Dimensions of Sexual Orientation and the Prevalence of Mood and Anxiety Disorders in the United States

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In the United States, mental health disorders affect a substantial proportion of the general population.[1,2] Data from the National Comorbidity Study show that approximately 29% of adults meet *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*)[3] criteria for anxiety disorder and nearly 21% for a mood disorder over their lifetime.[1] Data from the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) indicate that 11% of the US general population met criteria for a *DSM-IV* independent (nonsubstance-induced) anxiety disorder in the past year and 9.3% met criteria for a *DSM-IV* mood disorder in the past year.[2] Given the personal and societal costs associated with mental illness,[4] it is necessary to understand which groups are at disproportionate risk for mental health disorders so that appropriate prevention and intervention programs can be designed.

A growing body of evidence suggests that sexual minorities are at higher risk for mental health disorders than their heterosexual counterparts.[5–8] In a meta-analysis, Meyer[8] concluded the odds of lifetime mood and anxiety disorders were twice as high for lesbian, gay, and bisexual women and men as for heterosexuals. However, as Meyer and others[9,10] have noted, research on the mental health of sexual minorities has been hampered by methodological limitations, such as nonrandom samples that constrain the generalizability of findings. In addition, many studies contain small samples, which preclude analyses by age, race/ethnicity, and other characteristics that vary with mental health disorders. Lesbian, gay, and bisexual women and men are often combined for analytic reasons, such as the need to increase the overall sample size and corresponding statistical power. This obscures potential differences between lesbians or gays and bisexuals as well as between men and women—and can lead to biased results.

Although some researchers have considered how different operationalizations of sexual

Objectives. We used data from a nationally representative sample to examine the associations among 3 dimensions of sexual orientation (identity, attraction, and behavior), lifetime and past-year mood and anxiety disorders, and sex.

Methods. We analyzed data from wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions.

Results. Mental health outcomes differed by sex, dimension of sexual orientation, and sexual minority group. Whereas a lesbian, gay, or bisexual identity was associated with higher odds of any mood or anxiety disorder for both men and women, women reporting only same-sex sexual partners in their lifetime had the lowest rates of most disorders. Higher odds of any lifetime mood or anxiety disorder were more consistent and pronounced among sexual minority men than among sexual minority women. Finally, bisexual behavior conferred the highest odds of any mood or anxiety disorder for both males and females.

Conclusions. Findings point to mental health disparities among some, but not all, sexual minority groups and emphasize the importance of including multiple measures of sexual orientation in population-based health studies. (*Am J Public Health.* 2010;100:468–475. doi:10.2105/AJPH.2008.152942)

orientation may affect health outcomes,[11–13] national studies rarely assess sexual orientation and, to date, no national population-based study has compared mental health outcomes across all 3 major dimensions of sexual orientation—identity, behavior, and attraction.[14] As others have noted,[10,15] health risks associated with one dimension of sexual orientation, such as behavior, may differ from those associated with another, such as sexual identity. Furthermore, virtually no population-based health studies of adults have explored associations between sexual attraction and health outcomes. Through the inclusion and measurement of these 3 dimensions in population-based health studies, we can begin to better understand the different dimensions of sexual orientation and their associations with health behaviors and health outcomes.[16–18]

To address the aforementioned limitations and to contribute to a greater understanding of the prevalence of mental health disorders among sexual minorities, we used data from the 2004–2005 NESARC to assess lifetime and past-year prevalence of *DSM-IV* mood and anxiety disorders among heterosexual and

sexual minority women and men. Our purpose was to answer the following question: does the prevalence of mood and anxiety disorders differ across the 3 major dimensions of sexual orientation and does it differ for women and men?

METHODS

We analyzed cross-sectional data from wave 2 of the 2004–2005 NESARC. The NESARC is a longitudinal survey that began in 2001, with wave 2 data collected in 2004 and 2005. The purpose of NESARC is to estimate the prevalence of alcohol, drug, and mental health disorders (e.g., mood, anxiety, and personality disorders) among the noninstitutionalized general population of the United States. Questions related to sexual orientation were added in wave 2.

The NESARC wave 2 sample is representative of civilian adults, who were 20 years and older, residing in noninstitutionalized settings in the United States. Data were collected in face-to-face interviews conducted in

respondents' homes. The response rate at baseline was 81.0% (a detailed discussion of methods can be found elsewhere[19]). A total of 34 653 interviews were conducted among the eligible respondents. The wave 2 response rate was 86.7% and the cumulative response rate for both waves 1 and 2 was 70.2%.[20]

NESARC data are weighted on the basis of a number of factors such as survey design, nonresponse, and oversampling of Blacks, Hispanics, and those aged 18 to 24 years. Design weights are also calculated and adjusted to conform to national census estimates of the population on the basis of region, age, sex, race, and ethnicity.[19,20]

Measures

DSM-IV mood and anxiety disorders. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV) was used to assess mood and anxiety disorders. The AUDADIS-IV is a structured interview schedule meant for use by lay interviewers. The reliability and validity of this instrument has been tested and described by numerous authors.[21,22]

The AUDADIS-IV assesses the following mood disorders: major depression, dysthymia, mania, and hypomania. Anxiety disorders assessed were panic disorder with and without agoraphobia, social phobia, specific phobia, and generalized anxiety disorder. The AUDADIS-IV is structured to rule out mood and anxiety disorders associated with a medical condition or with bereavement.[2] We assessed all disorders for lifetime and past-year time frames.

Sexual orientation. To assess sexual identity, sexual behavior, and sexual attraction, respondents were shown a preprinted card with response options.[23] Sexual identity was assessed by asking, "Which of the categories on the card best describes you? (1) heterosexual (straight), (2) gay or lesbian, (3) bisexual, or (4) not sure?" Sexual attraction was assessed by asking, "People are different in their sexual attraction to other people. Which category on the card best describes your feelings? (1) only attracted to females, (2) mostly attracted to females, (3) equally attracted to females and males, (4) mostly attracted to males, or (5) only attracted to males." Sexual behavior was assessed by asking, "In your entire life, have you had sex with——? (1) only

males, (2) only females, (3) both males and females, or (4) never had sex."

Demographic and background characteristics. Demographic and background characteristics included in the current analyses were sex, age, race (White, Black, Native American, Asian, Hispanic), educational level (less than high school, high school, some college or higher), job status (full-time, part-time, not working), income ($19 999 or less, $20 000–$34 999, $35 000–$69 999, $70 000 or higher), health insurance coverage (yes or no), and relationship status (married or cohabiting; widowed, separated, or divorced; or never married).

Data Analysis

The NESARC design included stratification and clustering of the target population. In addition, sampling weights were computed for wave 2 respondents to offset unequal probabilities of selection, differential nonresponse, and poststratification of the population. Wave 2 data were also adjusted on the basis of the 2000 Decennial Census so that these data were representative of the civilian noninstitutionalized US population by region, sex, age, race, and ethnicity.[19,24] All analyses were conducted with the SUDAAN,[25] which uses Taylor series linearization to adjust variance estimates for the complex survey design. Bivariate associations were estimated for females and males separately, and for lifetime as well as past-year time frames (past-year data not shown). Multiple logistic regression analyses were used to test for associations between the 3 sexual orientation dimensions and *DSM-IV* mood and anxiety disorders for females and males separately.

RESULTS

Table 1 summarizes the demographic characteristics of the sample. Most participants were White (70.9%) and more than half were female (52.1%). More than one half of participants reported educational levels beyond high school (58.5%). A large majority had some type of health insurance coverage (87.7%) and just over one half (53%) were working full-time. In terms of sexual orientation, 1.4% of the sample identified as lesbian, gay, or bisexual, 3.4% reported some same-sex sexual behavior in their lifetime, and close

to 6% reported nonheterosexual sexual attraction.

Women

As shown in Table 2, lesbian, bisexual, or "not sure" sexual identities were associated with higher rates of most lifetime disorders among women, with the highest rates concentrated among those identifying as bisexual. More than one half (58.7%) of bisexual women had a lifetime history of mood disorder, compared with 44.4% of lesbian women, 36.5% of women who were unsure about their sexual identity, and 30.5% of heterosexual women.

Behaviorally bisexual women reported a higher prevalence of lifetime disorders than behaviorally heterosexual women. In contrast, women who reported exclusive same-sex sexual behavior had the lowest rates of every disorder compared with the other behaviorally defined groups (i.e., those with exclusively male sexual partners, those with both male and female sexual partners, and those who never had sex). Similarly, women reporting exclusive same-sex attraction had the lowest rates of most mood and anxiety disorders compared with other attraction-defined groups.

Patterns for past-year prevalence estimates were similar to lifetime estimates (data not shown; tables are available upon request from author). Women who identified as bisexual had the highest rates of any past-year mood and anxiety disorders. In comparisons based on sexual behavior, women with histories of both male and female sexual partners had the highest rates of all mood and anxiety disorders, whereas women with exclusively female sexual partners had the lowest rates of almost every past-year mood or anxiety disorder. Women reporting exclusive same-sex attraction had the lowest rates of most past-year disorders, which is similar to what was found with lifetime disorders.

After adjustment for demographic covariates, the odds of any lifetime or past-year mood or anxiety disorder were twice as high for self-identified bisexual women as for heterosexual women (Table 3). Lesbians had greater odds than heterosexual women of any lifetime mood disorder (adjusted odds ratio [AOR]=1.5; 95% confidence interval [CI]=1.01, 2.1) or any past-year anxiety disorder (AOR=1.7; 95%

TABLE 1—Demographic Characteristics of Study Participants: National Epidemiologic Survey on Alcohol and Related Conditions, Wave 2, 2004–2005

Demographic Characteristic	No.[a]	% (SE)[b]
Sex		
Male	14 564	47.9 (0.34)
Female	20 089	52.1 (0.34)
Age, y		
20–24	2 183	7.6 (0.23)
25–44	13 333	38.5 (0.40)
45–64	11 960	34.6 (0.32)
≥65	7 177	19.3 (0.34)
Race/ethnicity		
White, not Hispanic	20 161	70.9 (1.54)
Black, not Hispanic	6 587	11.0 (0.66)
American Indian, not Hispanic	578	2.2 (0.18)
Asian or Pacific Islander, not Hispanic	968	4.3 (0.52)
Hispanic	6 359	11.6 (1.19)
Marital status		
Married or cohabitating	18 866	63.8 (0.47)
Widowed, divorced, or separated	9 149	18.9 (0.26)
Never married	6 638	17.3 (0.45)
Employment status		
Working full-time (≥35 h/wk)	17 833	53.0 (0.40)
Working part-time (<35 h/wk)	3 675	10.9 (0.20)
Not working	13 145	36.1 (0.42)
Education		
Less than high school	5 514	14.0 (0.45)
Completed high school	9 452	27.5 (0.53)
More than high school	19 687	58.5 (0.63)
Any health insurance coverage in past year	30 213	87.7 (0.39)
Sexual attraction[c]		
Only attracted to opposite sex	32 062	94.2 (0.18)
Mostly attracted to opposite sex	1 152	3.0 (0.18)
Equally attracted to both sexes	390	1.0 (0.06)
Mostly attracted to same sex	183	0.4 (0.05)
Only attracted to same sex	504	1.4 (0.08)
Lifetime sexual behavior[c]		
Only same sex	519	1.5 (0.08)
Only opposite sex	32 438	94.6 (0.17)
Both sexes	747	1.9 (0.09)
None	583	2.0 (0.13)
Sexual identity[c]		
Heterosexual	33 598	98.1 (0.10)
Lesbian or gay	335	0.8 (0.07)
Bisexual	242	0.6 (0.05)
Unsure	170	0.5 (0.04)

Note. The total sample for wave 2 was 34 653.
[a]Based on unweighted data.
[b]Based on weighted data.
[c]For the sexual attraction, lifetime sexual behavior, and sexual identity variables, the "unknown" category included 357, 366, and 308 people, respectively.

CI=1.02, 3.0). Compared with heterosexual women, respondents who were unsure about their sexual identity had greater odds of any past-year anxiety disorder (AOR=1.8; 95% CI=1.01, 3.3).

Significant differences in the odds of any lifetime or past-year disorder on the basis of sexual attraction were concentrated among women who reported being attracted *mostly* to males. These women had significantly higher odds of any lifetime or past-year mood or anxiety disorder compared with women reporting exclusive attraction to males.

Women with histories of both male and female sexual partners had significantly higher odds of any lifetime or past-year disorder than women whose sexual partners were exclusively male. Notably, compared with women reporting exclusively heterosexual behavior, women with exclusively same-sex sexual partners had significantly *lower* odds of any lifetime mood disorder (AOR=0.6; 95% CI=0.4, 0.9).

Men

Mood and anxiety disorders among men were also more concentrated in sexual minority groups (Table 4). Compared with men who identified as heterosexual, those who identified as gay or bisexual or were unsure of their sexual identity had higher rates of most lifetime mood and anxiety disorders. For instance, gay men had a higher prevalence than heterosexual men of any lifetime mood disorder (42.3% vs 19.8%) and of any lifetime anxiety disorder (41.2% vs 18.6%).

The prevalence of almost every mood and anxiety disorder was lowest among men reporting exclusive attraction to females; conversely, men reporting any same-sex attraction (only to males, mostly to males, to both males and females, or mostly to females) had a higher prevalence of most disorders. Among men, those reporting sexual attraction mostly to males had the highest prevalence of lifetime major depression, dysthymia, panic disorder with and without agoraphobia, specific phobia, and generalized anxiety disorder. This is similar to the pattern seen among those women reporting sexual attraction mostly to the same sex.

Men who reported lifetime sexual behavior with both male and female partners had the highest rate of every mood and anxiety

TABLE 2—Lifetime prevalence of *DSM-IV* Mood and Anxiety Disorders Among Women, by Sexual Identity, Sexual Attraction, and Sexual Behavior: National Epidemiologic Survey on Alcohol and Related Conditions, Wave 2, 2004–2005

Disorder	Sexual Identity					Sexual Attraction						Sexual Behavior				
	Lesbian (n=145), % (SE)	Bisexual (n=161), % (SE)	Not Sure (n=101), % (SE)	Heterosexual (n=19489), % (SE)	P^a	Only Females (n=275), % (SE)	Mostly Females (n=87), % (SE)	Equally Females and Males (n=260), % (SE)	Mostly Males (n=880), % (SE)	Only Males (n=18358), % (SE)	P^a	Only Females (n=177), % (SE)	Both Females and Males (n=445), % (SE)	Never Had Sex (n=334), % (SE)	Only Males (n=18904), % (SE)	P^a
Any mood disorder	44.4 (4.9)	58.7 (4.4)	36.5 (6.6)	30.5 (0.5)	≤.01	23.8 (3.1)	39.2 (7.0)	32.3 (3.7)	39.2 (2.1)	30.5 (0.5)	≤.01	19.4 (3.4)	55.8 (2.9)	31.3 (3.1)	30.4 (0.5)	≤.01
Major depression	41.8 (5.1)	52.3 (4.7)	32.1 (6.6)	27.3 (0.5)	≤.01	20.5 (3.0)	35.8 (7.0)	27.9 (3.4)	35.3 (2.0)	27.3 (0.5)	≤.01	15.0 (3.1)	51.0 (3.0)	27.5 (2.9)	27.2 (0.5)	≤.01
Dysthymia	9.1 (3.0)	18.6 (3.6)	9.5 (3.2)	6.3 (0.2)	≤.05	4.3 (1.5)	8.5 (3.6)	10.3 (2.5)	9.8 (1.3)	6.2 (0.2)	≤.05	2.6 (1.2)	16.4 (2.1)	6.4 (1.5)	6.3 (0.2)	≤.01
Mania	4.9 (1.9)	15.0 (2.8)	11.8 (3.9)	5.4 (0.2)	≤.01	2.6 (0.9)	8.8 (3.7)	9.8 (2.0)	8.6 (1.1)	5.4 (0.2)	≤.01	4.6 (1.7)	15.4 (2.0)	5.4 (1.6)	5.3 (0.2)	≤.01
Hypomania	5.0 (2.3)	10.5 (3.3)	2.3 (1.7)	3.6 (0.1)	≤.01	3.3 (1.2)	1.4 (1.0)	3.4 (1.3)	5.4 (1.0)	3.6 (0.2)	≤.05	2.4 (1.0)	9.1 (2.0)	5.9 (1.4)	3.5 (0.2)	≤.05
Any anxiety disorder	40.8 (5.2)	57.8 (4.7)	37.6 (6.7)	31.3 (0.6)	≤.01	24.5 (3.4)	41.1 (7.2)	36.8 (3.6)	35.8 (2.1)	31.5 (0.6)	≤.05	21.5 (4.0)	50.7 (3.0)	27.6 (2.9)	31.4 (0.6)	≤.01
Panic (without agoraphobia)	11.6 (4.0)	23.5 (4.7)	14.4 (5.9)	7.4 (0.3)	≤.05	5.8 (1.8)	11.0 (5.8)	10.1 (2.4)	9.6 (1.1)	7.5 (0.3)	≤.01	6.0 (2.4)	17.7 (2.2)	3.3 (1.0)	7.5 (0.3)	≤.01
Panic with agoraphobia	2.5 (0.1)	7.0 (2.7)	5.9 (3.1)	2.5 (0.1)		3.3 (1.3)	3.5 (2.2)	3.0 (1.2)	4.0 (1.0)	2.5 (0.1)		0.4 (0.4)	6.8 (1.6)	2.1 (0.9)	2.5 (0.1)	≤.01
Social phobia	9.6 (3.0)	18.2 (3.1)	13.6 (5.6)	7.9 (0.3)	≤.05	6.5 (2.0)	12.4 (4.0)	13.4 (2.3)	11.0 (1.2)	7.8 (0.3)	≤.01	4.0 (2.1)	15.5 (2.1)	11.1 (2.0)	7.8 (0.3)	≤.01
Specific phobia	27.6 (4.7)	35.0 (4.5)	23.7 (6.3)	19.5 (0.5)	≤.01	14.1 (2.9)	25.2 (5.9)	21.5 (3.1)	21.3 (1.8)	19.7 (0.5)	≤.01	12.6 (3.3)	31.3 (2.8)	15.5 (2.5)	19.6 (0.5)	≤.01
Generalized anxiety disorder	14.8 (4.0)	22.5 (3.9)	15.5 (5.6)	10.0 (0.3)	≤.05	7.8 (1.6)	18.7 (6.2)	12.7 (2.6)	13.3 (1.6)	10.0 (0.3)	≤.01	5.8 (1.8)	20.0 (2.2)	8.4 (1.7)	10.0 (0.3)	≤.01

Note. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.
[a]Based on χ^2 test of association.

disorder, which is similar to what was found for women who reported both male and female partners. Men reporting lifetime sexual behavior exclusively with males, as well as those reporting never having had sex, were also more likely to have experienced any lifetime mood or anxiety disorder than men who reported exclusively female partners. For example, 46.5% of men who reported histories of both female and male sexual partners experienced some mood disorder in their lifetime, compared with 26.8% of men who reported only same-sex sexual partners, 29.3% who reported no sexual partners, and 19.4% who reported exclusively female partners.

The pattern for past-year prevalence was somewhat similar to that for lifetime prevalence (data not shown). For instance, behaviorally bisexual men had the highest prevalence of all disorders. However, rates of past-year disorders among behaviorally homosexual men and behaviorally heterosexual men generally did not differ.

After control for demographic characteristics, sexual identity was associated with greater odds of lifetime and past-year mood and anxiety disorders (Table 3). Compared with heterosexual men, gay and bisexual men and those not sure of their identity each had higher odds of any lifetime mood or anxiety disorder. In addition, gay men were at higher odds of any past-year mood or anxiety disorder.

Differences across sexual attraction were also evident, again demonstrating higher odds of both mood and anxiety disorders among men with any same-sex attraction. Differences were particularly apparent in comparisons of men with exclusive attraction to females and those with attraction mostly to males.

As with women, behaviorally bisexual men had higher odds of both lifetime and past-year disorders than behaviorally heterosexual men. For example, they were more than 3 times as likely to meet diagnostic criteria for any lifetime mood disorder (AOR=3.2; 95% CI=2.2, 4.2).

DISCUSSION

Results of this study provide compelling evidence that the prevalence of mental health

TABLE 3—Adjusted Odds Ratios (AORs) for Any Lifetime or Past-Year Mood and Anxiety Disorders, by Sexual Identity, Sexual Attraction, and Sexual Behavior: National Epidemiologic Survey on Alcohol and Related Conditions, Wave 2, 2004–2005

	Any Lifetime Mood Disorder, AOR (95% CI)	Any Lifetime Anxiety Disorder, AOR (95% CI)	Any Past-Year Mood Disorder, AOR (95% CI)	Any Past-Year Anxiety Disorder, AOR (95% CI)
Men				
Sexual identity				
Gay (n = 190)	2.4 (1.6, 3.7)	2.7 (1.8, 4.1)	1.8 (1.1, 3.1)	2.3 (1.4, 3.7)
Bisexual (n = 81)	2.1 (1.2, 3.7)	2.7 (1.6, 4.5)	1.7 (0.8, 3.7)	2.4 (1.2, 4.7)
Not sure (n = 69)	2.1 (1.1, 3.8)	2.2 (1.1, 4.2)	4.0 (1.9, 8.3)	2.0 (0.8, 5.0)
Heterosexual (n = 14 109) (Ref)	1.0	1.0	1.0	1.0
Sexual attraction				
Only males (n = 229)	1.7 (1.1, 2.5)	2.2 (1.6, 3.1)	1.1 (0.7, 1.8)	1.6 (1.01, 2.7)
Mostly males (n = 96)	2.6 (1.4, 4.7)	3.3 (1.5, 5.6)	2.2 (1.04, 4.7)	4.0 (2.2, 7.6)
Both males and females (n = 130)	2.3 (1.5, 3.5)	1.6 (0.9, 2.6)	2.5 (1.4, 4.5)	1.4 (0.7, 2.7)
Mostly females (n = 277)	1.7 (1.2, 2.3)	1.5 (1.1, 2.2)	2.2 (1.4, 3.4)	1.6 (0.9, 2.5)
Only female (n = 13 704) (Ref)	1.0	1.0	1.0	1.0
Lifetime sexual behavior				
Only males (n = 342)	1.6 (1.1, 2.2)	1.5 (1.1, 2.1)	1.3 (0.9, 2.0)	1.2 (0.7, 1.9)
Both males and females (n = 302)	3.2 (2.2, 4.2)	2.5 (1.9, 3.3)	2.3 (1.5, 3.5)	2.1 (1.4, 3.0)
Never had sex (n = 249)	1.2 (0.8, 1.7)	1.5 (0.9, 2.2)	1.1 (0.7, 1.9)	1.5 (0.9, 2.5)
Only females (n = 13 534) (Ref)	1.0	1.0	1.0	1.0
Women				
Sexual identity				
Lesbian (n = 145)	1.5 (1.01, 2.3)	1.4 (0.9, 2.1)	1.6 (0.9, 2.7)	1.7 (1.02, 3.0)
Bisexual (n = 161)	2.6 (1.8, 3.8)	2.7 (1.8, 4.0)	2.1 (1.4, 3.1)	2.2 (1.4, 3.3)
Not sure (n = 101)	1.2 (0.6, 2.1)	1.2 (0.7, 2.1)	1.1 (0.6, 2.0)	1.8 (1.01, 3.3)
Heterosexual (n = 19 489) (Ref)	1.0	1.0	1.0	1.0
Sexual attraction				
Only females (n = 275)	0.7 (0.5, 1.03)	0.7 (0.5, 1.1)	0.8 (0.5, 1.3)	0.8 (0.5, 1.2)
Mostly females (n = 87)	1.4 (0.8, 2.5)	1.5 (0.8, 2.8)	2.1 (1.02, 4.2)	2.0 (0.9, 4.1)
Both females and males (n = 260)	1.1 (0.8, 1.6)	1.4 (1.02, 1.9)	1.2 (0.9, 1.8)	1.3 (0.9, 1.9)
Mostly males (n = 880)	1.5 (1.2, 1.7)	1.2 (1.02, 1.5)	1.6 (1.3, 2.0)	1.4 (1.1, 1.7)
Only males (n = 18 358) (Ref)	1.0	1.0	1.0	1.0
Lifetime sexual behavior				
Only females (n = 177)	0.6 (0.4, 0.9)	0.6 (0.4, 1.0)	0.7 (0.4, 1.2)	0.6 (0.3, 1.1)
Both females and males (n = 445)	2.3 (1.8, 2.9)	2.0 (1.5, 2.5)	2.2 (1.6, 2.8)	2.1 (1.6, 2.8)
Never had sex (n = 334)	0.9 (0.6, 1.2)	0.8 (0.6, 1.1)	1.2 (0.8, 1.7)	0.9 (0.7, 1.4)
Only males (n = 18 904) (Ref)	1.0	1.0	1.0	1.0

Note. AOR = adjusted odds ratio; CI = confidence interval. Odds ratios are adjusted for race, age, educational status, employment status, marital status, and health insurance status. Results for these variables are not shown.

disorders does differ across dimensions of sexual orientation and that patterns of risk are different for women and men, as well as for specific sexual minority groups. Among men, any sexual minority status—whether defined by identity, attraction, or behavior—was generally associated with a higher prevalence of lifetime disorders. Among women, however, although any sexual minority identity was associated with higher rates of lifetime and past-year disorders, this was not the case in comparisons based on sexual attraction or sexual behavior. Exclusive same-sex attraction, as well as exclusive lifetime same-sex behavior, was associated

with lower rates of almost all lifetime and past-year mood and anxiety disorders among women. For example, 44.4% of women with a lesbian identity reported any lifetime mood disorder, compared with 23.8% of women reporting only same-sex attraction and 19.4% reporting only same-sex behavior.

That "nonheterosexuality" by any definition was more consistently associated with increased mental health disorders among men indicates that the role of sexual orientation in health outcomes probably functions differently for men and women. Although there are many ways to understand this gender disparity (e.g., genetically, biologically, or culturally), the difference probably emerges in large part from the more extreme stigma that is associated with male homosexuality in the United States. For example, surveys of attitudes toward gays and lesbians demonstrate more negative attitudes toward gay men than lesbian women.[26,27] Furthermore, transgressions of heteronormative behavioral scripts or violations of "traditional" sex norms are more severely sanctioned among and by men,[28] leading to more serious types of victimization, such as physical violence.[29] Experiences of physical harm, as well as threats of harm, are strongly associated with poor mental health outcomes.[10,30]

The finding that same-sex attraction or behavior may confer protective mental health benefits for women highlights the need to broaden discussions of the health status of sexual minority populations, and to move beyond what some have deemed a "minoritizing" or "repathologizing" view.[31,32] Rather than assume that sexual minority status is always associated with poorer health outcomes, we must acknowledge that there are positive aspects of being a member of a sexual minority and, conversely, that heterosexuality may also carry health risks. Results demonstrating better overall mental health for some sexual minority women compared with heterosexual women point to the need for further exploration of the health benefits of sexual minority status[33] and more considered inquiry into areas such as resilience and functional well-being among lesbian, gay, and bisexual groups (K.M. Kertzner et al., unpublished data).

Our study is unique in that it included groups that were unsure about their sexual identity. Some investigators have suggested

TABLE 4—Lifetime Prevalence of DSM-IV Mood and Anxiety Disorders Among Men, by Sexual Identity, Sexual Attraction, and Sexual Behavior: National Epidemiologic Survey on Alcohol and Related Conditions, Wave 2, 2004–2005

| | Sexual Identity | | | | | Sexual Attraction | | | | | | Sexual Behavior | | | | |
Disorder	Gay (n=190), % (SE)	Bisexual (n=81), % (SE)	Not Sure (n=69), % (SE)	Heterosexual (n=14 109), % (SE)	P^a	Only Males (n=229), % (SE)	Mostly Males (n=96), % (SE)	Equally Females and Males (n=130), % (SE)	Mostly Females (n=277), % (SE)	Only Females (n=13 704), % (SE)	P^a	Only Males (n=342), % (SE)	Both Females and Males (n=302), % (SE)	Never Had Sex (n=249), % (SE)	Only Females (n=13 534), % (SE)	P^a
Any mood disorder	42.3 (4.5)	36.9 (6.4)	36.4 (7.2)	19.8 (0.5)	≤.01	30.0 (3.6)	41.4 (6.8)	33.9 (5.0)	28.9 (3.3)	19.7 (0.5)	≤.01	26.8 (2.9)	46.5 (3.6)	29.3 (3.8)	19.4 (0.5)	≤.01
Major depression	37.8 (4.5)	35.8 (6.4)	26.8 (7.1)	15.4 (0.4)	≤.01	27.3 (3.7)	33.0 (6.4)	29.0 (4.8)	21.8 (3.2)	15.3 (0.4)	≤.01	23.0 (2.9)	36.9 (3.3)	19.7 (3.1)	15.2 (0.4)	≤.01
Dysthymia	12.3 (2.5)	3.6 (1.6)	0.6 (0.4)	3.5 (0.2)	≤.01	8.4 (2.0)	10.7 (3.6)	3.5 (1.5)	4.9 (1.4)	3.5 (0.2)	≤.01	5.0 (1.3)	10.7 (1.9)	4.0 (1.6)	3.4 (0.2)	≤.01
Mania	7.7 (2.2)	14.6 (4.4)	15.9 (6.4)	4.7 (0.2)	≤.05	7.1 (2.3)	9.7 (4.0)	12.4 (3.7)	8.5 (2.0)	4.7 (0.2)	≤.05	6.0 (1.7)	13.9 (2.4)	8.7 (2.5)	4.6 (0.2)	≤.01
Hypomania	4.0 (1.6)	5.0 (3.9)	8.9 (4.1)	3.8 (0.2)		3.6 (1.3)	2.5 (1.2)	7.7 (3.1)	6.2 (2.1)	3.8 (0.2)		3.5 (1.2)	7.2 (2.1)	7.1 (2.0)	3.7 (0.2)	
Any anxiety disorder	41.2 (4.7)	38.7 (6.0)	32.7 (7.2)	18.6 (0.6)	≤.01	33.5 (3.8)	43.0 (6.4)	24.2 (4.4)	25.5 (3.1)	18.3 (0.5)	≤.01	25.0 (2.8)	38.9 (3.4)	26.9 (3.7)	18.2 (0.5)	≤.01
Panic (without agoraphobia)	13.7 (3.0)	15.5 (4.9)	3.8 (2.6)	3.8 (0.2)	≤.01	10.3 (2.3)	15.3 (5.3)	5.7 (2.5)	8.8 (2.0)	3.7 (0.2)	≤.01	7.7 (1.9)	12.6 (2.3)	3.2 (1.4)	3.7 (0.2)	≤.01
Panic with agoraphobia	4.2 (1.6)	0.0 (0.0)	0.0 (0.0)	1.1 (0.1)	≤.01	2.6 (1.0)	3.9 (2.6)	0.0 (0.0)	1.2 (0.7)	1.1 (0.1)	≤.01	2.1 (1.1)	3.4 (1.2)	1.3 (0.7)	1.1 (0.1)	≤.01
Social phobia	12.4 (2.9)	14.2 (4.4)	15.6 (6.0)	5.8 (0.2)	≤.05	9.2 (2.4)	7.0 (2.9)	7.9 (2.7)	9.8 (2.0)	5.8 (0.2)	≤.05	6.1 (1.2)	13.8 (2.5)	11.8 (2.5)	5.7 (0.2)	≤.01
Specific phobia	21.8 (3.0)	19.8 (5.0)	18.4 (5.9)	10.0 (0.3)	≤.01	18.7 (3.1)	17.7 (4.6)	12.2 (3.0)	12.6 (2.3)	10.0 (0.3)	≤.01	12.4 (2.1)	20.9 (2.8)	17.3 (3.3)	9.8 (0.3)	≤.01
Generalized anxiety disorder	16.9 (3.5)	11.5 (4.2)	10.1 (4.4)	4.8 (0.2)	≤.01	8.9 (2.2)	23.6 (5.4)	8.6 (2.9)	7.7 (1.7)	4.7 (0.3)	≤.01	7.2 (1.7)	14.4 (2.6)	4.0 (1.3)	4.8 (0.2)	≤.01

Note. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.
[a]Based on χ^2 test of association.

that not claiming a sexual identity may exacerbate mental health problems,[8,10] but others contend that a "nonidentity" is becoming the norm and that such groups may be healthier.[34] Our findings suggest that neither of these contentions is universally true and that, to the extent that claiming a sexual identity may be protective, it differs by sex. Although male participants who were unsure about their sexual identity had significantly higher odds of mood and anxiety disorders (similar to males who identified as gay or bisexual), this was not the case for female participants.

We found that bisexual identity and behavior were strongly and persistently associated with heightened risk of mood and anxiety disorders for both men and women over both lifetime and past-year time frames. This finding is generally consistent with a growing body of work showing poorer health outcomes among bisexual groups than among lesbians and gay men, as well as among heterosexual women and men.[35–38] Those who identify as bisexual face a unique stigma, which is qualitatively different than the stigma experienced by lesbian and gay persons. Pervasive stereotypes and negative attitudes about bisexuality are present not only among the "dominant" heterosexual population but among lesbian and gay populations as well, resulting in a "double stigma" for bisexuals.[39–41] This stigma manifests itself through narratives of indeterminacy, confusion, and deceit, wherein bisexual persons are cast as being unable to choose their identity or, worse, lying about their "true" identity.[42] This perpetual contestation of a salient and meaningful aspect of one's self—which is to say, one's sexual identity—likely takes a psychic toll.[43]

Although explanations for health disparities among populations identifying as bisexual are typically linked to the stigma associated specifically with bisexuality and the lack of an identifiable community, it is unclear whether these reasons explain the association between bisexual behavior and higher odds of mental health disorders seen here. Investigations into the context in which bisexual behavior occurs may shed some light on these findings. For instance, some of the sexual behavior reported in the NESARC may reflect unwanted or coerced experiences such as childhood or adult sexual abuse, or situational factors such exchanging sex for money,

drugs, or other resources. More research is needed to determine why bisexual behavior is associated with a disproportionately higher risk for mental health disorders.

Studies of sexual orientation and mental health that use sexual behavior measures have typically combined all respondents who report any same-sex sexual behavior, rather than analyzing data separately for those reporting exclusive same-sex behavior and those reporting bisexual behavior.[7,44,45] Results of the current study suggest that this practice may inflate risk among some groups, mask risk among others, and obscure the presence of possible protective benefits conferred by exclusive same-sex behavior.

This study has a number of noteworthy strengths. It is based on data from the largest national sample of sexual minority populations to date. It includes multiple measures of sexual orientation, allowing comparisons across dimensions. Mental health disorders are based on *DSM-IV* diagnostic criteria and the measures are well validated, an improvement over earlier studies. The study also controlled for a variety of demographic factors, such as age, relationship status, and educational level, that may otherwise confound the association between sexual orientation and mental health disorders.

Limitations of the study include its reliance on cross-sectional data. Only wave 2 of the NESARC included questions about sexual orientation; therefore, we were unable to establish temporal order and do not know if the development of a minority sexual orientation preceded mental health disorders or vice versa. The use of face-to-face interviews may have led to underreporting of sensitive information such as sexual behavior, identity, or attraction, although the estimates are similar to those in other national studies.[14,46]

Of potentially greater importance is that the analysis relied on a lifetime measure of sexual behavior, in contrast to other national studies that have used past-year or past-5-year measures.[7,44,45] This difference makes direct comparisons with other studies more difficult and emphasizes the importance of standardizing sexual orientation measures, particularly question wording, for use in future studies.[17] Finally, the current investigation did not take into account variables such as level of disclosure of sexual orientation,[47] experiences of discrimination associated with sexual minority status,[48]

or victimization experiences such as childhood sexual abuse and adult sexual assault,[49] all factors that are associated with mental health status among sexual minority groups.

The connection between sexual minority identity and health disparities has gained increasing scholarly and theoretical attention. Meyer's minority stress model, for example, provides a multidisciplinary framework for understanding how discrimination and stigma based on sexual identity operate as stressors and, in turn, contribute to the increased prevalence of mental health disorders among lesbian, gay, and bisexual populations.[8] However, the relationships between sexual attraction and sexual behavior and mental health are much less understood. More work needs to be done to establish the theoretical underpinnings of the associations between all dimensions of sexual orientation and mental health.

In conclusion, this study provides strong evidence of increased risk for mood and anxiety disorders among some sexual minority groups and demonstrates that different dimensions of sexual orientation are associated with varying prevalence estimates of *DSM-IV* mental health disorders. These findings caution against considering dimensions of sexual orientation as equivalent or assuming that health risks or benefits associated with one dimension of sexual orientation can be extrapolated to another dimension. Results reinforce the importance of including multiple measures of sexual orientation in future studies. ■

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This article was accepted January 6, 2009.

Contributors

W.B. Bostwick led the writing. S.E. McCabe acquired funding. All authors assisted in conceptualization of the

study design, contributed to the analysis and interpretation of the findings, and reviewed drafts of the manuscript.

Human Participant Protection

The current study was approved by the University of Michigan institutional review board. The US Census Bureau and the US Office of Budget and Management approved the NESARC research protocol.

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