

The Survey Measurement of Sexual Orientation: Configurations of Sexual Identity and
Attraction and Associations with Mental Health

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Abstract

Purpose: This study aimed to examine how configurations of sexual identity and attraction are associated with mental health outcomes.

Methods: Data came from the 2015, 2016, and 2017 waves of the National Survey on Drug Use and Health, one of the few nationally representative surveys to ask about sexual attraction.

Sexual identity and attraction were combined into groups that are coincident (heterosexual-opposite gender attraction, gay/lesbian-same gender attraction, or bisexual-any multiple gender attraction) or branched (heterosexual-any same gender attraction, gay/lesbian-any opposite gender attraction, bisexual-only same or opposite gender attraction). The association between these configurations and various measures of mental health and well-being—severe psychological distress, major depressive episodes, suicidal ideation, and suicide plan or attempt—was examined.

Results: Heterosexual coincidence—being heterosexual and only attracted to the opposite gender—was associated with lower mental health risks than all other configurations of sexual identity and attraction. In addition, bisexual with coincident attraction was often associated with worse mental health outcomes than other configurations of identity and attraction, while bisexual with branched attraction did not necessarily follow this pattern. Finally, heterosexual with branched attraction was associated with worse mental health outcomes than heterosexual with coincident attraction, but better mental health outcomes than some of the other sexual identity and attraction configurations.

Conclusion: Including one question on sexual attraction and its intersection with sexual identity adds nuance to our understanding of disparities in mental health and well-being among previously identified sexual minority and majority groups.

Introduction

The survey measurement of sexual orientation and gender identity (SOGI) allows for the valid and reliable enumeration of sexual and gender minority populations, a fuller documentation of the scope of human experience, and nuanced assessment of the predictors of health disparities. The best practice recommendations for asking SOGI questions are preliminary and incomplete, requiring rigorous empirical examination across a range of populations and survey conditions.¹⁻⁴

When sexual orientation is included in surveys, it is usually in terms of one component of sexuality—most often sexual identity (e.g., “Do you consider yourself to be heterosexual, that is, straight; lesbian or gay; or bisexual?”),² sometimes sexual behavior (e.g., “During your life [or another reference period] with whom have you had sexual contact? I have never had sexual contact, females, males, females and males.”).² Questions about sexual attraction (physiological, sexual, or romantic desires and attachments to others) are least likely to appear in large scale data collection efforts, e.g., “People are different in their sexual attraction to other people. Which best describes your feelings? I am only attracted to females, mostly attracted to females, equally attracted to females and males, mostly attracted to males, only attracted to males, or I am not sure?”² Clearly, the gender binary and conflation of sex and gender are infused in questions about sexual identity, behavior, and attraction, yet these are the current “best practice” versions used in large scale data collection efforts.^{1,2}

Whether questions on identity, behavior, and attraction are asked has implications for the estimates of the overall sexual minority population and by extension, implications for estimates of health disparities among various populations.⁵⁻⁸ Studies document worse outcomes for sexual identity minority groups, particularly in terms of mood disorders, depression, anxiety, self-rated health, and substance use disorders.⁹⁻¹⁵ As posited by theories of minority stress, this is due in

part to increased exposure to stigma-specific stressors, such as resource-reducing (institutionalized) and interpersonal discrimination; isolation and lack of social integration and support; concealment; rejection; internalized homophobia; and substance-based coping mechanisms.^{11,15-18} Importantly, stigma-specific stressors and mental health outcomes are not experienced in the same way across sexual minority groups (with bisexual populations often experiencing the highest risk for poor mental health), indicating that the practice of combining across groups (usually due to sample size) is problematic in terms of elucidating health risks.^{7,18-21}

Previous research has demonstrated the added explanatory value of including, for example, separate measures of sexual identity and sexual behavior in the same model predicting mental health outcomes.¹⁹⁻²¹ An important step in research on health disparities by sexual orientation is examining how the components of sexual orientation—identity, attraction, and behavior—align or not, and what this alignment (or lack thereof) indicates for mental health and well-being.^{7,22-23} Theories of social identity and cognitive dissonance suggest that “discordance” between two components of sexual orientation is associated with poor mental health and substance abuse because of distress caused by the lack of internal consistency when one’s self-image (identity) does not match one’s behavior or feelings.²⁴⁻²⁹ Thus, the construct of interest becomes the unique categories formed by crossing components of sexual orientation.^{7,22,23}

In Sexual Configurations Theory, van Anders refers to concordance as “coincidence,” defined as configurations of sexual orientation aligning with societal expectations or definitions for sexuality (e.g., a lesbian who is only attracted to women).²³ Discordance is conceptualized as “branchedness,” configurations of sexual orientation that exist beyond societal expectations for sexuality (e.g., a lesbian woman who is equally attracted to men and women). This

reconceptualization introduces value-neutral language into the study of configurations of sexuality.²³

The current study examines how configurations of sexual identity and attraction are associated with mental health. The few studies that have examined this differ in the populations of interest, samples used, operationalization of coincidence and branching, and health outcomes examined.^{7,28-32} As a result, the picture of whether coincidence and branchedness in sexual identity and attraction matters for mental health and well-being—in particular, relative to which comparison group and for which measures of mental health—is incomplete, although previous research suggests some hypotheses.

For example, previous research indicates that coincidence with respect to heterosexual identity, attraction, and behavior is associated with better mental health outcomes.²⁹⁻³² However, all configurations of sexual orientation are not always compared to the others, and the heterosexual-coincidence advantage is not always the case, with evidence of no difference from gay/lesbian groups²⁹⁻³⁰ and in one study, worse outcomes for heterosexual-coincident compared to heterosexual-branched.³⁰ Thus, the hypothesized health advantage of heterosexual-coincidence is one that should be empirically examined.

In addition, previous research has shown that bisexual or nonexclusive sexual identities are associated with worse mental health outcomes compared to other configurations of identity and attraction,^{7,18-21,29,32} yet these studies do not consider the role of coincidence and branching among those who are bisexual. Although prior research has conceptualized discordance/branchedness as leading to cognitive dissonance that influences mental health and substance use disorders,^{7,22,29-31} it is unclear whether branchedness matters more for some sexual identities than for others. Gattis et al.³⁰ posit that because heterosexuality is normative, more

opportunities for or acceptance of heterosexual behavior and attraction exist among sexual identity minority groups. A few studies have examined this hypothesis and found evidence that differences across coincidence and branching occur among heterosexual more so than among gay/lesbian identities.^{29,31} This existing research leads to the hypotheses listed in Table 1, along with a summary of the findings from the current study.

Methods

Data

These data came from the 2015, 2016, and 2017 waves of the National Survey on Drug Use and Health (NSDUH). NSDUH is a yearly cross-sectional data collection effort sponsored by the Substance Abuse and Mental Health Services Administration and is representative of persons aged 12 and older who are not institutionalized and not active in the military. Since 1992, about 70,000 respondents have participated in this in-person, cross-sectional survey each year.³³⁻³⁵

This study combines data from the 2015, 2016, and 2017 independent cross-sectional samples in order to have larger sample sizes for configurations of sexual identity and attraction; 2015 was the first year in which NSDUH asked questions about sexual identity and attraction (but not behavior) among respondents aged 18 and older. The analytic sample is 125,978 (see Analytic Strategy). The Institutional Review Board at Loyola University Chicago determined that this study was exempt from review as it is a secondary analysis of publicly available data.

Measures

Respondents were classified as having a major depressive episode (MDE) in the past year if they experienced adverse events in five of the nine criteria for MDE where at least one of the criteria is a depressed mood or loss of interest or pleasure in daily activities.^{36,37} The Kessler-6

Distress Scale is used to measure how frequently respondents experienced symptoms of psychological distress during the past 30 days across 6 items (feeling nervous, hopeless, restless or fidgety, sad or depressed, everything effort, down on self; none, a little, some, most or all of the time; Cronbach's $\alpha=.89$).³⁸ Respondents are classified as having serious psychological distress if the respondent obtained a score of 13 or greater, a cutoff point used in prior research³⁶⁻³⁸ and shown to be highly correlated with serious mental illness.³⁹ Suicidal ideation is answering "yes" to the question, in the past 12 months, "did you seriously think about trying to kill yourself?"^{36,37} Any suicide plan or attempt is answering yes to one or both questions about making plans or trying to kill oneself in the past 12 months.^{36,37}

The two key independent variables of interest are sexual identity ("Which of the following do you consider yourself to be: heterosexual, that is, straight; gay [or if female] lesbian, or bisexual?") and sexual attraction ("People are different in their sexual attraction to other people. Which statement best describes your feelings? I am only attracted to females, mostly attracted to females, equally attracted to females and males, mostly attracted to males, only attracted to males, or I am not sure"). These dimensions of sexual orientation were then combined in various *sexual identity and attraction configurations* in terms of coincidence (that is, aligning with normative expectations or definitions of sexual orientation) and branching (that is, not aligning with normative expectations or definitions in this way). The six different configurations of sexual identity and attraction used in this study are presented in Table 2. The coincident configurations of sexual identity and attraction follow normative understandings of heterosexual and gay identities with single-gender attraction and the notion of bisexuality as allowing for attraction to "both" genders (Table 2).

Analytic strategy

Logistic regression analyses were conducted in Stata Version 15 (College Station, TX: StataCorp LLC). Data were weighted to adjust for the complex sampling design and are nationally representative of U.S. adults in 2015, 2016, and 2017. Each dependent variable was regressed on a variable comprised of the configurations of sexual identity and attraction described in Table 2 (using each category as a reference group for pairwise comparisons). Because the hypotheses being evaluated center on comparisons of each configuration of sexual identity and attraction with the others, results from the logistic regressions are reported in the metric of predicted probabilities. In particular, model-implied predicted probabilities of the outcome of interest were computed for each configuration of sexual identity and attraction. Then, pairwise comparisons of the difference in probabilities (the average marginal effect) across the groups were calculated (e.g., comparing heterosexual with coincident attraction and gay with coincident attraction).¹² The results were the same in the odds ratiometric in terms of statistical significance.

The questions about sexual identity and attraction had very low rates of nonresponse, increasing confidence that the results are not due to response bias: 1.8% of respondents did not answer the sexual identity question, 1.4% did not answer sexual attraction; 2.2% did not answer both.² The sample available was 128,740 U.S. adults interviewed in 2015, 2016, and 2017, and the analytic sample was 125,978 for respondents who answered both questions on sexual identity and attraction.

The regression models control for the following covariates: gender (the two options, female or male, are coded by the interviewer), race/ethnicity, education, marital status, employment status, household size, household income, any current receipt of government benefits, any health insurance coverage, body mass index (using the Centers for Disease Control

and Prevention classifications), year of study, age (recoding the age ranges presented for those 22 and older as category means with rounding),³⁶ language of survey, how well the respondent speaks English, and whether the respondent had a history of any military service (Table 3). The models use listwise deletion to account for item missing data. These models were missing only about 2.5% of cases compared to the models that regress dependent variables on sexual identity and attraction alone. For example, the model that regresses MDE on the configuration of identity and attraction alone has 125,100 respondents, the full model with all covariates has 122,009.

Results

Table 3 shows the descriptive statistics for the dependent and independent variables of interest, weighted to be representative of the U.S. population aged 18 and older in 2015-2017. Of the dependent variables, MDE showed the highest prevalence at 7% of the population, followed by severe psychological distress (5%), suicidal ideation (4%), and suicide plan or attempt (1%). Table 4 shows the distribution of sexual attraction within levels of sexual identity. Overall, much overlap existed between sexual identity and the type of attraction normatively assumed to align with that identity, but the variation indicates that sexual identity and attraction are distinct facets of sexuality.

Hypothesis 1 posits that heterosexual coincidence (being heterosexual and only attracted to the opposite gender) is associated with better mental health outcomes than other configurations of identity and attraction (Table 1). Consistent with Hypothesis 1, heterosexual coincidence was associated with lower model-implied predicted probabilities of each poor mental health outcome than the other configurations of identity and attraction (Table 5).

Hypothesis 2 posits that bisexual identities are associated with worse mental health outcomes compared to other configurations of identity and attraction (Table 1). Hypothesis 2 was

partially supported, in that this pattern emerged for those who are bisexual with coincident attraction (bisexual and attracted to more than one gender; Table 2). Bisexual with coincident attraction was associated with worse mental health outcomes compared to heterosexual with coincident and branched attraction and gay/lesbian with coincident attraction (for all four outcomes), gay/lesbian with branched attraction (for MDE and suicidal ideation), and bisexual with branched attraction (for MDE). Yet bisexual with branched attraction (bisexual and only attracted to one gender or not sure) was associated with worse mental health only when compared to those who are heterosexual with coincident attraction (all four outcomes) and heterosexual with branched attraction for suicidal ideation.

Hypothesis 3 posits that within a sexual identity, branched attraction is associated with worse mental health outcomes than coincident attraction, and *Hypothesis 4* posits that this will only be the case among those who are heterosexual (Table 1). Among those who are heterosexual and gay/lesbian, branched attraction was associated with a higher probability of severe psychological distress than coincident attraction. Thus, Hypothesis 3 was partially supported for severe psychological distress and Hypothesis 4 was not. However, Hypothesis 4 had more support than Hypothesis 3 for the other three mental health outcomes (MDE, suicidal ideation, and suicide plan or attempt), as branched compared to coincident attraction was associated with worse mental health outcomes for heterosexual respondents, but not for those who are gay/lesbian or bisexual. In addition, bisexual with branched attraction was associated with a lower probability of MDE than bisexual with coincident attraction ($p < 0.001$).

Supplementary analyses examining the intersection between gender and configurations of sexual identity and attraction in predicting mental health are reported in Supplementary Material.

Discussion

This study is one of the first to examine how sexual identity and attraction combine to inform a multifaceted understanding of sexuality, elucidating which sexual minority groups may face risks to their mental health and well-being and compared to whom. As hypothesized, the results suggest that mental health benefits accrue to those who align with heteronormative societal expectations, in that being heterosexual and only attracted to the opposite gender was associated with better mental health than other configurations of identity and attraction across the four outcomes: severe psychological distress, MDE, suicidal ideation, and suicide plan or attempt. As hypothesized, bisexual identity was associated with worse mental health outcomes compared to other groups, but with the added specification of bisexual with coincident attraction. This aligns with previous research showing that bisexual groups have worse physical and mental health outcomes compared to other sexual minority and majority groups,¹² due in part to bisexual-specific stigma (e.g., stereotypes of confusion or deceit)^{18,32} being associated with poor mental health⁴⁰ and sexual violence.⁴¹ Consistent with previous research, the differences remained even when controlling for measures of socioeconomic status.¹²

This study illustrates an important addition to this growing body of research on bisexual health disparities: there are more differences in mental health outcomes between bisexual-coincident and other configurations of sexual identity and attraction than bisexual-branched compared to other configurations. Furthermore, the hypothesis that among those with the same sexual identity, coincident attraction is associated with lower health risks than branched attraction was not supported among those who are bisexual—indeed, the opposite was found with MDE. This is particularly interesting given that branched attraction for those who are bisexual is largely comprised of those who are only attracted to the opposite gender or those who

report that they are not sure (Table 4), with the former aligning with heteronormative societal expectations about people being attracted to “the opposite gender.”

Thus, the results of this study indicate that the mental health consequences associated with bisexuality may be more accurately represented in large scale data collection efforts by delineating those who are bisexual with coincident attraction. This study thus improves upon previous work that has grouped together anyone who identifies as bisexual—based on the assumption that nonexclusive sexual identities are associated with worse mental health—even when parsing the configurations of identity and attraction for other sexual identity groups.^{7,29,32} In addition, the study informs research on the bisexual umbrella and health, as who is categorized as bisexual is particularly heterogeneous across identity, behavior, and attraction in ways that lead to variation in results.^{7,41-43}

Examining attraction adds further nuance to the health benefits afforded to those with a heterosexual identity. In considering the mental health of those who are heterosexual with branched attraction, previous research highlights potentially competing underlying mechanisms.^{17,29-30,32} Being heterosexual with branched attraction may be a stressful state with negative consequences for mental health and well-being because individuals do not have a visible minority community and network in which to connect or access group resources (in the same way that other sexual identity minority groups are able), or may be concealing aspects of their identity.¹⁷ Yet those who are heterosexual with branched behavior or attraction have lower risks of discrimination, victimization, and rates of substance use than other sexual minority groups, and thus lower risks of mental distress from these causes.^{29,30,32} The findings in this study suggest a graded relationship between configurations of sexual identity and attraction and mental health: heterosexual with branched attraction was associated with worse mental health than

heterosexual with coincident attraction, but better mental health than some of the other sexual identity and attraction configurations (bisexual-coincident for all four outcomes, gay-coincident and -branched for severe psychological distress, and bisexual-branched for suicidal ideation).

Importantly, the assumption that discordance/branchedness in components of sexual orientation causes stress that leads to poor mental health^{7,23} is not supported by the results of this study. Branchedness appears to be of consequence for mental health more broadly only among those who are heterosexual; among those who are gay/lesbian, branchedness compared to coincidence was only of consequence for severe psychological distress, and the opposite effect occurred among those who are bisexual for MDE. Thus, branching of sexual identity and attraction need not be presumed to be stressful with respect to mental health and well-being—it depends on identity. Indeed, it may be more distressing to be heterosexual and experience same-gender attraction than to be gay/lesbian or bisexual and experience exclusive opposite-gender attraction, given that heterosexuality is normative in the dominant society in terms of socialization, dominant frames, and expectations.^{29,30} Future research should examine this more explicitly and should also examine the mechanisms that lead to branching within different sexual minority groups, for example due to concealment, which would be distressing, as opposed to exploring sexuality as a form of empowerment.^{1,23}

Limitations

One limitation of the current study is that sexual behavior is not available in the NSDUH data; the strength in the data comes from the large sample size and several mental health outcomes. The components of sexual orientation do not exist in isolation; by focusing on these configurations of identity and attraction, the complicating proliferation of another important dimension of sexuality—behavior—is missed. Indeed, studies that include all three components

find that branching among identity and attraction and identity and behavior may have different impacts on mental health and well-being.^{28,30} However, the intersection of identity and attraction is understudied and is itself an important psychosocial dimension of sexuality to be considered. Furthermore, asking one survey question about sexual identity and one about attraction may be preferable to including questions about sexual behavior. If the survey is not directly related to sexual behavior and given that proper survey measurement of sexual behavior likely should include more than one question, including a survey question about sexual attraction in a section about sociodemographics may be more appealing to both researchers and respondents than including questions about sexual behavior; of course, this is an empirical question.^{1,2}

In this study (as in others), a problematic focus on the gender binary is embedded within the questions on sexual identity and attraction. Much research has been done to improve the survey measurement of sexual identity,⁴⁴ but research on improving the survey measurement of sexual attraction is nascent.⁴⁵ Another limitation is that statistical power may preclude examining other intersections of consequence, such as with race and ethnicity.^{46,47} In addition, the multiple dependent comparisons increase the chance that some findings are false positives. Given the substantive importance of the outcomes and the small sample size of some of the configurations, I decided not to increase false negative results by adjusting conservatively for multiple comparisons,⁴⁸ consistent with other studies.¹² Finally, NSDUH does not collect data on sexuality among adolescents or over time and does not include geographic data. Overall, the limitations in the current study based on the data and analysis call for replication and expansion with other data and exploring mechanisms that produced the pattern of results in this and prior studies.^{7,22,29-32}

Conclusion

Health disparities remain a durable feature of American society despite attempts to reduce these differences. The results of this study suggest that measuring sexual attraction in surveys in addition to sexual identity highlights key risks for mental health among sexual minority populations. In particular, the mental health risks for those with branched identity and attraction may be misunderstood without accounting for these distinct configurations: comparatively worse mental health for heterosexual-branched than -coincident, and comparatively better mental health for bisexual-branched than -coincident. This study has implications for practitioners and researchers who are interested in measuring sexual orientation comprehensively, reliably, and validly in survey research, as it indicates that the configuration of components of sexual orientation, in this case sexual identity and attraction, combines to produce various gradients in and associations with mental health. Survey data collection efforts must include the potential for a multifaceted understanding of sexual orientation.

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Table 1. Summary of hypotheses and findings: Mental health and well-being outcomes by configurations of sexual identity and attraction and covariates, National Survey on Drug Use and Health 2015, 2016, and 2017

| | Severe Psychological Distress | Major Depressive Episode | Suicidal Ideation | Suicide Plan or Attempt |
|---|-------------------------------|--------------------------|-------------------|-------------------------|
| Hypothesis 1: Heterosexual coincidence—being heterosexual and only attracted to the “opposite” gender—is associated with better mental health outcomes compared to other configurations of sexual identity and attraction. | Yes | Yes | Yes | Yes |
| Hypothesis 2: Bisexual identity is associated with worse mental health outcomes compared to other configurations of sexual identity and attraction. | Partial | Partial | Partial | Partial |
| Hypothesis 3: Within a given sexual identity, branched attraction is associated with worse mental health outcomes than coincident attraction. | Yes H,G/L | No | No | No |
| Hypothesis 4: The difference between coincident and branched attraction in the association with mental health will be significant for those who are heterosexual but not for those who are gay/lesbian or bisexual. | No | Yes Bi opposite | Yes | Yes |

No=hypothesis is not supported; Yes=hypothesis is supported; Partial=differences with other configurations are found for bisexual coincident more than branched; Bi opposite=difference between coincident and branched in the opposite direction hypothesized for those who are bisexual; H,G/L=difference between coincident and branched was significant among heterosexual and gay/lesbian sexual identities.

Coincident: heterosexual-opposite gender attraction, gay/lesbian-same gender attraction, bisexual-any multiple gender attraction.

Branched: heterosexual-any same gender attraction, gay-any opposite gender attraction, bisexual-only same or opposite gender attraction, or (for any identity) attraction is coded as “not sure.”

Table 2. Sexual orientation analysis matrix: Sexual identity by attraction

| | Heterosexual/Straight Identity | Lesbian/Gay Identity | Bisexual Identity |
|---|-----------------------------------|-------------------------|----------------------|
| Only attracted to the opposite gender | Heterosexual-coincident | Gay-branched | Bisexual-branched |
| Mostly attracted to the opposite gender | Heterosexual-branched | Gay-branched | Bisexual-coincident |
| Equal attraction to both genders | Heterosexual-branched | Gay-branched | Bisexual-coincident |
| Mostly attracted to the same gender | Heterosexual-branched | Gay-branched | Bisexual-coincident |
| Only attracted to the same gender | Heterosexual-branched | Gay-coincident | Bisexual-branched |
| Not sure | Heterosexual-branched | Gay-branched | Bisexual-branched |

Table 3. Descriptive statistics, National Survey on Drug Use and Health 2015, 2016, and 2017

| | Mean (SD) or Proportion | Sample Size |
|--|----------------------------|-------------|
| Sexual identity | | 126,463 |
| Heterosexual or straight | 0.95 | |
| Lesbian or Gay | 0.02 | |
| Bisexual | 0.03 | |
| Sexual attraction | | 126,988 |
| Only attracted to the opposite gender | 0.88 | |
| Mostly attracted to the opposite gender | 0.05 | |
| Equally attracted to opposite and same gender | 0.02 | |
| Mostly attracted to the same gender | 0.01 | |
| Only attracted to the same gender | 0.02 | |
| Not sure | 0.01 | |
| Severe psychological distress in the past 30 days (vs. none) | 0.05 | 128,740 |
| Major depressive episode in the past year (vs. none) | 0.07 | 127,282 |
| Any suicidal ideation in the past year (vs. none) | 0.04 | 127,879 |
| Any suicide plan or attempt in the past year | 0.01 | 127,875 |
| Gender is female (vs. male) | 0.52 | 128,740 |
| Race/ethnicity | | 128,740 |
| White | 0.64 | |
| Black | 0.12 | |
| Native American | 0.01 | |
| Native Hawaiian/Pacific Islander | 0.00 | |
| Asian | 0.06 | |
| More than one race | 0.02 | |
| Hispanic/Latino | 0.16 | |
| Age (18-65+ years) | 46.60 (24.47) | 128,739 |
| Household size (1-6 or more people) | 3.01 (2.08) | 128,740 |
| Marital status | | 128,740 |
| Married | 0.52 | |
| Widowed | 0.06 | |
| Divorced or separated | 0.14 | |

| | | |
|---|------|---------|
| Never married | 0.28 | |
| Education | | 128,740 |
| Less than high school | 0.13 | |
| High school graduate | 0.25 | |
| Some college or associates degree | 0.31 | |
| College graduate or more | 0.31 | |
| Employment status | | 128,740 |
| Full time | 0.49 | |
| Part time | 0.13 | |
| Unemployed | 0.05 | |
| Other | 0.33 | |
| No health insurance (vs. yes) | 0.10 | 128,740 |
| Household income | | 128,740 |
| Less than \$20,000 | 0.17 | |
| \$20,000 - \$49,999 | 0.30 | |
| \$50,000 - \$74,999 | 0.16 | |
| \$75,000 or more | 0.37 | |
| Participate in government assistance program (vs. no) | 0.19 | 128,740 |
| Any military service (vs. none) | 0.09 | 128,667 |
| Does not speak English well (vs. does) | 0.05 | 128,263 |
| Survey in Spanish (vs. English) | 0.05 | 128,740 |
| Body mass index | | 124,568 |
| Underweight | 0.02 | |
| Normal weight | 0.32 | |
| Overweight | 0.34 | |
| Obese I | 0.19 | |
| Obese II | 0.09 | |
| Obese III | 0.05 | |
| Year | | 128,740 |
| 2015 | 0.33 | |
| 2016 | 0.33 | |
| 2017 | 0.34 | |

Data are weighted to control for the sampling design and are representative of the U.S. population age 18 and older in 2015, 2016, and 2017.
SD, standard deviation.

Table 4. Percentage distribution of sexual attraction within levels of sexual identity, National Survey on Drug Use and Health 2015, 2016, and 2017

| | Heterosexual or straight | Lesbian or Gay | Bisexual |
|---|--------------------------|----------------|----------|
| Sexual attraction | | | |
| Only attracted to the opposite gender | 92.5% | 2.2% | 6.7% |
| Mostly attracted to the opposite gender | 4.6% | 2.6% | 28.6% |
| Equally attracted to opposite and same gender | 1.1% | 2.5% | 51.8% |
| Mostly attracted to the same gender | 0.1% | 27.1% | 7.3% |
| Only attracted to the same gender | 0.5% | 63.5% | 0.3% |
| Not sure | 1.2% | 2.1% | 5.2% |
| N | 117,762 | 2,723 | 5,493 |

Columns sum to 100%. Data are weighted to control for the sampling design and are representative of the U.S. population age 18 and older in 2015, 2016, and 2017.

Table 5. Predicted probabilities of mental health and well-being outcomes by configurations of sexual identity and attraction and covariates, National Survey on Drug Use and Health 2015, 2016, and 2017

| | Severe Psychological Distress in the Past 30 Days | | | | Major Depressive Episode in the Past Year | | | |
|-------------------------|---|---------------------------|-------|--------------------------|---|---------------------------|-------|--------------------------|
| | Pred. Prob. | (95% Confidence Interval) | | | Pred. Prob. | (95% Confidence Interval) | | |
| Heterosexual-coincident | 0.047 | 0.046 | 0.049 | b***,c***,d***,e***,f*** | 0.062 | 0.060 | 0.064 | b***,c***,d***,e***,f** |
| Heterosexual-branched | 0.081 | 0.074 | 0.088 | a***,b*,c***,e*** | 0.098 | 0.091 | 0.106 | a***,c*** |
| Gay/lesbian-coincident | 0.099 | 0.083 | 0.115 | a***,c*,d*,e* | 0.117 | 0.099 | 0.135 | a***,c*** |
| Gay/lesbian-branched | 0.142 | 0.111 | 0.173 | a***,b*,d*** | 0.105 | 0.082 | 0.129 | a***,c*** |
| Bisexual-coincident | 0.120 | 0.110 | 0.130 | a***,b*,d*** | 0.163 | 0.150 | 0.177 | a***,b***,d***,e***,f*** |
| Bisexual-branched | 0.108 | 0.077 | 0.139 | a*** | 0.098 | 0.067 | 0.129 | a*,c*** |

| | Any Suicidal Ideation in the Past Year | | | | Any Suicide Plan or Attempt in the Past Year | | | |
|-------------------------|--|---------------------------|-------|--------------------------|--|---------------------------|-------|-------------------------|
| | Pred. Prob. | (95% Confidence Interval) | | | Pred. Prob. | (95% Confidence Interval) | | |
| Heterosexual-coincident | 0.035 | 0.034 | 0.036 | b***,c***,d***,e***,f*** | 0.010 | 0.009 | 0.011 | b***,c***,d***,e***,f** |
| Heterosexual-branched | 0.071 | 0.064 | 0.078 | a***,c***,f* | 0.022 | 0.018 | 0.026 | a***,c*** |
| Gay/lesbian-coincident | 0.084 | 0.069 | 0.100 | a***,c*** | 0.029 | 0.020 | 0.039 | a***,c* |
| Gay/lesbian-branched | 0.088 | 0.066 | 0.110 | a***,c* | 0.035 | 0.022 | 0.048 | a*** |
| Bisexual-coincident | 0.115 | 0.105 | 0.126 | a***,b***,d***,e* | 0.043 | 0.037 | 0.050 | a***,b*,d*** |
| Bisexual-branched | 0.113 | 0.077 | 0.149 | a***,d* | 0.040 | 0.019 | 0.061 | a** |

Pred. Prob.=Predicted probabilities derived from logistic regression models. Models are weighted to control for the sampling design and are representative of the U.S. population age 18 and older in 2015-2017 and control for sociodemographic covariates.

Significantly different from: a=heterosexual-coincident attraction, b=gay/lesbian-coincident attraction, c= bisexual-coincident attraction, d=heterosexual-branched attraction, e=gay/lesbian-branched attraction, f=bisexual-branched attraction.

Coincident: heterosexual-opposite gender attraction, gay/lesbian-same gender attraction, bisexual-any multiple gender attraction.

Branched: heterosexual-any same gender attraction, gay-any opposite gender attraction, bisexual-only same or opposite gender attraction, or (for any identity) attraction is coded as “not sure.”

Supplementary Analyses by Gender

The intersection of sexual identity and attraction and its association with mental health and well-being has been examined in a few prior studies, which differ in the populations of interest, samples used, and health outcomes examined.¹⁻⁵ These studies are all similar in their treatment of analyses by gender, however: the models are run separately for women and men, with no statistical comparison (i.e., interaction) of the difference between women and men. Thus, supposed differences or similarities by gender are considered in terms of whether the effect is significantly different from zero for one group and not the other, not that the groups themselves are significantly different from each other. This is a particularly important methodological issue with theoretical consequence, as sexual fluidity and same-gender attraction and experiences are more commonly observed and accepted as part of women's development at various stages of the life course—which is often the justification for analyzing men and women separately.^{1,3-5} In the supplementary analyses, I examined differences by gender by examining interactions rather than separate models by gender in a way that moves forward the analysis of potential differences by gender.

Results

There were a few significant interactions between gender and configurations of sexual identity and attraction in their associations with mental health (Supplementary Table S1). The probability of severe psychological distress was slightly higher for women than men in each configuration of identity and attraction except for those who are gay/lesbian with coincident attraction and

bisexual with branched attraction, in which the gender gap is reversed. This gender difference among those who are gay/lesbian with coincident attraction was significantly different from those who are heterosexual with coincident and branched attractions and bisexual with coincident attraction.

For each configuration of sexual identity and attraction, the probability of reporting a major depressive episode (MDE) in the past year was higher for women than it was for men. However, this effect was even more pronounced among those who are heterosexual with branched attraction compared to those who are heterosexual with coincident attraction. In the metric of odds ratio, there were also significant interactions between gender and 1) heterosexual-coincident with gay-coincident and bisexual-coincident attraction, and 2) heterosexual-branched with gay-coincident and bisexual-coincident attraction.

For each configuration of sexual identity and attraction, the probability of reporting suicidal ideation was comparable for women and men, except for those who are gay/lesbian with coincident attraction and bisexual with branched attraction, for which the probability was higher among men. The differences by gender were significant for gay/lesbian-coincident attraction when compared to heterosexual-coincident and -branched attraction. Finally, the probabilities for any suicide plan or attempt in the past year were small and fairly constant by gender within the configurations of identity and attraction, with no significant interaction between gender and configuration of identity and attraction.

Discussion

Overall, there were few differences by gender, indicating that analyzing separately by gender a priori is not necessarily warranted without first analyzing the associations of interest for the entire sample, particularly in a quantitative study of sexuality in which statistical power may become a concern. That is, most of the associations between configurations of sexual identity and attraction with mental health and well-being did not vary by gender. This does not negate an intersectional perspective; rather, if claims of differences by gender are going to be made, this needs to be done statistically with models that examine whether effects are significantly different across groups with interaction models. Models that first separate the sample by gender and find that the statistical effect of a sexual identity-attraction configuration on an outcome is significantly different from zero for one group and not the other have not demonstrated that these effects are different from each other.

Indeed, the few significant interactions begin to expand the contours of common understandings of gender disparities in mental health and well-being when considering sexual identity, attraction, and their combination. For example, the oft-cited gender gap in MDE—in which women have a higher probability of MDE⁶—was significantly stronger among those who are heterosexual with branched attraction compared to those who are heterosexual with coincident attraction. Severe psychological distress followed this pattern—higher for women than men—except among those who are gay/lesbian with coincident attraction, in which the gap was reversed, and these effects were significantly different from those who are heterosexual with coincident and branched attraction and those who are bisexual with coincident attraction. Suicidal ideation was comparable across gender among those who are heterosexual

with coincident and branched attraction, and this was different from the higher probability of suicidal ideation among men compared to women for those who are gay with coincident attraction.

Thus, a trend emerged in which the “gender gap” in mental health (that women have worse mental health than men)⁶ appeared to reverse among those who are gay/lesbian with coincident attraction. These findings raise the question of how gender and facets of sexual orientation combine to produce mental health and well-being, supporting the intersectional perspective within which health must be studied.

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Supplementary Table S1. Predicted probabilities of mental health and well-being outcomes by configurations of sexual identity and attraction, gender, and covariates, National Survey on Drug Use and Health 2015, 2016, and 2017

| | | Severe Psychological Distress in the Past 30 Days | | | | Major Depressive Episode in the Past Year | | | |
|-------------------------|-------|--|---------------------------|-------|--------------|---|---------------------------|-------|----|
| | | Pred. Prob. | (95% Confidence Interval) | | | Pred. Prob. | (95% Confidence Interval) | | |
| Heterosexual-coincident | Men | 0.043 | 0.041 | 0.046 | b* | 0.048 | 0.046 | 0.051 | d* |
| | Women | 0.053 | 0.050 | 0.056 | | 0.078 | 0.075 | 0.081 | |
| Heterosexual-branched | Men | 0.071 | 0.060 | 0.082 | b* | 0.076 | 0.063 | 0.088 | a* |
| | Women | 0.091 | 0.082 | 0.101 | | 0.123 | 0.112 | 0.133 | |
| Gay/lesbian-coincident | Men | 0.109 | 0.086 | 0.132 | a*,c*, d* | 0.110 | 0.087 | 0.134 | |
| | Women | 0.086 | 0.067 | 0.106 | | 0.119 | 0.090 | 0.147 | |
| Gay/lesbian-branched | Men | 0.124 | 0.084 | 0.164 | | 0.077 | 0.044 | 0.110 | |
| | Women | 0.160 | 0.112 | 0.207 | | 0.135 | 0.100 | 0.170 | |
| Bisexual-coincident | Men | 0.109 | 0.087 | 0.130 | b* | 0.169 | 0.138 | 0.200 | |
| | Women | 0.132 | 0.120 | 0.145 | | 0.187 | 0.171 | 0.203 | |
| Bisexual-branched | Men | 0.115 | 0.054 | 0.176 | | 0.063 | 0.023 | 0.103 | |
| | Women | 0.109 | 0.073 | 0.144 | | 0.132 | 0.084 | 0.179 | |
| | | Any Suicidal Ideation in the Past Year | | | | Any Suicide Plan or Attempt in the Past Year | | | |
| | | Pred. Prob. | (95% Confidence Interval) | | | Pred. Prob. | (95% Confidence Interval) | | |
| Heterosexual-coincident | Men | 0.035 | 0.033 | 0.038 | b** | 0.010 | 0.009 | 0.011 | |
| | Women | 0.036 | 0.034 | 0.038 | | 0.011 | 0.010 | 0.012 | |
| Heterosexual-branched | Men | 0.070 | 0.058 | 0.082 | b* | 0.024 | 0.017 | 0.032 | |
| | Women | 0.073 | 0.064 | 0.081 | | 0.022 | 0.017 | 0.027 | |
| Gay/lesbian-coincident | Men | 0.101 | 0.077 | 0.125 | a**, d* | 0.034 | 0.018 | 0.051 | |
| | Women | 0.062 | 0.046 | 0.079 | | 0.025 | 0.016 | 0.035 | |
| Gay/lesbian-branched | Men | 0.094 | 0.057 | 0.132 | | 0.031 | 0.013 | 0.048 | |
| | Women | 0.084 | 0.059 | 0.109 | | 0.040 | 0.021 | 0.059 | |
| Bisexual-coincident | Men | 0.123 | 0.099 | 0.146 | | 0.048 | 0.033 | 0.064 | |
| | Women | 0.112 | 0.100 | 0.124 | | 0.042 | 0.035 | 0.050 | |
| Bisexual-branched | Men | 0.152 | 0.078 | 0.226 | | 0.063 | 0.012 | 0.113 | |

| | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|
| Women | 0.091 | 0.058 | 0.124 | 0.030 | 0.013 | 0.048 |
|-------|-------|-------|-------|-------|-------|-------|

Pred. Prob.=Predicted probabilities derived from logistic regression models. Models are weighted to control for the sampling design and are representative of the U.S. population age 18 and older in 2015-2017 and control for sociodemographic covariates.

a=gender difference for this group was significantly different from that observed for heterosexual-coincident attraction.

b=gender difference for this group was significantly different from that observed for gay/lesbian-coincident attraction.

c=gender difference for this group was significantly different from that observed for bisexual-coincident attraction.

d=gender difference for this group was significantly different from that observed for heterosexual-branched attraction.

e=gender difference for this group was significantly different from that observed for gay/lesbian-branched attraction.

f=gender difference for this group was significantly different from that observed for bisexual-branched attraction.

Coincident: heterosexual-opposite gender attraction, gay/lesbian-same gender attraction, bisexual-any multiple gender attraction.

Branched: heterosexual-any same gender attraction, gay-any opposite gender attraction, bisexual-only same or opposite gender attraction, or (for any identity) attraction is coded as “not sure.”

*p<0.05, **p<0.01, ***p<0.001.