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Investigating differential protective effects of marriage on substance use by sexual identity status

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Abstract

Background: Research suggests that marriage is protective against substance use. However, few studies have examined whether this protective effect differs for sexual minorities, a population at increased risk for substance use. Using data from four waves of the cross-sectional U.S. National Alcohol Survey (NAS; 2000, 2005, 2010, and 2015), we investigated whether the protective effects of marriage varied by sexual identity.

Methods: Sex-stratified logistic regression models were used to examine independent and interactive effects of current marital status (being married vs. not) and sexual minority status (lesbian/gay/bisexual vs. heterosexual) on high-intensity drinking, alcohol use disorder, and marijuana use in the past year.

Results: Among both women and men, sexual minority status was generally associated with higher odds of these outcomes and marriage was consistently associated with lower odds. Differential effects of marriage by sexual identity with respect to marijuana use were found only among men; marriage was significantly associated with decreased odds of marijuana use among heterosexual men but increased odds among sexual minority men.

Conclusions: Marriage may be less consistently protective against hazardous drinking and marijuana use among sexual minorities than heterosexuals. Findings underscore the importance of both quantitative and qualitative studies designed to better understand disparities in substance use across both sexual identity and relationship statuses.

Introduction

Sexual minority individuals (e.g., lesbian, gay, and bisexual identified) report higher rates of hazardous drinking and marijuana use than heterosexuals, with differences more consistent and pronounced among women than men (Boyd, Veliz, Stephenson, Hughes, & McCabe, 2019; Demant et al., 2016; Drabble, Mericle, Karriker-Jaffe, & Trocki, 2020; Hughes, Wilsnack, & Kantor, 2016; Kerridge et al., 2017; King et al., 2008). Minority stress has been identified as an important contributor to sexual-orientation-related disparities in health risk behaviors, including hazardous drinking and other substance use (Lewis, Mason, Winstead, Gaskins, & Irons, 2016; Lewis, Winstead, Lau-Barraco, & Mason, 2017; McCabe, Bostwick, Hughes, West, & Boyd, 2010). The cumulative impact of stressors associated with interpersonal and institutional prejudice and discrimination, expectations of rejection, managing visibility of identity, and self-stigmatization increase the likelihood of psychological distress and mental health problems among sexual minority individuals (Frost, 2017; Hatzenbuehler, 2009; Meyer, 2003; Meyer & Frost, 2013) and same-sex couples (Frost et al., 2017; LeBlanc & Frost, 2019; LeBlanc, Frost, & Bowen, 2018; LeBlanc, Frost, & Wight, 2015; Rostosky & Riggle, 2016).

Although sexual-orientation-related health disparities among adults are well-documented, there is a dearth of research examining factors that might buffer these risks (de Lira & de Morais, 2018; Hughes, Veldhuis, Drabble, & Wilsnack, 2020). Population-based research suggests that individuals who are married are less likely to engage in

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hazardous drinking or to use marijuana than those who are not, including those who are cohabiting, single, or divorced/separated (Blair & Menasco, 2016; Jang, Patrick, & Schuler, 2018; Kahle, Veliz, McCabe, & Boyd, 2020; Li, Wilsnack, Wilsnack, & Kristjanson, 2010; Liang & Chikritzhs, 2012; Reczek, Liu, & Spiker, 2014). Protective effects of marriage are linked to a variety of factors, including marital partners' influences on each other's health habits, greater social support, and lower general stress (Umberson & Karas Montez, 2010). Yet little research has investigated the potential protective effects of marriage among sexual minorities.

Expanded access to same-sex marriage affords an opportunity for research to explore whether and how legal marriage may confer protective effects among sexual minorities (Umberson & Kroeger, 2016). Legal recognition of same-sex marriage (marriage equality) began at the state level in the U.S. in 2003, and 37 of the 50 states had established same-sex marriage rights by the time the U.S. Supreme Court decision mandated national marriage equality in June 2015. Even before 2015, many same-sex couples who were legally married in another state or country considered themselves to be married, even if the state in which they lived did not recognize their marriage (DeMaio, Bates, & O'Connell, 2013). Policy changes, such as national legalization of marriage for same-sex couples, may reduce sexual minority stigma and experiences of minority stress (Herek, 2006; Ogolsky, Monk, Rice, & Oswald, 2019a; Rostosky & Riggle, 2016; Tatum, 2017). Studies about the potential impacts of legal marriage are needed to better understand how being married may or may not reduce sexual-orientation-related disparities in substance use outcomes.

Marriage equality extends access to various psychological and material benefits of marriage to same-sex couples (Herek, 2006; Riggle, Wickham, Rostosky, Rothblum, & Balsam, 2017). Qualitative and mixed methods studies have identified a number of specific reasons that legal marriage may contribute to improved health outcomes among sexual minorities. First, legal marriage provides a sense of social inclusion and acceptance for sexual minorities (Badgett, 2011; Ramos, Goldberg, & Badgett, 2009; Rostosky, Riggle, Rothblum, & Balsam, 2016; Shulman, Gotta, & Green, 2012) Second, legal marriage may have a positive impact on how immediate family members and extended social networks recognize and affirm the committed relationships of sexual minorities (Lannutti, 2008, 2014; Ogolsky, Monk, Rice, & Oswald, 2019b). Third, legal marriage provides access to important legal protections and financial benefits, which increases family security and a sense of entitlement to equal treatment (Lannutti, 2005, 2011b; MacIntosh, Reissing, & Andruff, 2010; Rostosky et al., 2016). Finally, access to legal marriage may make it safer for sexual minorities to be open about their identity and relationships (MacIntosh et al., 2010; Riggle et al., 2017). At the same time, studies also document ambivalence or concerns about the potential unintended negative impacts on sexual minority communities and queer culture of centering marriage as an institution. For example, some sexual minority people are concerned that a focus on marriage rights over-emphasizes assimilation to heterosexual norms at the expense of broader community connections and social support for a wide range of relationship structures (Bosley-Smith & Reczek, 2018; Drabble, Wootton, et al., 2020; Lannutti, 2011b; Ocobock, 2018).

Although the social and psychological meaning of marriage and intimacy are similar among sexual minorities and heterosexuals (Frost & Gola, 2015), there are several factors that may differentially influence the protective effects of marriage among sexual minorities. Sexual minority couples may experience less social support than heterosexual couples from family and extended social networks, and more stigma-related stressors (Frost & Gola, 2015; LeBlanc & Frost, 2019; LeBlanc et al., 2018). At the same time, same-sex couples report receiving more spousal support than different-sex couples, which may help buffer mental health consequences of discrimination (Donnelly, Robinson, & Umberson, 2019). Dynamics of how couples influence one another's health behaviors may also differ by sexual identity (Umberson, Donnelly, & Pollitt, 2018). These complexities highlight the importance of taking into account sexual identity in research that examines the potential protective effects of marriage on substance use.

An emerging body of research in the U.S. has examined how health risks may differ by marital status among sexual minorities. For example, several studies found that same-sex married or committed relationships are protective against psychological distress (Feinstein, Latack, Bhatia, Davila, & Eaton, 2016; Riggle, Rostosky, & Horne, 2010; Whitton, Dyar, Newcomb, & Mustanski, 2018; Williams & Fredriksen Goldsen, 2014) and may improve overall financial, psychological, and physical well-being (Ducharme & Kollar, 2012). However, some of these studies are based on data from non-probability samples (Riggle et al., 2010; Whitton et al., 2018; Williams & Fredriksen Goldsen, 2014), or rely on regional samples (Ducharme & Kollar, 2012), which limits generalizability of findings. Furthermore, many studies of marriage and health among sexual minorities lack heterosexual comparison groups (Riggle et al., 2010; Whitton et al., 2018; Williams & Fredriksen Goldsen, 2014).

Some studies on the protective effects of legalized same-sex relationships combine sexual minority women (SMW; e.g., lesbian and bisexual women) and sexual minority men (SMM; e.g., gay and bisexual men) in analyses (Feinstein et al., 2016; Riggle et al., 2010; Whitton et al., 2018; Williams & Fredriksen Goldsen, 2014). Because research suggests sex differences in the protective effects of marriage or relationship status (Blair & Menasco, 2016; Li et al., 2010; Reczek, Pudrovska, Carr, Umberson, & Thomeer, 2016), it is important to disaggregate analyses by sex to better understand how protective effects of marriage may vary for SMW and SMM. The importance of disaggregating by sex is underscored by research suggesting that married SMW may experience more microaggressions (Goldsen et al., 2017) and may benefit less from marriage (e.g., in relation to health care access and utilization) than sexual minority men (Carpenter, Eppink, Gonzales Jr, & McKay, 2018).

Although bisexuals in relationships with opposite-sex partners may "pass" as heterosexual and might be assumed to experience less minority stress, elevated risk for substance use and unique stressors in this population justify their inclusion in research related to potential protective effects of marriage. Research that disaggregates bisexual from monosexual groups (heterosexual and lesbian/gay) typically suggest similar or even greater risk of hazardous drinking and drug use among bisexual individuals (Gonzales, Przedworski, & Henning-Smith, 2016; Hughes et al., 2020; McCabe, West, Strobbe, & Boyd, 2018). Higher risks for hazardous drinking are also found among other groups who do not identify with strictly heterosexual or lesbian/gay/bisexual labels, including individuals who identify as "mostly heterosexual" (Hughes et al., 2010; Hughes, Wilsnack, & Kristjanson, 2015) or "something else" (Eliason, Burke, van Olphen, & Howell, 2011). Notably, elevated health risks appear to be consistent for individuals who identity as bisexual whether they are in same-sex or different-sex relationships (Hsieh & Liu, 2019; Veldhuis et al., 2019). Bisexual individuals who are married to different-sex partners may be impacted by unique minority stressors that amplify risk of hazardous drinking and drug use (Arriaga & Parent, 2019; Molina et al., 2015). For example, bisexual individuals in different-sex relationships often experience bi-negativity from both heterosexual and lesbian/gay communities (Arriaga & Parent, 2019; Dyar, Feinstein, & London, 2014; Lambe, Cerezo, & O'Shaughnessy, 2017; Molina et al., 2015) and feel misrecognized or rendered invisible because of normative assumptions about sexuality being binary (Hayfield, Campbell, & Reed, 2018). Studies of health across groups defined by marital status that operationalize sexual minority status by sex of marital partner typically exclude bisexual-identified individuals in relationships with different-sex partners, although this group appears to share patterns of hazardous drinking and drug use that are similar to those of other sexual minorities in same-sex relationships. Consequently, there is a need for research that defines bisexuals in both same and different-sex relationships as sexual minorities.

Findings from a few population-based studies have found protective effects for sexual minorities and heterosexuals in legally-recognized relationships compared to their single counterparts. These effects include better self-rated health (Reczek, Liu, & Spiker, 2017), lower psychological distress (Wight, LeBlanc, & Badgett, 2013), greater happiness (Wienke & Hill, 2008), and fewer activity limitations (Spiker, Reczek, & Liu, 2017). Differences in health risk behaviors by relationship status in these studies were more pronounced and variable among women than men (Reczek et al., 2017; Spiker et al., 2017). A recent study comparing marital advantage by sexual identity found the health advantage of marriage applied to heterosexual-identified women and men, but not to bisexual or lesbian/gay individuals (Hsieh & Liu, 2019). Furthermore, bisexual women and men in different-sex married relationships had worse health outcomes (poorer self-reported health and more functional limitations) than those in same-sex married relationships (Hsieh & Liu, 2019). Although research suggests that sexual identity is particularly salient in assessing risks for alcohol problems and marijuana use (McCabe, Hughes, Bostwick, West, & Boyd, 2009; Midanik, Drabble, Trocki, & Sell, 2006), few studies have examined whether sexual identity might modify the protective effect of marriage on alcohol or marijuana use.

Population-based studies that have examined whether the protective effect of marriage on alcohol use differs by sexual identity have yielded mixed results. For example, one recent U.S. study found marriage was associated with lower odds of alcohol use disorder and drug use disorder among heterosexual women and men, but not among SMW or SMM (Kahle et al., 2020). By contrast, other U.S. studies have found that both same-sex and different-sex married couples reported lower alcohol use than their cohabiting non-married counterparts (Reczek et al., 2014). Another study found that being married was associated with lower alcohol use among lesbian women but not gay men (Du Bois, Legate, & Kendall, 2019). It is worth noting that the alcohol measures in two of these studies were limited. For example, in the studies by Du Bois and colleagues and Reczek and colleagues, heavy drinking was defined based on number of drinks (more than 7 drinks per week on average for women and 14 or more drinks per week for men). No measures of alcohol dependence or alcohol-related problems were included. Using a nationally-representative longitudinal sample of adults in Australia, Sabia and colleagues (2018) examined multiple health outcomes, including binge drinking, by partnership status (same-sex partner, different-sex cohabiting partner, different-sex spouse, no partner). Men in any partnered relationship reported less binge drinking than single men; however, among women, only those in a relationship with a different-sex partner were significantly less likely to report binge drinking than single women (Sabia, Wooden, & Nguyen, 2018). To our knowledge, no studies have examined marijuana use by both sexual identity and marital status. Thus, the aim of the current study was to investigate the differential effects of marital status by sexual identity, stratified by sex, on heavy drinking, alcohol use disorder and marijuana use using data in a nationally-representative sample of U.S. adults.

Materials and Methods

Sample

Data were from four waves (2000, 2005, 2010, and 2015) of the National Alcohol Survey (NAS), a cross-sectional population-based survey of adults (ages 18 or older) in the U.S. The study included 29,571 respondents, and 25,510 respondents answered sexual identity questions, including 413 SMW and 421 SMM. See Table 1 for sample characteristics.

Measures

Marital Status. A dichotomous indicator of marital status was constructed: married (married and living with spouse, married and not living with spouse) vs not married (living as a couple in an unmarried relationship; legally separated; divorced; widowed; or never married).

Sexual Identity. Sexual identity was assessed using a question that invited respondents to select the category that best fit their sexual identity. Given the small sample sizes of sexual minority subgroups, lesbian/bisexual women and gay/bisexual men were combined and compared to their respective heterosexual counterparts. In the 2015 survey, sexual identity response options also included "something else"; these respondents were categorized as sexual minority respondents.

Table 1

Sample Characteristics by Gender and Sexual Identity (N=25,510)

	Women (N=14,395)					Men (N=11,115)				
	Heterosexual (N=13,982)		SMW (N=413)			Heterosexual (N=10,694)		SMM (N=421)		
	n	%	n	%		n	%	n	%	
Married					***					***
No	7,360	44.5	320	75.8		4,369	38.0	360	82.8	
Yes	6,579	55.5	93	24.3		6,298	62.0	61	17.2	
Age					***					
18-39	4,271	39.2	190	60.5		3,982	43.1	163	49.2	
40+	9,398	60.8	218	39.5		6,601	57.0	257	50.8	
Children in the Household										***
No	8,690	59.7	288	66.1		6,833	62.5	377	84.8	
Yes	5,264	40.3	124	33.9		3,838	37.5	44	15.2	
Race/Ethnicity										*
White/Caucasian	7,957	71.1	215	65.6		6,579	70.5	247	64.2	
Black/African American	2,930	11.7	101	13.5		1,631	10.4	77	16.4	
Hispanic	2,572	11.5	73	10.8		1,961	12.7	76	11.5	
Other	523	5.8	24	10.2		523	6.4	21	7.8	
Education										*
High school or less	5,709	40.3	186	42.9		4,215	41.1	123	32.0	
College or more	8,217	59.7	227	57.1		6,427	58.9	298	68.0	
Employment					*					
Employed	7,259	55.7	228	63.3		7,203	70.1	272	69.1	
Unemployed	6,689	44.4	185	36.7		3,467	29.9	148	30.9	
Survey Year					***					***
2000	3,794	28.4	86	20.1		3,284	28.5	84	16.2	
2005	3,379	25.8	85	21.6		3,033	26.1	81	18.8	
2010	3,734	25.0	91	22.8		2,320	25.3	107	27.8	
2015	3,075	20.9	151	35.5		2,057	20.1	149	37.2	
State-level Same-sex Marriage Laws					**					***
No legal recognition	9,759	71.2	249	61.2		7,805	72.0	254	61.6	
Domestic partnership/civil union option and/or recognition of marriage in other states	1,900	12.6	66	12.5		1,351	12.5	53	10.2	
Statewide access to marriage	2,308	16.2	98	26.3		1,531	15.5	114	28.2	

Notes. The combined dataset contained data from 29,571 respondents; sexual minority status could be categorized for 25,510 respondents. Valid percentages are listed; missing data was generally minimal. Unweighted cell sizes are presented, but prevalence estimates are weighted. Pearson chi-squared statistics are corrected for the survey design with the second-order Rao and Scott correction, converted into an F statistic. *p<0.05; **p<0.01; ***p<0.001

High-Intensity Drinking was constructed as any versus no instance of consuming 8 or more drinks in a single day in the past year. Inclusion of this measure was based on prior research suggesting an association between alcohol-related problems and consuming large amounts of alcohol at one time (Greenfield et al., 2014), as well as documenting sexual orientation disparities in high-intensity drinking among adults in the U.S. (Fish, 2019; Fish, Hughes, & Russell, 2018).

Alcohol Use Disorder. Past-year alcohol use disorder was defined as endorsing symptoms in 2 or more of 11 domains, defined as at least mild severity in the 5th edition of the American Psychiatric Association's Diagnostic and Statistical Manual (American Psychiatric Association, 2013).

Marijuana Use was dichotomized as any versus no use in the past 12 months.

Demographics and Other Covariates. Demographic measures included age (categorical), race/ethnicity, highest year of education, employment status, and children ages 17 or younger living in the household (see Table 1). Other covariates included survey year (2000, 2005, 2010, 2015) and a three-category measure of state laws regarding same-sex marriage at the time of the interview (no legal recognition, domestic partnership/civil union available and/or recognition of marriage from other states, legalized same-sex marriage).

Table 2

Findings from Independent and Interaction Effects Models

	DSM5 2+			High Intensity Drinking 8+			Marijuana		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Women									
Independent Effects Models									
Marital Status	0.42	[0.33, 0.54]	0.000	0.47	[0.37, 0.60]	0.000	0.47	[0.37, 0.60]	0.000
Sexual Minority Status	2.24	[1.41, 3.56]	0.001	1.69	[1.07, 2.68]	0.025	3.16	[2.14, 4.68]	0.000
Interaction Effects Models									
Marital Status	0.42	[0.33, 0.54]	0.000	0.46	[0.36, 0.59]	0.000	0.44	[0.35, 0.57]	0.000
Sexual Minority Status	2.15	[1.28, 3.62]	0.004	1.60	[0.95, 2.66]	0.074	2.69	[1.76, 4.12]	0.000
Marital Status * Sexual Minority Status	1.30	[0.48, 3.53]	0.610	1.47	[0.52, 4.19]	0.468	2.22	[0.91, 5.42]	0.079
Contrasts from Interaction Models									
Marital Status Effect-Heterosexuals	F(1, 26171)=47.69; p<0.001			F(1, 26583)=38.68; p<0.001			F(1, 26602)=40.86; p<0.001		
Marital Status Effect-Sexual Minorities	F(1, 26171)= 1.51; p=0.220			F(1, 26583)= 0.53; p=0.466			F(1, 26602)= 0.00; p=0.980		
Men									
Independent Effects Models									
Marital Status	0.43	[0.36, 0.53]	0.000	0.60	[0.51, 0.71]	0.000	0.38	[0.31, 0.47]	0.000
Sexual Minority Status	0.94	[0.62, 1.41]	0.754	0.51	[0.33, 0.77]	0.001	1.64	[1.10, 2.44]	0.015
Interaction Effects Models									
Marital Status	0.43	[0.35, 0.52]	0.000	0.60	[0.51, 0.71]	0.000	0.37	[0.30, 0.45]	0.000
Sexual Minority Status	0.87	[0.57, 1.31]	0.506	0.51	[0.33, 0.79]	0.003	1.37	[0.93, 2.01]	0.114
Marital Status * Sexual Minority Status	2.11	[0.57, 7.84]	0.267	0.92	[0.26, 3.27]	0.896	3.67	[1.18, 11.37]	0.024
Contrasts from Interaction Models									
Marital Status Effect-Heterosexuals	F(1, 27268)=70.47; p<0.001			F(1, 27755)=36.24; p<0.001			F(1, 27746)=87.85; p<0.001		
Marital Status Effect-Sexual Minorities	F(1, 27268)= 0.02; p=0.876			F(1, 27755)= 0.86; p=0.353			F(1, 27746)= 0.27; p=0.602		

Notes. Models are weighted and adjust for age, children in the household, race/ethnicity, education, employment, survey year, and state-level same-sex marriage laws

Statistical Analyses

All analyses were conducted in Stata (version 15) using sample weights and variance estimation techniques that adjusted for the complex survey design. We first conducted multivariable, sex-stratified logistic regression analyses to test independent effects of marital and sexual minority status on outcomes, controlling for demographics and other covariates. We then ran sex-stratified models including an interaction between marital status and sexual minority status to examine differential effects of marital status. In these models, contrasts tested effects of marital status separately for each group (heterosexuals and sexual minorities). In addition to presenting model coefficients, we graphically display predictive margins for each of the four groups, stratified by sex.

Because some same-sex couples did not have access to legalized marriage at the time of data collection, we also ran sensitivity analyses to investigate how results might differ when including cohabiting with married individuals (compared to those who were legally separated, divorced, widowed, or never married). Sensitivity analysis results are reported for women and men separately.

Results

Women

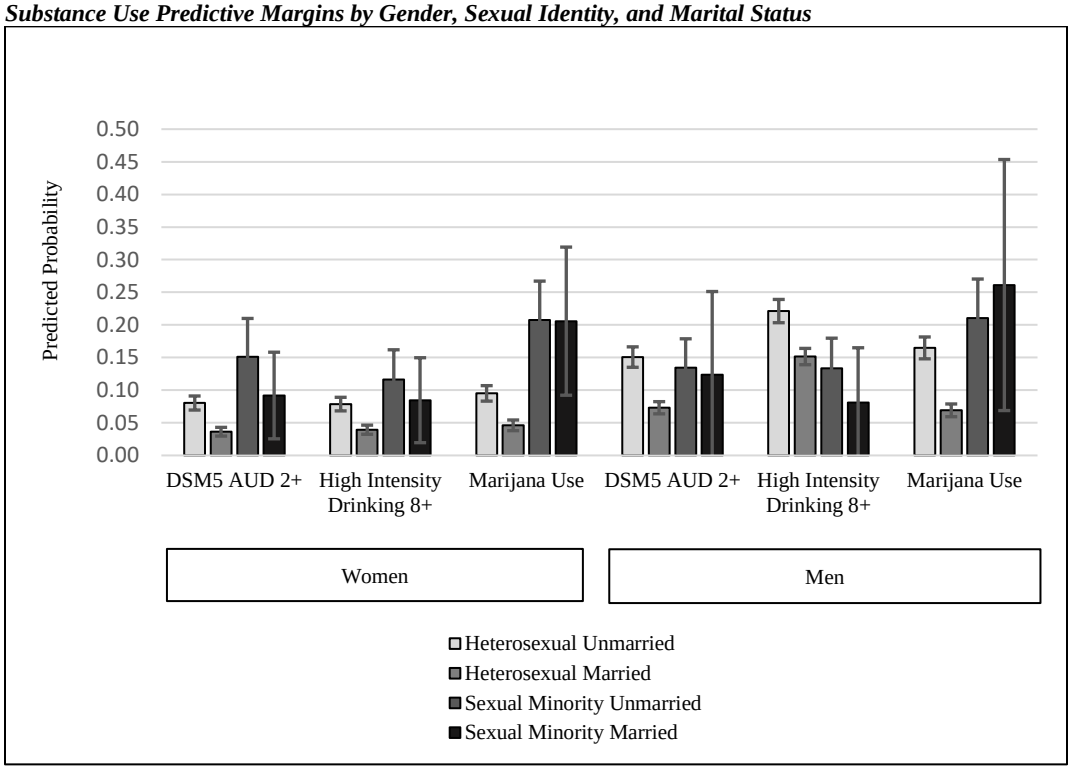
Table 2 summarizes results from models examining the independent and interactive effects of marital status and sexual minority status on alcohol and marijuana use measures. In the independent effects model for women, being married significantly decreased odds of alcohol use disorder, high-intensity drinking, and marijuana use, whereas sexual minority status increased the odds of each substance use outcome. However, the interaction between marital status and sexual minority status was non-significant in all models. Contrasts showed the protective effect of marriage was significant for heterosexual women, but not for

SMW. Table 3 displays the predicted probabilities (also see Figure 1) and average marginal effects (AME) of marriage for women by sexual identity. The AME of marriage for heterosexual women decreased the probability of harmful drinking and marijuana use by 4%-5%. The AME of marriage for SMW (see Table 3 and Figure 1) showed a trend toward decreased prevalence of alcohol use disorder and high-intensity drinking, although confidence intervals around the adjusted prevalence estimates for SMW were quite large and overlapped among married and unmarried SMW. For SMW, there was no indication of a protective effect of marriage in relation to marijuana use (the AME of marriage for marijuana use among SMW was essentially zero).

Sensitivity analyses combining cohabiting women with married women did not change the overall findings. There were no differential effects of married/cohabiting partnership status by sexual identity among women (findings from independent and interactive effects models are available upon request from the corresponding author)

Figure 1

Substance Use Predictive Margins by Gender, Sexual Identity, and Marital Status



Men

In the independent effects model among men (see Table 2), being married significantly decreased the odds of all substance use outcomes. Sexual minority status was associated with lower odds of high-intensity drinking and greater odds of marijuana use; there was no association with alcohol use disorder. There was evidence of an interaction effect of marital status and sexual minority status on marijuana use ($F_{interaction}$ [1, 27746]=6.31; p=0.012). Contrasts from interaction models showed the protective effects of marital status were significant for heterosexual men, but not for SMM. Table 3 displays the predicted probabilities (also see Figure 1) and average marginal effects (AME) of marriage for men. The AME of marriage for heterosexual men decreased the probability of both alcohol measures and marijuana use by 7%-10%. Although the AME of marriage for SMM suggested a similar 5% decrease in the probability of high-intensity drinking, the confidence intervals around the estimates overlapped among married and unmarried SMM. The small increase in the probability of marijuana use among married SMM was not significant, but the difference in comparison to the highly significant decrease in probability of use among married heterosexual men resulted in a statistically significant interaction effect.

Sensitivity analyses combining cohabiting and married men amplified differential effects of marital status. Among heterosexual men, the protective effect of being married/cohabitating was statistically significant, but it was not significant among SMM. Although the greater probability of harmful drinking and marijuana use among married/cohabitating SMM compared to unmarried SMM was not statistically significant (average marginal effects table available from the corresponding author), the divergent effects were large enough to create statistically significant interactive effects across all three substance use measures

Table 3

Predicted Probabilities and Average Marginal Effects of Marriage by Gender and Sexual Identity

	Heterosexual						Sexual Minority					
	Unmarried		Married				Unmarried		Married			
	Est	SE	Est	SE	AME	p	Est	SE	Est	SE	AME	p
Women												
DSM5 2+	0.08	0.01	0.04	0.00	-0.04	0.000	0.15	0.03	0.09	0.03	-0.06	0.185
High Intensity Drinking 8+	0.08	0.01	0.04	0.00	-0.04	0.000	0.12	0.02	0.08	0.03	-0.03	0.437
Marijuana Use	0.10	0.01	0.05	0.00	-0.05	0.000	0.21	0.03	0.21	0.06	0.00	0.980
Men												
DSM5 2+	0.15	0.01	0.07	0.00	-0.08	0.000	0.13	0.02	0.12	0.07	-0.01	0.872
High Intensity Drinking 8+	0.22	0.01	0.15	0.01	-0.07	0.000	0.13	0.02	0.08	0.04	-0.05	0.280
Marijuana Use	0.16	0.01	0.07	0.00	-0.10	0.000	0.21	0.03	0.26	0.10	0.05	0.621

Notes. Each estimate (Est) can be interpreted as the adjusted prevalence of substance use outcomes among unmarried and married heterosexual and sexual minority respondents. The average marginal effect (AME) of being married represents the difference between the estimates for unmarried and married respondents. 95% confidence intervals based on standard errors (SE) for the estimates are depicted in Figure 1.

Discussion

Our findings support prior research documenting robust protective effects of marriage against alcohol use disorder, heavy drinking, and marijuana use among heterosexual women and men, but not among sexual minorities. Interaction tests did not find significant differences in alcohol measures by marital status and sexual identity. However, although marijuana outcomes did not differ between heterosexual women and SMW, we found evidence of differential effects of marriage by sexual identity status for marijuana use by men. Sensitivity analyses including cohabiting with married men amplified differences in the effects of marriage between heterosexuals and SMM for drinking outcomes in a similar way, showing significant decreases among heterosexual men but a trend toward increased use among SMM.

There are several reasons marijuana use among married SMM might be higher than among their non-married SMM peers and their married heterosexual counterparts. First, higher rates of marijuana use and heavier drinking before marriage predict marijuana use after marriage (Homish, Leonard, & Cornelius, 2007). Given robust findings to date that marijuana use is significantly more prevalent among sexual minorities compared to heterosexuals (Boyd et al., 2019), continuation of heavier marijuana use may be particularly salient for married SMM compared to married heterosexual men. Furthermore, concordance in health behaviors among same-sex couples is greater than among heterosexual couples (Holway, Umberson, & Donnelly, 2018), so if a SMM uses marijuana, his spouse is more likely to use as well. Differential effects of marijuana use among women did not reach significance (only marginally significant interaction test) in the current study. The difference by sex might be explained in part by sex differences in how women and men influence their spouse's behavior. Women, regardless of their sexual identity, appear more likely than their male counterparts to use both direct and indirect strategies to positively influence their spouse's health behaviors (Umberson et al., 2018); thus, it is possible that SMW may benefit from marriage more than SMM. Additional research is needed with larger samples to determine whether this finding replicates and to better understand underlying reasons for potential differences between men and women.

Although findings should be interpreted with caution given large confidence intervals for SMM and SMW in the current study, the absence of a robust protective effect of marriage against alcohol use disorders among SMW and SMM in the current study may be due to the continued impact (after marriage) of minority stress on sexual minorities. Other studies (Du Bois et al, 2019; Kahle et al, 2020) found little evidence of a protective effect for marriage in relation to heavier drinking among married sexual minorities. As DuBois and colleagues point out, it is possible that being married may not fully buffer sexual minorities against the negative health impact of continued systemic discrimination and marginalization. Research verifies that same-sex married couples continue to experience minority stress as a result of their stigmatized statuses as sexual minority individuals and as a sexual minority couple (LeBlanc et al., 2018; Rostosky & Riggle, 2016). Furthermore, a recent U.S. study found mental health disparities as a whole have persisted over time in the U.S., despite legalization of same-sex marriage, and health disparities among young sexual minorities actually worsened from 2013 to 2016 (Hsieh, 2019).

In addition to minority stress, other factors may influence substance use among sexual minorities. Social psychological theories related to perceived norms and normative behavior may be important for understanding disparities in risk by sexual identity (Boyle, LaBrie, & Omoto, 2020; Boyle, LaBrie, & Witkovic, 2016; Cochran, Grella, & Mays, 2012). For example, research suggests perceived norms are reliable predictors of sexual minority substance use and sexual minorities overestimate the alcohol and drug use of peers (Boyle et al., 2020; Boyle et al., 2016; Cochran et al., 2012). Disparities in substance use also might be explained, in part, by differences in family and relationship structures. Role socialization theory suggests that changes in roles, such as parenting, are associated with reductions in alcohol and drug use, and these roles may differ by sexual identity (Hughes, 2005; Umberson & Karas Montez, 2010). Consistent with this theory, research suggests that both relationship status and having children under the age of 18 are important protective factors across sexual identity groups (Hughes, Szalacha, & McNair, 2010). It is worth noting that in the current study a majority of heterosexual study participants were married and had children, but the opposite was true for sexual minorities. Other differences in cultural and subcultural norms may influence potential relationships between marital status and substance use as well. For example, sexual and gender minority communities often embrace diverse conceptualizations of intimacy and respect varied relationship structures, which are more inclusive than traditional paradigms that privilege married, monogamous, heterosexual, and biological (rather than chosen family/community) relationships (Hammack, Frost, & Hughes, 2019). Measures of relationship status used in the current (and many other studies) may not adequately capture the diversity of intimate and supportive relationships in sexual and gender minority communities and, consequently, may not accurately characterize how those different relationships might influence health behaviors.

Findings should be interpreted in the context of study limitations. Data were collected largely before marriage was legalized for same-sex couples nationally; future studies are needed to monitor the potential differences in the effects of marriage in the new legal environment over time. Another important limitation is our inability to disaggregate bisexual and gay/lesbian respondents. This is especially true for SMW, given robust findings that bisexual women are more likely than lesbian women to engage in hazardous drinking (Green & Feinstein, 2012; Hughes et al., 2020; McCabe et al., 2009). Previous research also has found differences in the associations of relationship status with hazardous drinking among bisexual and lesbian women (Veldhuis, Hughes, Drabble, Wilsnack, & Matthews, 2020).

Additionally, the NAS did not ask about the sex or sexual identity of the respondent's spouse, making it impossible to control for such differences. However, previous research using a large and diverse volunteer sample of SMW suggests sexual identity may be a more robust predictor of relationships status differences in alcohol outcomes than sex of partner (Veldhuis et al., 2019). We also were unable to assess concordance in alcohol or marijuana among couples, a potentially important factor in substance use differences by sexual identity. Furthermore, the data were gathered over a 15-year period in which access to legalized marriage and social acceptance of LGBT people have been changing. Although we controlled for survey year and state laws regarding same-sex marriage at the time of the interview in our analyses, it was not possible to fully control for contextual changes that may have influenced respondent disclosure of sexual identity, classification of relationship status, or other responses over time. As mentioned earlier, the confidence intervals for sexual minority estimates were large, likely due to relatively small sample sizes. Future studies using strategies to over-sample sexual minorities are needed. Finally, the current study did not include measures of sexual minority stress (e.g., experiences of discrimination because of sexual minority status) or resiliency factors that may moderate the association between relationship status and substance use outcomes (e.g., level of family support and community support for sexual minority people in committed or married relationships). Studies are needed that examine both risk and protective factors that may differentially influence associations between relationship status and health outcomes among sexual minorities relative to heterosexuals.

Despite these limitations, this study underscores the importance of research on predictors of behavioral health outcomes among married sexual minorities. Future studies are needed that account for factors that influence the protective effect of marriage, such as partner sex/gender, concordance/discordance of substance use behaviors, social support, couple-level sexual identity disclosure, and structural stigma. Inclusion of such measures is important given findings from qualitative studies suggesting that the individual experience of national legal marriage recognition may be influenced by both interpersonal factors, such as familial rejection of same-sex marriage, as well as societal factors, such as inconsistent legal protections against discrimination for sexual and gender minorities (Lannutti, 2011a; Riggle, Drabble, Veldhuis, Wootton, & Hughes, 2018; Wootton et al., 2019). Because marriage may be less consistently protective against hazardous drinking and marijuana use among sexual minorities than heterosexuals, studies are needed to better understand disparities in substance use across both sexual identity and relationship statuses and to identify factors that contribute to minority stress in these different groups.

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