Effects of Participation in and Connectedness to the LGBT Community on Substance Use Involvement of Sexual Minority Young People

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Abstract

Introduction

Research shows disproportionate levels of substance use among sexual minority young people. A range of reasons for these disparities have been suggested, including connectedness to and participation in the LGBT community. Little is known about how these constructs are related to substance use involvement in sexual minority (sub)groups or how these relationships are affected by other factors.

Methods

1,266 young sexual minority Australians completed a cross-sectional online survey. Multiple regressions were conducted to assess associations between connectedness to and participation in the LGBT community on substance use involvement, before and after controlling for other factors such as substance use motives, psychological distress, wellbeing, resilience, minority stress, and age.

Results/Conclusion

Most participants identified as homosexual (57%, n=726) and male (54%, n=683). In the overall sample, participation in and connectedness the LGBT community were significantly associated with increased substance use involvement before ($F(2,1263)=35.930$, $p\leq0.001$, $R^2=0.052$) and after controlling for other variables ($F(8,1095)=33.538$, $p\leq0.001$, $R^2=0.191$), with meaningfully higher effect sizes for participation than for connectedness. After controlling for other variables, connectedness only remained significant for homosexuals. Effect sizes for participation were higher for females than males, and bisexuals than homosexuals. However, participation in the LGBT Community was not associated with substance use in participants identifying with a non-binary gender identity. In conclusion, substance use involvement was associated with participation in the LGBT community, but connectedness to the LGBT community only had a weak association with substance use involvement in the homosexual subgroup.

Keywords: Sexual Minority, Gender, Community Connectedness, Community Participation, LGBT Community, Substance Use Involvement

1. Introduction

A growing body of research has highlighted marked health disparities between sexual minority adolescents and young adults, and their heterosexual counterparts. While most research to date has focussed on the sexual health of sexual minority men, particularly adult gay men (Coulter, Kenst, Bowen, & Scout, 2014), a growing number of studies have examined the use of alcohol (Australian Institute for Health and Welfare, 2014; Ott et al., 2013), tobacco (Australian Institute for Health and Welfare, 2014; Hatzenbuehler, Jun, Corliss, & Austin, 2015; Ott et al., 2013), and illicit substances in sexual minority populations (Australian Institute for Health and Welfare, 2014; Demant et al., 2017; Hatzenbuehler et al., 2015; Newcomb, Birkett, Corliss, & Mustanski, 2014). Bisexuals and women are more likely to experience disparities in substance use than their gay/lesbian and male counterparts, respectively (Demant et al., 2017; Kerr, Ding, & Chaya, 2014). Suggested reasons for the disproportionate substance use among young people from sexual minorities include targeted marketing (Drabble, 2000; Stevens, Carlson, & Hinman, 2004), stress related to identifying with a sexual minority identity (Meyer, 2003; Stuber, Meyer, & Link, 2008), and factors associated with the lesbian, gay, bisexual, and trans (LGBT) community itself such as the community's bar culture (Cox, Vanden Berghe, Dewaele, & Vincke, 2010; Lehavot & Simoni, 2011; Lelutiu-Weinberger et al., 2013).

The LGBT community plays an important role in the life of sexual minority young people as a source of social support, and a safe space to meet other members of the community, which offers protection from the risk of marginalisation and oppression present in heterodominant cultures (Blosnich, Lee, & Horn, 2013; Otis, 2004). In countries with a Eurocentric culture, the LGBT community often revolves around licensed venues (businesses licensed to sell liquor for on-site consumption such as bars or clubs) as a physical representation of the LGBT Community (Chow et al., 2013; Wilkerson, Shenk, Grey, Rosser, & Noor, 2015). Despite this, relatively few studies on the relationship between the LGBT community and substance use have been conducted to date.

Neither the LGBT community nor the LGBT 'lifestyle' were found to significantly elevate substance use involvement in early research (Bux, 1996). However, more recent studies have shown very low or very high levels of identification, affiliation, connectedness and participation with the LGBT community were associated with elevated levels of substance use among gay and bisexual men, whereas men showing moderate affiliations with the community had lower rates of substance use (Green & Feinstein, 2012; Stall et al., 2001). In contrast,

Lelutiu-Weinberger et al. (2013) found identification and involvement with the gay community was protective against frequent substance use among young sexual minority men. A qualitative study among lesbian women (Gruskin, Byrne, Kools, & Altschuler, 2007), found frequently visiting LGBT bars and venues increased their alcohol consumption; however, socialising in LGBT bars also provided substantial benefits such as finding potential partners and friends as well as the development of an identity as a lesbian. While not directly related to participation in the LGBT community, a qualitative study conducted by McDavitt et al. (2008) showed that loneliness and feelings of isolation contributed to substance use among sexual minority men, suggesting that socialising with sexual minority peers (e.g., in the LGBT community) might be a protective factor from substance use.

The current body of research is limited to mostly descriptive studies on sexual minority men. Only one study exploring the role of connectedness to or participation in the LGBT community on substance use among sexual minority females could be identified (Gruskin et al., 2007). Previous research has also failed to take into account other factors known to influence substance use in the general population, including mental ill-health and wellbeing, substance use motives, coping self-efficacy and resilience (Green & Feinstein, 2012). This omission is particularly important given that sexual minority populations are known to have higher levels of psychological distress and mental ill-health (Cochran, Sullivan, & Mays, 2003; Lea, de Wit, & Reynolds, 2014). In addition, existing research has failed to differentiate between participation in and connectedness to the LGBT community even though not all sexual minority people participate in or identify with the social construct underlying the LGBT community (Barrett & Pollack, 2005; Frost & Meyer, 2011; Simon et al., 1998). Furthermore, existing studies have typically focused on adults or LGBT populations as a whole rather than on specific age or sexual minority subgroups.

In summary, the current literature highlights the importance of this topic but is scarce particularly in relation to sexual minority young people and sexual identity or gender subgroups. The overall aim of the present study was therefore to examine the relationship between participation and connectedness to the LGBT community and substance use involvement in young people. The effects of these two constructs on substance use involvement were examined both before and after controlling for other important substance use variables, and within both gender and sexual identity subgroups.

2. Methods

2.1 Recruitment and Participants

Sexual minority young people aged 18 to 35 years living in Australia participated in an online survey. Ethical approval to conduct the study was obtained from the Queensland University of Technology Human Research Ethics Committee (Approval number: 1600000636). The study was purposefully designed to recruit hard-to-reach populations using paid and unpaid advertisements on general social media such as Facebook, email lists, LGBT-specific media and through print material send to 115 community-based organisations working with young people in general (e.g. youth groups or centres) or functioning as commercial LGBT-venues. Entry into a draw of ten A$100 retail vouchers was offered as an incentive for participating in the study.

2.2 Measures

2.2.1 Substance Use Involvement (dependent variable)

The World Health Organisation Alcohol, Smoking and Substance Involvement Screening Test Version 3.0 (ASSIST) was used as the primary measure of substance use involvement (WHO ASSIST Project Research Group, 2002). This 8-item measure assesses lifetime and recent (past 3 months) use, as well as abuse and dependence symptoms for the following 10 groups of substances: tobacco, alcohol, cannabis, cocaine, amphetamine-type stimulants (speed, ecstasy), inhalants, sedatives/sleeping pills, hallucinogens, opioids and other drugs (specified). Responses were aggregated across substances to calculate a global substance use involvement score with a potential range of 0 to 372 (Humeniuk & Ali, 2006). The ASSIST has high levels of reliability and validity (Humeniuk & Ali, 2006; WHO ASSIST Project Research Group, 2002). More detailed information on the use patterns of individual substances can be found in Supplementary Table S1.

2.2.2 Connectedness to the LGBT Community Scale (independent variable I)

The 5-item Connectedness to the LGBT Community Scale is rated on a 5-point Likert-scale (1=agree strongly to 4=disagree strongly) (Frost & Meyer, 2011). The wording in 2 items was

changed from ‘LGB’ or ‘Gay Community’ to ‘LGBT’ or ‘LGBT Community’ for this study. Items are reproduced in Supplementary Table S2.

2.2.3 Participation in the LGBT Community (independent variable II)

Two existing scales were combined to measure participation in the LGBT community (Mills et al., 2001; Ross, Tikkanen, & Berg, 2014). Participants were asked if they engaged in five different activities of the LGBT community in the past year (e.g., visiting an LGBT bar or pride event; yes/no) and, how often they participated (1-2 times, less than monthly, monthly, fortnightly, weekly, daily/almost daily). Items are reproduced in Supplementary Table S3.

2.2.4 Demographic Measures

Demographic variables (see Table 1) included gender (male/female/non-binary), sexual orientation (homosexual/bisexual/other sexual minority identity), country of birth (Australia/other country), Ethnicity (Caucasian/White, other ethnicity), and living area (major city/other). Non-binary is an umbrella term used to categorise people whose gender identity does not fit into the male/female dichotomy (Richards et al., 2016), such as genderqueer (n=30) or a-gender (n=10). The category ‘other sexual minority identity’ includes all sexual minority identities other than homosexual or bisexual such as asexual (n=39), pansexual (attracted to people regardless of sex or gender, n=113) or ‘queer’ (umbrella term for non-heterosexual identities, n=68).

2.2.5 Control Variables

The 8-item Drug-Taking Confidence Questionnaire (DTCQ-8) (Sklar, Annis, & Turner, 1997) was used to assess situation-specific coping self-efficacy for the use of substances (with items being rated from 0, not at all confident, to 100, very confident). The 15-item Substance Use Motives Scale (SUMS) measured three types of substance use motives (enhancement, social, coping) on a 5-point Likert-scale (1=almost never/never to 5=almost always/always) (Glavak Tkalić, Sučić, & Dević, 2013). It is a modification of Cooper’s Drinking Motives Questionnaire (Cooper, 1994).

The Mental Health Continuum-Short Form for adults (MHC-SF), is a 14-item measure of mental wellbeing in the past month (Keyes, 2009). Each item assesses a specific component of emotional, psychological and social wellbeing on a 6-point Likert-scale (1=never to 6=every day). The 10-item Kessler-10 Psychological Distress Scale (K10), is a widely used scale to assess psychological distress in the past month, which is rated on a 5-point Likert scale (1=all of the time to 5=none of the time) (Kessler et al., 2002). The 5-item (5-point Likert scale: 1=strongly disagree to 5=strongly agree) Brief Resilience Scale (BRS) was used to assess resilience (Smith et al., 2008).

Minority Stress (Lewis, Derlega, Berndt, Morris, & Rose, 2002) was assessed in two specific areas: violence and harassment (7-items; e.g., 'Physical assault due to my sexual orientation'), and sexual orientation conflict (4-items; e.g., 'Difficulty accepting my sexual orientation'). Each item is rated on a 4-point Likert-scale (0=no stress/has not occurred to 3=severe stress). The wording of one item in the sexual orientation conflict scale was changed from 'Shame and guilt because I am homosexual' to 'Shame and guilt because I am LGBT'.

2.3 Statistical Analysis

2.3.1 Reliability and Validity of Constructs

The internal consistency of the measures was checked using Cronbach's alpha. All scales ranged between 0.87 and 0.93, except the Participation in the LGBT Community Scale (0.63). Confirmatory factor analyses were conducted on all adapted measures (Connectedness to the LGBT Community; Minority Stress Scale sexual orientation conflict subscale); even though, these minor adaptions were not expected to interfere with construct validity. A good fit was defined by constructs showing normed fit indexes (NFI) and comparative fit indexes (CFI) exceeding 0.95 (Bryne, 1994; Schumacker & Lomax, 2004). Exploratory and confirmatory factor analyses were performed for the newly developed Participation in the LGBT Community Scale. It was initially assumed that 8 items would load on the scale; however, an exploratory factor analysis using a random half of the sample identified 5 items (Kaiser-Meyer-Olkin Measure of Sampling Adequacy=0.789, $p \leq 0.001$). The model demonstrated good fit in a confirmatory factor analysis with the remaining half of participants (NFI=0.96, CFI=0.96). Supplementary Tables S1 and S2 showed similar regression weights among items for participation in and connectedness to the LGBT community.

2.3.2 Initial Group Comparisons

Gender and sexual identity subgroups were compared on demographic variables, psychological distress, mental wellbeing, substance use and LGBT specific variables using Pearson Chi-square (χ^2) for categorical variables and analyses of variance (ANOVA) for continuous variables to identify potential control variables. Post-hoc tests were conducted to confirm where differences between groups occurred (Tukey post-hoc tests for continuous variables and z-Tests for categorical variables).

2.3.3 Substance use Involvement and the LGBT Community

Multiple Regressions were conducted to determine if participation in and connectedness to the LGBT community were associated with differences in substance use involvement (ASSIST) among the total sample and within gender and sexual identity subgroups (Model 1). A second model controlling for variables found to influence substance use in previous research (wellbeing (Degenhardt et al., 2008), psychological distress (Deasy, Coughlan, Pironom, Jourdan, & Mannix-McNamara, 2014), coping self-efficacy (Choi, Krieger, & Hecht, 2013), substance use motives (Hecimovic, Barrett, Darredeau, & Stewart, 2014), resilience (Belcher, Volkow, Moeller, & Ferré, 2014), sexual orientation minority stress (Lehavot & Simoni, 2011; McDavitt et al., 2008), and age (Blum & Nelson-Mmari, 2004) were then conducted for the total sample and within subgroups. Variables with an effect size below $\eta^2 \leq 0.010$ in group comparisons (see Table 1) were excluded to reduce the number of control variables and to strengthen parsimony.

All variables met the assumptions of multiple regression analyses, except for mental wellbeing (MHC-SF) and psychological distress (Kessler 10), which were log transformed to ensure linearity. All analyses were completed using AMOS 23 and SPSS 23 (IBM, New York, US).

3. Results

3.1 Recruitment and Participants

A total of 1,757 participants consented and commenced the online survey: 76 that did not meet inclusion criteria were excluded. A further 125 participants with missing data on key demographic variables (age, gender, sexual orientation) were excluded, as were 290 participants with missing data on LGBT community participation/connectedness or substance use involvement. A missing data analysis (see Supplementary Table S4) did not show any significant difference between those included and excluded at the latter step on age, sexual minority/gender identity, ethnicity, and living area, but excluded participants were more likely to be born outside of Australia. The final sample comprised 1,266 LGBT young people. Table 1 shows the characteristics of the final sample by sexual orientation and gender identity.

The overall sample had a mean age of 22.6 years (95-%-CI: 22.4-22.9): homosexual and male participants were significantly older than their counterparts ($p \leq 0.001$). More than half identified as male (53.9%, n=683) followed by females (40.0%, n=507); 76 (6.1%) identified as neither male nor female. In response to the question on sexual identity, 57.3% (n=726) identified as gay or lesbian, 23.2% (n=294) as bisexual and 19.4% (n=246) identified with other sexual minority identities. Sexual orientations differed significantly ($p = <0.001$) between genders, with most males (81.7%, n=558) and females (40.5%, n=205) identifying as homosexual and bisexual respectively. Most non-binary participants identified with other sexual minority identities (73.7%, n=56). The majority identified as Caucasian/White (84.2%, n=1,066) and were born in Australia (84.2%, n=1,066). Females were more likely to be Caucasian/White (89.2% vs. 82.6%, $p \leq 0.01$) than their male counterparts; no difference between groups for country of birth or ethnicity could be detected among sexual identities (see Table 1). Two-thirds of participants (66.2%, n=837) resided in a major city. Male (70.5% vs. 59.8%, $p \leq 0.01$) and homosexual participants (70.9% vs. 58.5%, $p \leq 0.01$) were more likely to live in a major city than their female and bisexual counterparts. The WHO ASSIST Score for the overall sample was 30.3 (95-%-CI: 28.7-31.8). Males had a significantly higher score (33.3, 95-%-CI: 31.2-35.4) than their female counterparts (25.9, 95-%-CI: 23.5-28.3, $p \leq 0.001$).

3.2 Connectedness to and Participation in the LGBT Community

Across the whole sample, connectedness to the LGBT Community had a mean total score of 10.4 (95-%-CI: 10.2-10.6) on the 0 to 20 scale, and was weakly negatively correlated with participation in the LGBT community ($r = -.20$, $p = 0.013$). As Table 1 shows, the mean score differed between gender subgroups ($p < 0.001$). Male participants showed a significantly higher

connectedness to the LGBT Community (10.8, 95-%-CI: 10.5-11.0) than their female (10.1, 95-%-CI: 9.9-10.4) and non-binary counterparts (8.6, 95-%-CI: 7.8-9.4). As the confidence intervals show, differences between females and non-binary participants were also significant. Community connectedness also differed between sexual identity groups (p=0.007, Table 1). While homosexual (10.4, 95-%-CI: 10.2-10.7) and bisexual (10.7, 95-%-CI: 10.3-11.1) participants had similar scores, both had higher average connectedness than participants with other sexual identities (9.8, 95-%-CI: 9.4-10.3).

Across the total sample, the average score for participation in the LGBT Community was 3.3 (95-%-CI: 3.1-3.5) on a scale from 0 to 26 (see Table 1). Participation varied significantly across both gender and sexual identities ($p<0.001$). Participants who identified as non-binary showed the highest participation in the LGBT Community (5.0, 95-%-CI: 4.0-6.0) followed by males (3.4, 95-%-CI: 3.2-3.7) and females (2.9, 95-%-CI: 2.6-3.2). Bisexuals showed a significantly lower mean participation score (2.7, 95-%-CI: 2.3-3.0) than both homosexuals (3.4, 95-%-CI: 3.2-3.6) and participants with other sexual minority identities (3.9, 95-%-CI: 3.4-4.4).

3.3 Participation, Connectedness and Substance Use Involvement

Full sample analysis

Across the sample, multiple regressions showed that both connectedness to and participation in the LGBT community were significant predictors of substance use involvement before the inclusion of control variables (Model 1, see Table 2). Participation in the LGBT community ($\beta=0.249$, $p\leq0.001$) had a meaningfully higher coefficient than connectedness to the LGBT community ($\beta=0.102$, $p\leq0.001$). Both constructs remained significant predictors of substance use involvement after the inclusion of control variables in model 2; however, coefficients decreased for both variables (participation: $\beta=0.199$, $p\leq0.05$; connectedness: $\beta=0.078$, $p\leq0.05$), while preserving the pattern of a higher coefficient for participation than connectedness. In the second model, three control variables were significant predictors of substance use involvement: age ($\beta=0.090$, $p\leq0.01$), psychological distress ($\beta=0.135$, $p\leq0.001$), and social substance use motives ($\beta=315$, $p\leq0.001$). Model 1 explained 5.2% of the variance in substance use involvement, this increased to 19.1% in model 2.

Subgroup analyses

Within secondary analyses (see Table 3), participation in the LGBT community was a significant predictor for substance use involvement both before and after the inclusion of covariates in all gender and sexual minority subgroups with the exception of participants with a non-binary gender identity. Differences between effect sizes were not clinically meaningful for model 1, ranging from $\beta=0.248$ ($p\leq0.001$) among homosexuals to $\beta=0.270$ ($p\leq0.01$) among bisexuals. As with the full sample, the magnitude of coefficients decreased in all subgroups after the inclusion of control variables (Model 2). However, some meaningful differences between subgroups could be observed, particularly between sexual minority subgroups. Participants with a sexual minority identity other than homo- or bisexual had the lowest coefficient with $\beta=0.133$ ($p\leq0.05$) compared with their homo- ($\beta=0.205$, $p\leq0.001$) and bisexual ($\beta=0.247$, $p\leq0.001$) counterparts. In contrast, connectedness to the LGBT community was a significant predictor for two subgroups before control variables (Model 1) with no meaningful difference in size between these groups: males ($\beta=0.112$, $p\leq0.01$) and homosexuals ($\beta=0.117$, $p\leq0.01$). After the inclusion of covariates, connectedness remained only significant for homosexuals ($\beta=0.091$, $p\leq0.05$).

Among included control variables, only social substance use motives predicted substance use involvement in all subgroups. While coefficients varied with the lowest among males ($\beta=0.280$, $p\leq0.001$) and the highest among non-binary participants ($\beta=0.431$, $p\leq0.001$), social substance use motives was the strongest predictor of substance use involvement in all subgroups. Age was the only other variable to be a predictor in the majority of subgroups with coefficients ranging from $\beta=0.081$ ($p\leq0.05$) among males to $\beta=0.129$ ($p\leq0.05$) among those with sexual minority identities other than homo- or bisexual.

No meaningful differences could be detected in the explanatory power of model 1 between subgroups: it explained between 4.9% of the variance in substance use involvement among males and homosexuals, and 6.0% among bisexuals. After inclusion of control variables, the explanatory power increased among all subgroups explaining between 15.9% (males) and 28.3% (other sexual minority) of the variance in substance use involvement.

4. Discussion and Conclusion

Previous research has highlighted elevated levels of substance use in young people with a sexual minority identity (Australian Institute for Health and Welfare, 2014; Demant et al., 2017; Hatzenbuehler et al., 2015; Newcomb et al., 2014; Ott et al., 2013). However, there has been limited research to date on the potential role of the LGBT community in disproportionate levels of substance use in this population. In addition, previous research on substance use involvement among sexual minority adolescents and young adults has failed to take important predictors of substance use into account and to clearly differentiate between participation in and connectedness to the LGBT community.

This study aimed to examine the influence of participation in and connectedness to the LGBT community on substance use involvement among a large sample of young Australians with diverse gender and sexual minority identities. It also examined these relationships both before and after controlling for other known predictors of substance use.

Overall, both participation in and connectedness to the LGBT community were significant predictors of substance use involvement in the total sample. Higher levels of participation in the LGBT Community were significantly associated with higher substance use involvement in the total sample and in all subgroups, except individuals identifying with a non-binary gender identity. This indicates this effect is not due to differences in substance use between genders (Rosenfield & Mouzon, 2013). Previous research among gay and bisexual men also reported that higher levels of participation in the LGBT community were associated with higher substance use (Green & Feinstein, 2012; Lelutiu-Weinberger et al., 2013; Stall et al., 2001). One explanation for these findings might be in the physical structure of the LGBT community (Chow et al., 2013; Wilkerson et al., 2015), which often results in licensed venues being the main physical manifestation of the LGBT community. However, the Participation in the LGBT Community Scale used in the current study took participation in other parts of the LGBT community such as social (e.g. Community groups) or political (e.g. LGBT pride events) groups into account. Nevertheless, the effect of participation in these parts of LGBT community on substance use is likely to be small due to the

infrequency and specific locations of these events. Young sexual minority people who observe the high levels of substance use within their community may perceive this to be culturally normative. The sense of belongingness derived from engaging in substance use behaviour in the LGBT community may outweigh any negative expectancies and consequences of substance use. The overall low LGBT community participation score in respect of the potential range is similar to other literature showing overall low rates of participation (Johns et al., 2013; Mills et al., 2001), potentially related to the inclusion of infrequently occurring events such as pride festivals or political discussions. In this context, the high concentration of licenced venues as well as the higher acceptance of substance use within such environments is likely to contribute to the disproportionately high levels of community activities involving substance use.

The effects of participation in the LGBT community on substance use remained after a number of risk factors for substance use were entered into the analysis. These included social substance use motives, psychological distress, wellbeing, age and resilience, which have all been associated with substance use in general population samples (Belcher et al., 2014; Blum & Nelson-Mmari, 2004; Choi et al., 2013; Deasy et al., 2014; Degenhardt et al., 2008; Hecimovic et al., 2014). Minority stress (violence and harassment) was also entered as a covariate into the analysis, as it has previously been associated with substance use among sexual minority people (Hatzenbuehler, Nolen-Hoeksema, & Erickson, 2008). This indicates that these general risk factors for substance use and minority stress may not be sufficient to explain substance use in sexual minority youth.

Connectedness to the LGBT community was associated with substance use involvement among this sample in general and among males and homosexuals. While this effect remained significant for the overall sample after the inclusion of control variables, it was a predictive factor for substance use involvement in only one subgroup (homosexuals). Standardised coefficients were generally low, especially compared to participation in the LGBT community. These effects might therefore not be clinically meaningful. Previous studies have found that medium levels of connectedness to the LGBT community may be associated with lower substance use involvement than low or high connectedness, especially in gay and bisexual men (Green & Feinstein, 2012; Stall et al., 2001). The differing results from this study may

be due to cross-cultural differences in the perceived importance of the LGBT community in Australia compared with countries where previous research has been conducted. Furthermore, the importance of the LGBT community might differ for young sexual minority Australians because of changing attitudes towards sexual minorities within the Australian society (Kite & Bryant-Lees, 2016).

Connectedness to the LGBT community and participation in the LGBT community showed a weak negative correlation in this study. This correlation was unexpected and is difficult to interpret. Previous studies have not differentiated between these concepts or examined how they are associated (Frost & Meyer, 2011; Johns et al., 2013), so it is unknown whether this result is replicable. One possibility is that it reflects issues with the reliability of the measures used in the current study. Further research is needed to determine whether the distinction between connectedness and participation in the LGBT community is useful and whether – as in the current study – participation is the more robust predictor in non-homosexual groups.

Strengths and Limitations

The use of the ASSIST total substance use involvement score was a strength of this study as it provides a much broader substance use assessment than those used in previous studies, including the frequency, psychosocial consequences and abuse and dependence symptoms of eight substance types. The differentiation between connectedness to the LGBT community and participation in the LGBT community in the current study allowed for a more detailed analysis of the role of the LGBT community in substance use. Furthermore, this study is the first to determine if there is a differential relationship between participation in and connectedness to the LGBT environment and substance use involvement among different gender and sexual minority subgroups. Another strength of this study was the use of reliable and valid measures of substance use (ASSIST), connectedness to the LGBT community as well as the covariates including: substance use motives, self-efficacy, psychological distress, mental wellbeing, resilience, and minority stress. The reporting of results before and after controlling for a broad range of general risk factors for substance use, mental ill-health, wellbeing/resilience and minority stress allowed for a more precise

examination of the effect of connectedness and participation on substance use in sexual minority youth.

However, this study also has some limitations. The measure of participation in the LGBT community had low level internal consistency (0.63), although the coefficient was comparable to the reliability of measures of LGBT community participation in previous studies (0.57-0.59) (Ross et al., 2014). Participants with gender identities besides male and female, and participants with sexual minority orientations besides homo- and bisexuality were grouped together due to small sample sizes, potentially creating groups without sufficient collective commonalities. Participants in this study were self-selected and may not be representative of young sexual minority adults in Australia, although the design and recruitment strategy of this survey specifically targeted hard-to-reach groups (Barratt, Ferris, Palamar, Maier, & Winstock, 2017). The majority of the sample lived in major cities, which is consistent with general population data (Australian Bureau of Statistics, 2012, 2017). Furthermore, while this study already accounted for a range of important covariates, no data on variables such as personality were collected. Finally, a small reduction in the sample size between Model 1 and Model 2 could be observed; however, a missing data analysis did not show any significant differences between groups on the key variables in this study (LGBT community participation/connectedness, WHO ASSIST Score) or on demographic characteristics (age, sexual orientation, gender identity, living area) apart from country of birth.

Conclusion

Our results suggest that participation in the LGBT community as well as an individual's level of connectedness to it, may contribute to elevated levels of substance use in sexual minority young people. However, connectedness may only be important in homosexual subgroups of the LGBT community. Results from this study suggest that a more thorough exploration of how sexual minority youth participate in the LGBT community may help identify how the community itself may be changed through public health campaigns, policy and interventions to reduce the substance use disparities in this population. Future research on the effect of the LGBT community

on substance use among sexual minority young people is therefore needed, particularly among subgroups not identifying as male or female and homo- or bisexuals.

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Table 1: Sample characteristics, mean (95-%-CI) or % (n)

Variable (missing)		Overall (n=1,266)	Gender Identity				Sexual Minority Identity			
			Male (n=683)	Female (n=507)	Non-binary (n=76)	ETA^2	Homosexual (n=726)	Bisexual (n=294)	Other (n=246)	ETA^2
Age (n=0)		22.6 (22.4-22.9)	23.5 (23.2-23.9)^a	21.4 (21.1-21.8)^b	22.1 (21.1-23.0)^b	0.054***	23.4 (23.1-23.7)^a	21.3 (20.8-21.8)^b	21.9 (21.4-22.4)^b	0.043***
Sexual Minority Identity (n=0)	**Homosexual**	57.3% (726)	81.7% (558)^a	31.0% (157)^b	14.5% (11)^c	0.104***	…	…	**…**	…
	Bisexual	23.2% (294)	11.7% (80)^a	40.4% (205)^b	11.8% (9)^b		…	…	…	
	Other	19.4% (246)	6.6% (45)^a	28.6% (145)^b	73.7% (56)^c		…	…	…	
Country of birth (n=0)	**Australia**	84.2% (1066)	82.1% (561)^a	87.2% (442)^a	82.9% (63)^a	ns	83.5% (606)^a	84.0% (247)^a	86.6% (213)	ns
Ethnicity (n=0)	**Caucasian/White**	85.4% (1081)	82.6% (564)^b	89.2% (452)^a	85.5% (65)^{a,b}	0.005**	83.9% (609)^a	87.4% (257)^a	87.4% (215)^a	ns
Living Area (Major City) (n=1)		66.2% (837)	70.5% (481)^b	59.8% (303)^a	69.7% (53)^{a,b}	0.011**	70.9% (515)^a	58.5% (172)^b	61.2% (150)^b	0.012**
Mental Health Continuum (n=145)		38.9 (38.0-39.7)	41.4 (40.3-42.6)^a	36.4 (35.1-37.8)^b	32.4 (28.8-35.9)^c	0.037***	40.2 (39.0-41.3)^a	38.7 (36.9-40.6)^a	35.3 (33.4-37.3)^b	0.015***
Kessler 10 (n=86)		25.6 (25.0-26.1)	23.4 (22.7-24.1)^a	27.8 (27.0-28.7)^b	30.2 (28.0-32.4)^b	0.067***	23.9 (23.2-24.6)^a	27.2 (26.1-28.2)^b	28.6 (27.4-29.8)^b	0.046***
Minority Stress:		9.6 (9.1-10.0)	10.5 (9.7-11.2)^a	9.0 (8.4-9.6)^b	10.6 (8.6-12.5)^{a,b}	0.011**	9.2 (8.6-9.8)^a	9.9 (8.9-11.0)^a	10.5 (9.4-11.6)^a	ns
Family Reaction (n=287)										
Violence and Harassment (n=86)		8.4 (8.0-8.7)	8.9 (8.4-9.3)^a	7.5 (7.0-8.1)^b	9.3 (7.8-10.7)^a	0.012***	8.9 (8.4-9.3)^a	7.2 (6.5-7.9)^b	8.2 (7.4-9.0)^{a,b}	0.013***
Sexual Orientation Conflict (n=93)		5.8 (5.6-6.0)	5.6 (5.3-5.9)^a	6.1 (5.8-6.5)^a	5.7 (4.8-6.6)^a	ns	5.7 (5.4-6.0)^a	6.0 (5.7-6.5)^a	5.8 (5.3-6.3)^a	ns
Brief Resilience Scale (n=86)		18.1 (17.8-18.4)	19.4 (19.0-19.8)^a	16.6 (16.2-17.1)^b	16.1 (14.9-17.4)^b	0.069***	19.1 (18.7-19.5)^a	17.2 (16.6-17.8)^b	16.4 (15.7-17.1)^b	0.045***
Drug-Taking Confidence Questionnaire (n=12)		76.7 (75.4-78.0)	76.2 (14.5-78.0)^a	78.3 (76.3-80.4)^a	69.4 (64.0-74.7)^b	0.008***	77.4 (75.6-79.1)^a	76.1 (73.4-78.9)^a	75.3 (72.3-78.2)^a	ns
Substance Use Motives Score:		14.8 (14.5-15.1)	15.1 (14.7-15.6)^a	14.5 (14.0-15.0)^a	13.8 (12.4-15.1)^a	ns	14.9 (14.4-15.3)^a	15.5 (14.9-16.2)^a	13.8 (13.0-14.5)^b	0.10**
Enhancement (n=8)										
Social (n=2)		16.4 (16.1-16.7)	16.8 (16.4-17.2)^a	16.2 (15.7-16.7)^a	14.5 (13.2-15.8)^b	0.010**	16.7 (16.3-17.1)^a	16.8 (16.1-17.4)^a	15.0 (14.3-15.7)^b	0.015***
Coping (n=2)		11.9 (11.6-12.2)	11.4 (11.0-11.9)^a	12.5 (12.0-13.0)^b	12.4 (11.2-13.7)^b	0.009**	11.6 (11.1-12.0)^a	12.8 (12.1-13.4)^b	12.0 (11.3-12.7)^{a,b}	0.008**
LGBT Community Connectedness (n=0)		10.4 (10.2-10.6)	10.8 (10.6-11.1)^a	10.1 (9.9-10.4)^a	8.8 (8.0-9.5)^b	0.025***	10.4 (10.2-10.7)^{a,b}	10.8 (10.4-11.1)^b	9.9 (9.5-10.3)^a	0.007**
LGBT Community Participation (n=0)		3.5 (3.3-3.7)	3.6 (3.4-3.9)^a	3.1 (2.8-3.5)^a	5.2 (4.4-6.0)^b	0.017***	3.6 (3.3-3.9)^a	2.9 (2.5-3.3)^b	4.1 (3.6-4.6)^a	0.011***
WHO ASSIST Score (n=0)		30.3 (28.7-31.8)	33.3 (31.2-35.4)^a	25.9 (23.5-28.3)^b	32.4 (26.1-38.7)^{a,b}	0.016***	31.5 (29.4-33.5)^a	28.4 (25.4-31.8)^a	28.7 (25.2-32.2)^a	ns

Legend: ns not significant, * p≤0.05, ** p≤0.01, *** p≤0.001; ^{a,b,c} Each superscript letter denotes a group that differs significantly from other groups at a level of p<0.05 (Tukey post-hoc for continuous, z-Test for categorical)

Table 2: Full-sample Multiple Linear Regressions (Dependent Variable: WHO ASSIST Score)

Variable	**Model 1**		**Model 2**	
	B (SE)	**β**	**B (SE)**	**β**
LGBT Community Connectedness	0.239 (0.069)	0.102**	0.186 (0.071)	0.078*
LGBT Community Participation	0.527 (0.062)	0.249**	0.435 (0.065)	0.199**
Age	not included		0.165 (0.052)	0.090*
Mental Wellbeing (MHC-SF)[#]			-1.099 (0.597)	-0.066
Psychological Distress (Kessler 10)[#]			2.763 (0.767)	0.135**
Minority Stress (Violence and Harassment)			0.022 (0.039)	0.017
Resilience (Brief Resilience Scale)			-0.028 (0.051)	-0.019
Substance Use Motives (Social)			0.438 (0.038)	0.315**
Model Statistics	Adjusted R^2=0.052 F=35.930 (p<0.001) n=1,266		Adjusted R^2=0.191 F=33.538 (p<0.001) n=1,104	

log-transformed; ^ p ≤0.05, * p ≤ 0.01, ** p ≤0.001

Table 3: Multiple Linear Regressions by Gender and Sexual Minority Identity Subgroups (Dependent Variable: WHO ASSIST Score)

Variable	Male		Female		Non-binary		Homosexual		Bisexual		Other sex. min.	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Model 1												
LGBT Community Connectedness	0.247 (0.091)	0.112*	0.213 (0.121)	0.081	0.309 (0.287)	0.123	0.277 (0.094)	0.117*	0.102	0.044	0.280 (0.151)	0.120
LGBT Community Participation	0.519 (0.085)	0.251**	0.572 (0.104)	0.254**	0.321 (0.224)	0.164	0.543 (0.086)	0.248**	0.600	0.270**	0.480 (0.122)	0.253**
Model Statistics	Adjusted R^2=0.049 F=18.503 (p<0.001) n=683		Adjusted R^2=0.053 F=15.040 (p<0.001) n=507		Adjusted R^2=0.017 F=1.640 (p=0.201) n=76		Adjusted R^2=0.049 F=19.855 (p<0.001) n=726		Adjusted R^2=0.060 F=10.321 (p<0.001) n=294		Adjusted R^2=0.055 F=8.104 (p<0.001) n=246	
Model 2												
LGBT Community Connectedness	0.156 (0.096)	0.071	0.226 (0.123)	0.085	0.305 (0.329)	0.116	0.214 (0.097)	0.091^	0.116 (0.152)	0.048	0.208 (0.150)	0.085
LGBT Community Participation	0.465 (0.091)	0.217**	0.411 (0.106)	0.180**	0.291 (0.279)	0.137	0.469 (0.092)	0.205**	0.571 (0.148)	0.247**	0.254 (0.126)	0.133^
Age	0.129 (0.064)	0.081^	0.196 (0.100)	0.085^	0.225 (0.319)	0.085	0.161 (0.065)	0.095^	0.134 (0.132)	0.061	0.277 (0.128)	0.129^
Mental Wellbeing (MHC-SF)#	-0.366 (0.803)	-0.023	-1.469 (0.950)	-0.083	-3.965 (3.034)	-0.204	0.197 (0.804)	0.012	-2.651 (1.340)	-0.156^	-2.714 (1.218)	-0.160^
Psychological Distress (Kessler 10)#	2.706 (1.012)	0.140*	2.947 (1.246)	0.131^	7.206 (5.072)	0.222	2.765 (1.011)	0.140*	2.444 (1.675)	0.115	3.272 (1.801)	0.133
Minority Stress (Violence and Harassment)	-0.008 (0.052)	-0.007	0.063 (0.064)	0.046	-0.113 (0.216)	-0.071	0.034 (0.051)	0.026	-0.014 (0.084)	-0.010	0.087 (0.094)	0.061
Resilience (Brief Resilience Scale)	-0.089 (0.068)	-0.062	-0.017 (0.079)	-0.011	0.294 (0.327)	0.148	-0.076 (0.069)	-0.052	0.024 (0.106)	0.017	0.093 (0.113)	0.057
Substance Use Motives (Social)	0.390 (0.054)	0.280**	0.450 (0.059)	0.328**	0.660 (0.188)	0.431**	0.395 (0.052)	0.281**	0.410 (0.087)	0.282**	0.535 (0.078)	0.401**
Model Statistics	Adjusted R^2=0.159 F=14.868 (p=0.001) n=588		Adjusted R^2=0.206 F=15.694 (p<0.001) n=453		Adjusted R^2=0.221 F=3.199 (p=0.005) n=63		Adjusted R^2=0.160 F=16.006 (p<0.001) n=632		Adjusted R^2=0.178 F=7.820 (p<0.001) n=253		Adjusted R^2=0.283 F=11.765 (p<0.001) n=219	

log-transformed; ^ $p \leq 0.05$, * $p \leq 0.01$, ** $p \leq 0.001$

Supplementary Tables:

Supplementary Table S1: Substance Use in final Sample (n=1,266)

Substance	Lifetime Use	Past Year Us	Past Month Use
Alcohol	95.3% (n=1,206)	92.5% (n=1,171)	82.8% (n=1,048)
THC/Cannabis	55.6% (n=704)	38.5% (n=487)	18.3% (n=232)
Tobacco	53.4% (n=676)	39.0% (n=494)	25.7% (n=325)
MDMA/Ecstasy	27.5% (n=348)	17.3% (n=219)	7.3% (n=92)
Poppers (Amyl Nitrate)	24.7% (n=313)	15.2% (n=192)	7.2% (n=91)
Sedatives/Sleeping pills (non-prescriptive)	19.4% (n=245)	10.7% (n=136)	5.4% (n=68)
Hallucinogens	17.9% (n=227)	8.1% (n=103)	1.5% (n=19)
Amphetamines	15.6 (n=195)	5.5% (n=69)	1.1% (n=14)
Cocaine	15.4% (n=197)	8.0% (n=101)	1.9% (n=24)
Non-prescriptive use of prescription medicine (excl. Sedatives and Sleeping pills)	13.0% (n=165)	7.0% (n=88)	3.2% (n=40)
Inhalants (excl. Poppers)	8.5% (n=107)	3.4% (n=43)	1.0% (n=13)
Methamphetamine	6.8% (n=86)	3.4% (n=43)	1.3% (n=17)
GHB/GBL	5.1% (n=65)	2.6% (n=33)	1.1% (n=14)
Opioids	4.7% (n=60)	2.3% (n=29)	1.1% (n=14)
Steroids	1.3% (n=17)	0.6% (n=8)	0.6% (n=7)

Supplementary Table S2: Connectedness to the LGBT Community Scale Items

No.	Item wording	Standardised Regression Weight[#]
1	You feel you're a part of the LGBT Community.	0.782
2	Participating in the LGBT Community is a positive thing for you.	0.825
3	You feel a bond with the LGBT Community.	0.857
4	You are proud of the LGBT Community.	0.658
5	It is important for you to be politically active in the LGBT Community.	0.604

[#] in Confirmatory Factor Analysis

Supplementary Table S3: Participation to the LGBT Community Scale Items

No.	Item wording	Standardised Regression Weight[#]
1	I visited an LGBT pub/bar/café/disco/club.	0.425
2	I volunteered for an LGBT Community organisation (e.g., non-for-profit)	0.583
3	I participated in LGBT Community groups (e.g., youth group, student group/club/collective, queer comic club,…)	0.554
4	I participated in pride events (e.g., Brisbane Pride Festival, Sydney Mardi Gras,…)	0.614
5	I participated in other LGBT-specific events (e.g., art exhibitions, political discussions,…)	0.532

[#] in Confirmatory Factor Analysis

Supplementary Table S4: Missing Data Analysis*

Characteristic		Non-Missing (n=1,266)	Missing (n=290)*	Sig.
Age		22.6 (22.4-22.9)	22.3 (21.8-22.9)	ns
Sexual Minority Identity	Homosexual	57.3% (726)	57.6% (167)	ns
	Bisexual	23.2% (294)	25.2% (73)	
	Other	19.4% (246)	17.2% (50)	
Gender Identity	Male	53.9% (683)	52.8% (153)	ns
	Female	40.0% (507)	40.7% (118)	
	Non-binary	6.0% (76)	6.6% (19)	
Ethnicity (Caucasian/White)		85.4% (1,081)	82.8% (240)	ns
Country of Birth (Australia)		84.2% (1,066)	76.9% (223)	<0.001
Living Area (Major City)		66.2% (837)	62.5% (180)	ns

Legend: ns not significant, * excluded due to missing values on LGBT Community Connectedness/Participation and/or WHO ASSIST Global Score