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Social Context of Cannabis Use: Associations with Problematic Use, Motives for Use, and Protective Behavioral Strategies among Sexual Minorities Assigned Female at Birth

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Abstract

Sexual and gender minorities assigned female at birth (SGM-AFAB) are at heightened risk for problematic cannabis use compared to heterosexual cisgender women. Despite evidence that social context influences patterns of substance use, no known studies have examined context of cannabis use among SGM-AFAB. The current study examined two aspects of social contexts of cannabis use (locations and companions) and their associations with problematic use, motives for use, and protective behavioral strategies among SGM-AFAB. We utilized three waves of data from 358 SGM-AFAB from a larger study. We aimed to: (1) identify subgroups of SGM-AFAB based on contexts in which they used cannabis; (2) examine changes in contexts over time; and (3) examine associations between contexts, problematic use, motives for use, and protective behavioral strategies. Using latent class analysis, we identified four classes: those who used cannabis at home; those who used with friends; those who used alone and with friends; and those who used in all contexts. Those who used in all contexts reported more problematic use, higher coping motives, and used fewer protective behavioral strategies compared to other classes. Transitioning to using cannabis in fewer contexts was associated with a subsequent decrease in problematic use. Classes that were most stable over time (using in all contexts or alone and with friends) were also those that were associated with more problematic use. Social context has important implications for problematic cannabis use among SGM-AFAB. As such, interventions may benefit from attending to social context to reduce problematic use in this population.

Keywords

cannabis; sexual and gender minorities; social learning theory; social context

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Introduction

Cannabis use (CU) disorders are more prevalent among sexual minorities (i.e., lesbian/gay, bisexual, and other non-heterosexual individuals) and gender minorities (i.e., individuals whose gender identity differs from their sex assigned at birth) than among heterosexual and cisgender populations.[1,2] Among sexual minorities, this disparity is particularly pronounced for individuals assigned female at birth.[1,3] For example, estimates from the third wave of the National Epidemiologic Survey on Alcohol and Related Conditions indicate that 3.1% of gay men and 9.6% of bisexual men met criteria for cannabis use disorders in the past year compared to 3.4% of heterosexual men; however, 6.8% of lesbian women and 8.6% of bisexual women met criteria for cannabis use disorders in the past year compared to only 1.2% of heterosexual women.[3] Most studies of risk factors for CU among sexual and gender minorities assigned female at birth (SGM-AFAB) have focused on minority stress,[4] but social learning theory proposes that where and with whom people use substances (i.e., social context) also contributes to problematic use.[5] This is supported by research on alcohol use among heterosexual samples.[6,7] However, limited research has examined the contexts of CU among general population samples and we are not aware of any studies that have examined social contexts of CU among SGM. The current study aimed to: (1) identify subgroups of SGM-AFAB based on the contexts in which they use cannabis; (2) examine changes in contexts over time; and (3) examine associations between contexts, problematic use, motives for use, and protective behavioral strategies.

Contexts of CU

Social learning theory posits that the social contexts in which people use substances influence substance use behavior.[5] While there is a broad literature examining social contexts of alcohol use, literature examining the social context of CU has lagged behind. Several studies have documented the most common CU contexts in general population samples of adolescents and emerging adults. Across studies, the majority of participants who used cannabis did so with others and did not report any solitary use (74–77%),[6,8] and these social users reported less frequent use and fewer CU problems than those who reported any solitary use.[6,9] Research on contexts of CU has almost exclusively focused on differences between social versus solitary users. In one exception, Shrier, Walls, Rhoads, Blood[10] found that participants were more intoxicated when they used with friends than with family members, and use events were longer with friends than alone. Despite evidence that social context is linked to patterns of CU, we are not aware of any studies that have examined social context of CU among SGM.

Prior studies of social contexts of CU have used variable-centered approaches.[6,10] These approaches are limited to examining whether each specific context variable (e.g., drinking at home) is associated with each substance use outcome and thus cannot examine more complex patterns of substance use contexts (e.g., using predominately with friends at parties). Person-centered approaches (e.g., latent class analysis [LCA]) examine how variables tend to cluster within individuals, rather than how variables are related to one another across individuals, and thus can address this limitation. For example, person-centered approaches can identity distinct subgroups of individuals based on the contexts

in which they tend to use substances. Person-centered approaches have been useful in the study of social contexts of alcohol use, including in samples of SGM. However, we are not aware of any studies that have used LCA to examine contexts of CU among general population or SGM samples. For example, Fairlie, Feinstein, Lee, Kaysen[11] used latent class analysis to identify five patterns of drinking contexts among sexual minority women based on where and with whom they drank: infrequent or non-drinkers; private/intimate contexts (drinking at a home with partners or friends); convivial contexts (drinking at parties and bars/restaurants with partners or friends); alone/convivial contexts (drinking alone and in convivial contexts); and multiple contexts (drinking in all contexts). Those in the multiple contexts group reported more alcohol consumption and consequences, consistent with studies of college students[12] and sexual minority men.[13] These findings highlight the utility of using a person-centered approach to understanding social contexts of use rather than variable-centered approaches. However, it remains unclear to what extent these patterns based on drinking contexts generalize to cannabis. In fact, one of the only studies to examine social contexts of alcohol and CU in the same sample demonstrated marked differences in contexts of alcohol use compared to CU, with CU being more likely to take place alone, at school, or in a car and less likely to take place at a party compared to alcohol use among high school seniors.[14] As such, the current study aims to identify subgroups of cannabis users based on contexts of use.

Correlates of CU Contexts

The limited existing research on contexts of CU has focused almost exclusively on associations between contexts (examining one aspect at a time) and problematic use, and has neglected other characteristics of CU (e.g., motives, use of protective behavioral strategies). People use cannabis for various reasons, including coping (to reduce negative emotions) and enhancement (to increase positive emotions). A meta-analysis found that, among general population samples, coping and enhancement motives were both associated with more frequent use and higher quantity of use, but only coping motives were associated with more CU problems.[15] Few studies have examined associations between CU contexts and motives in general population samples, and results have been mixed. One study did not find significant associations between contexts and motives,[10] whereas another found that solitary use was associated with higher coping motives.[16] Drinking alone has also been linked to coping motives, whereas drinking in social contexts has been linked to enhancement motives among general population samples.[17,18] Thus, it is likely that solitary CU will be associated with coping motives, whereas using in social contexts will be associated with enhancement motives.

The use of protective behavioral strategies (strategies to reduce CU consequences; e.g., restricting use to weekends, limiting quantity consumed) has been linked to lower frequency of CU and fewer problems in general population samples.[19,20] However, we are not aware of any studies that have examined protective behavioral strategies in relation to contexts of CU. One study of drinking contexts found that more protective behavioral strategies were used when participants drank at bars or parties, but protective behavioral strategies were not associated with drinking at home, alone, or with friends or family members.[21] Further research is needed to determine whether these associations generalize to CU.

Current Study

The goals of the current study were to examine social contexts of CU among SGM-AFAB and their associations with problematic CU, motives, and protective behavioral strategies. We used LCA to identify classes of SGM-AFAB based on where and with whom they used cannabis. Then, we examined concurrent associations between latent class membership and demographics. We also examined concurrent and prospective associations between latent class membership and problematic use, motives, and protective behavioral strategies. Finally, we examined changes in latent class membership over time and their associations with problematic use, motives, and protective behavioral strategies.

While LCA is an exploratory approach (i.e., the identification of classes is data driven rather than a function of hypothesis testing), we expected to identify classes that were similar to drinking context classes from prior research:[11,13] (1) CU in multiple contexts with multiple companions; (2) CU alone and with friends at parties and houses; (3) CU with friends at parties and houses; and (4) CU with friends and partners at houses. We expected that any solitary use and use in multiple contexts would be associated with more problematic use, higher coping motives, lower enhancement motives, and less protective behavioral strategies than exclusively social use or use with close others in private settings. We considered analyses of changes in contexts over time exploratory due to the lack of prior research to guide hypotheses.

Methods

Participants and Procedures

We used data from an ongoing longitudinal study of SGM-AFAB, FAB400. To achieve a multiple cohort, accelerated longitudinal design, SGM-AFAB from a prior study of SGM (originally recruited in 2007) and a new cohort of SGM-AFAB were recruited in 2016–2017 using venue-based recruitment, social media, and incentivized snowball sampling. Inclusion criteria at initial enrollment (2007 or 2016–2017) were: age 16–20 years, assigned female at birth, and either identified as a sexual or gender minority or reported same-sex attractions or sexual behavior. Participants completed assessments at six-month intervals and were paid $50 for each. See Whitton et al., 2019 for additional details.[22]

The current analyses used data from Waves 3, 4, and 5 (conducted 12-, 18-, and 24-months after Wave 1), because contexts were not assessed prior to Wave 3. Data were collected from December 2017–2019. Retention for Waves 3–5 was 92.8%−94.9%. Participants who reported using cannabis during at least one of the three waves were included in analyses (N=357). The analytic sample (Table 1) was comprised predominately of cisgender women (70.1%). Participants were ages 17–32 (M=20.77, SD=3.37) at Wave 3.

Measures

CU Contexts.—Participants who reported using cannabis in the past six months were asked two questions about contexts in which they usually used cannabis during this period. Items were adapted from research on drinking contexts.[11] Participants could select multiple responses. Participants were asked, “Where do you usually use marijuana?” Response

options included: home, friends' homes, parties, relative's homes, bars/clubs, and cars. Use in bars/clubs was not included in analyses because it was rare (2.1–4.2% across waves). Participants were also asked, "Who do you usually use marijuana with?" Responses included: alone, romantic/sexual partner, friends, parents, brother/sister, and other relatives. Consistent with prior research,[9] parents, brother/sister, and other relatives were recoded into a single category (family).

Problematic CU.—The CUDIT-R[24] assessed CU and problems in the past six months. The CUDIT-R includes 8 items rated on different scales (α=.77–.79 across waves). For example, the item "How often during the past 6 months did you fail to do what was normally expected from you because of using marijuana?" was rated from 0 (*never*) to 4 (*daily or almost daily*).

CU Motives.—Two subscales of the Marijuana Motives Measure[25] assessed motives. Participants indicated how often they used cannabis for each reason, including five coping motives ("to forget your worries;" α=.85) and five enhancement motives ("because it's fun;" α=.85–.86). Responses ranged from 0 (*almost never/never*) to 4 (*almost always/always*).

Protective Behavioral Strategies.—We utilized a 9-item version of the Protective Behavioral Strategies for Marijuana Scale (e.g., "avoid using marijuana early in the day;" α=.88–.89).[26] Items from the full scale with the highest factor loadings were selected. Response options ranged from 1 (*never*) to 6 (*always*).

Analytic Plan

A total of 32 observations (3.0%) were missing. Within completed assessments, less than 0.1% of data were missing. Missing data were handled using full information maximum likelihood. A total of 140 participants reported no CU at one or more waves and were included in LCA analyses that utilized waves in which they reported CU (e.g., a participant who used cannabis at Waves 3 and 5 would be included in LCAs for Wave 3 and 5 but not 4). Latent transition analyses included data from all three waves and from all participants who reported CU at one or more waves. To accomplish this, we added a "no use" class to latent transition analyses, and participants with no CU at a given wave were assigned to this class for that wave.

First, an LCA was performed in Mplus 8 using Wave 4 data to identify classes of individuals based on CU context. The first LCA was conducted with Wave 4 rather than Wave 3 data because two of the three CU variables of interest (motives and PBS) were not assessed at Wave 3. As a sensitivity analysis, we conducted an LCA with the Wave 3 data, and it produced the same classes. Bayesian Information Criterion (BIC), sample size-adjusted BIC, Lo-Mendell-Rubin (LMR) likelihood ratio tests, parametric bootstrapped likelihood ratio tests (BLRT), entropy, smallest class size, and class interpretability were used to select the number of classes.[27,28] Lower BIC values indicate the preferred model, and significant LMR or BLRT indicate a preference for the current model. We considered size of the smallest class because small classes ($n < 25$) may indicate over-extraction.[29]

Next, associations between class membership, demographics, and CU variables were estimated. We used the modified Bolock-Croon-Hagenaars (BCH) approach for associations

between latent classes and continuous variables[30] and the distal categorical variable approach (DCAT) for associations with categorical variables.[31,32] These are currently the preferred approaches for estimating associations with latent classes because, in contrast to other approaches (e.g., one-step approaches) they do not allow changes in the meanings of the latent classes (e.g., changes in the probabilities of using cannabis in each context for each latent class) that might invalidate findings.[31] See Asparouhov and Muthén[31] for a detailed description of BCH and DCAT. First, concurrent associations between Wave 4 class and Wave 4 CU variables were examined. Next, two sets of prospective associations were estimated in which Wave 4 class predicted Wave 5 CU variables. In one set of prospective associations, the outcome at Wave 4 was controlled for, and in the other, the outcome at Wave 4 was not controlled for. Analyses in which the outcome at the previous wave was not controlled for were used to determine whether differences at Wave 4 were maintained (i.e., if being in one class at Wave 4 was associated with higher coping motives at Wave 4, was class membership at Wave 4 still associated with higher coping motives at Wave 5). Prospective associations in which the outcome at the previous wave was controlled for test whether context at Wave 4 predicted changes in the outcome from Wave 4 to 5 (i.e., did being in one class at Wave 4 predict a subsequent change in coping motives).

Next, a latent transition analysis (LTA) was conducted using Waves 3–5 in order to determine whether the same classes were present at all waves and to examine changes in class membership over time. We followed procedures established by Asparouhov and Muthen.[28] We estimated: 1) models in which the likelihoods of using cannabis in each context (e.g., at home) in each class were held constant over time and 2) models in which the likelihoods were allowed to vary over time, and we compared them using BIC to determine whether the same classes were present at each wave. To determine if transition likelihoods (i.e., the likelihood of transitioning from one class to another) were similar from Wave 3 to 4 and from Wave 4 to 5, we used BIC to compare 1) models in which the likelihoods of transitioning from one class to another were held constant over time (e.g., the likelihood of transitioning from class 1 to 2 from Wave 3 to 4 was the same as the likelihood of making the same transition from Wave 4 to 5) and 2) models in which the likelihoods of transitioning from one class to another were allowed to vary. While we were not powered to examine associations between each specific transition and CU covariates, we conducted preliminary analyses of differences in CU variables by categorizing transitions (i.e., remaining in each class, transitioning to a class with more CU contexts, and transitioning to a class with fewer CU contexts). We examined a latent growth curve of problematic CU to test whether transition type from Wave 3 to 4 prospectively predicted problematic use at Wave 5 (intercept) and change in problematic use from Wave 3–5 (slope).

Results

Descriptive information about CU locations and companions is presented in Supplemental Table 1.

Latent Class Analysis

First, we used LCA to identify classes based on CU locations and companions at Wave 4. BIC, adjusted BIC, LMR, and BLRT all preferred the four class solution (Supplementary Table 2). Class 1 (alone and with friends) contained 127 individuals (46.2% of those who used cannabis at Wave 4) and was characterized by high probabilities of CU at home, at friends' homes, alone, and with friends and romantic/sexual partners (see Table 2). Class 2 (with friends) contained 63 individuals (22.9%) and was characterized by high probabilities of CU with friends and at friends' homes. Class 3 (all contexts) contained 57 individuals (20.7%) and was characterized by high probabilities of CU in all locations, with all companions, and alone. Class 4 (at home) contained 28 individuals (10.2%) and was characterized by high probabilities of CU at home and alone.

Associations Between Latent Classes and Covariates

We examined associations between class at Wave 4 and demographics (Table 3). Participants in the "with friends" class were younger than those in the "all contexts" class. Class membership was not associated with race/ethnicity, gender, or sexual identity. Given that the reference class ("all contexts") only included one non-Latinx White participant, Black was chosen as the reference group for race/ethnicity and estimates of differences in class membership between Black and White participants are not reported.

We examined associations between class membership at Wave 4 and problematic CU, motives, and protective behavioral strategies at Wave 4, controlling for age (Table 4 and Supplementary Table 3). Classes differed significantly on concurrent problematic CU, with the "all contexts" class reporting more problematic CU than all other classes. The "alone and with friends" and "at home" classes also reported more problematic use than the "with friends" class. The "with friends" class reported lower coping motives than all other classes, and the "with friends" and "at home" classes reported lower enhancement motives than the "alone and with friends" and "all contexts" classes. Most classes differed significantly on protective behavioral strategies, with the "with friends" class reporting the highest protective behavioral strategies, followed by "alone and with friends," "at home," and "all contexts."

We also examined prospective associations between Wave 4 classes and Wave 5 CU variables, first not controlling for the outcome at Wave 4. Class differences in problematic CU and protective behavioral strategies found at Wave 4 were maintained at Wave 5, with the same pattern of group differences. Class differences in coping motives at Wave 5 differed from those at Wave 4. All classes differed significantly from one another at Wave 5, with the highest coping motives reported by "at home," followed by "all contexts," "alone and with friends," and "with friends." No class differences in enhancement motives were present at Wave 5.

Then, we examined prospective associations between Wave 4 classes and Wave 5 CU variables controlling for the outcome at Wave 4, in order to test whether Wave 4 classes predicted subsequent changes in CU variables. Being in the "at home" class at Wave 4 predicted an increase in coping motives from Wave 4 to 5, while other classes coping

motives remained stable from Waves 4 to 5. However, these were no differences in problematic CU, enhancement motives, or protective behavioral strategies.

Latent Transition Analysis

Next, we conducted an LTA to examine changes in class membership over time. Prior to the LTA, two LCAs were conducted with Wave 3 and 5 data to determine if the same classes were present for all three waves. The same four classes were extracted at all three waves, so we tested for measurement invariance. We compared BIC values when item probabilities were held equal across waves (BIC=8890.88) and when they were allowed to vary (BIC=9220.33). Results indicated that classes represented the same CU contexts at each wave. Tests for the stability of transitions between consecutive waves indicated that transition likelihoods were similar from Wave 3 to 4 and 4 to 5 (BIC unconstrained=3007.43; BIC constrained=2937.95). In other words, similar proportions of individuals made each transition from Wave 3 to 4 and from Wave 4 to 5. For example, the proportion of individuals who transitioned from the "alone and with friends" class to the "with friends" class was similar from Wave 3 to 4 and from Wave 4 to 5. Therefore, indicator probabilities and transition likelihoods were held equal across Wave 3 to 4 and Wave 4 to 5. The transition probability matrix is presented in (Table 5).

Results indicated variation in stability by class. While 36% of the "with friends" class and 49% of the "at home" class remained in the same class six months later, 70–71% of the "alone and with friends" and "all contexts" classes remained in the same class. Across the three waves, 63.9% of participants transitioned at least once. Of the 303 transitions that took place, 48.5% were transitions to a class associated with more problematic use (e.g., "with friends" to "all contexts") compared to 51.5% moving to a class associated with less problematic use.

Transition Type Predicting Problematic CU

We conducted preliminary analyses of differences across categories of transitions, using the following groups based on class at Waves 3 and 4: (1) "alone and with friends" at both waves; (2) "with friends" at both waves; (3) "at home" at both waves; (4) "all contexts" at both waves; (5) increasing contexts (moving to a class characterized by more CU contexts); and (6) decreasing contexts (moving to a class characterized by fewer CU contexts).[1] We used these categories to predict the intercept (Wave 5) and slope of a linear growth curve model of problematic CU from Waves 3 to 5.

First, we examined whether transition type predicted the intercept (CU problems at Wave 5). Those in the "with friends" class at both waves (M=4.75, SE=.68) and those who decreased contexts (M=4.74, SE=.68) reported fewer CU problems at Wave 5 compared to all other transition types (i.e., "alone and with friends" class at both waves (M=10.17, SE=.68), "at home" class at both waves (M=9.52, SE=1.21), "all contexts" class at both waves (M=12.17, SE=.90), and those who increased contexts (M=8.94, SE=1.11)). Cohen's

[1]Participants who reported no CU at Wave 3 or 4 were excluded from these analyses as transitions from using cannabis in some contexts to using cannabis in other contexts were of central interest.

d for these significant group differences ranged from .75 to 1.32. Additionally, those in the "all contexts" class at both waves reported higher problematic use at Wave 5 than those who increased contexts (Cohen's *d*=.58). Non-significant groups differences ranged in size from Cohen's *d* of .001 to .47.

Next, we examined whether transition type predicted changes in CU problems over time. Those who decreased contexts experienced a decrease in problematic use from Wave 3 to 5 (*b*=−.98, *SE*=.38, *p*=.01), while those in the "alone and with friends" group at Waves 3 and 4 experienced an increase in problematic use from Wave 3 to 5 (*b*=.84, *SE*=.28, *p*=.003). No other groups experienced significant changes in CU problems (*b*=−.62 to .49, *p*>.28).

Discussion

To our knowledge, the current study was the first to examine contexts of CU in a sample of SGM-AFAB and to use latent class analysis to simultaneously examine contexts of CU in either SGM or general population samples. By doing so, we were able to identify subgroups of cannabis users in a population at increased risk for problematic use and to examine the prospective associations between contexts of CU and CU outcomes. In addition, we found that contexts of CU were concurrently associated with problematic use and these differences were maintained over time, such that using in more locations and with a greater variety of companions was associated with more problematic use.

We identified four subgroups of SGM-AFAB based on the contexts in which they used cannabis. Our subgroups generally paralleled subgroups of sexual minority women based on drinking contexts[11] with two differences. First, consistent with evidence that solitary CU is more common than solitary drinking,[34] solitary CU was more common in two of our subgroups ("all contexts" and "alone and with friends") than solitary drinking was in Fairlie and colleagues' parallel subgroups. Solitary CU may be perceived as more normative than solitary drinking. Second, there were differences in where our participants used cannabis compared to where their participants drank. Our participants used cannabis in cars but rarely in bars, whereas their participants drank in bars but rarely in cars. This likely reflects different laws and social norms for cannabis versus alcohol. It may be less common to use cannabis than alcohol in bars because CU in these locations may result in removal and citation or arrest. Additionally, CU in cars may be more common than drinking in cars because driving under the influence of cannabis is perceived as less likely to result in negative consequences than driving under the influence of alcohol.[35,36] However, it is not clear whether SGM-AFAB were driving under the influence or simply using cannabis in a stationary car prior to entering a public location.

Problematic CU differed across contexts and these differences were maintained six-months later. The "all contexts" group had the highest problematic use, followed by "at home," "alone and with friends," and "with friends." This pattern remained at Waves 4 and 5, but CU contexts did not predict changes in problematic use over time. Therefore, CU in more contexts was associated with more problematic use, but problematic use was stable over time. Participants in the "all context" group tended to remain in this group across waves, and their average CUDIT-R score (12.71) was close to the cutoff for clinically significant

problematic use (13.00)[37] suggesting that they may be in need of intervention. The "with friends" group demonstrated the opposite pattern: low problematic use maintained over time. Given the high percentage of the "with friends" group who reported social but not solitary CU, these findings are consistent with evidence that social CU is associated with less problematic use than solitary use.[6,7,9,16]

We also found that those who remained in the same group over time generally did not experience changes in problematic use. In an exception, participants who remained in the "alone and with friends" group experienced an increase in problematic use from Wave 3–5. This suggests that they may be in need of treatment and intervention. In addition, transitioning to CU in fewer contexts was associated with a decrease in problematic use. As such, changes in CU contexts may contribute to changes in problematic use, but it is also possible that changes in the number of contexts reflect changes in frequency of use. It will be important for future research to attempt to disentangle the extent to which changes in contexts of use are associated with frequency of use versus problematic use. In contrast, transitioning to using cannabis in more contexts was not associated with an increase in problematic use. As we were unable to examine associations between specific transitions, it is possible that some specific transitions may be associated with changes in problematic use while others may not be. Further research with larger samples is needed to examine the effects of specific changes in social contexts of CU on problematic use.

Finally, contexts of CU were associated with coping motives and protective behavioral strategies. Consistent with evidence that coping motives are associated with more problematic CU,[15] the "with friends" group reported the lowest coping motives and the lowest problematic use, while the "at home" group reported the highest coping motives and the second highest problematic use. It has been suggested that using cannabis to cope with negative emotions may lead to more frequent and problematic use by creating a cycle of negative reinforcement that increases the frequency of CU and the number of contexts in which cannabis is used. This avoidant approach to coping may also lead to other stressors, such as missing obligations due to CU, and the development of problematic use.[15] This may be further exacerbated by using cannabis in dangerous contexts that may increase the likelihood of experiencing consequences (e.g., cars). The "all contexts" and "at home" groups also reported less protective behavioral strategies, which may further contribute to their high problematic use, given that protective behavioral strategies are associated with fewer CU problems.[19,26] Further research is needed to determine the directionality of these associations.

Clinical Implications

Results indicate that SGM-AFAB who used cannabis in more contexts were at higher risk for problematic CU and thus may be in greater need of interventions. Given associations between using cannabis in more contexts and higher coping motives, interventions that teach more adaptive coping strategies may be particularly effective in reducing problematic cannabis use in this population. Further, because using cannabis in more contexts was also associated with less use of protective behavioral strategies, it may also be important for interventions to teach SGM-AFAM to use protective behavioral strategies, particularly prior

to entering contexts where they tend to use cannabis heavily or where use may be more likely to lead to negative consequences. Of note, we found that reducing the number of contexts in which cannabis was used was associated with reductions in problematic use, suggesting that limiting CU to specific contexts may be an effective protective behavioral strategy; however, further research is needed to more fully understanding the directionality of this association.

Limitations

Findings should be considered in light of study limitations. First, we were unable to examine correlates of specific transitions due to small numbers of participants who made any specific transition. Second, because the CUDIT-R assesses frequency and consequences of use, we were unable to disentangle the extent to which changes in contexts were associated with frequency of use versus problematic use. Third, our convenience sample of SGM-AFAB was recruited from community events, social media, and peer referral, and it remains unclear if our findings generalize to broader sexual minority or heterosexual populations. Additionally, possession of small amounts of cannabis had already been decriminalized in Chicago, Illinois when data were collected, and recreational use was legalized in Illinois shortly after data collection. Our findings may or may not generalize to locations where CU remains criminalized or where recreational use is already legal.

Conclusions

By simultaneously examining where and with whom SGM-AFAB used cannabis, we were able to broaden our understanding of CU contexts and their implications for problematic use. CU contexts were associated with problematic use, motives, and protective behavioral strategies, and transitioning to using cannabis in fewer contexts was associated with a decrease in problematic use. Findings highlight that SGM-AFAB who use cannabis in many contexts are at higher risk for problematic use and they are less likely to use protective behavioral strategies, suggesting that they may be in particular need of intervention.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Statement of Public Health Significance

Social contexts of cannabis use have important implications for problematic use among sexual and gender minorities. Findings highlight that sexual and gender minorities who use cannabis in many contexts are at higher risk for problematic use and are less likely to use protective behavioral strategies, suggesting that they may be in need of intervention.

Table 1:

Demographics of Analytic Sample ($N = 358$)

Demographics	*N*	%
Cohort		
2016 Cohort	308	86.0%
2007 Cohort	50	14.0%
Race/Ethnicity		
White	99	27.7%
Black	112	31.3%
Latinx	89	24.9%
Other	58	16.2%
Participant Gender		
Cisgender Women	251	70.1%
Transgender or Male	34	9.5%
Genderqueer/Non-Binary	73	20.4%
Sexual Identity		
Lesbian	82	22.9%
Bisexual	126	35.2%
Queer	62	17.3%
Pansexual	67	18.7%
Other Sexual Identity	21	5.9%
Cannabis Use by Wave		
W3	304	84.9%
W4	276	77.1%
W5	283	79.1%

Table 2:

Latent Class Probabilities

	Class			
Context	**1**	**2**	**3**	**4**
Location				
Home	**1.00**	.00	**1.00**	**.73**
Friend's home	**.78**	**.89**	**1.00**	.32
Party	.37	.49	**.85**	.00
Relative's home	.00	.02	**.54**	.22
Car	.18	.21	**.67**	.10
Cannabis Use Companions				
Alone	**.62**	.04	**.83**	**.62**
Romantic/sexual partner(s)	**.52**	.23	**.82**	.44
Friend(s)	**1.00**	**.97**	**1.00**	.20
Family	.16	.11	**.79**	.33

Probably of cannabis use context by latent class at Wave 4. Proportions greater than .50 are bolded. Class 1 (alone and with friends) contained 127 individuals (46.2%); class 2 (with friends) contained 63 individuals (22.9%); class 3 (all contexts) contained 57 individuals (20.7%); and class 4 (at home) contained 28 individuals (10.2%). The first LCA was conducted with Wave 4 rather than Wave 3 because two of the three cannabis use variables of interest (motives and protective behavioral strategies) were not assessed at Wave 3. The LCA conducted on Wave 3 produced the same classes.

Table 3:

Demographic Differences in Latent Class Membership at Wave 4

	Alone + Friends		With Friends		At Home		All Contexts	
Predictor	***OR***	***p***	***OR***	***p***	***OR***	***p***	***OR***	***p***
Age	.90	.11	**.69**	**.001**	.97	.70	*ref*	*ref*
Race/Ethnicity								
Black	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
White	-	-	-	-	-	-	*ref*	*ref*
Latinx	2.75	.16	4.74	.06	1.98	.40	*ref*	*ref*
Another Race/Ethnicity	2.00	.48	1.35	.68	.75	.67	*ref*	*ref*
Gender Identity								
Cisgender Woman	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
Gender Minority	2.23	.11	1.82	.29	2.34	.12	*ref*	*ref*
Sexual Identity								
Lesbian/Gay	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*	*ref*
Bisexual	1.01	.98	.97	.97	.47	.26	*ref*	*ref*
Pansexual	1.79	.46	2.72	.22	1.91	.43	*ref*	*ref*
Another Identity	2.00	.53	3.78	.24	1.51	.72	*ref*	*ref*

Note. For race/ethnicity, only one non-Latinx White participant was in the “cannabis use in all contexts” class. This produced large and imprecise estimates for differences between White participants and participants in other racial/ethnic groups. Thus, estimates for White participants are not reported. Example OR interpretation (finding not significant): Compared to Black participants, Latinx participants were 2.75 times more likely to be in the alone and with friends group compared to the all contexts group. The first LCA was conducted with Wave 4 rather than Wave 3 because two of the three cannabis use variables of interest (motives and protective behavioral strategies) were not assessed at Wave 3. The pattern of results was the same when the Wave 3 latent classes were used.

Table 4:

Concurrent and Prospective Associations with Latent Class Membership

Latent Class Predictor	Distal Outcome (Wave)	Alone + Friends *M (SE)*	With Friends *M (SE)*	At Home *M (SE)*	All Contexts *M (SE)*
Concurrent Associations					
Wave 4 Latent Class	Cannabis Use (Wave 4)				
	Problematic Cannabis Use	8.22 (.58)[a]	4.47 (.41)[b]	8.73 (1.37)[a]	12.71 (.91)[c]
	Coping Motives	1.65 (.11)[a]	.91 (.13)[b]	1.94 (.18)[a]	2.08 (.18)[a]
	Enhancement Motives	2.63 (.09)[a]	2.13 (.15)[b]	2.04 (.23)[b]	2.77 (.14)[a]
	Protective Behavioral Strategies	4.45 (.10)[a]	4.85 (.13)[b]	3.99 (.28)[a,c]	3.32 (.19)[c]
Prospective Associations					
Wave 4 Latent Class	Cannabis Use (Wave 5)				
	Problematic Cannabis Use	8.46 (.62)[a]	4.43 (.49)[b]	8.73 (1.32)[a,c]	11.80 (.91)[c]
	Coping Motives	1.49 (.11)[a]	.97 (.14)[b]	2.59 (.24)[c]	1.63 (.29)[d]
	Enhancement Motives	2.54 (.09)	2.49 (.16)	2.53 (.28)	2.63 (.14)
	Protective Behavioral Strategies	4.31 (.12)[a]	4.71 (.13)[b]	3.73 (.32)[a,c]	3.72 (.18)[c]
Wave 4 Latent Class	Cannabis Use (Wave 5)				
Controlling for Wave 4 Outcome	Problematic Cannabis Use	8.68 (.40)	6.55 (.80)	8.49 (.97)	8.68 (.71)
	Coping Motives	1.48 (.08)[a]	1.40 (.16)[a]	2.40 (.27)[b]	1.70 (.11)[a]
	Enhancement Motives	2.43 (.08)	2.65 (.14)	2.77 (.19)	2.48 (.10)
	Protective Behavioral Strategies	4.16 (.08)	4.21 (.28)	3.89 (.26)	4.28 (.17)

Note. All means estimated controlling for age. Superscript letters represent the results follow-up mean comparisons with corrections for multiple comparisons. Means with superscript letters that differ from one another indicate that the means differed significantly from one another.

Table 5:

Latent Transition Analysis Patterns of Change

		Wave *t+1* Class				
		Alone + Friends	**With Friends**	**At Home**	**All Contexts**	**No Use**
Wave *t* Class	Alone + Friends	.70	.15	.05	.04	.06
	With Friends	.27	.49	.03	.03	.17
	At Home	.15	.03	.36	.14	.32
	All Contexts	.07	.02	.13	.71	.07
	No Use	.15	.26	.10	.04	.45

Note. Numbers represent the proportion of individuals in a specific class at Wave *t* who were in a specific class at Wave *t*+1.

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