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College Status, Perceived Drinking Norms, and Alcohol Use among Sexual Minority Women

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Abstract

Lesbian, gay, and bisexual young adults are at elevated risk for drinking compared to heterosexual young adults, and this discrepancy is particularly striking for sexual minority women (SMW). Perceived social norms are strong predictors of young adult alcohol use, especially among college students. The college environment is often one where increases in alcohol use are seen, but the impact of college status on SMW's drinking has been understudied. The present study explored patterns of alcohol use and consequences among SMW and the extent to which social norms relate to use and consequences. Participants were recruited via social networking sites for a larger national study on SMW's health behaviors. Present analyses focused on 875 SMW between 18 and 25 who were categorized as either a 2-year college student (n = 196), 4-year college student (n = 418), or non-student (n = 261). Several differences emerged between college and non-college SMW, with non-college women reporting higher alcohol use and social norms compared to 4-year college women. In terms of alcohol-related consequences, students in both 2-year and 4-year colleges reported a higher likelihood of any consequences. There was some evidence that perceived norms partially explained differences in typical drinking among the college status groups. The present findings suggest that college may play a protective role against heavy drinking for this population of young women, however, the results are not straightforward and additional research is warranted.

Keywords

sexual minority women; alcohol use; perceived drinking norms

Prior research has shown that sexual minority women (SMW) are at elevated risk for heavy drinking compared to heterosexuals in both population-based studies and college studies (e.g., Drabble, Midanik, & Trocki, 2005; Green & Feinstein, 2012; Hatzenbuehler, Corbin, & Fromme, 2008; Kerr, Ding, & Chaya, 2014; McCabe, Boyd, Hughes, & d'Arcy, 2003; Schauer, Berg, & Bryant, 2013; Wilsnack et al., 2007). These studies have often relied on very different recruitment strategies and methodologies that preclude comparisons across studies. College and aspects associated with college life (i.e., moving out of the parent's

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home) have been found to be a risk factor for increased alcohol use and alcohol-related consequences in young adults more generally (for review, see Borsari, Murphy, & Barnett, 2007). To our knowledge, no studies have explored the potential differences in SMW's alcohol use by college status (e.g., college versus non-college attending young adults) or the differences in potentially important social antecedents of alcohol use, such as perceived descriptive social norms. The present study explores the extent to which college is a potential risk or protective factor for SMW and whether perceived norms are associated with alcohol use in this population.

Alcohol use among SMW

Numerous studies have shown that SMW are at higher risk for heavy drinking in comparison to heterosexual women (e.g., Drabble et al., 2005; Green & Feinstein, 2012; Hatzenbuehler et al., 2008; Ridner, Frost, & LaJoie, 2006; Wilsnack et al., 2008). The disparities in drinking behaviors appear to begin in adolescence and continue on into young adulthood. For example, sexual minority girls are at elevated risk for past month drinking and past year binge drinking (Ziyadeh et al., 2007), and have been found to drink more and do so more frequently than heterosexual girls (Hatzenbuehler et al., 2008; Marshal et al., 2012; Ziyadeh et al., 2007). Research has also revealed a sharper increase in sexual minority girls' alcohol use during the transition into young adulthood compared to heterosexual counterparts (Dermody et al., 2014; Marshal et al., 2012; Talley, Sher, & Littlefield, 2010). Differences in drinking behaviors are evident throughout adolescence and into adulthood (e.g., Dermody et al., 2014; Drabble et al., 2005; Hatzenbuehler et al., 2008; Marshal et al., 2012; Wilsnack et al., 2008; Ziyadeh et al., 2007) and so identifying the factors that may help to explain these differences appears warranted.

College Status, Sexual Minority Status and Alcohol use

Research suggests that young adulthood is associated with an increased risk for high-risk alcohol use and problems, particularly for those who attend college. Approximately 60% of college students (broadly defined) drink alcohol, and of those, roughly 40% engage in heavy episodic drinking (Substance Abuse and Mental Health Services Administration, 2014). While most research conducted on college students has focused on those attending 4-year colleges and universities, there are a few studies indicating that students attending community colleges are also at risk. The limited research on alcohol use among community college students has found that 66% report past month alcohol use (Velazquez et al., 2011), and rates of heavy episodic drinking range from 25% to 47%, with highest rates among young adults enrolled in community colleges (Sheffield, Darkes, Del Boca, & Goldman, 2005; Velazquez et al., 2011; Wall, BaileyShea, & McIntosh, 2012).

Within the college environment, a growing number of studies have compared the drinking behaviors of sexual minority and heterosexual college students (e.g., Hatzenbuehler et al., 2008; Kerr et al., 2014; McCabe et al., 2003; Schauer et al., 2013). These studies have typically relied on small, mixed gender samples of sexual minority young adults. Of the studies in this area, findings suggest that lesbian, gay, and bisexual (LGB) students report more alcohol and other substance use as well as greater negative consequences than

heterosexual students (e.g., Eisenberg & Wechsler, 2003; Ford & Jasinski, 2006; McCabe et al., 2003; Reed, Prado, Matsumoto, & Amaro, 2010). For example, Ridner et al. (2006) found that SMW students were 10.7 times more likely to drink than heterosexual college women and also were more likely to be current alcohol users. Other studies have found that SMW in college consume more alcohol (Bostwick et al., 2007; Eliason, Burke, van Olphen, & Howell, 2011; Woodford, Krentzman, & Gattis, 2012) and experience more consequences associated with drinking, such as a higher likelihood of drinking and driving, injuries, unplanned sex, suicidal thoughts, and sexually harassing someone compared to heterosexual college women (Duryea & Frantz, 2011; McCabe et al., 2003). Other studies have not specifically reported on differences in the rates of specific consequences, but rather have found higher a number of consequences or problems related to drinking among sexual minorities.

Research examining the etiology of alcohol use among sexual minority college students has typically been conducted from a minority stress perspective. This work has focused on factors such as experienced violence, perceived stress, hostility, and experienced or witnessed incivility as possible reasons for increased alcohol use (e.g., Reed et al., 2010; Woodford et al., 2012). For example, LGB students who reported an unwelcome campus environment appear to drink more and experience more consequences from use (Eisenberg & Wechsler, 2003; Hughes & Eliason, 2002; Reed et al., 2010). Notably, much of what we know about sexual minority experiences in college have focused on that of gay men or combined samples of male and female sexual minority students. This is a significant limitation within the literature; additional research into the specific experiences of lesbian and bisexual women are needed to supplement this literature.

The differences in college drinking behaviors between sexual minorities and heterosexual students are notable. However, less is known about whether these differences may vary as a function of student status (e.g., college versus non-college attending SMW) or college setting (e.g., 4-year university versus 2-year college), as comparison studies of this kind are virtually non-existent. This comparison is an important one; we know that college is a risk factor more generally, but it may also be associated with attributes that are protective for this population of students (e.g., access to campus resources, LGBT activities and clubs, etc.). Findings with LGBT high school students indicate that students who attend high schools with Gay-Straight Alliances had better mental health and substance use outcomes than students attending schools without these alliances (Heck, Flentje, & Cochran, 2011). Peer interactions, residence halls, and classroom environments, as well as campus group activities, are all aspects of the college setting that can greatly affect experiences of sexual minorities in both positive and negative ways (Longerbeam, Inkelas, Johnson, & Lee, 2007). While the present study is not focused on college activities or access to resources per se, we are interested in exploring whether SMW attending college, both 2- and 4-year colleges, may have different patterns of alcohol use and consequences than those not attending college.

Perceived Descriptive Drinking Norms

Significant theoretical and applied work indicates the relevance of perceived social norms of others' use on individual alcohol use and consequences (e.g., Baer, Stacy, & Larimer, 1991; Cialdini, Kallgren, & Reno, 1991; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). Social networks influence behaviors both through direct observation of the behavior of others and through perceptions of that behavior. In other words, what we see people do and what we think people do influence our own behaviors. Perceived descriptive norms, which are the perceptions of how much other people drink, have been found to greatly influence individual behavior. Individuals typically overestimate the amount and frequency that they drink (e.g., Borsari & Carey, 2003). Furthermore, greater overestimation is associated with drinking more.

Limited research has focused on social norms among LGB individuals. Using the College Alcohol Study data, Eisenberg and Wechsler (2003) calculated behavioral norms for binge drinking across 109 U.S. college campuses. The authors were interested in whether campus-wide social norms would predict binge drinking in both heterosexual and LGB students. Findings indicated that social norms were not related to LGB student drinking behaviors. In contrast, a separate study examined perceived social norms for those within student's social networks and found that SMW had higher drinking norms when compared to heterosexual women (Hatzenbeuler et al., 2008). In addition, SMW were more influenced by drinking norms than were heterosexual women. For SMW, drinking norms mediated the relationship between sexual orientation and alcohol consumption during the senior year of high school, but this difference had disappeared by college. More studies are needed to better our understanding of the role that norms play on SMW's drinking behaviors. Further, there has been little work to date that has examined whether perceived drinking norms differs by college student status, and in particular looking 2-year college students, 4-year students, and non-college SMW.

The Present Study

Previous research suggests that SMW are at higher risk for heavy drinking compared to heterosexual populations, yet it is unknown the extent to which this risk relates to the college environment, or how these risks may vary by type of college setting. While college students in general are at higher risk for excessive alcohol use, there are institutional and personal supports in college that may buffer risk for SMW, such as a supportive and accepting community with accessible LGBT-related resources (e.g., Eisenberg & Wechsler, 2003). The purpose of the present study was to explore the potential differences in college/non-college drinking and negative consequences among a large sample of young adult SMW. It is hypothesized that non-college SMW will report more alcohol use and negative consequences compared to SMW in college. It is also hypothesized that, for women in both settings, social factors (i.e., normative perceptions of drinking among other SMW) will be associated with more alcohol use and negative consequences. Significant for the present study is our ability to examine college status differently for those currently attending 2- and 4-year colleges. Finally, we examine whether the associations between college status and alcohol use and consequences are explained by social factors.

Method

Participants and Procedures

A national sample of 1,090 young adult SMW were recruited via online advertisements for a larger study on women's health-related behaviors. Online ads were placed on the social networking site Facebook and on Craigslist (e.g., Chicago, New York). Facebook ads were tailored so that only potentially eligible women (i.e., those whose Facebook profiles listed that they were interested in relationships with women) would be shown the ad. Interested participants could access the screening survey either by clicking the Facebook ad or the URL from the Craigslist ad.

Upon logging into the screening survey, a bulleted information statement was shown. Those who agreed to participate were directed to the 5-minute assessment. Eligibility criteria included women who: 1) lived in the U.S., 2) had a valid e-mail address, 3) were between the ages of 18-25, and 4) self-identified as lesbian or bisexual at the time of the assessment. A total of 4,119 completed screening and 1,877 met criteria for the larger study. After screening, eligible participants were sent two e-mails inviting them to take an additional 45-minute baseline survey. Those who did not complete within five days of the invitation received additional e-mail and telephone reminders to do so. Once a participant logged into baseline, they were shown the full longitudinal consent form. A total of 1,090 completed the baseline and were compensated $25 for their time. Due to inconsistencies in their data (e.g., inconsistent reporting of date of birth and age across surveys), an additional 33 participants were removed thus leaving 1,057 available for analyses. Institutional human subjects approval and a federal Certificate of Confidentiality was obtained. No adverse events were reported.

For the current study, because we were interested in women who were attending or could attend a 4-year college, we excluded 136 (12.8%) women who reported already earning a Bachelor's, graduate, or professional degree. We also excluded an additional 18 women (1.7%) who indicated that they were in high school or whose school status was unclear. Finally, 28 women (2.6%) were removed due to missing data on student status or other covariates. After these exclusions, the remaining sample consisted of 875 women (82.8%). Of the sample, 40.7% identified as lesbian and 59.3% as bisexual. Racial composition included 73.1% Caucasian, 12.7% African American, 2.7% Asian Americans, 3.6% multiracial, and 7.9% as other or did not respond. The mean age of participants was 20.5 years old (SD= 1.9). Analyses for the current study were conducted on baseline data.

Measures

Student Status—To determine educational/occupational status, participants were given a list of options and were told to check all that applied. Response options included: 1) working full-time, 2) working part-time, 3) student, 4) military service/civil service, 5) unemployed, 6) on parental leave, and 7) none of the above. If participants selected student, they were asked follow-up questions regarding the type of school they attend, class standing, and highest degree achieved. College status was coded into one of three categories: (0) non-

college, (1) 2-year community college, vocational, or technical school, or (3) 4-year college or university.

Typical Drinks per Week—Number of drinks consumed per week was assessed with a modified version of the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). Participants were asked: "Consider a typical week during the last 12 months. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?" Participants then filled the typical number of drinks they have for each day of the week. A sum score was then calculated by adding the reported number of drinks.

Alcohol-Related Negative Consequences—The Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006) was used to determine any negative consequences experienced while drinking. Participants were presented 48 items and were asked which, if any, consequences they had experienced in the past 30 days. Response options were 1 = *yes* and 0 = *no*. A sum score was calculated to determine the total number of alcohol-related negative consequences. Items were modified to include both work and school-related consequences. The YAACQ has been shown to have good reliability and validity in young adult samples (α=.89, Read, Beattie, Chamberlain, & Merrill, 2008).

Perceived SMW Drinking Norms—Participants were asked to estimate the drinking behaviors of the typical lesbian or bisexual woman their age using a modified version of the Drinking Norms Rating Form (DNRF; Baer et al., 1991; Litt, Lewis, Rhew, Hodge, & Kaysen, in press). Similar to typical drinks per week, weekly drinking was computed by summing the standard number of drinks estimated for each day of the week. Past research has found differences in specific subgroup normative estimates for gender based norms, Asian and non-Asian norms, and Greek member or non-Greek member norms, as well as for combined subgroups (e.g., typical female Asian student) (Larimer et al., 2009).

Data Analysis Plan

Differences in demographic covariates by college status were assessed using χ^2 tests. Because of a relatively low percentage of participants reporting Asian, multi-racial, or other race, these groups were collapsed into a single other race category. Because of the importance of legal drinking age, age was dichotomized as <21 and ≥ 21 years. We also examined discrepancies in perceived SMW typical drinking norms and actual SMW norms by creating a score for the difference in a participant's perceived SMW drinking norms from the sample mean of typical drinks per week. We then conducted a one-sample t-test to assess whether this discrepancy was different from 0.

We also examined whether perceived SMW drinking norms differed by college status. Because the norms variable was a count that showed a positive skew as well as evidence of over-dispersion, we used negative binomial regression where college status was entered as dummy variables with those not in college as the referent group. Negative binomial regression connects the outcome to covariates via a natural log-link. It is common to raise regression coefficients to the base *e* to estimate rate ratios (RRs) that describe the proportional change in the count associated with a 1-unit increase in the predictor.

The main outcomes in this study, typical number of drinks per week and alcohol-related negative consequences, were non-negative integers and both showed a highly skewed distribution with a preponderance of zeroes. Hurdle (also referred to as two-part) regression models were used to examine associations between alcohol outcomes and college status and other predictors (Atkins & Gallop, 2007). Hurdle estimate two components of the outcome: 1) the likelihood of having any non-zero outcome (e.g., at least one drink vs. no drinks) as estimated using logistic regression, and 2) the predicted count (e.g., number of typical drinks per week) among those reporting at least one drink using truncated negative binomial count regression. For the logit part of the model, odds ratios (ORs) were estimated that described the proportional increase in odds of a non-zero vs. a value of zero (e.g., any vs. no drinking) associated with a one-unit change in the predictor. For the count portion of the model, a truncated negative binomial rather than Poisson regression was used because of evidence of over-dispersion and RRs were estimated as described above.

In all regression models, college status was entered as dummy variables where non-college was the reference group. In all models we included covariates for age (0: < 21 years, 1: ≥ 21 years) and highest level of parent's education modeled as an ordinal variable. Other covariates were considered for inclusion in models (namely, race, Latino ethnicity, and sexual orientation). However, as shown in Table 1, the distribution of these covariates was similar across college status and would not be expected to meaningfully impact parameter estimates for college status. In hurdle models, the same set of covariates was included in both the count and logit portions of hurdle model. For analyses with alcohol-related consequences as the outcome, we also included typical drinks per week as a covariate in order to understand associations with college status independent of level of typical drinking.

We also examined whether perceived norms for SMW drinking mediated associations between college status and drinking outcomes. Because tests for indirect effects are not yet well understood for zero-inflated outcomes, we examined the presence of mediation through a traditional approach of performing a series of regression models (Muller, Judd & Yzerbyt, 2005). The set of models described above for alcohol outcomes established the “total effect” of college status on drinking outcomes (the “c” path). The model for perceived SMW norms and college status described earlier established the association between college status and the mediator (the “a” path). In order to examine associations between perceived SMW drinking norms and drinking outcomes (“b” path) independent of college status, another set of models was conducted with the drinking outcomes as the dependent variables and perceived drinking for typical SMW as well as college status as covariates. For ease of interpretation, in regression models perceived SMW typical drinking was standardized such that its mean was 0 with a standard deviation of 1. When statistically significant associations were observed between college status and perceived SMW norms and between perceived SMW norms and the alcohol outcome, we considered this evidence for mediation (MacKinnon, Fairchild & Fritz, 2007). All analyses were performed in R version 3.2 (R Development Core Team, 2010) and hurdle models were run using the ‘pscl’ package (Jackman, 2008).

Results

Of the 875 women in this sample, 261 (29.8%) were not in school, 196 (22.4%) were attending 2-year community college or vocational/technical school, and 418 (47.8%) were attending a 4-year college or university. Table 1 shows the distribution of covariates by college status. Compared to those not attending college, women attending college were younger and had parents with a higher level of education.

The mean number of typical drinks per week consumed by women in this sample was 8.2 (*SD* = 10.7) and the mean number of alcohol-related consequences was 7.9 (*SD* = 9.3). These alcohol outcomes were strongly correlated (ρ = .68, p <. 001). Using the mean typical drinks per week as the "actual" number of drinks consumed per week by the typical SMW, perceptions of typical SMW drinking were generally overestimated (*M* = 5.0, *SD* = 8.6). This overestimation was found to be significantly greater than 0 (p < .001).

When examining differences in perceived SMW norms by college status, compared to those not in college, women in 4-year college perceived that SMW drank 19% fewer drinks per week (*RR* = .81; *95% CI*: .72, .91). There was no difference between non-college and community (2-year) college women in perceived SMW drinking norms (*RR* = .98; *95% CI*: . 86, 1.11). Post-estimation tests showed there was also no statistically significant difference between the 4-year and community college groups in perceived drinking norms.

Alcohol Use

In this sample, 28.8% of women reported no drinking. Among those reporting any drinking, the mean number of drinks consumed per week was 11.4 (*SD* = 12.1). Table 2 shows ORs (left) from the hurdle model for the likelihood of any drinking in a typical week, according to college status and other demographic characteristics. For the logit part of the model, being 21 years of age or older was associated with a higher likelihood of any drinking (*OR* = 2.51; *95% CI*: 1.81, 3.47). College status and other covariates were not statistically significantly associated with likelihood of any drinking in a typical week.

Table 2 (right) shows the RRs from the hurdle model for the non-zero count of typical drinks per week. Women attending 4-year college reported consuming 28% fewer drinks per week than those not attending college (*RR* = .72; *95% CI*: .59, .88). Although women in community college reported consuming fewer drinks per week than non-college women, this difference did not reach statistical significance (*RR* = .83; *95% CI*: .66, 1.03). Further, post-estimation test did not show any statistically significant difference between 4-year and 2-year college women.

A subsequent set of models included perceived SMW drinking norms as a covariate. As shown in Table 3 for the logit part of the model, a one standard deviation increase in perceived SMW drinking norms was associated with a higher likelihood of any drinking (*OR* = 1.44; *95% CI:* 1.16, 1.79). College status continued to show no statistically significant association with the likelihood of any drinking. When examining the count portion of the model, among those who were drinking, women with higher perceived SMW drinking norms reported drinking more (*RR* = 1.46; *95% CI:* 1.33, 1.60). Notably, the difference

between 4-year and non-college women became attenuated compared to the earlier model that did not adjust for perceived norms, but remained statistically significant (*RR* = .82; *95% CI*: .68, .98). On the original log-count scale, this would reflect a 37.5% reduction in the association. This suggests that the association between 4- year college status and less drinking (Table 2) was partially explained by differences in perceived SMW drinking norms.

Alcohol-related Consequences

Descriptive analyses showed that 25.9% of the women in this sample reported no alcohol consequences at baseline. Among those that did report at least some alcohol consequences, the mean was 10.7 (*SD* = 9.3). When examining predictors of alcohol consequences (Table 4, left) in the logit portion of the model, compared to non-college women, a higher likelihood of any consequences was observed among both community college (*OR* = 2.10; *95% CI:* 1.25, 3.54) and 4-year college women (*OR* = 1.75; *95% CI*: 1.12, 2.73). Typical drinking was also highly associated with likelihood of any alcohol consequences (*OR* = 1.39; *95% CI*: 1.30, 1.48). In the count portion of the model (Table 4, right), only typical drinking was significantly associated with number of non-zero alcohol consequences.

Table 5 shows adjusted ORs and RRs from the hurdle model for consequences with the additional inclusion of perceived SMW drinking norms as a covariate. When examining the logit portion of the model, somewhat surprisingly women who perceived higher SMW drinking norms had a lower likelihood of any alcohol consequences (*OR* = .75; 95% CI: . 59, .95). The difference in likelihood of consequences between non-college and those in 2- and 4-year college remained statistically significant. It should be noted that this negative association between perceived norms and any alcohol consequences was strongly influenced by the inclusion of typical drinking in the statistical model due to the strong correlation between the two. When typical drinking was removed from the model, the association between perceived norms and any consequences became become positive, but not statistically significant (*OR* = 1.18; *95% CI*: .97, 1.43); and the differences between those not in college and those in 2- and 4-year college remained statistically significant. Taken together, it appears that perceived norms did explain associations between college status and likelihood of any consequences. In the count portion of the model, among those reporting any alcohol consequences, a one standard deviation increase in perceived SMW drinking norms was associated with a 9% lower count of consequences (RR = .91; 95% CI: .83, .99). Again, this negative association was largely driven by the inclusion of typical drinking in the model. After removing typical drinking from the model, perceived norms was associated with 16% higher count of consequences (RR = 1.16; 95% CI: 1.05, 1.28). As in models not accounting for perceived SMW drinking norms, college status remained unrelated to the count of consequences whether typical drinking was included in the model or not.

Discussion

The present study makes a number of important contributions to the literature. This study demonstrates that several significant drinking-related differences exist between college and non-college SMW, and in particular between 4-year college students and non-students. Results indicate that 2-year college students appeared to be in the middle with respect to

typical drinking, in that these women were not significantly different from their 4-year counterparts or from women not in college. In this sample, college did act as a potential protective factor, in that 4-year college student status was associated with lower drinking, but did not influence alcohol-related consequences (at least not the number of consequences experienced). This is directly contrary to findings regarding heterosexual college students, where college status is associated with higher drinking compared to other peers of similar ages not in college (Dawson, Grant, Stinson, & Chou, 2004; Timberlake et al., 2007). For young SMW, college may provide more avenues for socialization and support that are not drinking-related than those accessible to non-college SMW, particularly for those at 4-year institutions. For women outside of college, bars and parties are common social contexts to meet other SMW. Indeed, when compared with heterosexual college students, lesbian and bisexual women on average report more involvement in campus activities, such as student organizations, which suggests that this aspect of college is a particular draw for this population (Carpenter, 2009). Moreover, involvement in campus activities may give SMW who are in college additional ways to create a lesbian or bisexual sense of self, which can involve alternatives to drinking, such as self as activist or self as leader (Abes & Kasch, 2007; Renn, 2007).

Given the above findings, it is perplexing that SMW in college, both 2- and 4-year, appear to be at higher risk of experiencing any consequences despite drinking less. Perhaps there is a different pattern of drinking between those in college and not in college. For example, it maybe that while non-college students drink more overall during a typical week, drinking is spread across numerous days, whereas college students may be engaging in more focused heavy drinking on one occasion. This heavy episodic drinking would more likely be associated with consequences, particularly acute physical and behavioral consequences such as having a hangover or saying or doing embarrassing things. Given our findings, additional research in this area is warranted and should explore whether there are buffering factors in the community outside of college that serve to reduce the negative consequences of drinking.

As found with previous research, normative perceptions were associated with risky drinking behavior (Borsari & Carey, 2003; Presley & Pimental, 2006). In this study, we found that non-college SMW perceived the typical SMW to consume more drinks than 4-year college students perceived, which is not surprising as non-college women reported drinking more than their 4-year college counterparts. Additionally, having greater normative perceptions in general was associated with a higher likelihood of drinking and consuming more typical drinks per week. Results also suggest that perceived norms are particularly important for 4-year college students, as perceived norms partially mediated the association between 4-year college status and drinking. Future research should explore other mechanisms for high-risk drinking, especially among non-college students, as our findings suggest other mechanisms may be more influential for these young adults. With respect to consequences, the pattern of results is consistent with the general college norms literature that finds greater perceived norms are associated with greater consequences, when using a strategy that does not control for typical drinking (e.g., Lewis & Neighbors, 2004). However, a different pattern is found when drinking is included in the model, which indicates possible suppression effects. These findings suggest that alcohol prevention programs that utilize a social norms approach may be particularly beneficial for young SMW attending 4-year colleges, but also these

intervention strategies should be explored with other SMW as perceived norms were associated with high-risk alcohol use.

While research continues to indicate that SMW are at high-risk for problematic drinking and negative consequences, the conversation should be turning towards what might be effective individual and contextual/environmental approaches for reducing risk in this population. College is a contained situation where schoolwork, social activities, and living situations often occur in the same context and potentially among the same groups of peers (Longerbeam et al., 2007). Thus, a discriminatory college environment may have a deleterious impact on individual health or drinking behaviors (Eisenberg & Wechsler, 2003; Hughes & Eliason, 2002; Reed et al., 2010; Woodford et al., 2012). Sexual minority students do experience more discrimination and perceive campus climates to be less accepting than do their heterosexual peers (Reed et al., 2010; Silvershanz, Cortina, Konik, & Magley, 2008). Both overt experiences of violence and threats of violence as well as experiencing more covert types of discrimination such as hostility and incivility predict alcohol use and consequences among sexual minority college students (Reed et al., 2010; Woodford et al., 2012). On college campuses, one avenue of prevention is to work on increasing awareness and discussion among faculty and resident assistants about the needs of sexual minority students and the impact of overt and covert types of discrimination as a way to potentially reduce drinking consequences for SMW (Evans & Broido, 2002; Manning, Pring, & Glider, 2012; Woodford et al., 2012). Further, loneliness and social isolation have been found to be problematic for LGB students, which may also increase drinking risk (Longerbeam et al., 2007). Moreover, campus health centers may be unaware of the needs of sexual minorities, unintentionally convey a heterosexist bias, or subtly fail to meet the needs of these students (Wright & McKinley, 2010). It is also very important for researchers to further study alcohol use among SMW at 2-year colleges and to more generally understand the environment of these institutions, as there is very little research done to date.

In some ways, the challenges for young SMW who are outside of a college setting are even more daunting. For these individuals, it may be more difficult to find other SMW and so they may struggle more with isolation, particularly those who live in rural settings. Despite the large societal changes in attitudes, lesbian and gay bars are still a common feature of the LGB social scene in many cities. Even non-alcohol-related social events, like parades and festivals, are often sponsored by the community bars or by the alcohol industry (Bond, Daube, & Chikritzhs, 2010). These findings suggest a need for a multipronged approach to prevention with this population, including intervention programs that can be implemented within gay and lesbian bars, as well as work developing other social avenues for young SMW. In addition, we do not know whether prevention programs that have been effective with heterosexual college students will meet the needs of young SMW who are not in a college context.

This study does have several limitations. The study was self-report and it is possible that individuals were inaccurate or misleading about their sexual orientation or health risk behaviors. Self-report has been found to generally reflect other measures and to be accurate when individuals are assured of confidentiality. In addition, this study was cross-sectional in nature. Future research should use longitudinal designs to examine how social norms and

drinking may change over time as well as better examine the causal nature of these relationships. For example, it is possible that individuals who drink more heavily may have been less likely to apply to or to be accepted to college. It is also possible that those individuals were more likely to have dropped out of school. In addition, as this study was focused on young SMW, these results may not generalize to gay or bisexual men, nor may not translate to the transgendered community. Future research should examine other related factors, such as the role of mental health symptoms, minority stress, experiences of discrimination, and experiences of microaggression as other factors that may influence drinking risk among SMW.

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Table 1

Distribution of demographic characteristics by college status

	Full sample N = 875 n (%)	Non-college, N = 261 n (%)	2-year, N = 196 n (%)	4-year, N = 418 n (%)	p-value
Age, 21+ years	376 (43.0)	152 (58.2)	87 (44.4)	137 (32.8)	<.001
Bisexual vs. Lesbian	519 (59.3)	160 (61.3)	123 (62.8)	236 (56.5)	.25
Race					.99
White	645 (73.7)	192 (73.6)	142 (72.5)	311 (74.4)	
African American	111 (12.7)	34 (13.0)	26 (13.3)	51 (12.2)	
Other	119 (13.6)	35 (13.4)	28 (14.3)	56 (13.4)	
Hispanic ethnicity	100 (11.9)	34 (13.6)	24 (12.8)	42 (10.4)	.42
Parent education					<.001
High school graduate or less	214 (24.5)	88 (33.7)	58 (29.6)	68 (16.3)	
Some college or other degree	282 (32.2)	111 (42.5)	62 (31.6)	109 (26.1)	
Bachelor's degree	165 (18.9)	26 (10.0)	36 (18.4)	103 (24.6)	
Graduate degree	214 (24.5)	36 (13.8)	40 (20.4)	138 (33.0)	

Psychol Sex Orientat Gend Divers. Author manuscript; available in PMC 2017 March 01.

Table 2

Hurdle model odds ratios for any drinking and rate ratios for non-zero count of drinks per week according to college status and demographic covariates.

	Logit model for any drinking			Count model for non-zero drinks		
Characteristic	**OR**	**95% CI**	**p-value**	**RR**	**95% CI**	**p-value**
Intercept	1.81	1.27, 2.57	0.001	13.30	10.95, 16.15	<.001
College status						
Non-college	Ref	--	--	--	--	--
2-year	0.98	.64, 1.51	0.94	0.83	.66, 1.03	0.096
4-year	1.04	.71, 1.51	0.85	0.72	.59, .88	<.001
Age, 21+ years	2.51	1.81, 3.47	<.001	1.08	.92, 1.27	0.34
Parental education	0.97	.84, 1.11	0.63	0.94	.87, 1.01	0.099

Psychol Sex Orientat Gend Divers. Author manuscript; available in PMC 2017 March 01.

Table 3

Hurdle model odds ratios for any drinking and rate ratios for non-zero count of drinks per week according to college status, perceived typical SMW drinking

	Logit model for any drinking			Count model for non-zero drinks		
Characteristic	**OR**	**95% CI**	**p-value**	**RR**	**95% CI**	**p-value**
Intercept	1.53	1.06, 2.21	0.024	10.62	8.79, 12.82	<.001
College status						
Non-college	Ref.	--	--	--	--	--
2-year	1.11	.71, 1.74	0.64	0.91	.74, 1.12	0.35
4-year	1.17	.79, 1.72	0.44	0.82	.68, .98	0.03
Perceived SMW norms	1.44	1.16, 1.79	0.001	1.46	1.33, 1.60	<.001
Age, 21+	2.68	1.90, 3.77	<.001	1.13	.97, 1.32	0.11
Parental education	1.02	.88, 1.18	0.83	0.99	.92, 1.06	0.72

Table 4

Hurdle model odds ratios for any consequences and rate ratios for non-zero count of consequences according to college status and demographic covariates.

	Logit model for any consequences			Count model for non-zero consequences		
Characteristic	**OR**	**95% CI**	**p-value**	**RR**	**95% CI**	**p-value**
Intercept	0.51	.33, .80	0.003	5.59	4.61, 6.78	<.001
College status						
Non-college	(Ref)	--	--	--	--	--
2-year	2.10	1.25, 3.54	0.006	1.15	.94, 1.39	0.17
4-year	1.75	1.12, 2.73	0.014	1.12	.95, 1.33	0.19
Drinks per week	1.39	1.30, 1.48	<.001	1.04	1.03, 1.05	<.001
Age, 21+	1.41	.95, 2.07	0.085	1.12	.97, 1.29	0.11
Parental education	0.95	.80, 1.13	0.55	0.97	.91, 1.03	0.37

Psychol Sex Orientat Gend Divers. Author manuscript; available in PMC 2017 March 01.

Table 5

Hurdle model odds ratios for any consequences and rate ratios for non-zero count of consequences according to college status and perceived SMW typical drinking

	Logit model for any consequences			Count model for non-zero consequences		
Characteristic	OR	95% CI	p-value	RR	95% CI	p-value
Intercept	0.48	.30, .76	0.002	5.58	4.55, 6.84	<.001
College status						
Non-college						
2-year	2.40	1.37, 4.11	0.002	1.12	.91, 1.37	0.28
4-year	1.78	1.12, 2.83	0.015	1.09	.91, 1.31	0.33
Perceived SMW norms, z-score	0.75	.59, .95	0.016	0.91	.83, .99	0.034
Drinks per week	1.39	1.30, 1.48	<.001	1.04	1.03, 1.05	<.001
Age, 21+	1.49	.99, 2.42	0.055	1.14	.99, 1.32	0.078
Parental education	0.93	.77, 1.11	0.4	0.96	.90, 1.02	0.19