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Title

Queer Binge: Harmful alcohol use among sexual minority young people in Australia

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Abstract

Objectives

Literature suggests that sexual minority young people ('SMYP') use alcohol at disproportionate levels when compared with their heterosexual counterparts. Little is known about alcohol dependency symptoms, and correlations between high-risk alcohol use/dependency symptoms and minority stress in this population in general and between subgroups.

Study Design

Cross-sectional study

Methods

Descriptive statistics, adjusted Odds Ratios, and Analysis of Covariance were used to determine high-risk alcohol use, dependency symptoms, differences between subgroups, and correlations between alcohol use, dependency symptoms, and minority stress.

Results

A total of 1,556 Australian SMYPs aged 18 to 35 completed the survey. Fifty percent of the participants reported high-risk alcohol consumption with significant differences between subgroups. Typical dependency symptoms such as 'health, social, legal or financial problems due to alcohol consumption' (16.8%, n=247) were identified in large parts of the sample.

High-risk consumption and dependency symptoms were significantly correlated with minority stress.

Conclusion

High levels of high-risk alcohol use and dependency symptoms were found, largely consistent with existing literature. However, disparities are not distributed equally in this population, suggesting that future health promotion interventions should focus on SMYP subgroups. Significant correlations between minority stress and dependency symptoms/high-risk use suggest a potential route for future interventions in these populations.

Keywords: Alcohol Use, Binge Drinking, Sexual Identity, Gender Identity, Health Disparities, Minority Stress, LGBT Health

Introduction

Alcohol is the most consumed substance of abuse in the world¹ and one of the largest contributors to the global burden of disease.² Excessive alcohol use has been shown to lead to significant mental and physical health problems in young people.³ A particular concern for public health is the phenomenon of binge drinking among young people which may lead to short- and long-term health consequences including anti-social behaviours such as violence, increased risk of suicidal ideation and risky sexual behaviours, and other adverse physical consequences.^{4,5}

Binge drinking is defined as the consumption of more than six standard drinks in one occasion.⁶ In 2016, the Australian Institute for Health and Welfare found that young Australians aged 18-24 and 25-36 were more likely (42% and 36%) to binge drink than those in other age groups.⁷ Furthermore, the survey found that sexual minority Australians were more likely to engage in harmful alcohol consumption than their heterosexual counterparts at least monthly (42% vs. 26%) as well as over the course of their lives (26% vs. 17%). This is consistent with a preponderance of research showing that sexual minority young people are more likely to use alcohol at high-risk levels, and to experience alcohol-related social, psychological, and physical consequences than their sexual majority counterparts.^{3,8,9} However, research also suggests that these disparities are larger in female than male sexual minority groups, and show generally higher levels of alcohol use among bisexuals compared to their gay or lesbian counterparts.^{10,11}

Disproportionate levels of high-risk alcohol consumption among sexual minorities are likely the result of a complex array of individual, community, and other psycho-social factors.^{12,13} Excessive alcohol use in these populations may present a strategy to cope with stressors related to their sexual minority identity. Minority stress theory can be used to conceptualise

excessive alcohol consumption as a coping response to the unique distal and proximal stressors related to their minority identity.¹⁴⁻¹⁷ Particularly internalised homonegativity may be an important factor in explaining the disproportionate levels of substance use in this population.¹⁸ A population-based study in California, for example, has shown that SMYPs are more likely to feel distressed after disclosing their sexual identity than those who ‘remained in the closet’.¹⁹ This is particularly relevant, considering that the perception of homonegative experiences is strongest in adolescence among sexual minority youth,^{16,20} a critical developmental period coinciding with the typical age of onset of alcohol use in adolescents.²¹

While the body of research demonstrates concerning levels of alcohol consumption among sexual minority adults, literature on alcohol consumption in SMYP beyond simple measurements of alcohol beverage consumption is scarce. Furthermore, previous research often treated SMYP as one monolith identity block without testing for potential differences between subgroups.^{20,22-24} Such a strategy may be perceived as problematic, considering strong evidence that bisexuals may have a higher vulnerability to minority stress than other sexual minority subgroups.^{25,26} Furthermore, research on high-risk alcohol consumption in non-US samples.²⁶

Given high rates of alcohol use in SMYP, there is clear need for further research in these populations. This analysis uses data from a large sample of diverse sexual minority young Australians to explore high-risk alcohol consumption in this population and their psychosocial consequences as well as dependency symptoms. This paper furthermore aims to identify disparities in harmful alcohol consumption between discrete identity subgroups.

Methods

Study procedures

Survey Design

This study analyses data derived from an anonymous, cross-sectional online survey distributed between November 2016 and April 2017.

Inclusion and exclusion criteria

Participants were eligible to participate if they lived in Australia, were aged between 18 and 35 years and identified with a sexual minority identity regardless of gender identity. No further inclusion or exclusion criteria were applied.

Participant recruitment

Participants were recruited through targeted advertisement (paid and unpaid) on social media platforms such as Facebook® and Instagram® as well as through print material sent to LGBT community organisations/media commercial LGBT-venues, and community-based organisations catering to young people. Potential participants were not proactively approached by the research team.

Measurements

Demographics

Demographic information on age, gender, sexual minority identity, country of birth, ethnicity, living area, and study status were collected. Sexual minority and gender identity categories were developed after community consultations, and participants identified with 33 discrete identity groups. Those unsure about their gender identity, sexual minority identity or both (n=42) were excluded from this analysis due to very low sample sizes in individual groups. Most participants identified as men or women; 83 participants identified with other gender identities (non-binary, genderqueer, agender) and were aggregated to one group ('non-binary'). Supplementary Table S1 provides a breakdown of sexual minority identities by gender identity.

Minority stress

Three dimensions of minority stress²⁷ were assessed:

- Reaction of family members to a person's sexual minority identity ('family reaction') with nine items (e.g., 'rejection by family members due to my sexual orientation'). Participants who did not disclose their sexual orientation to at least one family member could not complete this section leading to missing values (n=457) for this dimension.
- Experience of violence and harassment as a result of a person's sexual minority identity ('violence and harassment') with seven items (e.g., 'physical assault due to my sexual orientation')
- Conflicts with one's own sexual minority identity ('sexual orientation conflict') with four items (e.g., 'difficulty accepting my sexual orientation'). The wording of one item in this dimension was adapted from 'Shame and guilt because I am homosexual' to 'Shame and guilt because I am LGBT'.

Each item is measured on a 4-point end-defined Likert-scale from 0 (no stress/did not occur) to 3 (sever stress) with total scores ranging from 0 to 27 for the ‘family reaction’ dimension, from 0 to 21 for the ‘violence and harassment’ dimension, and from 0 to 12 for the ‘sexual orientation conflict’ dimension. There are currently no universally accepted cut-offs to indicate specific levels of minority stress.

Alcohol use behaviour

Alcohol use behaviours (high-risk use and symptoms of dependency) were assessed using the Alcohol Use Disorders Identification Test – Consumption (AUDIT-C), and the alcohol sub-domain of the World Health Organisation’s Alcohol, Smoking and Substance Involvement Screening Test (WHO ASSIST) Version 2.3.²⁸

The reliable and valid AUDIT-C uses three standardised questions measuring amount and frequency of alcohol consumption to calculate a score from 0 to 12²⁹ with a cut-off of 5 to identify high-risk/harmful alcohol use.⁶ It defines regular binge drinking as drinking more than six standard drinks in one occasion at least once a month over the past three months. The ASSIST is reliable and valid^{28,30} and assesses use and dependence symptoms. Responses are aggregated to calculate an alcohol use involvement score between 1 and 39 with a cut-off of 11 to identify harmful alcohol use behaviours.³⁰

The 8-item Drug-Taking Confidence Questionnaire (DTCQ-8) was used to assess participants’ situation-specific coping self-efficacy.³¹

Statistical analysis

Cronbach's alpha scores ranging between 0.87 and 0.93 for all scales indicate good to excellent internal consistency.³² Binary Logistic Regression analyses were used to calculate adjusted Odds Ratios (aORs) of problematic alcohol behaviours by discrete identity subgroups:

1. gender: men (reference), women, non-binary;
2. sexual minority identities: gay/lesbian (reference), bisexual, pansexual, queer, asexual;
3. sexual identity and gender: men (gay (reference), bisexual, pansexual, queer); women (lesbian (reference), bisexual, pansexual, queer, asexual).

Some subgroup analyses were omitted due to small sample sizes (e.g., non-binary participants by sexual minority identity and for asexual men). ORs were adjusted for variables identified to influence substance use behaviours (age, ethnicity, living area, country of birth, study status, and drug-taking coping self-efficacy).^{31,33} Analyses of Covariance (ANCOVA) using age as a covariate were conducted to determine if high-risk alcohol use and symptoms of dependency were correlated with individual dimensions of minority stress.

Results

Sample characteristics

The final sample for this analysis (see Table 1) consisted of 1,514 SMYP. The average age was 22.6 years (SD=4.4) with most participants identifying as men (54.5%, n=825), women (40.0%, n=365), and non-binary (5.5%, n=83). The majority of participants identified as gay or lesbian (59.0%, n=893), followed by bisexual (24.1%, n=365), pansexual (8.8%, n=133), queer (5.1%, n=77), and asexual (3.0%, n=46).

Most participants described their ethnicity as White/Caucasian (84.9%, n=1,286), were born in Australia (82.8%, n=1,254) and lived in a major city or metropolitan area (65.9%, n=995). More than half were current college/university students (53.3%, n=807).

[Insert Table 1 here]

The mean family reaction minority stress score was 9.6 (SD=7.3) followed by violence and harassment minority stress with 8.3 (SD=6.0), and sexual orientation conflict stress with a mean of 5.8 (SD=3.9).

Alcohol use behaviour

Full sample

Regular binge drinking was prevalent with 43% (n=683) binge drinking at least once per month; furthermore, 468 (31.5%) participants consume alcohol at least twice a week. Based on the AUDIT-C measurement more than half of the sample reported high-risk alcohol use (52.2%, n=779).

[Insert Table 2 here]

The prevalence of problematic alcohol use was lower when assessed using the WHO ASSIST, with one third of the sample reporting high-risk levels of alcohol use (32.3%, n=471). Individual components of the WHO ASSIST measurement show that problematic alcohol consumption and symptoms of dependency occurred in the sample. A quarter (26.8%,

n=395) of participants stated that others voiced concerns about their alcohol use, and 16.2% (n=239) have tried to cut down or control their alcohol use but failed. Within the past three months 270 (18.3%) participants failed to do something that was expected of them because of their alcohol use, and 16.8% (n=247) experienced health, social, legal or financial problems as a result of their alcohol use. A lower 6.7% (n=98) experience an (almost) daily urge to use alcohol.

Subgroup-differences in high risk alcohol use and dependency symptoms

Results for differences in high-risk alcohol use and dependency symptoms between discrete sexual minority subgroups can be found in Table 3. Some significant differences were detected between subgroups. Women (aOR: 0.49, 95%CI: 0.39-0.62) and non-binary participants (aOR: 0.40, 95%CI: 0.24-0.65) were significantly less likely to report high-risk alcohol use based on the AUDIT-C measurement. Women were also less likely to drink twice or more per week or to binge drink at least monthly compared to men. Furthermore, non-binary participants reported lower levels of frequent binge drinking but were more likely to experience an (almost) daily urge to use alcohol.

[Insert Table 3 here]

Results were mixed for sexual orientation subgroups with some significant differences. Participants who identified as bisexual (aOR: 0.72; 95%CI: 0.55-0.95), pansexual (aOR: 0.55; 95%CI: 0.37-0.82) or asexual (aOR: 0.20; 95%CI: 0.09-0.42) were less likely to use alcohol at high-risk levels (AUDIT-C) than gay or lesbian participants. These groups also

reported lower levels of monthly binge drinking. However, bisexuals (aOR: 2.4 (95%CI: 1.37-4.10) and pansexuals (aOR: 3.58, 95%CI: 1.84-6.93) were more likely to experience an (almost) daily urge to use alcohol. Bisexual were also more likely to report that others were concerned about their use, whereas asexuals reported low levels of others being concerned about their use. Finally, asexual participants were less likely to drink twice or more per week.

An analysis of differences between sexual minority identities by gender showed few differences. Pansexual men were more likely than their gay counterparts to experience two dependency symptoms: health, social, legal or financial problems as a result of their alcohol use and others showing concern about their use. Bisexual men were also more likely to report that others are concerned about their alcohol use than gay men.

Asexual women showed significantly lower aORs than their lesbian counterparts for regular binge drinking, high risk alcohol use (AUDIT-C), and others being concerned about their use of alcohol. The only other significant differences among women subgroups are pansexual participants who were more likely to report an (almost) daily urge to use alcohol.

Effects of minority stress on alcohol use behaviours and symptoms of dependency

Significant differences in minority stress mean scores were found between those reporting high-risk alcohol use and dependency symptoms and participants who did not (see Table 4). Family reaction minority stress mean scores were overall higher for those who reported problematic alcohol use and dependence symptoms with the exception of those who reported drinking twice or more per week; however, only one difference was significant ($p=0.003$): those who reported health, social, legal or financial problems as a result of their alcohol use had a mean family reaction minority stress score of 11.05 (SD=7.36) compared to 9.31 (SD=7.28) for those who did not report this.

[Insert Table 4 here]

Those who reported problematic alcohol use or dependence symptoms also showed higher mean scores of violence and harassment minority stress; these differences were significant for most variables (see Table 4): high-risk alcohol use (AUDIT-C), high-risk alcohol use (WHO ASSIST), (almost) daily urge to use alcohol; health, social, legal or financial problems as a result of alcohol use, others being concerned about their alcohol use, tried to cut down/control alcohol use but failed, and failed expectations because of alcohol use.

Similarly, those who reported problematic alcohol use had higher mean scores for sexual orientation conflict minority stress for all variables except drinking twice or more per week (see Table 4). However, these difference were only significant for three variables: (almost) daily urge to use alcohol; health, social, legal or financial problems as a result of alcohol use, and other being concerned about their alcohol use.

Discussion

The aim of this paper was to explore high-risk alcohol consumption in a diverse sample of young SMYPs in Australia, and to identify disparities between discreet identity subgroups based on both sexual orientation and gender. A further aim was to identify correlations between minority stress and alcohol use. Overall, this analysis showed high levels of high-risk alcohol consumption and dependency symptoms in a sample of sexual minority young Australians. Some significant correlations between dependency symptoms and dimensions of minority stress were detected.

. A population-based study from Australia⁶ showed that 42% of young people had more than four standard drinks in one session at least monthly. While this figure appears to be identical with the results of the analysis at hand, the threshold in this paper was higher with six standard drinks, translating overall to a higher prevalence of binge drinking. The same study reports higher rates of harmful alcohol use among SMYPs than the present analysis.⁷ This may be the result of a higher level of education in the present study compared to the general population.³⁴

Previous studies have also found meaningful disparities in general and high-risk alcohol consumption between sexual minority and sexual majority young people.^{3,26,35,36} Very few studies did not detect significant disparities in high-risk alcohol consumption between sexual minority and sexual majority young people.³⁷⁻³⁹

Furthermore, more than half of all participants showed a high-risk alcohol consumption based on the AUDIT-C measurement; a figure similar to other studies on alcohol consumptions among young people in Australia in general.⁴⁰ Significant parts of the sample have also shown a range of alcohol dependency symptoms including trying to cut down alcohol but

failing, failed expectations, a daily urge to consume alcohol as well as experiencing health, social, legal or financial problems as a result of their alcohol consumption. However, while still high at about a third of sample, overall significantly less participants demonstrated high-risk alcohol consumption when utilising the more rigorous WHO ASSIST measurement.

These disparities are not equally distributed among this population and results suggest that high-risk alcohol consumption is more prevalent among gay men as well as bisexual men and women compared to their lesbian and other sexual minority identities counterparts.^{7,41} However, while these subgroups showed an overall higher level of alcohol consumption and binge drinking, few differences between subgroups were detected for dependency symptoms suggesting that higher levels of risky alcohol consumption do not necessarily translate to a higher prevalence of alcohol-dependency symptoms in these groups. This is consistent with results from a large sample bisexual female students at a Midwestern university in the USA showing that despite lower levels of alcohol consumption, these women had a comparably higher number of drinking problems likely related to stigma and minority stress.⁴² While literature generally reports higher levels of problematic and high-risk alcohol consumption among men compared to women, this appears to be less consistent in the current sample, suggesting that underlying reasons for problematic alcohol use are more nuanced, and that a lower pronunciation and perception of traditional gender roles young sexual minority populations may lower the importance of values associated with these such as lower levels of alcohol or substance use.^{43,44}

Finally, this analysis identified significant correlations between concepts of minority stress and general high-risk alcohol consumption and dependency symptoms, particularly between violence and harassment minority stress. This is consistent with the current body of literature suggesting that substance use is used as a coping mechanisms among those who experienced violence and harassment, particularly among minority population.⁴⁵ However, inconsistent

with the current body of literature, few correlations were found between family reaction and sexual orientation conflict minority stress.¹⁶ Previous studies have found correlations between elevated rates of alcohol use and minority stress in SMYP,^{16,46-49} this was not the case in this study. This may be explained by the use of different dimensions of minority stress and a more rigorous analysis of alcohol use. Furthermore, easier access to sexual minority communities for young people as well as a higher level of accessibility to mental health services and peer-support in Australia may explain these differences.

Overall, this analysis demonstrates that problematic alcohol consumption is at high levels and that disparities are not distributed equally. Persistently high rates of binge drinking among SMYP potentially places this population at a risk of further mental, social and physical health issues. Health professionals and policy advocates are well-positioned to implement strategies that address the high-risk alcohol consumption in this population and recognise disparities in harmful alcohol consumption from within the community by identifying which discreet identity subgroups are at higher risk. Furthermore, underlying reasons for these disparities such as violence and harassment need to be addressed to form a comprehensive approach to this issue.

Strengths and limitations

A strength of this study was the use of the WHO ASSIST measurement, allowing an in-depth analysis of alcohol use including frequency, psychosocial consequences and dependence symptoms. This rigorous assessment of risky alcohol consumption and dependency symptoms is scarcely used in young sexual minority populations and in studies in general. Furthermore, all measurements used showed excellent levels of internal consistency. The

large sample size allowed for subgroup analyses; however, participants identifying with sexual minority identities other than gay, lesbian or bisexual, and with gender identities other than man or woman had to be grouped together due to low sample sizes. Using different dimensions of minority stress allowed for a more in-depth analysis of reasons for disparities in alcohol use.

This study also has some limitations. This study was specifically designed to target a hard-to-reach group and aimed at recruiting a diverse sample of sexual minority young people. However, participants were self-selected and as such may not be representative of SMYP in Australia, restricting the generalisability of results. Compared to the general population, participants in this study were more likely to be born in Australia, to identify as Caucasian/White and to study at tertiary level while no specific data on sexual minority young people is included in the Australian Census.³⁴ Recruiting representative samples of marginalised, hard-to-reach populations such as SMYP has been shown to be associated with challenges, also given that size and characteristics of this population are unknown adding to the already existing limitations of non-random sampling methods.⁵⁰ However, previous research has demonstrated that such samples, while potentially not representative, have the potential to gain an in-depth understanding of substance use behaviours in marginalised populations.⁵¹ Furthermore, self-reporting bias such as recall and social desirability bias may lead to an underestimation of substance use in the sample.

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Table 1: Participant Demographics (n=1,514)

Variable	Descriptive	Missing
Age in years, Mean (SD)/Median (IQR)	22.6 (4.4)/21.0 (6)	n=0
<i>Gender Subgroups</i>		n=0
Men	54.5% (n=825)	
Women	40.0% (n=606)	
Non-binary	5.5% (n=83)	
<i>Sexual Minority Identity Subgroups</i>		n=0
Gay/Lesbian	59.0% (n=893)	
Bisexual	24.1% (n=365)	
Pansexual	8.8% (n=133)	
Queer	5.1% (n=77)	
Asexual	3.0% (n=46)	
White/Caucasian	84.9% (n=1,286)	n=0
Born in Australia	82.8% (n=1,254)	n=0
Living in major city/metropolitan area	65.9% (n=995)	n=0
College/University student	53.3% (n=807)	n=0
<i>Minority Stress</i>		
Family Reaction Stress	9.6 (7.3)/8.0 (12.0)	n=457 ^a
Violence and Harassment Stress	8.3 (6.0)/8.0 (10.0)	n=229
Sexual Orientation Conflict Stress	5.8 (3.9)/6.0 (7.0)	n=236
Drug-Taking Confidence Questionnaire Score	76.7 (23.65)/83.8 (33.8)	n=119

^a participants who did not disclose their sexual orientation to a part of their family will have missing values.

Table 2: Alcohol use (full sample)

Variable		Missing
Drinks twice or more per week	31.5% (n=468)	n=29
Binge drinking at least once per month	43.0% (n=683)	n=31
High Risk Use based on AUTID-C (score of 5 or higher)	52.2% (n=779)	n=22
High Risk Use WHO ASSIST (score of 11 or higher)	32.3% (n=471)	n=58
Daily or almost daily urge to use (past three months)	6.7% (n=98)	n=41
Use led to health, social, legal or financial problems (past three months)	16.8% (n=247)	n=44
Others concerned about their use (ever)	26.8% (n=395)	n=41
Tried to cut down/control use but failed (ever)	16.2% (n=239)	n=41
Failed expectations because of alcohol use (past three months)	18.3% (n=270)	n=41

Table 3: Adjusted Odds Ratios (95%CI) of Problematic Alcohol Consumption by Discreet Identity Groups

Identity Group	Drinks twice or more per week	Binge drinks at least monthly	High Risk Use (AUDIT-C)&	High Risk Use (WHO ASSIST)^	(Almost) Daily urge to use	Health, social, legal or financial problems	Others concerned about their use	Tried to cut down/control use and failed	Failed expectations because of alcohol use
By Gender Subgroups									
Men	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Women	<i>0.61 (0.47-0.79)</i>	<i>0.45 (0.35-0.57)</i>	<i>0.49 (0.39-0.62)</i>	0.88 (0.68-1.14)	1.49 (0.90-2.48)	1.10 (0.80-1.51)	0.85 (0.65-1.12)	1.20 (0.86-1.67)	1.03 (0.76-1.40)
Non-binary	0.68 (0.40-1.15)	<i>0.33 (0.20-0.57)</i>	<i>0.40 (0.24-0.65)</i>	0.77 (0.45-1.34)	<i>3.51 (1.67-7.31)</i>	0.97 (0.51-1.84)	0.61 (0.34-1.09)	1.48 (0.80-2.72)	0.65 (0.34-1.27)
By Sexual Orientation Subgroups									
Gay/Lesbian	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Bisexual	0.80 (0.60-1.09)	<i>0.69 (0.52-0.91)</i>	<i>0.72 (0.55-0.95)</i>	1.23 (0.92-1.67)	<i>2.4 (1.37-4.10)</i>	1.40 (0.98-2.00)	<i>1.34 (1.01-1.82)</i>	1.17 (0.80-1.70)	1.05 (0.74-1.48)
Pansexual	0.88 (0.57-1.36)	<i>0.55 (0.36-0.83)</i>	<i>0.55 (0.37-0.82)</i>	1.12 (0.72-1.74)	<i>3.58 (1.84-6.93)</i>	1.57 (0.96-2.58)	1.13 (0.72-1.77)	1.32 (0.78-2.21)	0.85 (0.51-1.43)
Queer	0.98 (0.57-1.66)	0.91 (0.55-1.50)	0.78 (0.47-1.30)	1.23 (0.72-2.10)	1.25 (0.42-3.73)	0.92 (0.46-1.85)	1.01 (0.57-1.79)	1.01 (0.51-2.00)	1.01 (0.54-1.88)
Asexual	<i>0.11 (0.03-0.46)</i>	<i>0.05 (0.01-0.23)</i>	<i>0.20 (0.09-0.42)</i>	0.43 (0.17-1.06)	0.58 (0.07-4.82)	0.48 (0.14-1.63)	<i>0.16 (0.04-0.69)</i>	0.29 (0.07-1.28)	0.25 (0.06-1.05)
Sexual Identity - Men									
Gay	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Bisexual	0.71 (0.42-1.20)	0.80 (0.51-1.28)	0.78 (0.49-1.25)	1.14 (0.69-1.90)	2.59 (1.10-6.10)	1.27 (0.70-2.33)	<i>2.23 (1.35-3.66)</i>	0.94 (0.48-1.85)	0.55 (0.28-1.10)
Pansexual	0.42 (0.13-1.37)	0.40 (0.14-1.12)	0.45 (0.17-1.22)	1.99 (0.71-5.57)	0.99 (0.12-8.23)	<i>4.30 (1.55-11.97)</i>	<i>2.92 (1.05-8.12)</i>	1.45 (0.44-4.81)	1.35 (0.44-4.16)
Queer	0.97 (0.33-2.86)	2.05 (0.68-6.17)	1.34 (0.46-4.14)	1.63 (0.56-4.72)	0.00 (0.00-0.00)	1.29 (0.35-4.74)	1.84 (0.61-5.51)	0.73 (0.15-3.48)	0.57 (0.13-2.62)
Sexual Identity - Women									
Lesbian	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Bisexual	1.42 (0.86-2.32)	1.17 (0.75-1.83)	1.22 (0.80-1.87)	1.55 (0.95-2.50)	1.87 (0.74-4.73)	1.48 (0.83-2.65)	1.11 (0.68-1.80)	1.16 (0.65-2.08)	1.54 (0.89-2.67)
Pansexual	1.90 (0.98-3.67)	1.13 (0.60-2.12)	1.12 (0.62-2.04)	1.28 (0.65-2.52)	<i>3.83 (1.29-11.36)</i>	1.58 (0.71-3.51)	0.88 (0.43-1.77)	1.17 (0.52-2.62)	0.96 (0.42-2.18)

Queer	1.31 (0.58-2.94)	1.64 (0.77-3.46)	1.41 (0.67-2.95)	1.62 (0.74-3.57)	1.08 (0.2-5.78)	0.97 (0.35-2.71)	1.00 (0.43-2.28)	1.04 (0.39-2.80)	1.67 (0.70-4.03)
Asexual	0.26 (0.06-1.21)	<i>0.15 (0.03-0.66)</i>	<i>0.39 (0.15-0.98)</i>	0.60 (0.19-1.85)	0.49 (0.04-5.39)	0.69 (0.17-2.83)	<i>0.20 (0.04-0.93)</i>	0.14 (0.02-1.27)	0.40 (0.08-1.94)

- Odds Ratios are adjusted for Age, Study Status, Ethnicity, Country of Birth, Living Area, and Drug-Taking coping self-efficacy; & - AUDIT-C score of 5 or higher; ^ - WHO ASSIST alcohol sub-score of 11 or higher ('brief intervention level'); ***Bold and Italic*** - Significant at p <= 0.05

Table 4: Effects of dimensions of minority stress on high-risk alcohol use and symptoms of dependency (Analysis of Covariance#)

Response to alcohol use/dependency symptom variable	Drinks twice or more per week	Binge drinks at least monthly	High Risk Use (AUDIT-C)&	High Risk Use (WHO ASSIST)^	(Almost) Daily urge to use	Health, social, legal or financial problems	Others concerned about their use	Tried to cut down/contr of use and failed	Failed expectations because of alcohol use
Family Reaction Minority Stress, mean (SD)									
No	9.77 (7.31)	9.56 (7.22)	9.54 (7.27)	9.50 (7.31)	9.50 (7.32)	9.31 (7.28)	9.32 (7.30)	9.50 (7.33)	9.56 (7.35)
Yes	9.18 (7.33)	9.63 (7.44)	9.64 (7.36)	11.09 (7.09)	10.95 (7.34)	11.05 (7.36)	10.26 (7.37)	10.01 (7.29)	9.70 (7.23)
Sig.	p=0.221	p=0.862	p=0.825	p=0.149	p=0.127	p=0.003	p=0.059	p=0.383	p=0.815
Violence and Harassment Minority Stress, mean (SD)									
No	8.23 (6.05)	8.05 (6.07)	7.91 (5.98)	8.15 (5.99)	8.15 (5.99)	7.90 (5.90)	7.83 (5.97)	8.02 (5.97)	8.08 (5.97)
Yes	8.32 (5.99)	8.58 (5.97)	8.59 (6.04)	10.81 (6.59)	9.95 (6.36)	10.12 (6.36)	9.47 (6.03)	9.55 (6.18)	9.07 (6.23)
Sig.	p=0.840	p=0.115	p=0.042	p=0.001	p=0.008	p≤0.001	p≤0.001	p=0.001	p=0.022
Sexual Orientation Conflict Minority Stress, mean (SD)									
No	5.95 (3.90)	5.76 (3.92)	5.74 (3.89)	5.77 (3.92)	5.76 (3.91)	5.69 (3.93)	5.58 (3.93)	5.74 (3.93)	5.73 (3.92)
Yes	5.54 (3.97)	5.92 (3.93)	5.90 (3.95)	6.62 (3.90)	6.85 (3.97)	6.47 (3.85)	6.50 (3.83)	6.23 (3.89)	6.23 (3.94)
Sig.	p=0.078	p=0.482	p=0.482	p=0.128	p=0.015	p=0.007	p≤0.001	p=0.097	p=0.075

- Covariate: Age; & - AUDIT-C score of 5 or higher; ^ - WHO ASSIST alcohol sub-score of 11 or higher ('brief intervention level')

Supplementary Table S1: Discreet Identity Groups by Gender and Sexual Identity (n=1,514)

	Man	Women	Non-binary
Gay/Lesbian	82.7% (n=682)	32.7% (n=198)	15.7% (n=13)
Bisexual	12.1% (n=100)	41.7% (n=253)	14.5% (n=12)
Pansexual	2.7% (n=22)	12.7% (n=77)	41.0% (n=34)
Queer	2.2% (n=18)	6.9% (n=42)	20.5% (n=17)
Asexual	0.4% (n=3)	5.9% (n=36)	8.4% (n=7)