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ABSTRACT

The Perceived Social Rejection of Sexual Minorities: Substance Use and Unprotected Sexual Intercourse

This study presents associations between the perceived social rejection of sexual minorities and tobacco, alcohol, and cannabis consumption and unprotected sexual intercourse in the capital of Greece, Athens. This is the first Greek study to evaluate the concept of the minority stress theory on sexual minorities' substance use and unprotected sexual intercourse. In addition, this is among the first international studies to examine whether periods of adverse economic conditions are associated with sexual minorities' substance use and unprotected sexual intercourse. Two panel datasets covering the periods 2013–2014 and 2018–2019 were used to determine the perceived social rejection, that is, whether sexual minorities have been rejected by friends, treated unfairly in educational and/or workplace environments, treated negatively in social situations and received poor health and public services due to their sexuality. The estimates indicate that perceived social rejection is associated with the increased consumption of tobacco (by 9.1%, $P < 0.01$), alcohol (by 7.1%, $P < 0.01$), and cannabis (by 12.5%, $P < 0.01$), as well as unprotected sexual intercourse (by 6.5%, $P < 0.01$). In the first three cases, the magnitude of the associations is stronger for men than women and there is increased cannabis consumption during periods of deteriorated economic conditions (by 5.5%, $P < 0.01$). In the European Union, reducing stigma, substance use, risky sexual behaviours, and health inequalities for sexual minorities is a goal of public health. If minority stress is correlated with substance use and risky sexual behaviours leading to detrimental physical/mental health outcomes then prevention and support interventions should be designed.

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1. Introduction

1.1 Research objectives

Minority stress theory indicates that sexual minorities (i.e. individuals who identify as gay, lesbian, bisexual, asexual, queer or questioning) are at greater risk of physical health and mental health problems than sexual majorities (i.e. individuals who identify as heterosexuals) because they experience stigma and its adverse consequences such as exclusion, discrimination, victimisation and poverty [1] (Meyer, 2003). Stigma is a serious public health problem due to the adverse health consequences of those being stigmatised [2,3] (Slater et al., 2017; Hafeez et al., 2017). For sexual minorities, minority stress may result in escape avoidance behaviours, such as substance use and misuse, perhaps as a means of coping with adverse experiences [4-7] (Meads, 2020; Schuler et al., 2018; Goldbach et al., 2014; Pachankis et al., 2014). Studies have found that sexual minorities smoke more tobacco, consuming more alcohol and cannabis than their heterosexual peers [4,6,8] (Meads, 2020; Goldbach et al., 2014; Newcomb et al., 2012).

In Greece, there are no studies regarding sexual minority stress and substance use and unprotected sexual intercourse, as the main focus has been on HIV suggesting that the disease disproportionately affects gay men [9,10] (Nikolopoulos et al., 2019; Paraskevis et al., 2011). The empirical sexual minority literature is limited in Greece and focused on the labour market experiences of sexual minorities, showing that gay/bisexual men and lesbian/bisexual women face lower wages and job satisfaction, higher unemployment and adverse experiences in the workplace than sexual majorities [11] (Drydakis, 2021a). The reasons for the assigned differences have been attributed to stigma and discriminatory attitudes against sexual minorities [11] (Drydakis, 2021a). Greece is more homophobic compared to the EU28 average [12] (Eurobarometer, 2019) and has historically pursued an intolerant approach to sexual minority civil and human rights issues [13] (Giannou & Ioakimidis, 2019).

Since 2010, Greece has experienced a recession due to the financial crisis, increasing unemployment by nearly 16 percentage points [14] (Drydakis, 2015). Nine years later, in 2019, the country's unemployment rate continued to be double that before the onset of the economic recession (9%), indicating a recession [15] (Eurostat, 2019). Since 2010, homophobia increased due to a rise of the far-right political party, with sexual minorities experiencing severe stigmatisation and a 'barrage of homophobic violence' in the capital city associated with the adverse political and socioeconomic effects of the recession [11] (Drydakis, 2021a).

Given the stressors sexual minorities experience in Greece, it is surprising that no research has been conducted to examine how adverse societal experiences are associated with substance use and unprotected sexual intercourse. The present study aimed to fill the gap by empirically examining associations between perceived social rejection and tobacco, alcohol and cannabis

consumption, and unprotected sexual intercourse for sexual minorities. To fulfil the aim of the study, two longitudinal data sets covering the periods 2013–2014 and 2018–2019 were pooled for analysis. Moreover, the study examines whether the association between perceived social rejection and substance use and unprotected sexual intercourse is gender-sensitive. In addition, the study evaluates whether periods characterised by increased financial hardships within a recession (i.e. 2013–2014 vs 2018–2019) are associated with increased substance use and unprotected sexual intercourse, a question that has not been addressed in the literature for sexual minorities.

1.2 Minority stress and substance use and unprotected sexual intercourse

Based on the minority stress hypothesis, if stigma, perceived rejection and victimisation are experienced by minority population groups, such as sexual minorities, then these experiences can serve as chronic stressors increasing their susceptibility to illness and disease [1,3] (Hafeez et al., 2017; Meyer, 2003). Stigma-related stressful life events due to a minority sexual orientation can include both distal and proximal stressors such as being rejected by friends, biased experiences in the educational and workplace environment, poor services, harassment and internalised stigma [1,16] (Frost, 2011; Meyer, 2003). Moreover, as people perceive stressors as either threats or challenges [17] (Lazarus & Folkman, 1984) and if stigma-related stressful life events occur repeatedly, sexual minorities can experience chronic stigma-related stress [16] (Frost, 2011). However, if sexual minorities cope with their experiences of stigma-related stress, the negative effects of stigma can be diminished or neutralised [16] (Frost, 2011). In Greece, studies indicate that sexual minorities might experience deteriorated physical and mental health due to family disapproval and social rejection [18] (Drydakis, 2021b).

Studies indicate that sexual minority youth and adults experience peer victimisation, rejection and sexual abuse to a greater extent compared to the general population [3,4] (Meads, 2020; Hafeez et al., 2017). Indeed, sexual minorities are at a higher risk of anxiety, depression and suicide (Meads, 2020; Hafeez et al., 2017), often engaging in passive and/or avoidant coping strategies, such as smoking, drinking, unhealthy eating and cannabis consumption to buffer the negative effects of stigma-related stress [2,4,6,16,19] (Meads, 2020; Slater et al., 2017; Shahab et al., 2017; Goldbach et al., 2014; Frost, 2011).

EU and US studies indicate that the experiences of a lack of supportive environment, parental rejection during adolescence, negative disclosure reactions, internalised homophobia, perceived rejection, loneliness and depression, and expectations of rejection from lesbian, gay, bisexual and transgender (LGBT) communities are associated with substance use, poor decisions and risky sexual behaviours [5,6,20-24] (Schuler et al., 2018; Hall, 2018; Katz-Wise et al., 2016; Goldbach et al., 2014; Mustanski et al., 2011; Rosario et al., 2009; Kashubeck-West & Szymanski,

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2008). Given these features, it is not surprising that in the US, the EU and Australia, sexual minorities adolescents and adults report higher use of cigarettes, alcohol, marijuana, cocaine and ecstasy compared with heterosexual peers [8,25] (Kelly et al., 2015; Newcomb et al., 2012).

Risky sexual behaviours may be a coping strategy among sexual minorities in response to stress from the stigma regarding their sexual orientation [7,26] (Pachankis et al., 2014; Hatzenbuehler et al., 2008). Meta-analyses and EU and US studies found that there is a significant effect of minority stress on unprotected sexual intercourse and HIV risk behaviour, with gay and bisexual men more likely to engage in risk-taking behaviours for poly-substance use and unprotected sexual intercourse with both causal and anonymous partners increasing the risk of sexually transmitted infections more than the general population [22,24,27] (Cochran & May, 2011; Mustanski et al., 2011; Kashubeck-West & Szymanski, 2008).

In this study, given the presented evidence, it is hypothesised that perceived social rejection is associated with tobacco, alcohol and cannabis consumption, and unprotected sexual intercourse for sexual minorities. Figure S1 (Supporting Information) presents the conceptual framework.

1.3 Financial crisis and substance use and unprotected sexual intercourse

During the great recession (starting in the US in 2007) and the EU financial crisis (since 2009), a few EU and US studies indicated that there was an increase in consumption of alcohol, smoking and cannabis due to unemployment, long-term unemployment and pre-existing vulnerabilities in the general population [28,29] (Dom et al., 2016; Gallus et al., 2015). In addition, the great recession and the EU financial crisis were associated with increased cannabis use [30-32] (Bruguera et al., 2018; Collel et al., 2015; Kondilis et al., 2013), as people sought comfort in response to the loss of a stable income, social status and/or family, more stress at work, greater substance availability during this period and more free time [30] (Bruguera et al., 2018). During this time, there was also an increasing trend in new HIV diagnoses, especially for people injecting drugs [33] (WHO, 2018).

During recessions, the economic condition of disadvantaged population groups is more negatively affected compared to the majority [34,35] (Johnston & Lordan, 2016; Biddle & Hamermesh, 2013). During periods of economic stability, sexual minorities are already at risk of experiencing higher unemployment, poverty and underinvestment in health care [36] (Drydakis & Zimmermann, 2020). Indeed, the chronic experience of homophobia in conjunction with increased discriminatory attitudes and economic struggles due to recessions and austerity measures could be associated with substance use, risky sexual behaviours and adverse physical and mental health outcomes [13,14,37,38] (OECD, 2019; Drydakis, 2015; Giannou & Ioakimidis, 2019; Halkitis et al., 2018).

In Greece, there was an increase in homophobic attitudes during the financial crisis, as well as annual aggregate unemployment enhanced employment discrimination against sexual minorities [11] (Drydakis, 2021a). During this time, there was a health/mental health deterioration that negatively affected both sexual minorities [18] (Drydakis, 2021b) and the general population [14] (Drydakis, 2015). Furthermore, there was a rise in HIV incidence in the capital city, Athens, notably among sexual minority men and injecting drug users [9,10,39] (Nikolopoulos et al., 2019; Paraskevis et al., 2011; Paraskevis et al., 2013). Unfortunately, research on smoking, alcohol and cannabis consumption based on sexual orientation during recessions is scarce, either in Greece or internationally.

Therefore, given the presented evidence, it is hypothesised that periods characterised by adverse economic conditions might be associated with increased tobacco, alcohol and cannabis consumption and unprotected sexual intercourse for sexual minorities.

2. Methods

2.1 Data gathering

The dataset consists of two independent panel sets capturing the periods 2013–2014 (panel data set one) and 2018–2019 (panel data set two). In 2013, the research team approached LGBT non-profit organisations working on sexual minorities' rights to gather information on public events which were planned to take place before the annual LGBT Pride in Athens every June. During the Pride preparation, as well as during the Pride week, the events such as round-table talks and workshops, lectures, film screenings, as well as artistic and cultural exhibitions are attended by thousands of people, hence there is a unique opportunity for researchers to undertake face-to-face collaborations with the participants [40] (Sidiropoulou et al., 2020). The research team attended the planned events between April to June 2013 and distributed participation forms facilitated by the organisers. At each event, the research team informed the participants that university research was being conducted, introduced the aim of the project, and distributed the participation forms. It was mentioned that the study aimed to collect information on health-oriented behaviours and patterns for sexual minorities.

The participation forms provided information regarding the research team, as well as the aim to collect longitudinal information on sexual minorities' demographic characteristics and habits, societal approval, and health-oriented behaviours and outcomes. Potential participants were asked to provide an email address to forward the e-questionnaire for completion and informed that those who completed the survey would be approached in 2014 for a follow-up study. The first data collection was between April and August 2013 and up to two reminder emails were sent to participants to undertake the survey. A follow-up data collection was conducted in 2014 between

April to August, with those who had provided information in the first wave approached. Similar to the first data collection, up to two reminder emails were sent to participants to consider the follow-up study.

Between April to June 2013, the research team gathered 281 participation forms, where individuals confirmed their participation, verified a self-identified sexual minority status and provided an email address. The e-questionnaires were forwarded to the provided email addresses and 252 responses were received. In 2014, the follow-up data collection had 204 responses. The consent form highlighted that the email address of the participants would only be utilised for follow-up surveys. In each correspondence, information on how participants could raise concerns, ask for clarifications and/or complain was provided. No participant submitted a complaint. The email address of the University's Ethics Committee was also provided.

Between April to June 2018, recruitment took place by utilising the same research protocol as in 2013–2014. The research team attended LGBT events in Athens before and during the Pride week in 2018 to distribute and collect participation forms. E-questionnaires were forwarded to participants between April and August 2018, with a follow-up data collection between April and August 2019. The research team gathered 268 participation forms and 223 individuals completed the e-questionnaire between April to June 2018 and in 2019, 187 individuals provided updated information. Hence, this study had a sample of 866 observations, 456 from 2014–2013 and 410 from 2018–2019.

Informed consent was obtained from all individual participants included in the study. The participants have consented to the submission of the anonymized and aggregated data to scientific journals.

2.2 Variables

Information on basic demographic characteristics was included in the questionnaire such as gender (men/women), gender identity (cis-gender/transgender), age and employment status. The study utilised Ramirez-Valles *et al.*'s [41] (2010) Internalised Homosexual Stigma framework to measure perceived social rejection, that is, whether individuals due to their minority sexuality have been '*rejected by a friend*', '*treated unfairly in educational and/or workplace environments, or when looking for a work*', '*treated negatively in social situations*' and '*received poor services (i.e., public/health services)*' [41,42] (Kuhns et al., 2008; Ramirez-Valles et al., 2010). Each question required a dichotomous answer (yes/no) capturing whether perceived social rejection was experienced. The scores were summed ranging from zero to four, with higher values indicating higher perceived social rejection against sexual minorities [41] (Ramirez-Valles et al., 2010). The dimension demonstrated internal validity [41-43] (Ramirez-Valles et al, 2013; Ramirez-Valles et al,

2010; Kuhns et al., 2008) and the Kuder and Richardson (1937) [44 formula was used to assess the internal validity of the scale.

To capture tobacco consumption the previous month, the study utilised the World Health Organization (WHO) and Centres for Disease Control and Prevention's [45] (WHO and CDCP, 2011) question on smoking habits, asking individuals whether they had *smoked tobacco the last 4 weeks*'. To capture drinking alcohol habits the previous month, the study relied on the WHO's Alcohol Use Disorders Identification Test [46] (WHO, 2001) framework by asking individuals whether they had *six or more drinks on one occasion in the last 4 weeks*'. Moreover, to record cannabis consumption the previous month, the study utilised WHO's Alcohol, Smoking and Substance Involvement Screening Test [47] (WHO, 2013) by asking individuals whether they had *'consumed cannabis for recreational purposes the last 4 weeks*'. Cannabis in Greece is illegal for recreational purposes [48] (Skliamis et al, 2020).

In addition, to record incidents of unprotected sexual intercourse the previous month, the study employed the UNAIDS and WHO's Guidelines for Second Generation HIV Surveillance [49] (UNAIDS and WHO, 2013) framework by asking individuals whether they had '*unprotected sexual intercourse in the last 4 weeks*'. Unprotected sexual intercourse was defined as having vaginal, anal or oral sex without a condom [49,50] (WHO, 2004; UNAIDS and WHO, 2013).

There are variations in the method used to record substance use and unprotected sexual intercourse [47,49] (UNAIDS and WHO, 2013; WHO, 2013), the present study used four questions with a dichotomous answer, yes/no [47] (WHO, 2013), hence, the frequencies of substance use and unprotected sexual intercourse were unknown. The present study utilised validated and straightforward instruments to capture patterns. Bowling [51] (2005) evaluated that single questions in social epidemiology have the advantage of brevity and the captured information is in line with multi-item measurement scales.

2.3 Estimation strategy

Given the longitudinal nature of the data, panel specifications are more appropriate than cross-sectional specifications [52] (Wooldridge; 2010). Breusch-Pagan LM-tests and Hausman tests were conducted finding that random effects rather than pooled and fixed effects models better fitted the data [52,53] (Wooldridge, 2010; Molenberghs & Verbeke, 2005). The random effects model enabled estimation of the effect of covariates at the group level, e.g. men and women, and the groups were treated as a random sample from a population of groups [54] (Morgan, 2013). Akaike's Information Criterion and Bayesian Information Criterion indicated that the random effects probit models better fitted the data [55] (Chen & Tsurumi, 2010). Given the nature of the dependent

variables (i.e. dichotomic variables), the study also reports marginal effects calculated using the Bland and Cook [56] (2019) specification to produce unbiased estimates.

In all measurements (i.e. smoking, drinking, cannabis, unprotected sexual intercourse), the empirical specification includes information on perceived social rejection, the time period, individuals' gender, gender identity, age, higher education and employment status. Multicollinearity tests were conducted to assess whether the simultaneous inclusion of the aforementioned variables was recommended [57] (Belsley, 1991). A statistically significant positive perceived social rejection estimate will indicate a positive association between perceived social rejection and substance use and/or unprotected sexual intercourse. Similarly, a statistically significant positive time period estimate will indicate that in 2013–2014 individuals might consume more substances and have unprotected sexual intercourse compared to 2018–2019.

To examine whether the four social rejection items are associated with substance use and unprotected sexual intercourse, additional empirical specifications are offered. Instead of the aggregated social rejection scale, new models decompose the scale into four components and include information on: (i) rejection by friends; (ii) unfair treatment in educational/workplace environments; (iii) negative treatment in social situations; and (iv) poor treatment in public/health service because of a minority sexual orientation.

Including the gender variable enables the estimation of an interaction effect between perceived social rejection and gender (i.e. *perceived social rejection × gender*), and perceived social rejection and age (i.e. *perceived social rejection × age*). The interaction effects enable examination of whether the perceived social rejection is associated with higher substance use and unprotected sexual intercourse for men than women, and for older than younger sexual minorities. A statistically significant positive interaction effect will indicate that perceived social rejection is more detrimental to sexual minority men than women, as well as for older than younger sexual minorities.

A few empirical specifications are offered to assess the robustness of the estimates. The study aims to identify whether the estimates might be sensitive to time. The sample is split, with random effects probit specifications offered for the 2013–2014 period and the 2018–2019 period. Moreover, the study examined whether the estimates are robust if the dataset is treated as not longitudinal subject to heteroskedastic residuals [52] (Wooldridge; 2010). Hence, the study reports pooled probit estimates using robust standard errors. In addition, the study presents random effects logit estimates to examine whether the estimates are sensitive to errors distribution (i.e. normal vs logistic distribution of errors) [52] (Wooldridge; 2010).

3. Results

3.1 Descriptive statistics

Table 1 presents the descriptive statistics, with the 2013–2014 panel sample consisting of 456 observations from sexual minorities and the 2018–2019 panel sample consisting of 410 observations from sexual minorities.

Table 1 shows that on average, 63.5% were men (n=550) and 91.4% (n=792) identified as cis-gender, with a mean population age of 32.6 years; 33.1% (n=287) had a higher education degree and 31.9% (n=276) were unemployed. An important characteristic of this study is that the rate of unemployment for sexual minorities between the two periods (i.e. 2013–2014 vs 2018–2019) is statistically significant indicating that economic hardships between the two periods might be critical[1]. Also, during the preceding four weeks, 27.8% (n=241) smoked tobacco, 13.8% (n=120) had six or more drinks on one occasion, 14.4% (n=125) consumed cannabis and 16.0% (n=139) had unprotected sexual intercourse but only the cannabis consumption was statistically significantly higher (P <0.01) in 2013–2014 than in 2018–2019.

[Table 1]

Table 2 presents the substance use and unprotected sexual intercourse descriptive statistics per demographic characteristic, showing that sexual minority men consumed more alcohol (17.4 vs 7.5, P <0.01) and cannabis (15.6 vs 12.3, P <0.01), and had more unprotected sexual intercourse (18.1 vs 12.3, P <0.01) than sexual minority women. Moreover, trans people smoked more tobacco (28 vs 25.6, P <0.01) and consumed more cannabis (14.8 vs 9.4, P <0.01) than cis people, however, cis-gender people had more unprotected sexual intercourse (20.2 vs 15.6, P <0.01) than trans people. Those with a higher education degree smoked less tobacco (20.2 vs 31.6, P <0.01), consumed less alcohol (11.8 and 14.8, P <0.01) and had less unprotected sexual intercourse (14.6 vs 16.7, P <0.01) than those without a higher education degree. Employed people smoked less tobacco (19.6 vs 45.1, P <0.01), consumed less alcohol (10 vs 22, P <0.01), cannabis (8.9 vs 25.9, P <0.01) and had less unprotected sexual intercourse (11 vs 26.7, P <0.01) than unemployed people.

[Table 2]

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[1] In Greece, in 2013–2014, the general population unemployment rate was 27%, the growth rate was -1.2%, and the rate of people living at risk of poverty or social exclusion was 35.1%, whereas in 2018–2019, the unemployment rate was 18.2%, the growth rate was 1.8%, and the rate of people living at risk of poverty or social exclusion was 31.8% [15] (Eurostat, 2019). In addition, in 2013–2014, the youth unemployment rate was 55.1% decreasing to 37.2% in 2018–2019 [15] (Eurostat, 2019).

Table 3 presents a correlation matrix, showing a positive correlation between perceived social rejection and smoking tobacco (r=0.35, *P* <0.01), drinking alcohol (r=0.33, *P* <0.01), cannabis consumption (r=0.39, *P* <0.01) and unprotected sexual intercourse (r=0.33, *P* <0.01). There is a positive correlation between the 2013–2014 period and cannabis consumption (r=0.09, *P* <0.01), indicating that cannabis consumption was higher in 2013–2014 compared to 2018–2019.

[Table 3]

3.2 Main estimates: The perceived social rejection of sexual minorities and substance use and unprotected sexual intercourse

Table 4 presents the estimates. In Model I, perceived social rejection is associated with an increase in smoking tobacco (1.584, *P* <0.01, marginal effect [m.e.] 9.1%). In addition, smoking tobacco is positively associated with unemployment (1.915, *P* <0.01, m.e. 11.0%).

In Model II, perceived social rejection is positively associated with drinking (1.830, *P* <0.01, or m.e. 7.1%), and drinking is positively associated with men (2.787, *P* <0.01, or m.e. 10.8%).

Model III indicates that perceived social rejection is associated with cannabis consumption (1.533, *P* <0.01, or m.e. 12.5%). Moreover, it is found a positive association between cannabis consumption and the 2013–2014 period (0.678, *P* <0.05, or m.e. 5.5%), and men (0.703, *P* <0.05, or m.e. 5.7%).

Model IV shows that perceived social rejection is associated with unprotected sexual intercourse (1.050, *P* <0.01, or m.e. 6.5%). Furthermore, unprotected sexual intercourse is associated with men (1.193, *P* <0.01, or m.e. 7.4%) and unemployment (1.126, *P* <0.01, or m.e. 7.0%).

[Table 4]

3.3 Social rejection items

In Table 5, Model I presents that smoking tobacco is associated with perceived unfair treatment in educational and/or workplace environments (2.333, *P* <0.01, or m.e. 12.7%) and perceived poor treatment in public and/or health services (3.429, *P* <0.01, or m.e. 18.7%). Model II also estimates that drinking is associated with perceived unfair treatment in educational and/or workplace environments (4.730, *P* <0.01, or m.e. 15.4%) and perceived negative treatments in social situations (3.903, *P* <0.01, or m.e. 12.7%).

In addition, Model III shows that cannabis consumption is associated with perceived rejection by friends (2.561, *P* <0.01, or m.e. 20.1%), perceived unfair treatment in educational and/or workplace environments (1.483, *P* <0.01, or m.e. 11.7%) and perceived negative treatments

in social situations (1.446, *P* <0.01, or m.e. 11.4%). The difference between perceived rejection by friends and perceived unfair treatment in educational and/or workplace environments is statistically significant (*P* <0.05), as is the difference between perceived rejection by friends and perceived negative treatment in social situations (*P* <0.05). Model IV presents that unprotected sexual intercourse is associated with perceived rejection by friends (1.401, *P* <0.01, or m.e. 8.9%), and perceived unfair treatment in educational and/or workplace environments (1.312, *P* <0.01, or m.e. 8.3%).

[Table 5]

3.4 Interaction effect analysis

Table S1 (Supporting Information) offers interaction effect specifications to evaluate whether the associations between perceived social rejection and substance use and unprotected sexual intercourse are moderated by gender and age. Model I estimates that the association between perceived social rejection and smoking tobacco is stronger for sexual minority men than for sexual minority women (6.440, *P* <0.01; or m.e. 20.6%). Moreover, it is estimated that the association between perceived social rejection and smoking tobacco is stronger for younger sexual minorities than for older sexual minorities (-0.957, *P* <0.01; or m.e. -3.0%).

Model II shows that the association between perceived social rejection and drinking is stronger for sexual minority men than for sexual minority women (2.515, *P* <0.01; or m.e. 12.3%). Similarly, in Model III, it is estimated that perceived social rejection and cannabis consumption is stronger for sexual minority men than for sexual minority women (1.162, *P* <0.01; or m.e. 9.5%).

3.5 Robustness tests

Table S2 (Supporting Information) presents estimates per period, with Models I-IV indicating that in 2013–2014, perceived social rejection is associated with an increase in smoking tobacco (0.998, *P* <0.01, or m.e. 6.2%), drinking (3.292, *P* <0.01, or m.e. 10.2%), and cannabis consumption (2.579, *P* <0.01, or m.e. 16.7%). Similarly, Models V-VIII show that in 2018–2019, perceived social rejection is associated with an increase in smoking tobacco (5.674, *P* <0.01, or m.e. 18.5%), drinking (1.486, *P* <0.01, or m.e. 6.6%), and cannabis consumption (0.967, *P* <0.01, or m.e. 8.4%) and unprotected sexual intercourse (1.873, *P* <0.01, or m.e. 11.2%). The estimates in Table S2 (Supporting Information) confirm the estimates presented in Table 4.

Table S3 (Supporting Information) presents estimates based on alternative empirical models. Specification I offers pooled probit estimates and reports robust standard errors. Model I indicates that perceived social rejection is associated with an increase in smoking tobacco (0.481, *P* <0.01, or m.e. 15.6%), and Model II estimates that perceived social rejection is associated with an increase in

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drinking (0.729, *P* <0.01, or m.e. 12.9%). Model III presents a positive association between perceived social rejection and cannabis consumption (0.743, *P* <0.01, or m.e. 13%), with a positive association between the 2013–2014 period and cannabis consumption (0.327, *P* <0.05, or m.e. 4.4%). Model IV indicates that perceived social rejection is positively associated with unprotected sexual intercourse (0.633, *P* <0.01, or m.e. 13.4%).

In Table S3 (Supporting Information), specification II presents random effects logit estimates. In Model I, there is a positive association between perceived social rejection and smoking tobacco (2.431, *P* <0.01, or m.e. 8.6%), and Model II estimates that perceived social rejection is associated with an increase in drinking (4.140, *P* <0.01, or m.e. 9.3%). Model III indicates that there is a positive association between perceived social rejection and cannabis consumption (2.645, *P* <0.01, or m.e. 12.2%). Furthermore, there is a positive association between the 2013–2014 period and cannabis consumption (1.196, *P* <0.05, or m.e. 5.5%). Model IV presents that perceived social rejection is associated with an increase in unprotected sexual intercourse (1.988, *P* <0.01, or m.e. 7.6%).

The estimates in Table S3 (Supporting Information) indicate that the random effects probit results presented in Table 4 hold if alternative empirical models are employed.

4. Discussion

4.1 Outcomes evaluation

This study examined whether perceived social rejection of sexual minorities is associated with substance use (tobacco, alcohol and cannabis consumption) and unprotected sexual intercourse, utilising two panel datasets covering observations in 2013–2014 and 2018–2019. The study applied the minority stress framework [1] (Meyer, 2003) and hypothesised that perceived social rejection is associated with substance use and unprotected sexual intercourse. In addition, the study assessed whether time points of economic deterioration within a recession (i.e. 2013-2014 vs 2018-2019) are associated with substance use and unprotected sexual intercourse.

The estimates indicated that sexual minorities who faced perceived societal rejection were more likely to smoke tobacco, consume alcohol and cannabis, and have unprotected sexual intercourse. Perceived rejection by friends, unfair treatment in educational and/or workplace environments and/or social situations and poor health and public services due to minority sexuality were correlated with increased substance use and unprotected sexual intercourse in line with the EU and US studies [2,4,19,22,24,27] (Meads, 2020; Slater et al., 2017; Shahab et al., 2017; Cochran & May, 2011; Mustanski et al., 2011; Kashubeck-West & Szymanski, 2008). Moreover, there was an increase in cannabis consumption in 2013–2014 compared to 2018–2019, a period in which sexual

minorities experienced increased unemployment, in agreement with the outcomes of US and EU studies [30-32] (Bruguera et al., 2018; Collel et al., 2015; Kondilis et al., 2013).

It was hypothesised that sexual minorities may engage in coping strategies, such as smoking, drinking, and cannabis consumption to buffer the negative effects of stigma-related stress associated with rejection, victimisation, and internalised stigma [1-3,6] (Slater et al., 2017; Hafeez et al., 2017; Goldbach et al., 2014; Meyer, 2003), as anxiety and interpersonal stress are associated with a desire to consume alcohol, the number of drinks consumed on a given day, and acute alcohol use disorder symptoms [58,59] (Dvorak et al., 2014; Nadal et al., 2011). In addition, risky sexual behaviours may function as a coping strategy among sexual minorities in response to stress related to a minority sexual stigma [7,26] (Pachankis et al., 2014; Hatzenbuehler et al., 2008). Distressing psychiatric symptoms predate substance use, which may relieve these symptoms but lead to continued and excessive use of substances [60] (Chutuape & de Wit, 1995). Although individuals might experience short-term anxiety decline, the use of substances may increase stress and anxiety in the long term [61] (Kushner et al., 2000).

The raw statistics indicated that unemployment for sexual minorities was higher in 2013–2014 than in 2018–2019 and the estimates indicated that cannabis consumption for sexual minorities was higher in 2013–2014 than in 2018–2019. Greek studies have reported that homophobia and victimisation increased in the region during the EU financial crisis [11] (Drydakis, 2021a). Increased discriminatory attitudes and economic hardships due to the recession could be associated with the adoption of coping strategies [37] (OECD, 2019). Indeed, cannabis consumption increased during the EU financial crisis [32,62] (Smith, 2016; Kondilis et al., 2013).

The estimates found that for sexual minority men, perceived social rejection was associated with a higher level of tobacco, alcohol, and cannabis consumption compared to sexual minority women. Bettinsoli *et al*. [63] (2020) found that in every one of the twenty-three Western and non-Western countries in their study, gay men were less accepted than lesbians. Both men and women violating traditional gender norms are subject to the backlash with social repercussions for gender-atypical behaviour stronger against males [64] (Vandello et al., 2008). In Greece, gay men experience more prejudice than lesbians [65,66] (Drydakis, 2009; 2011), hence, it might be that sexual minority men consume more substances as a way to deal with stigma-related stress. Apart from gender norms and prejudices, generally, men consume more tobacco, alcohol and cannabis than women and biology might play a role [67-69] (Becker et al., 2017; Higgins et al., 2015; Wilsnack et al., 2009). Smoking might activate men's reward pathways more than women's [70] (Cosgrove et al., 2014), and body weight and height could relate to how men and women drink [69] (Wilsnack et al., 2009).

Moreover, the estimates found that there was a stronger association between social rejection and smoking tobacco for younger sexual minorities than for older sexual minorities. In the general population, young people are susceptible to tobacco addiction [71] (Reitsma et al., 2021), with minority stressors significantly predicting adverse psychological outcomes among young people [72] (Kelleher, 2009).

In addition, the correlation analysis presented that consuming tobacco, alcohol, and cannabis, as well as unprotected sexual intercourse, was positively associated. The literature suggests that these behaviours do not exist in isolation, i.e. cannabis use can predict alcohol consumption and risky sexual activity [20,21] (Hall, 2018; Katz-Wise et al., 2016). In this study, the determinants of tobacco, alcohol and cannabis consumption and unprotected sexual intercourse were being male, and unemployment. As previously discussed, men consume more substances than women [67-69] (Becker et al., 2017; Higgins et al., 2015; Wilsnack et al., 2009) but status characteristics (i.e. employment) could be associated with lower levels of substance use. Social epidemiology research has shown that unemployment, reduced budgets, poverty, and debt could determine unhealthy behaviours [14] (Drydakis, 2015).

In the present study, 27.8% of the sexual minorities smoked tobacco, 13.8% had six or more drinks on one occasion and 14.4% consumed cannabis in the last four weeks compared to 25% of the general population being daily smokers, 7.3% had six or more drinks on one occasion in Greece between 2014 to 2019 [73] (Eurostat, 2022), and 1% of the Greek population consuming cannabis the previous month in 2004 and 2020 [74,75] (Eurobarometer 2020; European Monitoring Centre for Drugs and Drug Addiction, 2012). Thus, it seems that sexual minorities in Greece, consume more tobacco, alcohol and cannabis[2], in line with US, EU and Australian studies [8,25] (Kelly et al., 2015; Newcomb et al., 2012).

4.2 Policy implications

Since the consumption of tobacco, alcohol and cannabis in the general population is related to adverse physical and mental health outcomes [76] (Schulte & Hser, 2013) and sexual minorities consume more substances [8,25] (Kelly et al., 2015; Newcomb et al., 2012), the physical health and mental health outcomes of sexual minorities should be evaluated. In the general population, substance use is associated with the risk of overdose, accidental injury and attempted suicide [76] (Schulte & Hser, 2013). Experiences with minority stress predict substance use and risky sexual behaviours among sexual minorities, which has links to physical health problems, morbidity and

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[2] Representative statistics on unprotected sexual intercourse in the general Greek population were not available.

mortality [77,78] (Ronksley et al., 2011; Rehm et al., 2006). It has been found that more sexual minorities report chronic fatigue syndrome and gastrointestinal problems compared to heterosexual people [79] (Lick et al., 2013). Moreover, lesbians experience a higher cardiovascular disease risk, asthma, and higher mortality rate from breast cancer than heterosexual women (Meads et al., 2018), with gay and bisexual men experiencing a high prevalence of HIV/AIDS compared to heterosexual men [4] (Meads, 2020). Sexual minorities' deteriorated health and mental health might be associated with stigmatising environments that exaggerate substance rates, and risky sexual behaviours resulting in vicious cycles of negative events which become increasingly worse with time [3,4,79,80] (Meads, 2020; Meads et al., 2018; Hafeez et al., 2017; Lick et al., 2013).

In the EU, reducing stigma and health inequalities is a critical goal of public health [81] (European Commission, 2017). If minority stress is correlated with substance use, unprotected sexual intercourse and deteriorated health and mental health due to substance misuse and risky sexual behaviour, then prevention and support interventions should be designed with this in mind [82] (European Monitoring Centre for Drugs and Drug Addiction, 2019). Policies to reduce the stigma against sexual minorities in families, school settings, the labour market, and health services should be examined. They should also aim to secure those sexual minorities are not excluded or discriminated against, as inclusive policies targeting homophobia are associated with increased self-esteem and employment, and income for LGBT people [40,83,84] (Bozani et al., 2020; Sidiropoulou, et al., 2020; Drydakis, 2019). Programs to prevent and reduce sexual minorities' substance use and recovery policies should also be considered [85] (Mericle et al., 2020), especially during periods of economic recession, there should be a focus on protecting minority groups from increased vulnerability, rejection and deteriorating physical and mental health [11,18] (Drydakis, 2021a; b).

4.3 Limitations and future research

Additional research is needed for firm generalisations. This study focused on the capital city of Greece, so further studies should employ more representative datasets, including rural areas where homophobia is expected to be higher with sexual minorities experiencing a higher level of minority stress and perceived social rejections. Furthermore, the dataset did not offer comparisons between sexual majorities and minorities, so a future study might consider offering relevant specifications, as well as examining variations between different sexual orientation groups such as bisexuals, queers, questioning, etc.

How sexual orientation is measured varies [84] (Drydakis, 2019) and in the present study, a minority sexual orientation was identified through self-identification questions. The study did not utilise alternative approaches such as questions on the gender of married or unmarried partners

(couple status), or responses to questions on the gender of past sex partners (sexual behaviour). Further studies could utilise alternative approaches to capture sexual orientation and validate the study outcomes.

Moreover, this study sample was not the outcome of a random data collection as the participants attended community events. It is unknown whether individuals attending LGBT events might experience higher (or lower) perceived social rejection than those who do not attend relevant events, so it is difficult to indicate the direction of potential bias. The assigned patterns might not apply to closed sexual minorities since their perceived social rejection due to a minority sexual orientation should not be applicable. However, closed sexual minorities might experience stress from having to hide and adopt coping strategies related to substance use, so a further study comparing substance use and unprotected sexual intercourse between open and closed sexual minorities might offer useful insights.

Due to the lack of information regarding adverse physical health/mental health symptoms, it is not feasible to assess whether substance use and unprotected sexual intercourse can be detrimental to sexual minorities' physical and mental health. New studies should consider gathering information on certain physical and mental health conditions and offer relevant specifications.

Although spurious relationships may be captured through panel data, the adverse consequences of smoking, drinking, cannabis consumption, and unprotected sexual intercourse might exaggerate societal rejection. For instance, an exaggeration might hold due to multi-level stigma arising from being both a cannabis user and belonging to a sexual minority group. Critical information is missing such as the degree of victimisation and personality characteristics and relevant information might moderate the aforementioned relationships in sexual orientation studies [86] (Drydakis et al., 2018), so a future study capturing more in-depth information might reveal critical patterns.

In the substance use and risky sexual behaviour literature, there are a plethora of questions to capture further patterns, whereas this study used four basic questions utilised by the WHO [45-47,49] (UNAIDS and WHO, 2013; WHO and CDCP, 2011; WHO, 2001; 2013). Future studies should capture additional behaviours such as duration and intensity of substance use, utilising richer data sets to better understand the phenomena under consideration.

Finally, representative datasets capturing sexual orientation do not exist in Greece, so there is a need for representative data for firm evaluations.

5. Conclusions

The present study indicated that perceived social rejection was associated with an increase in tobacco, alcohol and cannabis consumption and unprotected sexual intercourse for sexual

minorities in Athens, Greece. In the first three cases, the magnitude of the outcomes was stronger for sexual minority men than for sexual minority women. Moreover, there was an increase in cannabis consumption for sexual minorities during periods of economic deterioration. This is the first Greek study to examine associations between perceived social rejection and substance use and unprotected sexual intercourse for sexual minorities, as well as one of the first studies to examine whether periods characterised by economic deterioration might be associated with substance use and unprotected sexual intercourse for sexual minorities. The longitudinal nature of the present study enabled better-informed evaluations on the subject matter. If perceived social rejection is associated with substance use and unprotected sexual intercourse and these behaviours are found to be detrimental to sexual minorities' physical health and mental health outcomes, then policies to reduce stigma and support vulnerable groups should be considered by policymakers.

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Table 1. Descriptive statistics. Percentages and means.

	2013-2014	2018-2019	Difference test	Pooled data 2013-2014 and 2018-2019
Men (percent)	61.62 (0.48)	65.60 (0.47)	z=-1.21	63.51 (0.48)
Cis-gender (percent)	91.22 (0.28)	91.70 (0.27)	z=-0.25	91.45 (0.27)
Age (c.)	32.46 (8.64)	32.82 (9.91)	t=-0.56	32.63 (9.26)
Higher education (percent)	32.89 (0.47)	33.41 (0.47)	z=0.16	33.14 (0.47)
Unemployed (percent)	37.06 (0.48)	26.34 (0.44)	z=3.39*	31.98 (0.46)
Inactive^ (percent)	9.86 (0.29)	7.07 (0.25)	z=1.46	8.54 (0.27)
Perceived social rejection (c.)	0.513 (0.71)	0.439 (0.83)	t=1.51	0.478 (0.71)
Smoked tobacco in the last 4 weeks (percent)	28.94 (0.45)	26.58 (0.44)	z=0.81	27.82 (0.44)
Consumed six or more drinks on one occasion in the last 4 weeks (percent)	14.69 (0.35)	12.92 (0.33)	z=0.92	13.85 (0.34)
Cannabis consumption in the last 4 weeks (percent)	17.54 (0.31)	10.97 (0.21)	z=2.74*	14.43 (0.01)
Unprotected sexual intercourse in the last 4 weeks (percent)	17.32 (0.37)	14.63 (0.35)	z=1.32	16.05 (0.36)
Observations	456	410		866

Notes. (c.) Continuous variable. (^) People who are neither working nor seeking work. (z) Two-sample test of proportions. (t) Two-sample mean comparison test. Standard deviations are in parentheses. (*) Statistically significant at the 1 percent.

Table 2. Descriptive statistics. Tabulation analysis. Percentages.

	Smoked tobacco in the last 4 weeks	Consumed six or more drinks on one occasion in the last 4 weeks	Cannabis consumption in the last 4 weeks	Unprotected sexual intercourse in the last 4 weeks
Men	28.18 (0.45)	17.45 (0.37)	15.63 (0.35)	18.18 (0.38)
Women	27.21 (0.45)	7.59 (0.26)	12.34 (0.32)	12.34 (0.32)
Cis-gender	25.67 (0.45)	14.86 (0.35)	9.45 (0.29)	20.27 (0.40)
Trans-gender	28.03 (0.41)	13.76 (0.34)	14.89 (0.35)	15.65 (0.36)
Higher education	20.20 (0.40)	11.84 (0.32)	13.58 (0.34)	14.63 (0.35)
No higher education	31.60 (0.46)	14.85 (0.35)	14.85 (0.35)	16.75 (0.37)
Employed	19.60 (0.39)	10.01 (0.30)	8.9 (0.28)	11.03 (0.31)
Unemployed	45.12 (0.49)	22.02 (0.41)	25.99 (0.43)	26.71 (0.44)

Notes: Obs.=866. Pooled data: 2013-2014 and 2018-2019. Standard deviations are in parentheses.

Table 3. Correlation coefficients.

	Perceived social rejection	Smoked tobacco in the last 4 weeks	Consumed six or more drinks on one occasion in the last 4 weeks	Cannabis consumption in the last 4 weeks	Unprotected sexual intercourse in the last 4 weeks	2013-2014^
Perceived social rejection	1					
Smoked tobacco in the last 4 weeks	0.35*	1				
Consumed six or more drinks on one occasion in the last 4 weeks	0.33*	0.16*	1			
Cannabis consumption in the last 4 weeks	0.39*	0.17*	0.18*	1		
Unprotected sexual intercourse in the last 4 weeks	0.33*	0.19*	0.17*	0.16*	1	
2013-2014^	0.05	0.02	0.02	0.09*	0.03	1

Notes. Obs.=866. (^) The reference category is 2018-2019. (*) Statistically significant at the 1 percent.

Table 4. Random effects probit estimates. Substance use and unprotected sexual intercourse.

	Model I Smoked tobacco in the last 4 weeks	Model II Consumed six or more drinks on one occasion in the last 4 weeks	Model III Cannabis consumption in the last 4 weeks	Model IV Unprotected sexual intercourse in the last 4 weeks
Perceived social rejection	1.584 (0.534)*	1.830 (0.393)*	1.533 (0.266)*	1.050 (0.245)*
2013-2014^	-0.042 (0.428)	0.055 (0.449)	0.678 (0.324)**	0.306 (0.379)
Men	0.878 (0.641)	2.787 (0.788)*	0.703 (0.351)**	1.193 (0.456)*
Cis-gender	0.474 (0.818)	-0.465 (0.889)	0.290 (0.611)	-0.696 (0.673)
Age	-0.043 (0.227)	0.254 (0.239)	-0.046 (0.153)	-0.002 (0.195)
Higher education	-0.922 (0.477)	-0.028 (0.470)	0.284 (0.323)	-0.035 (0.379)
Unemployed	1.915 (0.731)*	0.618 (0.562)	0.402 (0.348)	1.126 (0.430)*
Inactive^^	0.884 (0.813)	1.043 (0.927)	-1.929 (1.013)	-0.403 (0.858)
Wald	18.02	30.49	40.00	39.32
Prob>x^2	0.021	0.000	0.000	0.000
Observations	866	866	866	866

Notes. (^) The reference category is 2018-2019. (^^) People who are neither working nor seeking work. Standard errors are in parentheses. (*) Statistically significant at the 1 percent. (**) Statistically significant at the 5 percent.

	Model I	Model II	Model III	Model IV
	Smoked tobacco in the last 4 weeks	Consumed six or more drinks on one occasion in the last 4 weeks	Cannabis consumption in the last 4 weeks	Unprotected sexual intercourse in the last 4 weeks

Table 5. Random effects probit estimates. Substance use and unprotected sexual intercourse.

	Model I Smoked tobacco in the last 4 weeks	Model II Consumed six or more drinks on one occasion in the last 4 weeks	Model III Cannabis consumption in the last 4 weeks	Model IV Unprotected sexual intercourse in the last 4 weeks
Perceived rejection by friends because of sexual orientation	1.797 (1.198)	0.514 (0.754)	2.561 (0.485)*	1.401 (0.519)*
Perceived unfair treatment in educational and/or workplace environments, or when looking for a work because of sexual orientation	2.333 (0.814)*	4.730 (1.130)*	1.483 (0.384)*	1.312 (0.443)*
Perceived negative treatments in social situations because of sexual orientation	1.709 (1.288)	3.903 (1.371)*	1.446 (0.479)*	0.911 (0.629)
Perceived poor treatment in public and/or health services because of sexual orientation	3.429 (1.593)*	1.969 (1.240)	0.759 (0.610)	0.902 (0.758)
Wald	47.96	127.86	42.06	42.49
Prob>x^2	0.000	0.000	0.000	0.000
Observations	866	866	866	866

Notes. Each model controls for time period, gender, gender identity, age, higher education, unemployment, and inactivity status. Standard errors are in parentheses. (*) Statistically significant at the 1 percent.

Table S1 (Supporting Information). Random effects probit estimates. Substance use and unprotected sexual intercourse. Interaction effect analysis.

	Model I Smoked tobacco in the last 4 weeks	Model II Consumed six or more drinks on one occasion in the last 4 weeks	Model III Cannabis consumption in the last 4 weeks	Model IV Unprotected sexual intercourse in the last 4 weeks
Perceived social rejection x Men	6.440 (0.686)*	2.515 (0.592)*	1.162 (0.409)*	-0.039 (0.507)
Perceived social rejection x Age	-0.957 (0.278)*	-0.261 (0.255)	0.293 (0.187)	-0.105 (0.203)
Wald	337.50	58.54	35.08	40.52
Prob>x^2	0.000	0.000	0.000	0.000
Observations	866	866	866	866

Notes. Each model controls for perceived social rejection, time period, gender, gender identity, age, higher education, unemployment and inactivity status. Standard errors are in parentheses. (*) Statistically significant at the 1 percent.

Table S2 (Supporting Information). Random effects probit estimates. Substance use and unprotected sexual intercourse. Robustness tests. Time period analysis.

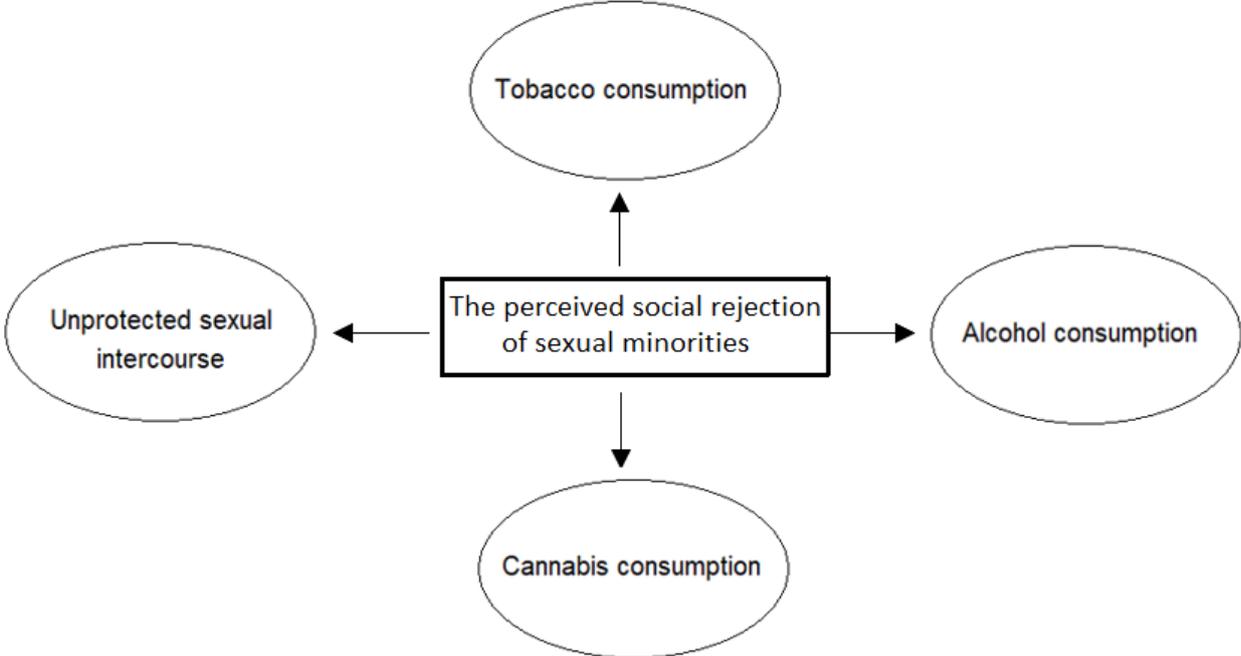|	2013-2014 period				2018-2019 period			
	Model I Smoked tobacco in the last 4 weeks	Model II Consumed six or more drinks on one occasion in the last 4 weeks	Model III Cannabis consumption in the last 4 weeks	Model IV Unprotected sexual intercourse in the last 4 weeks	Model V Smoked tobacco in the last 4 weeks	Model VI Consumed six or more drinks on one occasion in the last 4 weeks	Model VII Cannabis consumption in the last 4 weeks	Model VIII Unprotected sexual intercourse in the last 4 weeks
Perceived social rejection	0.998 (0.465)*	3.292 (0.761)*	2.579 (0.455)*	0.507 (0.361)	5.674 (0.799)*	1.486 (0.520)*	0.967 (0.264)*	1.873 (0.481)*
Wald-test	25.98	38.50	38.09	6.83	112.71	13.04	18.07	22.83
Prob>chi-squared	0.000	0.000	0.000	0.446	0.000	0.071	0.011	0.001
Observations	456	456	456	456	410	410	410	410

Notes. Each model controls for gender, gender identity, age, higher education, unemployment and inactivity status. Standard errors are in parentheses. (*) Statistically significant at the 1 percent.

Table S3 (Supporting Information). Pooled probit estimates and random effects logit estimates. Substance use and unprotected sexual intercourse. Robustness tests.

	Model I Smoked tobacco in the last 4 weeks	Model II Consumed six or more drinks on one occasion in the last 4 weeks	Model III Cannabis consumption in the last 4 weeks	Model IV Unprotected sexual intercourse in the last 4 weeks
Specification I: Pooled probit estimates (using robust standard errors)				
Perceived social rejection	0.481 (0.085)*	0.729 (0.095)*	0.743 (0.103)*	0.633 (0.090)*
2013-2014 period^	-0.000 (0.095)	0.058 (0.117)	0.327 (0.119)**	0.101 (0.110)
Wald	90.09	89.47	93.26	86.74
Prob>x^2	0.000	0.000	0.000	0.000
Observations	866	866	866	866
Specification II: Random effects logit estimates				
Perceived social rejection	2.431 (0.637)*	4.140 (0.666)*	2.645 (0.519)*	1.988 (0.484)*
2013-2014 period^	-0.048 (0.708)	0.187 (0.848)	1.196 (0.600)**	0.477 (0.644)
Wald	35.04	84.02	29.25	31.35
Prob>x^2	0.000	0.000	0.000	0.000
Observations	866	866	866	866

Notes. Each model controls for gender, gender identity, age, higher education, unemployment, and inactivity status. (^) The reference category is 2018-2019. Standard errors are in parentheses. (*) Statistically significant at the 1 percent. (**) Statistically significant at the 5 percent.

Figure S1 (Supporting Information). The perceived social rejection of sexual minorities and substance use and unprotected sexual intercourse

Notes: Theoretical framework. The perceived social rejection of sexual minorities is associated with tobacco, alcohol and cannabis consumption, and unprotected sexual intercourse. The perceived social rejection captures whether sexual minorities have been rejected by friends, treated unfairly in educational and/or workplace environments, treated negatively in social situations and received poor health and public services due to their sexuality.