the body to meet demands of external stressors. Over time, however, repeated activation may produce allostatic load, which ultimately takes a toll on physical functioning and produces health disparities (McEwen, 2006; McEwen & Stellar, 1993; Seeman et al., 1997).

**HPA axis.** Minority stress may impact physiology via hormone regulation. Cortisol is a steroid hormone released by the HPA axis in response to stressors that are socially threatening (Dickerson & Kemeny, 2004). Over time, chronic social stress can lead to dysregulation of the HPA axis (i.e., high levels of circulating cortisol; exaggerated or blunted cortisol responses to novel stressors), which is associated with a host of negative health outcomes (e.g., cardiovascular disease, diabetes; Lovallo & Thomas, 2000; Lundberg, 2005). A great deal of work in the general population has established links between social stress, HPA functioning, and downstream health (for a review, see Dickerson & Kemeny, 2004).

Some preliminary evidence suggests that minority stress affects HPA functioning among LGB individuals. For example, one of the first studies to explore physiological correlates of minority stress compared salivary cortisol of gay and bisexual men who disclosed their sexual orientation at work with those who did not (Huebner & Davis, 2005). Disclosure was associated with significantly heightened cortisol during the workday after controlling for baseline levels at home. The authors argued that disclosing one’s sexual orientation at work elevates the risk of experiencing victimization related to one’s sexual orientation (see Pachankis, 2007; Waldo, 1999), arousing concerns about social rejection and therefore stimulating a cortisol response. Persistently high levels of circulating cortisol are associated with a host of poor health outcomes for which LGB individuals show elevated risk (e.g., cardiovascular disease; Lundberg, 2005).

Results from Huebner and Davis (2005) suggest that disclosing one’s sexual orientation may arouse concerns about social evaluation, stimulating cortisol responses that accrue over time to damage health. At the same time, *concealing* one’s sexual orientation may damage health via dysregulated immune function (Cole, Kemeny, et al.,

1996; Cole et al., 1997). Although researchers have yet to experimentally compare the physiological correlates of disclosure and concealment in a single study, these findings suggest that acts of disclosure and concealment both negatively affect LGB physical health but that each does so by different means. Thus, LGB individuals may be in a double bind: Disclosing their sexual orientation may put them at risk for social rejection and exaggerated cortisol responses, but concealing their sexual orientation may put them at risk for anxiety and dysregulated immunity. These possibilities highlight multiple routes by which sexual-orientation-related stressors may affect physical health in LGB communities.

*ANS reactivity.* Social experiences may also impact physiology via ANS reactivity. Indeed, social stressors (e.g., giving a speech before unresponsive judges) are associated with exaggerated ANS responses measured via heart rate and blood pressure reactivity, as well as poor recovery from such activity, among healthy adults (e.g., Kirschbaum, Pirke, & Hellhammer, 1993; Uchino & Garvey, 1997). Furthermore, cardiovascular reactivity and poor recovery are well-known risk factors for health problems, insofar as people who show exaggerated cardiovascular responses to stressors are most likely to develop hypertension, atherosclerosis, and cardiovascular disease (Bongard, al'Absi, & Lovallo, 2012; Lovallo & Wilson, 1992). Moreover, a large literature has linked discrimination to cardiovascular reactivity and health in other minority communities, especially Black communities. Laboratory and epidemiological studies have demonstrated that Black individuals who report high rates of discrimination experience dysregulation in daily cardiovascular functioning and cardiovascular health problems in the long term (for a review, see Williams & Mohammed, 2009).

Both the general importance of ANS reactivity for physical health and recent evidence from racial minority communities support the notion that minority stress may help to explain disparities in cardiovascular disease and disease risk documented among LGB individuals (e.g., Case et al., 2004; Diamant & Wold, 2003). Furthermore, Perez-Benitez, O'Brien, Carels, Gordon, and Chiros (2007) compared cardiovascular recovery of healthy gay men who disclosed their sexual orientation during a laboratory experiment with recovery of those who did not disclose their orientation. They found greater recovery among gay men who disclosed their sexual orientation—a pattern that is at odds with previous observations of elevated cortisol levels following disclosure (Huebner & Davis, 2005). However, the recovery trend was only prevalent among gay men who tended to conceal their sexual orientation in everyday life but disclosed it during the study. The authors argued that persistent concealment of one's sexual orientation is

stressful (see Frable et al., 1998; Pachankis, 2007), leading to chronic cardiovascular arousal. For individuals who regularly concealed their sexual orientation, disclosure may have momentarily reduced this stress, as evidenced by the greater recovery for gay men who tended to conceal their sexual orientation before the study. This work adds to the small but growing literature demonstrating links between minority stress processes—especially sexual orientation disclosure—and physiological functioning among LGB individuals.

*Immune system.* Immune functioning is a third route by which experiences of minority stress may impact physiology. Research in psychoneuroimmunology has consistently linked social stressors to increased inflammation, as indicated by circulating levels of proinflammatory cytokines (e.g., Cohen et al., 2012; Steptoe, Hamer, & Chida, 2007). Studies have also linked psychological stressors (e.g., job strain, caregiving) to poor antibody responses following immunization (Cohen, Miller, & Rabin, 2001). More generally, a meta-analysis of more than 300 empirical studies indicated robust associations between psychological stress and diverse indicators of immune function (Segerstrom & Miller, 2004). Collectively, these studies suggest that psychological stress affects the immune system, resulting in inflammatory processes and poor antibody responses that leave the body susceptible to disease (Segerstrom & Miller, 2004).

Among LGB individuals in particular, concealing sexual orientation negatively impacts immune function—this is consistent with Perez-Benitez et al.'s (2007) findings. Specifically, HIV-positive gay men who concealed their sexual orientation in one study exhibited significantly higher incidences of cancer, infectious diseases, and mortality in a 5-year longitudinal study (Cole, Kemeny, et al., 1996). Demographic, behavioral, and psychological differences among participants did not account for these effects, but poor immune functioning and faster disease progression among gay men who concealed their sexual orientation did (see Cole et al., 1996). Thus, in much the same way that sexual orientation disclosure aids cardiovascular recovery, concealment appears to hinder immune functioning, at least among HIV-positive gay men, leading to disease progression and poor health outcomes overall.

Aside from established links between chronic sexual orientation concealment and immune dysregulation, other forms of minority stress may also affect immune functioning. Indeed, in the general population, acute social-evaluative threats such as those elicited by the Trier Social Stress Test (Kirschbaum et al., 1993) affect the number and function of immune cells in the body. Fleeting experiences with antigay stigma may have similar effects on LGB individuals' immune systems. Because

stigma is a common experience of social-evaluative threat for sexual minorities, LGB people may face constant immune dysregulation, which ultimately wears on the body and hinders physical health. However, researchers have yet to provide empirical support for such associations between acute stressors and immune functioning among LGB individuals; this is an important goal for future work.

*Conclusions and research gaps.* As reviewed here, several recent studies have linked experiences of minority stress to dysregulation of the HPA axis, immune system, and ANS among LGB adults. It is important to note that dysregulation of these systems is associated with physical health problems in the general population (see Cacioppo, Tassinary, & Berntson, 2007), and specific disease processes among gay men (Cole, Kemeny, et al., 1996). Thus, we propose that minority stress is likely to affect physiological functioning among LGB individuals.

Although existing studies have revealed potential links between minority stress and physiological functioning for LGB people, the data are sparse, and methodological limitations of existing studies warrant comment. First, most research to date has relied on small convenience samples, compromising our ability to generalize beyond those samples. Second, most studies have focused exclusively on the physiological functioning of gay men, some of whom were HIV-positive, which raises questions about the applicability of the findings to broader sexual minority populations. Furthermore, most work on this topic has relied on cross-sectional designs and self-reports of minority stress (e.g., sexual orientation disclosure), limiting our ability to draw causal inferences. Also, many of these studies examined a single biomarker, and this narrow focus may obscure interactions among diverse physiological systems following exposure to minority stress.

Perhaps most important, the ways in which discrete instances of physiological dysregulation manifest in poor health for LGB individuals remain unclear. Allostatic load models suggest that repeated stress exposure leads to chronic dysregulation of multiple physiological systems; over time, such dysregulation wears on the body and compromises physical health (McEwen, 2006; McEwen & Stellar, 1993; Seeman et al., 1997). However, strikingly few studies have examined allostatic load among LGB individuals. In one study, Adams (2008) used data from the National Health and Nutrition Examination Survey to compare allostatic load between LGB and heterosexual participants based on nine stress-related biomarkers: systolic blood pressure, diastolic blood pressure, body mass index, resting heart rate, glycohemoglobin, C-reactive protein, albumin, HDL cholesterol, and total cholesterol. After equating LGB and heterosexual subgroups on demographic factors and health behaviors, there were no differences in allostatic load between groups. There are several potential reasons for the non-significant allostatic

load effect in this study. First, allostatic load may not be the mechanism by which physiological dysregulation affects LGB physical health. However, this explanation seems improbable due to the data linking stress to allostatic load and poor physical health in the general population (e.g., Seeman et al., 1997). Second, we have argued that poor health behaviors help to explain physical health outcomes among LGB adults. In particular, increased substance abuse following minority stress may contribute to LGB health disparities. However, Adams (2008) controlled for health risk behaviors, which may have eradicated differences in allostatic load between the LGB and heterosexual subsamples. Indeed, if LGB people engage in riskier behaviors than heterosexual people due to differential exposure to minority stress, and if these behaviors are linked to health disparities, then adjusting for differences in risk behavior between LGB and heterosexual participants may have occluded important physiological differences between the groups. Current data do not permit strong inferences about these possibilities, and the fact that so few studies have examined allostatic load in LGB communities suggests that this topic deserves a great deal more attention in the future.

### **Future Directions for Research on LGB Physical Health**

Sexual minority health has become a pressing concern for scholars, policymakers, and medical professionals around the world. A number of recent studies have demonstrated poorer health outcomes among LGB individuals relative to heterosexual individuals, but there is little theory about the causes and correlates of those disparities. In this article, we endeavored to improve knowledge in this area by linking evidence of LGB health disparities to difficult social experiences that arouse stress. Although our review relied on empirical evidence from both LGB and general populations to pinpoint specific pathways by which social experiences may impact physical health in LGB communities, there is still much work to be done. We now outline five goals that future researchers must meet if we are to achieve a comprehensive knowledge of LGB physical health. This call-to-arms implores colleagues in the allied fields of public health, epidemiology, psychology, sociology, and medicine to provide new insights about the social determinants of LGB physical health.

#### ***Researchers must collect new epidemiological data on the existence, frequency, and correlates of LGB physical health disparities***

A growing number of studies have uncovered physical health disparities related to sexual orientation. Still, we

need additional epidemiological research on the form and frequency of these disparities. This is especially true because evidence supporting the most dramatic disparities often comes from single studies (e.g., higher rates of cardiovascular disease among lesbian women; Diamant & Wold, 2003). New studies will help to clarify the prevalence rates of such severe disparities. Furthermore, whereas some studies have uncovered increased disease diagnoses among LGB individuals (e.g., cancer: Koblin et al., 1996; asthma: Kim & Fredriksen-Goldsen, 2012), many existing studies have investigated disease risk factors rather than diagnoses per se. This is partially due to a reliance on younger LGB samples (e.g., Adams, 2008; Landers et al., 2011), which may not yet exhibit signs of disease. As this area of research matures, studies of clinically significant diagnoses among aging LGB adults will be increasingly important (Wallace, Cochran, Durazo, & Ford, 2011). It is also worth noting that most epidemiological evidence of LGB physical health problems has relied on self-reports from sexual minority adults. In the future, studies that explore archival data, medical records, and physician observations are necessary to confirm previous findings and obviate potential confounds in self-reports of physical health (e.g., malingering). Moreover, researchers have demonstrated a wide variety of physical health disparities between LGB and heterosexual adults, ranging from asthma to cancer and cardiovascular disease. Because only a handful of studies have examined each outcome, it was necessary to combine them for the purposes of this review. Still, it is likely that some disparities are more common than others and that minority stress is a better predictor of some disparities than others. In the future, it will be important to gauge the relative frequency of each of these health outcomes and to tease apart their common and unique predictors. As more population-based surveys and medical records include questions about sexual orientation, it will become increasingly feasible to address these issues.

Aside from additional data on the form and frequency of LGB physical health disparities, we need more population-level data about correlates of such disparities. Indeed, most epidemiological work in this area has examined only sexual minority status and health outcomes, without testing potential mechanisms linking these variables. Based on existing literature, epidemiologists should strive to include several additional measures in future studies. First, measures of both lifetime and recent exposure to antigay prejudice, as well as expectations of future prejudice, are necessary to draw stronger links between distal stressors and health outcomes among LGB individuals. Furthermore, to help clarify conflicting findings about the health costs and benefits of sexual orientation disclosure, epidemiological studies should include measures of disclosure (e.g., time since sexual

orientation disclosure, frequency of sexual orientation disclosure). Previous findings from convenience samples indicated that frequent exposure to antigay stigma leads to internalized homophobia, which may be associated with poor physical health; population-level data are necessary to buttress these claims. Finally, we have almost no information about factors that may buffer associations between sexual minority status and poor health. Population-level data about community connectedness, identity pride, and family acceptance would help us understand how and why some LGB individuals flourish and others do not. As epidemiological studies include more measures of perceived discrimination, sexual orientation disclosure, internalized homophobia, and stress-buffering factors, we will be able to reach stronger conclusions about potential mechanisms linking sexual minority status to physical health outcomes.

### ***Researchers must systematically rule out potential confounds of the minority stress account of LGB physical health***

Future work must also rule out competing theories that may account for LGB physical health disparities. Comorbid diagnoses of HIV/AIDS are especially important, as they may explain some health problems observed among gay men (see Cochran & Mays, 2007). Response biases and social desirability represent other important confounds, as most studies in this area rely on self-report. In the future, studies that control for comorbid disease and gather data from multiple sources would allay these methodological concerns. Several recent studies provide creative methods for achieving these goals. For example, future researchers might sample sibling pairs in which one individual identifies as LGB and the other identifies as heterosexual (see Balsam et al., 2005) to reduce potential confounds related to rearing and early family experiences. Similarly, researchers might examine objective measures of health outcomes (e.g., medical records and biomarkers; see Hatzenbuehler et al., 2012; Huebner & Davis, 2005) to mitigate concerns about biased self-reports. Adopting these and other novel methods will greatly enhance the evidentiary basis for conclusions in this literature.

### ***Researchers must clarify the causal directions of physiological processes proposed to drive LGB physical health disparities***

Although results from cross-sectional studies have revealed associations between experiences with minority

stress, physiological functioning, and physical health outcomes for LGB individuals, the correlational nature of the data obfuscates causal inferences. For example, it remains unclear whether some negative psychological states observed among LGB individuals (e.g., neuroticism, negative affect) are a cause or a consequence of minority stress and its related physical health problems. Controlled experiments that provide causal evidence are a crucial next step for this area of research. In particular, studies that experimentally manipulate minority stress and objectively measure physiological outcomes in a laboratory setting will help to clarify the direction of association between social experiences and LGB physical health.

Researchers who investigate health difficulties in other minority communities have made great strides toward specifying causal directions, and these efforts can serve as a template for new work with LGB communities. Indeed, research with African American participants has consistently revealed that stigma leads to physiological changes that are associated with long-term health disparities (Blascovich, Spencer, Quinn, & Steele, 2001; Brondolo, Gallo, & Myers, 2008; Guyll, Matthews, & Bromberger, 2001; Krieger, 2012; K. A. Matthews, Salomon, Kenyon, & Zhou, 2005). Despite theoretical rationales for similar links between social experiences and physiological functioning in sexual minority communities, only a few studies have tested the effects of minority stress on physiology among LGB individuals. Furthermore, extant research has explored only a few physiological mechanisms in isolation (e.g., salivary cortisol, cardiac recovery, immune responses). In the future, researchers will gain from replicating these findings and exploring how multiple bodily systems interact following exposure to minority stressors. This work will help to clarify specific pathways by which minority stress gets under the skin, and it may reveal promising avenues for interventions that reduce morbidity in LGB communities.

Aside from controlled experiments, other research designs will also be helpful in clarifying causal pathways linking stigma to physical health outcomes in LGB communities. Indeed, whereas laboratory studies are useful for examining interpersonal forms of minority stress, they are less useful for pinpointing broader sociocultural determinants of LGB physical health (e.g., discriminatory social policies). Longitudinal datasets with representative geographic variation, valid measures of sexual orientation, and objective measures of physical health will be especially helpful in exploring these broader aspects of minority stress. Overall, a multimethod approach that incorporates controlled experiments, prospective and longitudinal studies, and quasi-experimental datasets will provide the most comprehensive knowledge of causal mechanisms underlying LGB health disparities.

### ***Researchers must carefully examine links between mental and physical health in LGB communities***

Psychological and physiological systems are intricately connected, such that dysregulation in one area may lead to dysregulation in the other (Irwin, 2008; McGregor & Antoni, 2009). For example, researchers have highlighted complex interactions between depression and immune functioning in the general population, such that depressed individuals exhibit heightened inflammation, which in turn may fuel further depression (Raison, Capuron, & Miller, 2006). Thus, to fully understand LGB physical health disparities, we must understand their associations with psychological health. Traditionally, however, LGB mental health and physical health are studied in isolation and by different disciplines. When researchers have assessed both domains of well-being, they have tended to treat one as a confound of the other (e.g., exploring physical health after controlling for mental health status), thus obscuring meaningful interactive effects. Interdisciplinary research teams that integrate both domains of well-being will advance the field toward a more nuanced understanding of LGB health.

### ***Researchers must explore the developmental timeline of LGB physical health disparities***

Finally, most studies of sexual minority health have relied on reports at a single time point and often from a fairly young sample of adults. These studies provided useful information about LGB health disparities, but they have resulted in limited knowledge of those disparities across the life span. This is an especially important limitation in light of "critical periods," or points during development in which people are highly susceptible to stress (Taylor, 2009), which have received increasing attention in health research. LGB individuals' first experiences disclosing their sexual orientation may represent a critical period, wherein social rejection from family and friends acts as a potent stressor that predicts future health (Ryan, Huebner, Diaz, & Sanchez, 2009; Ryan, Russell, Huebner, Diaz, & Sanchez, 2010). As LGB individuals come out at earlier stages of development (Ryan, 2003), critical periods may become increasingly important for understanding their long-term health. Longitudinal studies that follow LGB individuals from the time they come out (or even before they come out) until later adulthood will help us to understand the time course of physical health problems in the LGB community.

## Conclusion

In summary, a growing body of research reveals that LGB individuals suffer physical health disparities relative to their heterosexual peers, ranging from poor overall health to activity limitations, disability, disease risk factors, and specific diagnoses. In this article, we provided the first comprehensive overview of various pathways by which social factors may hinder LGB physical health, providing a starting point for more detailed theorizing about the social determinants of LGB health disparities. Still, there is much work to be done. In particular, it is critically important for future researchers to employ laboratory and longitudinal methods to understand the causal time course of LGB health disparities. Such new studies have the potential to inform multiple disciplines, highlighting not only important links between sexual orientation, minority stress, and physical health, but also correlates and confounds of these issues (e.g., single vs. coupled LGB individuals; exclusively lesbian/gay vs. bisexual individuals). We certainly have our work cut out for us, but these topics cannot be ignored, as they concern the morbidity of millions of sexual minority individuals and inform both local and federal policy decisions. If research on this topic continues with the vigor of the past 10 years, then by the time the U.S. Department of Health and Human Services releases their Healthy People guidelines for 2030, we are confident that scholars and policymakers will have a more complete knowledge of LGB physical health that will be useful in mitigating such serious concerns.

## Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

## Notes

1. We focus specifically on the physical health of LGB individuals, as they share a common stigma related to their sexual orientation (i.e., attraction to members of the same sex). Although transgender individuals are often included in discussions of sexual minority populations and may experience discrimination based on their sexual orientation, they also face distinct stigmas and health issues related to discrepancies between their biological sex and gender identity. Therefore, it does not seem appropriate or feasible to review the literature on LGB and transgender health in the same article. We limit the current review to health disparities specifically related to sexual orientation, fully recognizing that a detailed review of transgender health warrants its own analysis.
2. Throughout our review, we rely primarily on research conducted with LGB samples. In cases in which there has been little or no research conducted with sexual minority participants, we extend our review to the health implications of stigma for other minority groups but only when necessary.

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