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# Relationships Among Sexual Identity, Sexual Attraction, and Sexual Behavior: Results from a Nationally Representative Probability Sample of Adults in the United States

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**Abstract**
Sexual orientation is a multi-dimensional concept, at a minimum comprised of sexual identity, sexual attraction, and sexual behavior. Our study aimed to assess relationships among self-identified sexual identity, sexual attraction, and sexual behaviors in a probability sample of adults in the U.S. and to identify associated factors with diverse patterns. We collected data from adults in the 2015 *National Survey of Sexual Health and Behavior*, an Internet-based nationally representative probability survey of the general U.S. population. Concordance between sexual identity versus sexual attraction and sexual behaviors was assessed using percent agreement. We identified correlates of discordance using logistic regression. Concordance between sexual identity versus sexual attraction and past-year sexual behaviors was 94% and 96%, respectively, though our sample was predominately composed of heterosexual individuals. Women and sexual minority individuals reported greater discordance across sexuality-related measures than men and heterosexual individuals. Younger adults (aged 18–24 years) were more likely to report sexual behaviors discordant with sexual identity compared with older adults (including those ages 25–34 years). Higher levels of educational attainment were significantly associated with less discordance of reported recent sexual activity and sexual identity. Measures of sexual identity, attraction, and behaviors are not interchangeable. Future research should consider multiple sexuality-related measures in order to capture the complexity and variability of sexualities.

**Keywords** Sexual identity · Sexual attraction · Sexual behavior · Probability sample · Sexual orientation

## Introduction

In 2011, the Institute of Medicine encouraged more in-depth research on sexual and gender minority individuals (including lesbian, gay, bisexual, and transgender individuals) in population-based studies to address health issues and disparities (Institute of Medicine Committee on Lesbian Gay Bisexual and Transgender Health Issues and Research Gaps and Opportunities, 2011). Historically, there has been a focus on the disproportionately higher risk of sexually transmitted infections (STI), especially HIV/AIDS, among self-identified gay men and other men who have sex with men, which remain critical health issues today (Beyrer et al., 2016; Vermund et al., 2010). Other studies have shown that sexual minority subgroups (particularly bisexual individuals) have higher rates of adverse mental health outcomes, substance use, and suicidality (Bolton & Sareen, 2011; Bostwick, Boyd, Hughes, & McCabe, 2010; Dodge et al., 2016; McCabe, Hughes, Bostwick, West, & Boyd, 2009).

"Sexual minority" status can be defined by a number of criteria, including self-identified sexual orientation, sexual attraction, and sexual behaviors. These measures overlap only in part, although they are often used interchangeably in research and policy decisions. However, it is well established that sexual identity, sexual attraction, and sexual behaviors are independent constructs and that discordance among them is not unusual (Baldwin et al., 2017; Bauer & Jairam, 2008; Baunach

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& Burgess, 2013; Chandra, Mosher, & Copen, 2011; Copen, Chandra, & Febo-Vazquez, 2016; Igartua, Thombs, Burgos, & Montoro, 2009; Keyes, Rothman, & Zi, 2007; Nield, Magnusson, Brooks, Chapman, & Lapane, 2015; Pathela et al., 2006; Richters et al., 2014). Some studies have demonstrated associations between sexual identity discordance, in particular, and a number of health outcomes. For example, Talley, Aranda, Hughes, Everett, and Johnson (2015) found that sexual orientation discordance was a risk factor for risky drinking outcomes among sexual minority women, particularly in older adulthood. Schick, Rosenberger, Herbenick, Calabrese, and Reece (2012) found that sexual minority women whose recent sexual partnering matched their sexual identity reported fewer mentally/physically unhealthy days, as well as higher quality sexual experiences.

Sexual orientation, therefore, is considered a multi-dimensional concept, comprised of sexual identity, sexual attraction, and sexual behaviors (Laumann, Gagnon, Michael, & Michaels, 1994), as well as other possible dimensions. Many studies assess "sexual orientation" by using only a single component of this multi-dimensional construct. In some instances, such as in studies measuring HIV transmission, sexual behavior rather than sexual identity may play a more important role due to risk relevance (Dodge, Jeffries IV, & Sandfort, 2008; Young & Meyer, 2005). However, studies have found that STI prevalence among individuals reporting same-sex behaviors varies significantly by sexual identity (Everett, 2013; Xu, Sternberg, & Markowitz, 2010a, b). Hence, considering only sexual behaviors and not sexual identity in STI research may be ignoring the effects of contextual and social factors on STI transmission (Sandfort & Dodge, 2009; Young & Meyer, 2005). Furthermore, sexual behavior characteristics, such as age at first sex and lifetime number of sex partners (Xu et al., 2010a, b), also vary among sexual identity groups, and not identifying these subgroups may lead to missed opportunities for STI prevention, as well as gaps in sexual health research. The appropriateness of the type of assessment should be examined based on study-specific objectives, and care should be taken in generalizing results generated from sexual behavior measures to sexual identity groups and vice versa (Baldwin et al., 2015; Bauer & Jairam, 2008). Understanding the interplay between the different classifications of sexual orientation is valuable to assessing the interchangeability and appropriate use of such measures and critical to inform public health research.

Studies have assessed the concordance/discordance among a variety of sexuality-related measures (Baunach & Burgess, 2013; Keyes et al., 2007; Laumann et al., 1994; Pathela et al., 2006; Ross, Essien, Williams, & Fernandez-Esquer, 2003; Vrangalova & Savin-Williams, 2012), though few have used nationally representative probability samples, including a wide range in age and other demographic characteristics, thus limiting generalizability to the broader population. One of the most vivid examples of the few probability studies on sexual concordance/discordance is found in the pioneering work of Laumann et al. (1994). As part of their General Social Survey, Laumann et al. found that 9% of 18- to 59-year-old men living in the largest U.S. cities identified as gay or bisexual in one wave of data collection. However, a higher proportion of men (14%) surveyed in the same cities reported having male sexual partners in the past 5 years and 10% in the previous year.

The first and second Australian Study of Health and Relationships (ASHR & ASHR2) used random digit dialing to enroll a representative sample of approximately 20,000 Australian men and women aged 16–69 years to explore intersections and distinctions among sexual identity, sexual attraction, and sexual experiences (Richters et al., 2014; Smith, Rissel, Richters, Grulich, & de Visser, 2003). They defined sexual experiences as any kind of contact with another person that felt sexual, including kissing, touching, intercourse, or any other form of sex. Participants could self-identify as heterosexual or straight, homosexual (gay), bisexual, queer, not sure/undecided, or something else. Response options for sexual attraction and sexual behavior measures were binary and limited to males and females, though levels of attractions/behaviors were captured (only males/females, more often one than the other, equally males and females). Richters et al. collapsed categories together during analysis to conduct comparisons between exclusive other-sex attractions/sexual experiences and at least some same-sex attractions/sexual experiences. Comparing how people answered across the three measures for same-sex attraction (any vs. none), same-sex experience (any vs. none), or sexual identity (non-heterosexual vs. heterosexual), 32.6% of men and 16.5% of women consistently reported lifetime same-sex attraction, lifetime same-sex experience, as well as a non-heterosexual identity. However, Richters et al. did not provide further stratification in sexual identity, and pooling all individuals reporting any same-sex attraction, experience, or identity likely accounts for at least part of the discordance observed across the sexual measures.

Researchers of the Adult Psychiatric Morbidity Survey recruited over 7000 men and women in the UK aged 16 years and older, designed to be representative of people living in private households in England, and assessed their current self-identified sexual orientation and lifetime sexual partnerships (Hayes et al., 2012). Response options for sexual orientation included entirely heterosexual, mostly heterosexual, bisexual, mostly homosexual, or entirely homosexual; response option for lifetime sexual partnerships included only opposite sex, mainly opposite sex, about equally, mainly same sex, or only same sex. Concordance between those who identified as "entirely heterosexual" and those who reported only other-sex partnerships was over 97%, while those self-identified as exclusively gay, lesbian, or homosexual generated lower percentages of individuals reporting only same-sex partnerships over their lifetime. Approximately one-third of individuals who self-identified as bisexual had reported only other-sex partnerships over

their lifetime. Other researchers did not assess sexual attraction separately, and lifetime sexual partnerships may not account for sexual fluidity over time (Katz-Wise & Hyde, 2015; Mock & Eibach, 2012).

The National Survey of Family Growth (NSFG) used nationally representative probability samples in the U.S. to conduct similar comparisons (Bauer & Jairam, 2008; Chandra et al., 2011; Copen et al., 2016; England, Mishel, & Caudillo, 2016). The most recent research using the 2011–2013 NSFG survey data focused on men and women aged 15–44 years old. Researchers in one study executed more detailed comparisons across sexual identity (heterosexual, homosexual, bisexual, or did not report), sexual attractions (only to other sex, mostly to other sex, or other), and sexual behaviors (vaginal oral, or anal sex with any other-sex partners or any same-sex partners) (Copen et al., 2016). Sexual attraction correlated closely with sexual identity among heterosexuals in that 99% of men and women reporting being only attracted to the other sex self-identified as heterosexual. Though homosexual or bisexual individuals reported a much higher rate of same-sex sexual contact than heterosexual individuals did, many of them also reported other-sex sexual contact. The associations between sexual identity and sexual behaviors in this study were more difficult to tease out because researchers combined homosexual and bisexual identities in the analyses, obfuscating potentially important differences between these unique sexual identities (Dodge & Sandfort, 2007).

In summary, most prior research rests on the assumption that there are three normative patterns of sexuality classified that as "concordant:" (1) heterosexual identity as attraction to other gender only/sexual behavior with other gender only; (2) homosexual identity/attraction to same gender only/sexual behavior with same gender only; and (3) bisexual identity/attraction to "both" genders/sexual behavior with "both genders," with any derivation being considered "discordant." According to this notion, it is assumed that a heterosexual identity is reflective only of other-gender attractions/behaviors, a bisexual identity reflective of "both" genders (without taking into account non-binary gender identities), and a gay/lesbian identity reflective of only same-gender attractions/behaviors. Based on a vast amount of previous research (most of which is limited in terms of assessment and generalizability), we know this is not the case.

Thus, the aim of this study was to explore the different patterns that exist between sexual identity, attraction, and behavior and to document which patterns are most common and which are less common in order to continue to expand our understanding of human sexual diversity. To accomplish this, we assessed relationships among sexual identity, sexual attraction, and past-year sexual behaviors in the *National Survey of Sexual Health and Behavior* (NSSHB), a nationally representative probability sample of adult men and women in the U.S., ages 18–102 years old. Our measures also explored issues related to sexual and gender minorities not often included in prior research, such as asexual, transgender, and genderqueer individuals. We examined the patterns of sexual attraction toward a single gender or multiple genders, and then further stratified by respondent gender and sexual identity. In addition, we examined factors associated with discordance between sexual identity and sexual behaviors.

## Method

The NSSHB is a population-based probability sample of adolescents and adults in the U.S. (Herbenick et al., 2009; Reece et al., 2009). We initiated the first wave of data collection in 2009, with subsequent waves in 2012, 2013, 2014, and 2015. This article presents data from the 2015 NSSHB (Dodge et al., 2016). KnowledgePanel of GfK Research (GfK) (Menlo Park, CA) conducted data collection in November and December 2015. GfK research panel members were recruited via a dual probability sampling methodology composed of random digit dialing and address based sampling (ABS) to establish national coverage. ABS utilizes the US Postal Service's Delivery Sequence File, which contains information on every mail deliverable address in the U.S. This dual sampling method achieves approximately 98% coverage of all U.S. households. Randomly sampled addresses were recruited to the research panel through several mailings (initial invitation letter, reminder postcard, follow-up letter) and telephone calls if a matched landline telephone number was available. GfK provides households without internet connection with a web-enabled device and free internet service upon enrollment. Panel recruitment was by invitation only; households could not volunteer to join the research panel. The raw distribution of the GfK research panel mirrors that of the U.S. population fairly closely, and further weighting adjustments using the March 2015 Current Population Survey (CPS) as benchmarks were applied to account for minor differential attrition rates among recruited panel members. Using the above weights as the measure of size for each panel member, we used a probability proportional to size procedure to select our study sample. For this wave of data collection, we oversampled two groups (young adults, ages 18–34 years, and self-identified gay men) by adjusting the corresponding weights with the CPS benchmarks serving as reference points.

All sampled individuals received an invitational message from GfK with an overview of the NSSHB and a link to the survey questionnaire. Panel members could enter raffles or sweepstakes with both cash rewards and other prizes as incentives to participate. For the 2015 NSSHB, a total of 2999 adults (ages 18 and above) and 596 adolescents (ages 14–17) completed the survey. Of the 2999 adults completing the survey, 1320 were part of the general population sample, 1230 were from an oversample of young adults ages 18–34 years, and 146 were from an oversample of gay men. This analysis included only

adults from the general population sample and the oversample of 18–34-year-olds, resulting in an unweighted total sample of 2843 adults.

GfK provided post-stratification weights to maximize generalizations to the U.S. population. We generated the post-stratification weights using an iterative proportional fitting (raking) procedure that ensured alignment with respect to all study benchmark distributions based on the March 2015 CPS. Results in this study hereinafter used the weighted data. The weighted sample included 2434 adults from the general population sample and 787 from the oversample of 18–34-year-olds, resulting in a total weighted sample of 3221 adults.

Researchers have used the GfK KnowledgePanel (previously known as Knowledge Networks) to conduct numerous health-related studies, thus validating GfK's methods for obtaining nationally representative probability samples of the U.S. population (Baker, Wagner, Singer, & Bundorf, 2003; Hays, Liu, & Kapteyn, 2015; Herbenick et al., 2009; Holman et al., 2008; Reece et al., 2009). The Institutional Review Board at the first author's academic institution approved all study protocols.

## Measures

Basic demographic information, such as age, gender, race/ethnicity, geographic region, education, household income, etc., was collected as part of GfK's panel recruitment and retention processes. The current research team developed all other items, which were administered by GfK. Though gender was pre-collected through GfK, we collected an additional self-identified gender measurement (men/women/transmen/transwomen), which was used to define gender in our analyses. Specific details on measurements of sexual identity, sexual attraction, and sexual behavior are described below.

### Sexual Identity

Participants were asked "Which of the following commonly used terms best describes your sexual orientation?" Response options included: straight/heterosexual; gay, lesbian, or homosexual; bisexual; asexual (I am not sexually attracted to others); or other, please describe (including textbox for responses).

### Sexual Attraction

We collected information on sexual attraction using a multiple-choice question: "Many people are attracted to people of their same gender as well as other genders. Other people are attracted only to people of just one gender. Do you find yourself feeling sexually attracted to: (select all that apply)." Response options included: women/females, men/males, transgender women, transgender men, genderqueer individuals, and other.

### Sexual Behavior

We assessed past-year partnered sexual behavior by asking, "During the past year, with whom have you been sexually active?" (only men, only women, both women and men, or I have not been sexually active with anyone at all). We defined being sexually active as "engaging in sexual activities (e.g., sexual touching, oral sex, vaginal or anal sex, etc.) with someone. This person could be someone you were dating, a relationship partner, a friend, or someone you just met."

## Statistical Analysis

Similarities and differences between self-identified sexual identity and the spectrum of sexual attraction combinations are presented descriptively and stratified by gender. To provide an overall assessment of sexual concordance/discordance, we first categorized sexual attraction into different gender only, same gender only, men and women, no attraction, and other. We applied the same categories to sexual behaviors. The different-gender category for men included attractions (or behavior) with women and/or transgender women; the different-gender category for women included attractions (or behavior) with men and/or transgender men. We used similar methods to define same-gender categories in that transgender individuals were included with men and women (presumably cisgender) answer options. We conducted sensitivity analyses for our sexual attraction analyses to include only attractions toward cisgender men and women.

We assessed concordance among sexual identity, sexual attraction, and sexual behaviors in the past year, respectively, using percent agreement. Individuals reported not being sexually active in the past year were excluded from calculations of percent agreement as not being recently sexually active does not usually correspond to an asexual identity or having no sexual attractions. Sensitivity analyses were conducted for the past-year sexual behavior of bisexual individuals restricting to those who were not currently in a relationship or married, since those in a committed relationship would be more likely to have only had sex with one gender, that reflecting the gender of their current partner. We identified factors associated with discordance between sexual identity and sexual activity in the past year using logistic regression for weighted survey data.

Variables that were statistically significantly associated with discordance between sexual identity and sexual behaviors ($\alpha = .05$) were entered into a multiple logistic regression model. The final model adjusted for age (18–24/25–34/35–44/45–54/55–64/65+), education (less than high school/high school/some college/bachelor's degree or higher), race/ethnicity (White/Black/Hispanic/Other/2 + races), and current relationship status (single/in a relationship/married). We conducted all statistical analyses using the Stata version 14 software.

## Results

Table 1 shows the demographic characteristics stratified by gender. There was no statistically significant gender difference observed regarding self-identified sexual identity. Overall, 92.7% identified as heterosexual/straight, 3.6% identified as gay, lesbian or homosexual and 2.4% identified as bisexual. Men were more likely than women to report sexual activity in the past year with other-sex-only partners (74.0% vs. 67.2%), and women reported a higher percentage of not being sexually active in the past year than men (28.9% vs. 20.4%) ($p < .05$).

Self-identified sexual identity and sexual attraction combinations stratified by gender are shown in Table 2. Among men who self-identified as heterosexual or homosexual, over 94% reported sexual attractions concordant with their sexual identity. Sexual attraction variability appeared to be high for bisexual men, with only 41.0% reporting sexual attraction to cisgender men and women. However, if considering all combination of attractions toward cisgender or transgender men and women, 82% of bisexual men reported sexual attractions toward men and women. The majority of heterosexual women (91.5%) reported sexual attraction to men only, though we observed a slightly higher variability in sexual attraction patterns when compared to heterosexual men. Approximately 69% of lesbian-identified women reported sexual attraction to women only, though a sizable 12.5% reported attraction to men and women. Other common sexual attraction combinations among lesbians included attractions to women and transgender women or to genderqueer individuals. Over two-thirds (68.1%) of bisexual women reported sexual attraction to men and women, while others reported attraction to only one gender (10.6%) or a combination of men and women plus transgender and/or genderqueer individuals. The majority of respondents who reported sexual attraction to the "other" group only specified being attracted only to their husband/wife or partner.

We present an overview of concordance/discordance between self-identified sexual identity versus sexual attraction and past-year sexual behaviors in Table 3. For men, 96.4% of heterosexual men reported being attracted to women only, 96.2% of homosexual men reported being attracted to men only, and 82.6% of bisexual men reported attractions to men and women. About 93% of heterosexual women reported being attracted to men only. Among lesbian-identified women, only 78.3% reported being attracted to women only, while 13.0% reported being attracted to men and women. Approximately 89% of bisexual women reported being attracted to men and women. Though the number of individuals who identified as asexual was small, we observed that a relatively low percentage (32% of asexual men and 0% of asexual women) reported no sexual attraction, as implied by the definition of asexual. Over half of both asexual men and women reported sexual attraction to different sex only. Percent agreement between sexual identity and sexual attraction was higher among men than among women (96.1% [95% CI 94.2%, 97.4%] vs. 91.9% [95% CI 89.5%, 93.8%]). Sensitivity analyses restricting sexual attraction categories to cisgender men and women were similar for heterosexuals as well as gay men and lesbian women. The percentage of bisexual individuals who reported sexual attractions toward cisgender men and women was much lower (41% for men and 68% for women) than when transgender individuals were included (data not shown).

For participants self-identifying as heterosexual or homosexual, approximately two-thirds to three-fourths reported past-year sexual activity corresponding nominally to their sexual identity; over 20% reported not being sexually active in the past year. The majority (74%) of bisexual women reported sexual activity with different sex partners only in the past year, while we did not observe a consistent pattern among bisexual men. Sensitivity analyses showed that among bisexual men not currently in a relationship or married, 41% reported past-year sexual activity with men and women, 8% reported sexual activity with different-gender partners only, 11% reported sexual activity with same-gender partners only, and another 40% reported no sexual activity in the past year (data not shown). Trends were similar among bisexual women not in committed relationships, with 25% reporting sexual activity with men and women in the past year and 61% reporting sexual activity with different-gender partners only (data not shown). Though the number of asexual-identified individuals were few, approximately half reported sexual activities in the past year. The overall percent agreement between sexual identity and past-year sexual activity was 95.6% (95% CI 94.2%, 96.7%), with no significant differences observed between men and women.

We conducted similar comparisons for sexual attraction versus sexual activity in the past year and generated an overall percent agreement of 92.4% (95% CI 91.2%, 93.6%), with no significant differences observed between men and women (Table 4). The majority of respondents reporting past-year sexual activity with different-gender partners only consistently reported sexual attraction toward different-gender partners as well. Of those reporting sex with same-gender partners only in the past year, 79% reported sexual attractions toward the same gender, while 11–16% reported sexual attractions toward a different gender. We observed more variability among those reporting past-year sexual activity with men and women partners. Sensitivity analyses restricting sexual attraction categories to cisgender men and women produced different results for respondents who reported past-year sexual activity with men and women; only 18% of these men and 21% of these women reported sexual attractions toward cisgender men and women (data not shown).

Factors associated with discordance between self-identified sexual identity and past-year sexual activity were assessed (Table 5). After adjusting for other demographic variables, young adults (ages 18–24) were more likely to report recent sexual activity discordant with sexual identity than adults ages

**Table 1** Weighted demographic and sexual characteristics by gender: National Survey of Sexual Health and Behavior, USA, 2015

| Characteristics | Men ($N=1517$) % ($n$) | Women ($N=1681$) % ($n$) | Total[a] ($N=3209$) % ($n$) |
|---|---|---|---|
| Age (years) | | | |
| 18–24 | 12.0 (182) | 11.4 (192) | 11.8 (378) |
| 25–34 | 19.1 (290) | 20.9 (351) | 20.2 (648) |
| 35–44 | 15.9 (241) | 13.5 (227) | 14.6 (468) |
| 45–54 | 16.3 (248) | 16.1 (270) | 16.1 (518) |
| 55–64 | 19.9 (302) | 18.7 (315) | 19.2 (616) |
| 65+ | 16.8 (255) | 19.4 (326) | 18.1 (582) |
| Race/ethnicity | | | |
| White, non-Hispanic | 66.4 (1008) | 63.9 (1074) | 65.0 (2085) |
| Black, non-Hispanic | 10.3 (157) | 13.3 (223) | 11.9 (380) |
| Other, non-Hispanic | 6.8 (103) | 6.2 (104) | 6.5 (207) |
| Hispanic | 15.1 (229) | 14.9 (250) | 15.2 (486) |
| Multiple races/ethnicities | 1.4 (21) | 1.7 (28) | 1.5 (49) |
| Education | | | |
| Less than high school | 11.1 (168) | 12.1 (203) | 11.7 (376) |
| High school | 31.5 (477) | 28.7 (482) | 29.9 (960) |
| Some college | 27.6 (418) | 29.7 (499) | 28.6 (918) |
| Bachelor's degree or higher | 29.9 (454) | 29.5 (496) | 29.8 (955) |
| Household income* | | | |
| < $25,000 | 14.3 (218) | 20.2 (339) | 17.4 (560) |
| $25,000–$49,999 | 20.7 (315) | 22.0 (370) | 21.4 (688) |
| 50,000–$74,999 | 17.8 (270) | 17.4 (292) | 17.6 (566) |
| ≥ $75,000 | 47.1 (715) | 40.4 (679) | 43.5 (1396) |
| Geographic region | | | |
| Northeast | 18.3 (277) | 18.4 (310) | 18.3 (587) |
| Midwest | 21.4 (325) | 21.3 (358) | 21.3 (684) |
| South | 36.0 (546) | 38.0 (638) | 37.0 (1187) |
| West | 24.3 (369) | 22.3 (375) | 23.4 (751) |
| Sexual identity | | | |
| Straight/heterosexual | 93.0 (1408) | 92.8 (1559) | 92.7 (2967) |
| Gay, lesbian, or homosexual | 4.4 (66) | 2.7 (45) | 3.6 (115) |
| Bisexual | 1.8 (27) | 2.9 (48) | 2.4 (76) |
| Asexual | 0.5 (8) | 0.9 (14) | 0.8 (25) |
| Other | 0.4 (5) | 0.7 (12) | 0.6 (18) |
| Sexual attraction (select all that apply) | | | |
| Women | 89.4 (1356) | 10.5 (176) | 47.8 (1532) |
| Men | 8.0 (121) | 88.9 (1494) | 50.4 (1616) |
| Transwomen | 1.3 (20) | 0.9 (16) | 1.3 (42) |
| Transmen | 1.1 (16) | 0.8 (13) | 1.0 (33) |
| Genderqueer | 0.4 (6) | 1.2 (20) | 0.9 (28) |
| Other | 2.0 (30) | 2.7 (46) | 2.4 (76) |
| Sexual activity in the past year* | | | |
| Different sex only | 74.0 (1114) | 67.2 (1120) | 70.4 (2234) |
| Same sex only | 4.4 (66) | 2.9 (49) | 3.6 (115) |
| Men and women | 1.3 (20) | 1.0 (17) | 1.2 (37) |
| Not sexually active | 20.4 (307) | 28.9 (481) | 24.8 (788) |

*$p < .05$ by chi-square test assessing differences between men and women

[a]Transgender not presented separately due to small sample size ($n=11$) but is included in the total

**Table 2** Sexual attraction patterns by gender and sexual identity: National Survey of Sexual Health and Behavior, USA, 2015

| Sexual identity (men) | | | Sexual attraction[a] | | | | | | Sexual identity (women) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Heterosexual ($N$ = 1 369) % | Gay ($N$ = 66) % | Bisexual ($N$ = 27) % | Women | Men | Trans-women | Trans-men | Gender-queer | Other | Heterosexual ($N$ = 1 499) % | Lesbian ($N$ = 45) % | Bisexual ($N$ = 48) % |
| 94.8 | – | 6.2 | ■ | | | | | | 1.6 | 69.4 | 7.5 |
| 1.6 | 94.4 | 5.0 | | ■ | | | | | 91.5 | – | 3.1 |
| 1.6 | – | – | | | | | | ■ | 2.6 | – | – |
| 0.6 | 3.6 | 41.0 | ■ | ■ | | | | | 3.7 | 12.5 | 68.1 |
| 0.4 | – | 1.2 | ■ | | ■ | | | | – | 6.3 | – |
| 0.3 | – | – | | | ■ | | | | 0.2 | 0.5 | – |
| 0.3 | – | – | ■ | | | ■ | | | – | – | – |
| 0.3 | – | – | ■ | | ■ | ■ | | | – | – | – |
| 0.2 | – | – | ■ | | | | | ■ | – | – | – |
| 0.1 | – | 11.7 | ■ | ■ | ■ | | | | – | – | 2.3 |
| – | – | – | | | | ■ | | | 0.1 | – | 0.6 |
| – | – | – | | ■ | | | | ■ | 0.1 | – | – |
| – | 0.8 | – | | ■ | | | ■ | | – | – | – |
| – | 0.1 | 4.2 | ■ | ■ | ■ | ■ | ■ | | – | 0.5 | 4.4 |
| – | – | 5.0 | | | | | ■ | | – | 8.7 | – |
| – | – | – | ■ | | | | ■ | | – | 2.1 | – |
| – | – | 19.5 | ■ | ■ | | ■ | | | – | – | – |
| – | – | 3.8 | ■ | ■ | ■ | | ■ | | – | – | – |
| – | – | 1.7 | ■ | ■ | | | ■ | | – | – | 7.9 |
| – | – | – | ■ | ■ | | ■ | ■ | | – | – | 4.6 |
| – | – | – | ■ | ■ | ■ | ■ | ■ | ■ | – | – | 1.5 |

[a]Shaded cells indicate answering "yes" to attraction of specific identities as part of a "select all that apply" sexual attraction survey question. For example, 94.8% of heterosexual men and 6.2% of bisexual men indicate they are attracted only to women. Similarly, 1.6% of heterosexual women, 69.4% of lesbians, and 7.5% of bisexual women reported attraction only to women

**Table 3** Sexual attraction and recent sexual activity in the past year by gender and sexual identity: National Survey of Sexual Health and Behavior, USA, 2015

| | Sexual identity | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Men ($N$ = 1512) | | | | | | | | Women ($N$ = 1666) | | | | | | | |
| | Heterosexual | | Gay | | Bisexual | | Asexual | | Heterosexual | | Lesbian | | Bisexual | | Asexual | |
| | % | ($n$) | % | ($n$) | % | ($n$) | % | ($n$) | % | ($n$) | % | ($n$) | % | ($n$) | % | ($n$) |
| Sexual attraction[a] | | | | | | | | | | | | | | | | |
| Different gender | 96.4 | (1318) | 0.0 | (0) | 7.4 | (2) | 53.1 | (4) | 92.5 | (1386) | 0.0 | (0) | 3.7 | (2) | 64.2 | (3) |
| Same gender | 1.6 | (21) | 96.2 | (64) | 5.0 | (1) | 13.3 | (1) | 1.8 | (27) | 78.3 | (36) | 7.5 | (4) | 0.0 | (0) |
| Men and women | 1.3 | (17) | 3.8 | (3) | 82.6 | (22) | 2.0 | (0) | 3.9 | (58) | 13.0 | (6) | 88.8 | (43) | 27.2 | (1) |
| None | 0.6 | (8) | 0.0 | (0) | 0.0 | (0) | 31.7 | (2) | 1.8 | (27) | 0.0 | (0) | 0.0 | (0) | 0.0 | (0) |
| | Percent agreement (95% CI) = 96.1% (94.2%, 97.4%) | | | | | | | | Percent agreement (95% CI) = 91.9% (89.5%, 93.8%) | | | | | | | |
| Past-year sexual activity[b] | | | | | | | | | | | | | | | | |
| Different gender | 78.4 | (1096) | 0.0 | (0) | 37.6 | (10) | 47.3 | (4) | 69.2 | (1072) | 1.5 | (1) | 74.0 | (35) | 35.7 | (5) |
| Same gender | 0.8 | (11) | 76.6 | (51) | 13.3 | (4) | 0.0 | (0) | 1.2 | (19) | 62.5 | (28) | 4.0 | (2) | 0.0 | (0) |
| Men and women | 0.9 | (13) | 0.8 | (1) | 22.7 | (6) | 5.5 | (0) | 0.1 | (2) | 11.0 | (5) | 15.5 | (7) | 9.6 | (1) |
| None | 19.9 | (278) | 22.5 | (15) | 26.4 | (7) | 47.2 | (4) | 29.5 | (456) | 25.1 | (11) | 6.5 | (3) | 54.8 | (8) |
| | Percent agreement (95% CI) = 96.8% (94.5%, 98.2%) | | | | | | | | Percent agreement (95% CI) = 94.6% (92.3%, 96.2%) | | | | | | | |

[a]Overall percent agreement (95% CI) of sexual attraction categories versus sexual identity was 93.8% (92.3%, 95.0%)

[b]Overall percent agreement (95% CI) of past-year sexual activity versus sexual identity was 95.6% (94.2%, 96.7%). Calculations of agreement between past-year sexual activity and sexual identity excluded asexuals and those reporting no sexual activity within the past year

**Table 4** Sexual attraction by recent sexual activity in the past year: National Survey of Sexual Health and Behavior, USA, 2015[a]

| | Past-year sexual activity | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Men ($N=1512$) | | | | | | | | Women ($N=1666$) | | | | | | | |
| | Different gender | | Same gender | | Men and women | | None | | Different gender | | Same gender | | Men and women | | None | |
| | % | (*n*) | % | (*n*) | % | (*n*) | % | (*n*) | % | (*n*) | % | (*n*) | % | (*n*) | % | (*n*) |
| Sexual attraction | | | | | | | | | | | | | | | | |
| Different gender | 96.2 | (1044) | 16.0 | (11) | 45.4 | (9) | 86.6 | (261) | 90.4 | (981) | 11.2 | (5) | 16.8 | (3) | 88.5 | (398) |
| Same gender | 1.3 | (14) | 79.0 | (52) | 2.2 | (0) | 6.9 | (21) | 1.1 | (12) | 79.2 | (39) | 13.2 | (2) | 2.7 | (12) |
| Men and women | 1.9 | (20) | 5.0 | (3) | 52.4 | (10) | 2.9 | (9) | 7.5 | (81) | 9.7 | (5) | 46.9 | (8) | 4.6 | (21) |
| None | 0.3 | (3) | 0.0 | (0) | 0.0 | (0) | 3.2 | (10) | 0.8 | (9) | 0.0 | (0) | 0.0 | (0) | 4.2 | (19) |
| | Percent agreement (95% CI) = 95.1% (92.5%, 96.8%) | | | | | | | | Percent agreement (95% CI) = 90.4% (88.2%, 92.2%) | | | | | | | |

[a]Overall percent agreement (95% CI) of sexual attraction categories versus past-year sexual activity was 92.4% (91.2%, 93.6%). Calculations of agreement between sexual attraction categories and past-year sexual activity excluded those reporting no sexual attraction and no sexual activity within the past year

25–34 (adjusted odds ratio [aOR] = 1.83; 95% CI 1.05, 3.19). We did not observe significant differences among adults ages 35 years and over compared to young adults ages 25–34. Higher education (high school or higher vs. less than high school) appeared to be associated with less discordance of reported recent sexual activity and sexual identity, though no consistent trend was observed across education levels.

## Discussion

We examined the concordance and discordance among self-identified sexual identity, sexual attraction, and sexual behaviors, as well as factors associated with discordance between self-identified sexual identity and sexual behaviors, in a nationally representative probability sample of U.S. adults. Overall, concordance between sexual identity and sexual attraction or past-year sexual behaviors were both high (percent agreement = 94% and 96%, respectively). Though overall concordance across sexual measures seems high, it is important to note that these figures reflect to overall population estimates with the vast majority identifying as heterosexual. We found discordance to be higher among women and in particular those who identified as any sexual minority. These results highlight the inaccuracy of assuming concordance of sexual identity, sexual attraction, and sexual behaviors and provide further evidence that sexual orientation is a multi-dimensional construct. Therefore, it is critical that the dimensions of sexual orientation most relevant to the topic of interest should be evaluated in research and clinical practice, and that inferences across dimensions should be approached with care. Given the findings reported herein, it is also apparent that any such inferences are significantly more likely to be inaccurate in the case of sexual minorities.

Our findings showed that > 90% men and women in the U.S. reported being heterosexual or straight, consistent with other nationally representative population-based samples. Approximately 3–4% reported being gay, lesbian, or homosexual, 2–3% reported being bisexual, and 1% reported being asexual or of another sexual identity. Data from the 2011–2013 NSFG

**Table 5** Factors associated with discordance between sexual identity and sexual activity in the past year: National Survey of Sexual Health and Behavior, USA, 2015

| Variables | OR | (95% CI) | aOR[a] | (95% CI) |
|---|---|---|---|---|
| Age | | | | |
| 18–24 | 2.67 | (1.74, 4.10)* | 1.83 | (1.05, 3.19)* |
| 25–34 | 1.00 | – | 1.00 | – |
| 35–44 | 1.05 | (0.36, 3.10) | 1.01 | (0.30, 3.33) |
| 45–54 | 0.71 | (0.16, 3.21) | 0.80 | (0.18, 3.60) |
| 55–64 | 0.44 | (0.16, 1.21) | 0.56 | (0.19, 1.60) |
| 65+ | 1.34 | (0.36, 4.96) | 1.37 | (0.39, 4.86) |
| Education | | | | |
| Less than high school | 1.00 | – | 1.00 | – |
| High school | 0.22 | (0.10, 0.51)* | 0.30 | (0.14, 0.64)* |
| Some college | 0.34 | (0.13, 0.85)* | 0.41 | (0.15, 1.13) |
| Bachelor's degree or higher | 0.19 | (0.08, 0.49)* | 0.27 | (0.10, 0.70)* |
| Race/ethnicity | | | | |
| White, non-Hispanic | 1.00 | – | 1.00 | – |
| Black, non-Hispanic | 0.90 | (0.23, 3.48) | 0.68 | (0.17, 2.70) |
| Other, non-Hispanic | 2.10 | (0.73, 6.10) | 2.23 | (0.68, 7.32) |
| Hispanic | 3.26 | (1.45, 7.34)* | 2.03 | (0.86, 4.79) |
| 2+ races, non-Hispanic | 0.34 | (0.05, 2.15) | 0.24 | (0.03, 2.26) |
| Relationship status | | | | |
| Single | 1.00 | – | 1.00 | – |
| In a relationship | 0.87 | (0.37, 2.05) | 0.86 | (0.37, 2.01) |
| Married | 0.43 | (0.18, 0.99)* | 0.66 | (0.21, 2.06) |

*$p < .05$

[a]Adjusted odds ratio; adjusted for all other variables in the table

reported slightly more bisexual women and fewer adults identifying as gay, lesbian, or homosexual than our study (Copen et al., 2016), but that sample only covered U.S. adults aged 18–44. Data from Australia (ages 16–69) showed 1–2% of Australians identified as homosexual, 1–2% identified as bisexual, and less than 1% reported an undecided or other sexual identity (Richters et al., 2014).

A major innovation of the current study is that we assessed sexual attraction to permit more nuanced answers than most previous research, including transmen, transwomen, and genderqueer as response options. Though the majority of heterosexual participants and gay men reported attractions that were congruent with their reported sexual identity (i.e., to the other or same sex, respectively), lesbian women and bisexual participants reported a wider variety of sexual attraction patterns. Therefore, we suggest that this presumed close association between sexual identity and sexual attraction, the notion that one simply reflects the other, is limited and may be more readily applicable to self-identified heterosexual and gay men than to other sexual minority groups. Also of note was the wider range of attraction reported among bisexual men and women, providing further evidence that bisexuality is not a "binary" sexual identity and would be better understood as attraction to "more than one gender" rather than "both men and women" (Dodge et al., 2016).

As gender and sexual identity categories are proliferating in the twenty-first century, we suggest that future research considers expanding response options when possible. We observed sexual attractions toward transgender and genderqueer individuals that were absent from prior studies. Additional sexual identity labels identified included "pansexual" and "demisexual," specified as write-in answers for the "other" sexual identity group. Individuals who self-identified as pansexual were likely to report sexual attractions to three or more gender identities, which is consistent with the pansexual definition of not limiting sexual choice with regard to sex or gender identity. A number of individuals who reported an "other" sexual attraction also specified "only their husband/wife/partner," which was congruent with the definition of demisexuality, or feeling sexual attraction only to people with whom they have an emotional bond. Future studies measuring sexual attractions should move beyond binary biological sex categories and include more gender identities.

Overall, we observed approximately 4% discordance between past-year sexual behaviors and self-identified sexual identity. Young adults under 25 years demonstrated high levels of discordance between sexual identity and recent sexual behaviors. Previous studies have suggested that sexual orientation identification and behaviors may be less congruent during developmental stages of adolescence (Igartua et al., 2009; Mustanski et al., 2014), and such effects of developmental processes may carry over to periods of young adulthood (Savin-Williams, Joyner, & Rieger, 2012). Higher education was also associated with less discordance across sexual identity and behavior. Though discordance across sexual identity and behaviors were low among those who were sexually active in the past year, over 20% of most sexual identity subgroups (with the exception of bisexual women) did not report partnered vaginal, oral, or anal sex in the past year. In this context, a sizeable proportion of the population may not be sexually active and analyses and interpretations should be adjusted accordingly.

Our study had several limitations. First, it is important to note that, as a nationally representative sample (most assuredly a strength), it is comprised predominantly of self-identified heterosexual individuals, and there were relatively few people who identified as gay, lesbian, or homosexual, bisexual, asexual, or other. Therefore, the findings reflect national estimates that are dominated by the prevalence of self-identified heterosexual individuals. For example, the estimate overall of 96% agreement between sexual identity and sexual behavior in the past year was heavily weighted by the findings for heterosexuals that had the highest consistency of any of the sexual identity groups. Second, the NSSHB is a nationally representative probability sample, which resulted in very few individuals reporting a transgender identity. Therefore, results and inferences were only available for what are likely to be mostly cisgender men and women. Any research questions regarding transgender health issues would need to include an oversample of transgender individuals (or to examine non-probability samples specifically focused on the recruitment of transgender individuals). Similar sample size issues exist for other sexual and gender minorities such as asexual or genderqueer individuals. Although we were able to include assessment of attractions toward transgender individuals into our measurement of sexual attraction, additional analyses and generalizations, highlighting transgender individuals, are limited due to small numbers of people choosing these response options in this predominantly heterosexual sample. Additionally, though our measurement of sexual attraction was very detailed, we only collected data from the sexual behavior variable including traditional binary genders. This design of the study instrument restricted our ability to look at sexual behaviors with gender identities beyond men and women.

Implications of our results include that researchers should avoid the assumption that sexual measures such as self-identified sexual identitfy, sexual attraction, or sexual behaviors would always be (or that they "should" be) concordant. As the literature already suggests, sexual orientation is a multidimensional construct and discordance across dimensions is common. Sexual health research should be based on knowledge of which dimensions would be the most relevant, and we must exercise caution in interpretations of results across subgroups, especially among sexual minority groups. In making comparisons to sexual behaviors, we should also be mindful that there is a proportion of individuals not engaging in partnered sexual behaviors. Additionally, the emergence of innovative

theoretical perspectives such as van Anders' (2015) sexual configurations theory reminds us that exploring diversity in other factors (e.g., diverse partnered sexualities, separate from solitary sexualities) continues to demonstrate the need for more nuanced study of diverse sexual experiences beyond identity, attraction, and behavior. Sexual attraction, in particular, is a complex phenomenon, and research assessing sexual attraction should continue to move beyond measuring attractions toward people of binary or singular identities. Future sexual health research should consider asking about a greater range of sexual identities (e.g., asexual, demisexual, pansexual) and gender identities (e.g., transgender, genderqueer) as these are becoming increasing relevant, and assessing them in greater detail provides further evidence of the complexity of sexuality across the domains of identity, attraction, and behavior.

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## Compliance with Ethical Standards

**Conflict of interest** D. Herbenick received grant funding from Church & Dwight Co., Inc. M. Reece is a member of the Sexual Health Advisory Council for Church & Dwight Co., Inc. All other authors have declared no conflict of interests.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

**Human and Animal Rights** This article does not contain any studies with animals performed by any of the authors.

**Informed Consent** We obtained informed consent from all individual participants included in the study.

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