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Reciprocal relationships over time between descriptive norms and alcohol use in young adult sexual minority women

Dana M. Litt, PH.D.[†], **Melissa A. Lewis, PH.D.**, **Isaac C. Rhew, PH.D**, **Kimberley A. Hodge, B.A.**, and **Debra L. Kaysen, PH.D.**

Department of Psychiatry and Behavioral Sciences, University of Washington, Box 354944, Seattle, Washington 98195

Abstract

Objective—Young adulthood, roughly ages 18–25, is a period of great risk for excessive consumption of alcohol, especially among sexual minority women. Despite the substantial literature examining the relationships between social norms and behavior in general, little attention has been given to the role of descriptive norms on the drinking behaviors of sexual minorities. The present study had three aims: to compare both typical woman descriptive norms and sexual minority-specific descriptive normative perceptions among a sample of sexual minority women, examine reciprocal associations between sexual minority-specific descriptive norms and alcohol consumption over time, and to examine whether these reciprocal associations were moderated by sexual orientation (i.e. whether one identifies as lesbian or bisexual).

Method—A national sample of 1,057 lesbian and bisexual women between the ages of 18–25 were enrolled in this study. Participants completed an online survey at four time-points that assessed the constructs of interest.

Results—Results indicated that sexual minority women consistently perceived that sexual minority women drank more than their non-sexual minority peers; sexual minority women-specific descriptive drinking norms and alcohol consumption influenced one another over time in a reciprocal, feed-forward fashion; and these associations were not moderated by sexual orientation.

Conclusions—These findings highlight the importance of considering sexual minority women-specific norms as an important factor predicting alcohol consumption in sexual minority women. Results further support the development and testing of normative interventions for high risk drinking among sexual minority women.

Keywords

alcohol; sexual minority women; descriptive norms; longitudinal

Young adulthood, roughly ages 18–25, is a period of great risk for excessive consumption of and experiencing consequences associated with alcohol and other substances (Arnett, 2000;

[†]Please send correspondence concerning this article to: Dana M. Litt, Department of Psychiatry and Behavioral Sciences, University of Washington, Box 354944, Seattle, WA 98105. Phone: (206) 543-5689, Fax: (206) 616-1310, dlitt@uw.edu.

Arnett, 2005; Arnett, Ramos, & Jensen, 2001). Sexual minority status, especially among women, increases this risk (Cochran, Keenan, Schober, & Mays, 2000; Drabble, Midanik, & Trocki, 2005; Hughes, et al., 2006; Russell, 2006; Wilsnack et al., 2008; Ziyadeh et al., 2007). For example, in a study of women aged 20–34 enrolled in a large health maintenance organization (HMO), lesbian and bisexual women or sexual minority women (SMW) had higher weekly alcohol consumption and less abstinence as compared to either older lesbian and bisexual women or heterosexual women (Gruskin, Hart, Gordon, & Ackerson, 2001). Of the SMW, 23% were classified as heavy drinkers, as compared to 6% of the heterosexual women (Gruskin et al., 2001). Similarly, among college women, lesbian/bisexual college women were 10.7 times more likely to consume alcohol than heterosexual women (Ridner, Frost, & LaJoie, 2006).

Despite these risks, SMW remain an understudied population relative to both heterosexual women and sexual minority men (Coulter, Kenst, & Bowen, 2014; Institute of Medicine, 2011). As such, the processes leading to increased disparity during this significant developmental period remain inadequately understood in part due to a lack of research on the determinants of alcohol use among SMW (Hughes, 2003, Institute of Medicine, 2011). The majority of research conducted to date has evaluated the role of minority stressors such as exposure to violence, experiences of discrimination, and both internal and external experiences of heterosexism as predictors of alcohol use among SMW (Hatzenbuehler, 2009; Hatzenbuehler, Corbin, & Fromme, 2011; Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010; Hughes, 2003; Rosario, 2008). However, other social factors such as increased involvement with the sexual minority community have also been found to predict elevated drinking.

Research has shown that SMW spend more time in heavier drinking contexts as compared to heterosexual women, and this is associated with heavier drinking especially for SMW (Trocki, Drabble, & Midanik, 2005). Among adolescents, participation in lesbian, gay, and bisexual community events, but not history of childhood abuse or gay-related stress, predicted substance use (Rosario, Schrimshaw, & Hunter, 2004). Similarly, engagement with a greater number of campus lesbian, gay, and bisexual resources were found in one study to predict more binge drinking (Eisenberg & Wechsler, 2003) among sexual minority college students. Although this norms and behavior relationship is not unique to SMW, it suggests that peer influences may also play a strong role in increasing alcohol risk among SMW.

One important way in which peer influences have been conceptualized is through the impact of descriptive norms. Descriptive drinking norms are the perceived quantity or frequency of others' drinking behavior (Lewis & Neighbors, 2004). Research has shown that both college and non-college young adults overestimate the drinking of their peers and that these normative perceptions are positively associated with alcohol use (Collins & Spelman, 2013; Quinn & Fromme, 2011; Scaglione, Turrisi, Cleveland, Mallett, & Comer, 2013). Moreover, findings suggest that elevated descriptive drinking norms may be particularly problematic in groups, such as sexual minorities, who are at heightened risk for alcohol use (Eisenberg & Wechsler, 2003; Hamilton & Mahalik, 2009; Hatzenbuehler, Corbin, & Fromme, 2008). Further, a strong line of research that indicates that more specific normative referents (i.e.

more similar to the participant) leads to greater impact of normative information and that gender-specific referents may produce greater reductions in drinking compared with gender-neutral referents (Borsari & Carey, 2003; Lewis & Neighbors, 2006; Walters & Neighbors, 2005). Moreover, other research suggests that using gender-specific personalized normative feedback may be particularly effective for women. Other research has shown that individuals on campuses with more lesbian, gay, and bisexual resources were found in one study to engage in more binge drinking (Eisenberg & Wechsler, 2003), again supporting the role of SMW-specific social influences on alcohol use in this population. However, research has not examined to what extent specific versus typical student drinking norms for sexual minority women may be more salient and may be more closely tied to one's own drinking behavior.

According to the Social Learning Theory principle of reciprocal determinism (Bandura, 1977), cognitions and behavior influence one another in a dynamic learning process whereby a person's behavior both influences and is influenced by the social environment. Research investigating the temporal precedence of descriptive norms and drinking behavior among adolescent (Marks, Graham, & Hansen, 1992) and college student populations, and has yielded mixed support with evidence for (Lee, Geisner, Patrick, & Neighbors, 2010; Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006) and against (Farrell, 1994; Read, Wood, & Capone, 2005) reciprocal influences. Recent research among a college student sample suggests that descriptive and injunctive norms and drinking have reciprocal relationships over time and that both conformity and projection processes occur (Lewis, Litt, & Neighbors, 2015). If there is support for reciprocal determinism, then there are clinical implications for which cognitions are targeted in an intervention.

Despite the substantial growth of research examining the relationships between norms and behavior, little attention has been given to the role of descriptive norms on the drinking behaviors of sexual minorities (Eisenberg & Wechsler, 2003; Hamilton & Mahalik, 2009; Hatzenbuehler et al., 2008). In a national study of gay, lesbian, and bisexual college students (Eisenberg & Wechsler, 2003) the actual norms of the community were not related to binge drinking among women. However, *perceptions* of these norms were not examined. Another prospective study of high school students conducted by Hatzenbuehler and colleagues (2008) found that lesbians drank more alcohol than heterosexual women. Specifically, they found that descriptive norms mediated the relationship between sexual orientation and drinking in high school such that lesbians had higher perceived norms for drinking than heterosexual women and these descriptive norms predicted drinking behavior. Although these findings suggest that normative social influences may help to explain alcohol use in sexual minority women just as they do in heterosexual college student samples, it is important to note that these studies did not include sexual minority specific normative misperceptions (e.g., how much does the typical lesbian or bisexual woman drink?). Instead, both studies solely looked at normative misperceptions for typical student or close friends with sexual orientation unspecified (e.g., how much does the typical student drink?). Given that research has indicated that perceived norms that are closer to one's social network do appear to better predict drinking (Lewis & Neighbors, 2007), evaluating SMW-specific norms is an important next step.

One challenge with much of the research on SMW conducted to date is that these studies typically merge lesbian and bisexual women together due to sample size issues. However, bisexual women and lesbians may have different experiences and have differential drinking risks. Bisexual women have generally been found to be more likely to consume alcohol and to be at higher risk for problem drinking than heterosexual or lesbian women (McCabe, Hughes, Bostwick, Morales, & Boyd, 2012; Midanik, Drabble, Trocki, & Sell, 2007; Scheer et al., 2002). Bisexuals report higher levels of exposure to risk factors like childhood adversity and adverse life events (Balsam, 2002; Balsam, Rothblum, & Beauchaine, 2005; Jorm, Korten, Rodgers, Jacomb, & Christensen, 2002). Moreover, there is some research that suggests that bisexual women may be marginalized in both the heterosexual and lesbian communities, which may further increase their drinking risk (Ault, 1996; Friedman et al., 2014; Herek, 2002; Yost & Thomas, 2012). At the same time, they may be less influenced by sexual minority normative misperceptions. Thus, it is important to disaggregate the role of social norms on drinking behavior among SMW.

Study Aims

Given the extant literature, the current study had three aims. First, this study aimed to compare both typical woman normative perceptions and SMW-specific normative perceptions among a sample of sexual minority women. Next, we examined the temporal relationships of SMW-specific descriptive normative perceptions and alcohol consumption over time. It was hypothesized that consistent with reciprocal determinism, drinking norms and alcohol consumption would show reciprocal associations over time. Finally, the present study examined whether reciprocal associations between norms and drinking were moderated by sexual orientation (i.e. whether one identifies as lesbian or bisexual).

Methods

Participants & Procedures

Advertisements were placed on the social networking site Facebook so that only women who met eligibility criteria, based on their Facebook profile, would be shown the ad. At the time of recruitment, ads were projected to be shown to 1,028,700 lesbian and bisexual female Facebook users at any given time. Upon logging into Facebook, potential participants would be shown the study advertisement in the side bar as they navigated through the site. Advertisements were divided into LGB-specific content (e.g., “LGB women needed for an online study on partying”) and non-LGB-specific content (e.g., “we need you for an online study on health behaviors”).

In addition, online advertisements were also placed on Craigslist in a total of twelve cities. These cities included Atlanta, Austin, Boston, Chicago, Houston, Los Angeles, New York, Philadelphia, San Francisco, Seattle, South Florida, and Washington DC. Craigslist ads provided participants with a brief summary of the project and a URL to the screening survey.

Upon logging into the screening assessment, potential participants were shown a bulleted information statement. Those who agreed to participate were then routed to the 5-minute

screening assessment. A total of 4,119 completed the screening survey. Eligibility criteria included women who: 1) lived in the U.S., 2) had a valid e-mail address, 3) were between the ages of 18 to 25, and 4) self-identified as lesbian or bisexual at the time of the assessment. It is important to note that if participants did not respond to the sexual-orientation item at follow-up surveys, or changed their sexual orientation to heterosexual, they were still included in the survey in all subsequent years. Eligible participants (n = 1,877) were sent two automatic e-mails: one containing the URL for the baseline assessment and the second containing their personal identification number (PIN). Upon logging into the baseline survey, participants (n = 1,083) were shown a full consent form for the larger study. Due to inconsistencies in the data that suggested that participants were falsifying information (e.g., inconsistent birth dates over time), a final sample of 1,057 was used for this analysis. Data from the baseline survey as well as data from the yearly 12-, 24-, and 36-month Longitudinal Surveys were used in the current study. Participants were paid $25 for completion of the baseline survey and $30 for completion of each follow up survey. A Federal Certificate of Confidentiality was obtained for the study and all study procedures were approved by the university's Institutional Review Board.

Measures

Demographics—Demographic information included ethnicity, race, birth sex, sexual identity (lesbian or bisexual), and age.

Alcohol Norms—A modified version of The Drinking Norms Rating Form (DNRF: Baer, Stacy, & Larimer, 1991) was used to measure drinking norms. Participants were asked to "Consider a typical week during the last three months. How much alcohol, on average (measured in number of drinks), do you think a [typical woman/typical SMW (typical lesbian/bisexual woman)] your age drinks each day of a typical week?" Norms for typical weekly drinking was the sum of the standard number of drinks for each day of the week for both reference groups (i.e. both the typical woman and typical SMW).

Alcohol Consumption—The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) is a 4 item measure used to assess typical weekly drinking habits. The DDQ has been used in previous studies of college student drinking demonstrating good convergent validity and high test–re-test reliability (Marlatt et al., 1998). Previous research examining quantity measures of alcohol consumption has suggested that typical weekly consumption is among the best predictors of alcohol-related problems (Borsari & Carey, 2001), therefore, the current study took only the first item, "Consider a typical week during the last three months. How much alcohol, on average (measured in number of drinks), do you drink each day of a typical week?" Typical weekly drinking was the sum of the standard number of drinks for each day of the week.

Analytic Plan

Prior to statistical tests of study aims, we examined the distribution of the study variables. There were extreme values for both descriptive norms and actual typical drinking. To account for this, extreme values were recoded to the value to the 99th percentile (typical drinking: 60; SMW-specific norms: 49; typical woman norms: 43). Sensitivity analyses

were run that excluded these extreme values. We first examined whether typical woman and SMW-specific descriptive norms were different using the Wilcoxon paired sign-ranked sum test. We also assessed the correlation between these two variables using Spearman correlation coefficients.

To examine reciprocal one-year lagged associations between SMW-specific drinking norms and alcohol use, we used autoregressive cross-lagged models. Using this approach, we estimated simultaneously the associations between SMW-specific norms and drinking one year later and associations between actual typical weekly drinking and perceived SMW drinking norms one year later across the 4 study waves (Figure 1). Both the actual typical drinks per week consumed and perceived SMW drinking norms outcomes were non-negative integers that showed a positively skewed distribution and thus both variables were treated as counts. Also, because both variables showed evidence of over-dispersion negative binomial regression was used. In count regression models, coefficients are connected to the outcome via a log link and can be exponentiated (e^{β}) to yield Rate Ratios (RRs) that describe the proportional change in the count associated with a one-unit increase in the covariate (Atkins & Gallop, 2007). Finally, the typical drinks per week variable showed an excess number of zeros beyond what is expected in a negative binomial distribution. Thus, zero-inflated negative binomial regression was used for the actual drinks per week outcome. Zero-inflated models examine two aspects of the outcome: 1) the likelihood of being an excess zero (non-drinker vs. drinker) using logistic regression and 2) the count of drinks using negative binomial regression. Because of the non-normal distribution of the variables, maximum likelihood with robust errors (MLR) estimation was used. Note that MLR does not allow estimation of common model fit indices such as the comparative fit index (CFI) and root mean square error of approximation (RMSEA). Models included baseline demographic characteristics including age in years, race (0: non-White, 1: White), and sexual orientation (0: lesbian, 1: bisexual) as covariates for norms and drinking at each follow-up wave.

We also examined how perceived typical woman norms might compare to SMW norms in regards to its relation with actual drinking by performing two additional sets of cross-lagged models. One set used the same approach listed above, but replaced perceived SMW norms with perceived typical woman norms. The next set of models included both SMW and typical woman norms as predictors of drinking and as outcomes.

Over the follow-up waves of the study, data were available on 77% of the original sample at the 12-month follow-up, 69% at the 24-month follow-up, and 68% at the 36-month follow-up. Although MLR yields unbiased estimates in the presence of data missing at random, because the SMW descriptive norms and typical drinking variables are predictors as well as outcomes in the model, the number of observations used in models would be reduced which could limit statistical power. Thus, we used multiple imputation by chained equations (MICE) to impute 20 datasets where missing values were replaced with plausible values according to covariates included in the model as well as auxiliary variables correlated with the variables. Multiple imputation should provide valid estimates assuming data were missing at random, where missingness is only due to measured covariates (Graham, 2009). Although this assumption cannot be confirmed, we did observe findings consistent with this

assumption. Neither level of typical drinks per week at the prior visit (visit *t−1*) nor the subsequent visit (visit *t+1*) was statistically significantly associated with likelihood of missing at a given follow-up visit (visit *t*). Imputation and descriptive statistics were performed in Stata 14.0 (Stata Corporation, College Station, TX). Autoregressive cross-lagged models were performed in Mplus Version 7 (Muthén & Muthén, Los Angeles, CA) over each imputed dataset and then results were combined to yield parameter estimates and standard errors that accounted for both the within- and between-imputation variance (Rubin, 2004).

Wald tests were used to assess whether autoregressive (e.g., typical drinking at *t−1* to typical drinking at *t*) and cross-lagged (e.g., typical drinking at *t−1* to SMW norms at *t*) parameters differed over the course of follow-up (Jöreskag, 1993). Non-significant tests would indicate that parameters for a given type of path (e.g., autoregressive, cross-lagged) are not significantly different over time and could be reported as a single longitudinally averaged parameter. We compared Bayesian Information Criteria (BIC) between nested models to assess whether models that constrained a given parameter to be equal over time showed improved fit compared to models where parameters were allowed to vary over time. We also conducted Wald tests to examine whether parameter estimates differed between lesbian and bisexual women. Because of the imputed data, other comparisons of model fit such as the chi-squared difference test could not be used.

Results

As reported at baseline in this study sample, the mean age of the participants was 20.9 (SD = 2.1), 21.6% were non-White race, 40.5% reported lesbian sexual orientation (19% of the sample reported a transition in sexual orientation at least once over the 3 year study with 1.2% [N= 50] reporting being transgendered). On average, participants reported consuming about 8 drinks during a typical week with 26.5% reporting not drinking at all (Table 1). At later visits, the proportion of those reporting no drinking was similar (21% to 26%). Participants resided within one of the following nine U.S. Regional Areas: 9% in Region 1 (New England), 14% in Region 2 (Mid-Atlantic), 19% in Region 3 (East North Central), 6% in Region 4 (West North Central), 18% in Region 5 (South Atlantic), 4% in Region 6 (East South Central), 9% in Region 7 (West South Central), 6% in Region 8 (Mountain), and 15% in Region 9 (Pacific).

Correlations between typical woman and SMW-specific descriptive norms were high at each study wave (Spearman's $\rho > .83$, $p < .001$). Mean and median perceived drinks per week consumed by a typical and SMW woman are shown in Table 2. Perceived descriptive norms for both typical and SMW women declined over the course of the study. Although correlations were high, across the three study waves, participants systematically perceived that SMW women drank nearly a drink more per week on average than typical women ($p <$ .001 at all waves).

We examined autoregressive and cross-lagged associations among repeated measures of perceived SMW-specific drinking norms and one's actual typical drinking over time. Wald tests showed that parameters did not significantly vary over time except for the SMW-

specific norms autoregressive parameter (SMW norms at *t−1* predicting SMW norms at *t*). Thus, in final models, this autoregressive parameter was allowed to vary while all other parameters were constrained to be equal over time. Comparing the BIC of this final model to a model that allowed parameters to vary over time indicated that this constrained model showed better model fit (50797 vs. 50904). Examining the probability of being a non-drinker, higher levels of typical drinking one year earlier was associated with a lower probability of being a non-drinker (OR = .53; 95% CI: .30, .92; p = .024); however, there was no association with level of SMW-specific drinking norms (OR = 1.01; 95% CI: .98, 1.04; p = .43).

Figure 1 shows results for the other longitudinal paths among the SMW norms and typical drinking counts over time adjusted for race, age, and sexual orientation. Not surprisingly, levels of the count outcomes were strongly associated with prior levels of the outcome for both typical drinking (RR = 1.044; 95% CI: 1.038, 1.050; p < .001) and perceived SMW-specific norms (RR ≥ 1.028; p < .001; across waves). There was also evidence for reciprocal associations between the two constructs. Women with higher compared to lower perceived SMW-specific drinking norms at the prior study wave reported consuming more typical drinks per week (RR = 1.015; 95% CI: 1.009, 1.021; p <.001) at the next study wave. Further, women drinking more at the prior wave had higher perceived SMW-specific drinking norms (RR = 1.005; 95% CI: 1.003, 1.007; p <.001). Results of Wald tests indicated that none of the paths differed significantly between lesbian and bisexual women. Sensitivity analyses that excluded rather than recoded outliers showed that reciprocal associations between norms and drinking were of similar magnitude and all remained statistically significant.

A similar pattern was observed when perceived typical woman norms were used in the model rather than SMW norms. In addition to strong autoregressive effects, typical drinking was associated with higher perceived typical woman norms one year later (RR = 1.005; 95% CI: 1.003, 1.007; p<.001), and higher perceived typical woman norms were associated with drinking one year later (RR = 1.011; 95% CI: 1.003, 1.019; p = .005). However, when including both SMW and typical woman norms in the model, SMW norms remained significantly associated with drinking (RR = 1.016; 95% CI: 1.006, 1.026; p = .002), but typical woman norms no longer showed an association (RR = .998; 95% CI: .986, 1.010; p = .80). Typical drinking remained significantly associated with both perceived SMW and typical woman norms (p<.001).

Discussion

In line with the first aim, although SMW women's perceived drinking norms for both women in general and SMW women were highly correlated, they consistently perceived that SMW drank more than their non-SMW peers. The overestimation found in the present study may be due to elevated perceptions of lesbians and bisexual women as being heavier drinkers than heterosexual or "typical" women among SMW. This also could be a product of socializing with other SMW in heavier drinking contexts. Despite changes in societal acceptance toward SMW, much of the socializing among the lesbian, gay, and bisexual community still occurs in heavier drinking settings (Drabble & Trocki, 2014; McKirnan &

Peterson, 1989; Trocki et al., 2005), which may in turn lead to higher community perceived norms. This is the first study to evaluate differences between sexual minority specific and typical woman perceived normative drinking. Moreover, as an important factor in determining susceptibility to social influence is the extent to which the individual values the group in question (Latane, 1981) “typical” norms may not be as compelling or relevant to SMW. Instead, women may look to women within the lesbian, gay, and bisexual community for behavioral cues regarding drinking behavior. This is in line with social identity theory, which proposes that norms and behaviors are tied to groups that are most salient (Tajfel 1981, 1982). Generally, socialization with similar others is generally seen as a coping resource for sexual minorities and is associated with positive outcomes (Halpin & Allen, 2004; Meyer, 2003; McLaren, 2009 and increased social support (LeBeau & Jellinson, 2009). However, SMW do appear to spend more time in heavier drinking contexts; for women especially this is associated with heavier drinking (Trocki et al., 2005). Therefore, it follows that SMW-specific norms would be of greater salience for SMW women.

When comparing strengths of associations between referent groups (typical woman versus typical SMW norms), we found that there was a statistically significant association between typical woman drinking norms and drinking one year later. Although significant, the coefficient for the typical woman norms variable was lower than the coefficient for the model using SMW norms. Additionally, when both SMW and typical woman norms were included together as predictors of later drinking and as outcomes, results indicated that SMW norms remained significantly associated with drinking; however, there was no independent association between typical woman norms and drinking. Although the correlation between the descriptive norms variable is high, this does suggest that after accounting for any variance in drinking explained by typical woman norms, SMW norms is predictive of later drinking.

Furthermore, we found that perceived SMW-specific descriptive drinking norms and alcohol consumption influenced one another over time in a reciprocal, feed-forward fashion. This finding is consistent with the reciprocal determinism principle of Social Learning Theory (Bandura, 1977), and can be understood by considering the social context of alcohol use among young adults. The beliefs young adults hold about what is normal drinking behavior likely will be subject to change as they gain experience with drinking in new environments and around new peers. Heavier drinking individuals may self-select into heavier drinking peer groups (Read et al., 2005), which could influence normative perceptions over time. Then, as perceived norms shift, SMW’s own ongoing drinking behavior is likely to shift in kind, as they adjust their alcohol use to conform to what they perceive as “normal” drinking behavior among other SMW.

Finally, results indicated that the reciprocal relationships found between norms and drinking over time did not differ by sexual orientation status. We also failed to find that bisexual women drank more than lesbians, despite other studies that suggest bisexual women are at higher risk (McCabe et al., 2012; Midanik et al., 2007; Scheer et al., 2002). In general this suggests that bisexual women and lesbians are both influenced by sexual minority specific perceived norms. Thus, the same factors that influence lesbian drinking, in terms of exposure to higher drinking contexts and perceptions of other sexual minority women’s

drinking may also influence bisexual women. It is important to note that our measure combined lesbian and bisexual norms rather than further distinguishing between normative perceptions for lesbians and for bisexuals, which does preclude us from examining whether there were further subgroup differences. These findings also would not apply to women who engage in same-sex sexual behavior or who identify as mostly heterosexual who do not identify as bisexual and who also may not identify with lesbian/bisexual women's drinking norms. It is interesting that our study found 19% of the sample reported a transition in sexual orientation status over the study. This is in keeping with other research indicating that sexual orientation is relatively fluid among SMW (Kinnish, Strassberg, & Turner, 2005; Mock & Eibach, 2012; Rosario, Scrimshaw, & Braun, 2006). It is unknown whether there are differences between the group with stable sexual orientation status versus those with more fluid identities in norms or drinking behavior. Future research should also examine to what extent lesbian and bisexual women see themselves as distinct from one another and how that possible distinction influences the endorsement of general SMW drinking norms. However, since our study was focused broadly on SMW we did not make that distinction in our measures.

Clinical Implications

It is of concern that despite elevated risks for SMW of alcohol misuse, no studies conducted to date have evaluated whether social normative interventions that have been found effective among predominantly heterosexual emerging adults have the same degree of efficacy when applied to sexual minority populations. Many of the recommendations regarding tailored interventions to address health risk behaviors among sexual minorities emphasize either handling developmental transitions such as coming out or enhancing coping skills to address minority stressors but do not necessary address issues of drinking norms (Barbara, 2003; Blackwell, 2012; Stevens, 2012; Taliaferro, Lutz, Moore, & Scipien, 2014). Future research should begin to develop and test interventions for high risk drinking for SMW. Based on our findings, interventions for high risk drinking tailored for SMW may want to include addressing elevated norms regarding alcohol use within the community. Moreover, studies should evaluate whether norms-based interventions for SMW are more efficacious if they are geared toward in-group specific norms or typical woman norms. It is also important to note that based on our findings, it does appear that the same norms may be able to be used for both bisexual and lesbian-identified women. Given that Larimer and colleagues (2009) recommended that providing normative feedback targeting at least one level of specificity to the participant (i.e., beyond what the "typical" student does) is an important tool in normative feedback interventions, the present study suggests that SMW norms might be particularly efficacious in this population.

Together, past and current findings continue to support targeting descriptive drinking norms in single or multi-component interventions (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Cronce & Larimer, 2011; Miller et al., 2013). Prior research examining personalized normative feedback among college students has shown that reducing normative perceptions for drinking in turn reduces drinking behavior (Lewis et al., 2014; Neighbors, Larimer, & Lewis, 2004). However, research has yet to examine if reducing drinking in turn reduces risky cognitions, such as perceived drinking norms. In addition, research has yet to target

reducing normative perceptions among SMW aged 18–25. The current findings suggest that successful approaches for reducing college student drinking, such as personalized normative feedback, may also be efficacious among SMW. As drinking norms among this population may be in flux during young adulthood, changes in drinking as a result of normative feedback interventions could in turn reinforce more realistic cognitions (norms). For example, a recent study (Neighbors et al., 2015) examining a college student intervention found that the intervention reduced drinking at three months and also reduced normative misperceptions at six months. Thus, future research should examine the reciprocal nature of the norms-behavior relationship following intervention among SMW.

Limitations and Future Directions

Despite the important contributions the present study makes to the literature, it is important to note several limitations. First, although a 36 month long follow-up improves upon previous time-frames used with similar samples, given research that has indicated that drinking changes throughout young adulthood, with SMW experiencing higher increases in alcohol use over time compared to heterosexual adolescents and young adults (Corliss. Rosario, Wypij, Fisher, & Austin, 2008; Hatzenbuehler et al., 2008; Marshal et al., 2008), future research should examine the lagged associations between norms and drinking over longer durations and as SMW transition out of young adulthood. In addition, although there is a distinct need to focus on within group findings, with alcohol use among SMW being one such area, future research should also examine whether the findings for SMW apply to gay and bisexual men. Future research should also evaluate the extent to which there are differences in perceptions of typical woman and SMW injunctive norms, or the extent to which members of the lesbian, gay, and bisexual community approve or disapprove of various types of drinking behaviors.

Finally, given the unique struggles that SMW may face, future research should continue to look at additional moderators of the norms and behavior relationship such as victimization, mental health, and sexual identity. Understanding how and why SMW may be particularly at risk for heavy alcohol use can inform better prevention and intervention practices among this population.

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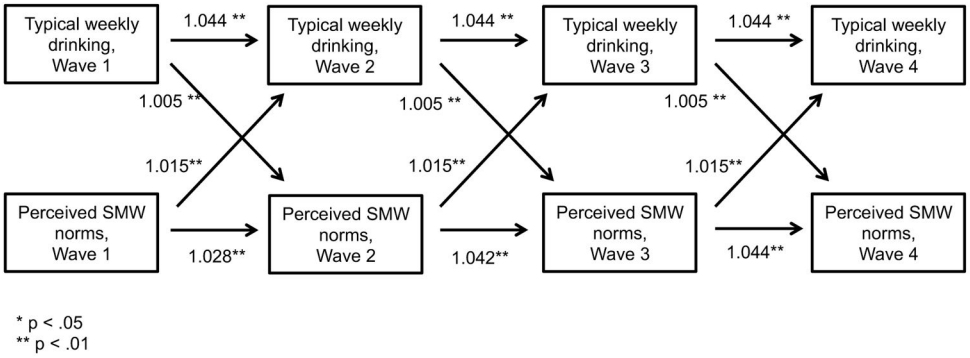

Figure 1.

Rate ratios for typical weekly drinking and perceived SMW drinking norms from negative binomial autoregressive cross-lagged model adjusted for race, age, and sexual orientation

Table 1

Baseline characteristics of the study sample

Characteristic	Mean (SD) or n (%)
Age	20.9 (2.1)
Lesbian sexual orientation	428 (40.5)
Race	
White	791 (78.4)
African American	127 (12.6)
Asian American	36 (3.6)
Native American	19 (1.8)
More than one race	36 (3.6)
Typical drinks per week	8.4 (11.5)
Reporting no drinking	277 (26.5)

Table 2

Mean and median perceived drinks per week consumed by a typical and sexual minority woman at the four study waves, and Wilcoxon sign-ranked test p-value for the difference

	Typical		SMW		
	Mean (SD)	**Median**	**Mean (SD)**	**Median**	**p-value for difference**
Wave 1	11.4 (7.5)	10	12.7 (8.8)	11	<.001
Wave 2	10.7 (6.8)	9	11.7 (7.6)	10	<.001
Wave 3	9.9 (6.4)	9	10.8 (7.1)	9	<.001
Wave 4	9.6 (6.6)	8	10.6 (7.3)	9	<.001

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