SEXUAL IDENTITY AND ADVERSE HEALTH-RELATED OUTCOMES: A STUDY ON RISK BEHAVIOUR, SUICIDE, AND SUBSTANCE USE

İbrahim Sönmez

TESI DOCTORAL, UPF / 2022

DIRECTOR DE LA TESI

Dra. M. José González

DEPARTAMENT DE CIÈNCIES POLÍTIQUES I SOCIALS

upf. Universitat
Pompeu Fabra
Barcelona

ACKNOWLEDGEMENTS

"Roger Horwitz, my beloved friend, died of complications of AIDS on October 22, 1986, nineteen months and ten days after his diagnosis. That is the only real date anymore, casting its ice shadow over all the secular holidays lovers mark their calendars by. Until that long night in October, it didn't seem possible that any day could supplant the brute equinox of March 12—the day of Roger's diagnosis in 1985, the day we began to live on the moon"

Paul Monette – *Borrowed Time*

This is for all the effort that keep my friends alive.

Abstract

This PhD dissertation addresses how stress regarding one's sexual identity relates to health-related adverse outcomes. It is composed of four articles. The first one examines how internalized homonegativity (IH) is associated with the number of non-steady male partners with condomless intercourse among men who have sex with men (MSM) in Spain. Results suggest that the meaning of risky sex changes among MSM depending on the IH levels. The second article investigates the relationship between internalized homonegativity and sexual risk behaviour by comparing samples of MSM in Spain and Turkey. This study highlights the importance of understanding of what constitutes safe sex may differ across contexts, and this should be taken into consideration when tailoring HIV prevention programs. The third article shows that sexual identity-attraction discordance is associated with self-injurious thoughts and behaviours (SITBs), which presents especially alarming results concerning bisexual-identified men. Finally, the fourth article finds that early substance use initiation significantly mediates the relationship between sexual identity and substance use disorders later in life. These articles underline the continuing importance of minority stressors and sexual identity development on the health disparities among sexual minorities.

Resumen

Esta tesis doctoral aborda cómo el estrés relacionado con la identidad sexual de uno se relaciona con los resultados adversos relacionados con la salud. Se compone de cuatro artículos. El primero examina cómo la homonegatividad internalizada (HI) se asocia con el número de parejas masculinas no estables con relaciones sexuales sin preservativo entre hombres que tienen sexo con hombres (HSH) en España. Los resultados sugieren que el significado de sexo de riesgo cambia entre HSH dependiendo de los niveles de HI. El segundo artículo investiga la relación entre la homonegatividad internalizada y el comportamiento sexual de riesgo mediante la comparación de muestras de HSH en España y Turquía. Este estudio destaca la importancia de comprender que lo que constituye el sexo seguro puede diferir entre contextos, y esto debe tenerse en cuenta al adaptar los programas de prevención del VIH. El tercer artículo muestra que la discordancia identidad sexual-atracción está asociada con pensamientos y conductas autolesivas (SITB), lo que presenta resultados especialmente alarmantes en hombres identificados como bisexuales. Finalmente, el cuarto artículo encuentra que el inicio temprano del uso de sustancias media significativamente la relación entre la identidad sexual y los trastornos por uso de sustancias más adelante en la vida. Estos artículos subrayan la importancia continua de los factores estresantes de las minorías y el desarrollo de la identidad sexual en las disparidades de salud entre las minorías sexuales.

Table of Contents

LIST OF TABLES AND FIGURES

Table of acronyms

STIBs	Self-injurious thoughts and behaviours
MSM	Men who have sex with men
GBM	Gay or bisexual men
GBMSM	Gay or bisexual, or men who have sex with men
LGB	Lesbian, gay, bisexual
LGBT	Lesbian, gay, bisexual, and transgender
LGBTQ+	Lesbian, gay, bisexual, transgender, and queer
EMIS	European Men Internet Survey
NSUDH	National Survey on Drug Use and Health
IAD	Identity-attraction discordance
STD	Sexually transmitted disease
HIV	Human immunodeficiency virus
AIDS	Acquired immunodeficiency syndrome
PLWH	People living with HIV
PrEP	Pre-exposure prophylaxis
ART	Antiretroviral Therapy
MDMA	Methylenedioxymethamphetamine
GHB/L	Gamma-hydroxybutyrate
IH	Internalized homonegativity
SIHS	Short internalized homonegativity scale
SRB	Sexual risk behaviour
HPK	HIV/PrEP knowledge
SUIS	Sex under influence of substances
SEM	Structural equation modelling
MG-SEM	Multigroup structural equation modelling
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
TLI	Tucker Lewis index
RMSEA	Root Mean Square Error of Approximation
aOR	Odds ratio
DSM-5	Diagnostic and Statistical Manual of Mental Disorders 5
US	United States

Chapter 1. General introduction: addressing the study on sexual minorities, risk behaviours and health outcomes

1.1. Introduction

Over the last decades, mental and physical health disparities across sexual orientations have been the focus of sociological research. It is well documented that individuals who belong to sexual minority groups, lesbian, gay, and bisexual (LGB) individuals, tend to experience adverse health-related outcomes when compared to general heterosexual population. Sexual minority individuals has shown to be at increased risk of earlier onset of substance use (Sönmez & Palamar, 2022a), greater levels of substance use (Schuler et al., 2019), high levels of depression (Guz et al., 2021), self-injurious thoughts and behaviours (SITBs) (Sönmez & Palamar, 2022b), and a range of physical health problems including chronic diseases and multi-morbidity (Cunningham et al., 2018; Han et al., 2020). As research on sexual minority status and health-related outcomes continues to expend, it furthers depicts, and corroborates, the novel ways in which we should research these inequalities.

Varying differences in regard to health-related outcomes for sexual minorities appears to be associated with gender, sexual identity, and structural variables such as the context the individual lives in. Research on gender-related disparities has shown that sexual minority women are greatly affected by substance use and substance dependence than sexual minority men (McCabe et al., 2009a). Likewise, belonging to different subgroups of sexual minorities imply varying associations with adverse health outcomes, with bisexual identified-individuals appear to be disproportionately affected. For example, it is well documented that bisexuals are at greater risk of hazardous outcomes, such as opioid and alcohol misuse (Schuler & Collins, 2020), self-injury (Swannell et al., 2016), and suicidal ideation (Nystedt et al., 2019).

There has been more than a handful explanations put forward to answer why sexual minorities suffer poorer mental and physical health than heterosexuals do. Largely, these explanations hinge upon socially charged discrimination and rejection (Meyer, 2003), as well as complications with self-acceptance of own sexual identity. Historically, research on sexual identity development have focused on how LGB identity may develop in hostile social contexts with negative attitudes towards homosexuality (Greene & Britton, 2012). Indeed, sexual identity development depends on intricate set of factors that is specific to individual and "the way in which the individual assimilates how these factors are viewed by the wider society in which s/he lives" (Horowitz & Newcomb, 2001). Reviews of existing research documents that sexual identity development of sexual minorities is primarily affected by stigma, discrimination, and prejudice (Meyer, 2003).

In relatively more hostile contexts, for example, individuals belonging to sexual minority group may conceal their sexual identity as a means to coping with discriminatory environment and situations (Bry et al., 2017). Concealment of self can be a useful tool for sexual minorities to protect their mental health by reducing experienced exposure to interpersonal rejection (Pachankis, 2007). However, concealment of a salient part of one's identity has been associated with detrimental health outcomes (Smart & Wegner, 2000), such as increased psychological distress (Quinn & Chaudoir, 2009), greater depressive symptoms and even lower CD4 count (an index of HIV disease status) among gay men living with HIV (Ullrich et al., 2003).

Structural level disparities not only effect sexual minorities' health through inter-personal relationships, but also directly effects overall well-being. Societal level factors such as cultural norms and institutional policies can contribute to disadvantaging sexual minorities (Hatzenbuehler, 2016). For example, a study from Australia showed that sexual minorities' overall health and reported life satisfaction were relatively low in constituencies with higher shares of 'no' voters against the same-sex marriage legislation (Perales & Todd, 2018). Likewise, despite the perpetual changes in law and norms related to lesbian, gay, bisexual, transgender, and queer (LGTBQ) rights, especially since the first legalization of same-sex marriage in The Netherlands in 2000 (Masci et al., 2019), public opinion on LGBTQ rights and homosexuality still is divided by county, region, culture, and economic development (Poushter & Kent, 2020). Table 1.1 presents data on acceptance of homosexuality in selected countries and the change between 2013 and 2019, based on the Spring 2019 Survey Data from PEW Research Centre. It is documented that in the selected countries, such as South Africa, Turkey, Japan, US, UK, and Spain public opinion on acceptance of homosexuality has increase significantly, with the greatest change recorded in South Africa with 22%. Similarly, macro-level research have shown that inclusion of LGBT and economic development levels are mutually reinforcing (Badgett et al., 2019). Economic development and well-being have been associated with inclusion of LGBT rights and also individuals' attitudes toward homosexuality (Badgett et al., 2014).

Table 1.1. Acceptance of homosexuality over time, percentage of who say homosexuality should be accepted by society, selected countries between 2013-2019

Country	2013	2019	% change from 2013 to 2019
South Africa	32%	54%	+22
Turkey	9%	25%	+16
Japan	54%	68%	+14
US	60%	82%	+12
UK	76%	86%	+10
Spain	88%	89%	+1

Note: Source PEW Research Centre. Only shown here the countries with the biggest percentage change between 2013 and 2019 and countries of interest. Percentage change from 2013 to 2019 is significant for all countries shown, except for Spain.

With these notions in mind, in the next sections, I present minority stress theory, sexual identity development, and disproportioned risk of certain health-related outcomes effecting LGB individuals. Throughout the study, sexual identity and its development is places under the focus; because statistical limitations do not allow for an additional lens on minority gender identity (i.e., transgender). This is also why acronyms to refer to these groups are carefully used throughout the study. Despite the fact that acceptance of homosexuality has increased significantly in most post-industrial societies with higher levels of development and social welfare, sexual minorities are still at a higher risk of suffering from poorer health status than the heterosexual population in general. This section discusses the main theories and concepts that attempt to shed some light on this paradox and aims to describe the variables associated with poor health related outcomes for sexual minorities in detail to be able to situate the results and discussions from the scientific papers in the further chapters. Considering disparities among sexual identities, sex-based differences, context-dependency, and fluidity of sexual orientation into account, this doctoral dissertation aims to deepen our knowledge of health-related risks associated with sexual minorities.

1.2. Minority Stressors

Research on psychological stressors help us to shed light on important outcomes such as diseases, dysfunction, and adaptation (Monroe & Slavich, 2007). Stress, to a certain extent, can be defined as one's inability to response to and cope with the perceived threat to one's physical or emotional well-being (Mink et al., 2014). Minority stressors, therefore, stem from social conditions and it can have a strong impact on the lives of people belonging to certain categories related to socioeconomic status, race, gender, or more (Meyer, 2003).

Minority stressors exist under the influences of predominant sociocultural environment which includes cultural norms, institutions, and policies, within which the individual affiliates with (Mink et al., 2014). Positive social identity is as important as personal identity (Scheepers & Ellemers, 2005; Tajfel & Turner, 1979) and consequences of social identity threat can result in lowered self-esteem and out-group discrimination (Branscombe & Wann, 1994). High status (i.e., advantaged status) groups possess greater access to material goods, including social goods such as political power and authority, compared with low-status groups (O'Brien & Major, 2005). Therefore, predominance is defined, to a certain extent, with the cultural beliefs and norms shaped by high-status groups since they bear greater power to shape them (Jost & Hunyady, 2003). Sexual identity of the high-status group thus can be definitive of what kinds of romantic and sexual acts can be defined as 'normal'. Sexuality is a collective "truth" in the Western societies (Foucault, 1978) and heterosexuality has remained as unproblematic and unquestioned (Yep, 2003), which created a sociocultural environment where heteronormativity has placed damaging stressors against LGBT individuals (Mink et al., 2014).

1.3. Sexual minority stressors

While LGBTQ individuals may experience general psychological stressors such as, for example, unexpected instability in income or death of kin; it is very likely that they would experience unique set of stressors based on their sexual minority identity (Mink et al., 2014). Sexual minority theory, which has been postulated by Meyer (1995) as an extension of the minority stressors model, suggests that lesbian, gay, and bisexual (LGB) persons tend to experience elevated social stress because of perception of negative social attitudes towards their sexual identity (Meyer, 1995, 2003). Sexual minority stress

refers to the stressors embedded in the social position of sexual minority individuals, such as stigma, prejudice, and discrimination.

Originally, Meyer (1995) has referred to the minority stressors along a continuum ranging from distal to proximal stressors. On one hand, distal sexual minority stressors refer to events occurring outside the person and that have an impact on how individual perceives outside. For example, personal experiences of discrimination at workplace (Barron & Hebl, 2013; Elmslie & Tebaldi, 2007), biased medical care (Foglia & Fredriksen-Goldsen, 2014), and housing discrimination (Lunsing, 2005) are of the distal sexual minority stressors. As Meyer (2015) notes, distal stressors are "everyday hassles; everyday discrimination and macroaggressions". On the other hand, proximal sexual minority stressors refer to internalization of cognitive processes such as stressors (i.e., distal) altered through socialization. These processes are individual-dependent (Ramirez & Paz Galupo, 2019) and follows a sequence of internalizing stressful events posterior to perception (Meyer, 2003). Thus, proximal minority stressors include internalization of stressful events: such as internalized homonegativity, concealment of identity, and perpetual vigilance of such events, which could be mentally draining.

Theoretical models of psychological distress for sexual minorities frame various ways through which these stressors can have impact on the health of sexual minorities. For example, LGBT youth face a particular risk of victimization (Ybarra et al., 2015) and The 2011 National School Climate Survey has documented that 82% of LGBT youth are verbally assaulted and 32% physically harassed due to their sexual identity in the past year (Kosciw et al., 2012). LGBT youth who experience victimization during adolescence and early adulthood has shown to be at greater risk of depression and posttraumatic stress disorder (Mustanski et al., 2016). Similarly, a meta-analysis of 13 studies has documented that self-reported minority stressors such as lack of support from family and friends, lack of identity disclosure, and internalized heterosexism were associated with lower self-acceptance (Camp et al., 2020). Camp et al. (2020) also note that lower self-acceptance was associated with poorer health outcomes for LGBT population.

Recently, scholars have also focused on minority stressors which posit structural stigma, where community-level negative attitudes are linked to individual-level outcomes (Hatzenbuehler & Link, 2014; Sönmez & Palamar, 2022a). Structural stigma can range (Hatzenbuehler, 2016) from institutional policies that restrict opportunities towards a certain group (Corrigan et al., 2004) to public prejudice regarding certain

groups (Herek, 2007). For example, it is shown that LGBT protection rights at state-level contributes to elimination of disparities in dysthymia in different sexual identities (Hatzenbuehler et al., 2009). In other contexts, non-recognition of LGBT identities in state-level regulations and policies, especially regarding housing, employment, and health care, has lead scholars to assert structural stigma as a barrier against equality (Yilmaz & Göçmen, 2016). In a summary, whether be distal, proximal, or structural, minority stressors are linked to health-related adverse outcomes including psychological problems, physical disorders, health behaviours, and substance use (Lea et al., 2014; Meyer & Frost, 2013; Mongelli et al., 2019).

Despite the commonalities of how sexual minorities are affected from minority stressors, there are notable differences by sexual and gender identity. Firstly, while all sexual minorities experience minority stressors to a certain extent, bisexual identified individuals experience unique stressors (Feinstein & Dyar, 2017). Bisexual identity is not only marginalized in the broader communities, but also within the LGB communities (Feinstein & Dyar, 2017). Bisexual individuals face challenges in expressing an authentic identity, while bisexual identity is rendered "invisible" (Mohr et al., 2017; Schuler et al., 2018) due to the belief that bisexuals are promiscuous (Brewster & Moradi, 2010) or bisexuality is not a legitimate identity (Feinstein & Dyar, 2017). Empirical evidence from a qualitative study suggests that bisexuals feel that their identity is invisible to other sexual minorities and therefore marginalized from LGB venues (Hequembourg & Brallier, 2009). Likewise, quantitative evidence suggest that bisexual individuals are at greater risk of experiencing victimization (Katz-Wise & Hyde, 2012) and macroaggressions (Flanders, 2015) compared to heterosexuals and other sexual minorities, more likely to conceal their sexual identity compared to lesbians and gays (Balsam & Mohr, 2007).

Secondly, even though minority stress theory has originally been developed based on sexual orientation (Meyer, 1995), gender identity plays a fundamental role in its implication (Meyer, 2015). Gender identity refers to how a person experience oneself to be like others of one gender that is culturally constructed (Steensma et al., 2013). Some people's gender does not correspond with the sex assigned to them at birth, such as trans women and trans men, or identifying as neither men nor women (e.g., agender or non-binary); or as moving between binary genders (e.g., genderfluid) (American Psychological Association, 2015). Recent research document that sexual minority stressors have an impact on transgender and gender non-confirming individuals (Bockting

et al., 2013; Meyer, 2015). For example, stress related to gender identity, such as gender abuse, in the form of psychological and physical abuse have shown to be common in the experiences trans women told (Nuttbrock et al., 2014). However, further amplification of sexual minority stressors is necessary for a holistic understanding of health disparities affecting trans populations (Toomey, 2021).

1.4. Internalized Homonegativity

As stated previously, internalized homonegativity is a product of internalizing negative societal attitudes about same-sex attraction, identity, and behaviours. Internalized homonegativity (IH) is defined as negative feelings about one's homosexuality (Herek, 2004) is the product of social and political stigma and bias instead of a response which stems from within individuals (Berg et al., 2016). Negative internalized beliefs about one's sexual identity can lead to feelings of guilt, shame, and low self-esteem (Herek, 2007; Meyer & Dean, 1998). The concept of internalized homonegativity is sometimes used interchangeably with the term internalized homophobia; however, this has been criticized previously (Berg et al., 2016; Herek, 2004). The term homophobia refers to fear, anxiety, and discomfort that a person experiences during in interaction with LGB individuals (Adams et al., 1996; Negy & Eisenman, 2005), while homonegativity refers to negative attitudes and beliefs towards homosexuality (Hudson & Ricketts, 1980). For example, a study recorded cardiac responses of men, whom are ostensibly homophobic, to the explicit photographs of sex between men and they failed to record characteristics of phobias (i.e. fear, anxiety), instead they recorded negative responses (i.e. disgust) (Shields & Harriman, 1984). Thus, it is important to recognize that the term internalized homonegativity is characterized by wider societal factors and is not only a product of subjective and personal "fears" (Berg et al., 2016; Szymanski & Carr, 2008).

IH refers to a process of internalization because this term denotes to "adapting one's self-concept to be congruent with the stigmatizing responses of society" (Herek et al., 2009). These negative societal beliefs towards LGB individuals also form a part of childhood socialization. The formation of sexual identity is rather complicated for LGB individuals. Traditionally, researchers proposed several sexual identity development models for sexual minorities (Cass 1979; Savin-Williams 1988; Troiden 1979) that most

of them follow a sequence of events: (1) awareness, (2) internalization/acceptance, (3) disclosing, and (4) integration. These models, however, have been criticized by scholars for not taking into continuity of this process into account (D'Augelli 1994) or complexity of variety in homosexual experience that is shaped by both individual and the society (Horowitz & Newcomb, 2001). Recent scholarship on sexual identity development documented that this process depends on sexual identity, cohort, and race and ethnicity (Bishop et al., 2020).

Nevertheless, due to the pervasiveness of sexual minority stigma, most people internalize the negative attitudes to a certain extent, regardless of their sexual orientation (Herek & McLemore, 2013). Research on homosexual identity development has shown that IH was associated with less developed gay identity and higher sex-related guilt, which was associated with lower self-esteem and poorer emotional stability (Rowen & Malcolm, 2003). As noted by Weinberg (1972), "the person who from early life has loathed himself for homosexual urges arrives at this attitude by a process exactly like the one occurring in heterosexuals who hold the prejudice against homosexuals" (p.74).

1.5. Cognitive Dissonance

As previously mentioned, sexual identity is rather complex and it cannot be accounted by a certain set of behaviours, desires, nor social context (Horowitz & Newcomb, 2001). Long history of definitional crisis has come to a point where we can depart from, theoretically, maintenance of homosexuality (or any other sexual identity) as a state of being, and consider homosexuality (or any other sexual identity) in other possible states: desire, behaviour, and identification (Richardson, 1984). However, research have shown that these three do not always match. It is well documented that sexual identity can show relative fluidity (Saewyc, 2011) and sexual identity can shift over time (Katz-Wise et al., 2017; Mock & Eibach, 2012). Reported sexual attraction, behaviour, and identities are neither always synonymous (Chandra et al., 2011; Fish & Pasley, 2015) nor is sexual identity always concordant with individuals' behaviours (Burgard et al., 2005; Chandra et al., 2013; Smith et al., 2003). This mismatch is referred as sexual identity-attraction discordance (IAD).

Ambivalence and self-ambiguity regarding one's sexual identity, attraction, and behaviour can stem from societal pressures of dominant sexual identity-attraction norms. Individuals may feel the pressure to present a heterosexual sexual identity, and

identify themselves a heterosexual, and still engage in same-sex relationships (Nield et al., 2015). Indeed, individuals may experience a discordance between the cognitions of sexual identity and attraction due to several reason, including perceived homophobia, internalized homonegativity, and restrained sexual identity development.

Previous studies have shown that sexual IAD is associated with several adverse health related outcomes, such as depression (Lourie & Needham, 2017), suicidal behaviors (Annor et al., 2018; Fish & Pasley, 2015), chronic health conditions (Horn & Swartz, 2019), and drug use (Qeadan et al., 2021). It is postulated by previous studies that cognitive dissonance theory can be employed to explain, to a certain extent, health-related outcomes associated with sexual IAD. Firstly proposed by Festinger (1957), cognitive dissonance theory refers to a lack of alignment of individuals' cognitions with their normative self-standards. In other words, if two cognitions are relevant to one another (i.e. sexual identity and sexual attraction), they are either consonant or dissonant. If dissonance between the two exists, it can lead to disturbance, for example, psychological discomfort. This psychological discomfort motivates individual to reduce the dissonance, at least to a degree, and to avoidance of information or situations that can increase the dissonance (Festinger, 1957; Harmon-Jones & Mills, 2019, p. 3). This motivation may lead to adverse health outcomes and behaviours, such as mental health problems, drug use, and eventually lead to chronic health conditions and poor health.

1.6.   Minority Identity and Vulnerabilities

Epidemiological research on syndemic factors affecting sexual minority populations have been extensively studied. Syndemic conditions, which refers to a "synergy" among certain harmful social and physical conditions which are at play simultaneously to augment disease burden of a population (Singer, 2009). In majority, syndemic framework has been applied to predict HIV and ITS acquisition among MSM. For example, psychosocial conditions such as sexual childhood abuse and internalized homophobia (Chuang et al., 2021), depression and victimization (Chakrapani et al., 2017), heavy alcohol use and polydrug consumption (Mimiaga et al., 2015), have been associated with increased HIV-related sexual risk behaviour among MSM. Similarly, syndemic framework has also been applied to other sub-populations from sexual minorities. In a study, co-occurring syndemic conditions such as heavy episodic drinking, marijuana use, ecstasy use, hallucinogen use, depressive symptoms were associated with

sexual orientation discrimination among young sexual minority women (Coulter et al., 2015). Likewise, other studies also have focused on the influence on syndemic on health-disparities among gender minorities (i.e., trans populations) (Chakrapani, 2019; Reisner et al., 2016).

As it will be discussed in the next chapters of this dissertation in greater detail, sexual minorities suffer from a number of different syndemic conditions that widens the health disparities across gender identities, sexual identities, and contexts. Among these numerous conditions, which are also the main focus of the subsequent chapters, far greater prevalence rates of substance use and substance use problems, mental health problems, and sexual risk behaviour and HIV and STI infections exists. These three syndemic conditions are introduced briefly in this chapter.

1.6.1. Substance Use

It is extensively documented that sexual minorities are at disproportioned risk of substance use (Demant et al., 2016; Duncan et al., 2019; Schuler et al., 2018, 2019) and substance use disorders (Kerridge et al., 2017; Tucker et al., 2008). Early substance use initiation (Schuler & Collins, 2019; Sönmez & Palamar, 2022a) and higher life-time rate for illicit drug use among LGB youth is also prevalent when compared to heterosexual youth (Newcomb et al., 2014). The disparities between sexual minorities and heterosexuals in substance use outcomes often attributed to minority stressors (Goldbach et al., 2014).

Heterogeneity of substance use behaviours within sexual minorities is well-established. Previous research suggest that substance use behaviours vary according to gender and sexual identity (Schuler et al., 2019). For example, among a representative sample from the 2015 National Survey on Drug Use and Health (NDSUH), Medley et al. (2015) documented that while gay and bisexual men had reported higher prevalence of using inhalants (i.e., amyl nitrate [poppers]), lesbian and bisexual women had reported higher prevalence of using ecstasy and MDMA. Similarly, it is well-documented that bisexual-identified individuals are at greater risk of substance use behaviours, including increased prevalence of marijuana (Schuler et al., 2019), hallucinogens (Schuler et al., 2019), inhalants (Le et al., 2020), and stimulants (Philbin et al., 2020), when compared to heterosexuals. Thus, it is important to consider substance use disparities across and within sexual identities in studying health-related outcomes concerning this population.

1.6.2. Mental Health

Abundance of literature has linked LGB identity and problems related to mental health. It has been documented that, compared to their heterosexual counterparts, LGB individuals are at greater risk of mental health disparities (see Mongelli et al. [2019] for a review of 62 papers), including depression (McLaren et al., 2007) and anxiety (A. Jones et al., 2017). LGB individuals are most likely report mental health problems due to several reasons. Based on minority stress theory, it is plausible to expect that exposure to stressors, such as identity concealment (Pachankis et al., 2015), internalized homonegativity (Lozano-Verduzco et al., 2017; Rosser et al., 2008), and discrimination (Lee et al., 2016), can lead to mental illness. Factors such as depression and substance use have also been showed to be a correlate of suicidality (Lourie & Needham, 2017; Talley et al., 2015). Suicide continues to be one of the leading causes of death in the US (Hedegaard, 2021) and previous research showed that LGB individuals are disproportionately affected by suicidality (Guz et al., 2021; Hottes et al., 2016; Miranda-Mendizábal et al., 2017; Quarshie et al., 2020). Similarly, study of Sönmez & Palamar (2022b) showed that the self-reported suicidal thoughts, suicide plans, and suicide attempts increased among LGB individuals between 2015 and 2019. Therefore, based on the empirical evidence, understanding mental health vulnerabilities disproportionately experienced by sexual minorities is important in any study framed around this population.

1.6.3. Sexual Risk Behaviour and Disease Risk

Sexual minorities, especially MSM, are disproportionately affected by HIV/AIDS and other sexually transmitted diseases (STD). In the US (2019; 69%, (Diagnoses of HIV Infection in the United States and Dependent Areas, 2019, 2021) and the European Economic Area (2019; 38.7%, (European Centre for Disease Prevention and Control & World Health Organization, 2020), sex between men remains the predominant mode of HIV transmission. Similarly, prevalence of other STDs, such as human papillomavirus (HPV), syphilis (de Voux et al., 2017), and gonorrhoea (Stenger et al., 2017), are alarmingly high among MSM. Sexual transmission risk of HIV and other STD infection among MSM is associated with multiple individual, social, and structural factors. Previous research have pointed to the inconsistent results regarding individual-level variables, such as IH (Newcomb & Mustanski, 2010; Puckett et al., 2017) and

substance use (P. Fernández-Dávila & Zaragoza Lorca, 2009; Folch et al., 2006; González-Baeza et al., 2018; Ross et al., 2001), influencing sexual risk behaviour among MSM. Furthermore, recent medical developments such as Pre-exposure prophylaxis (PrEP), which is a promising preventive tool in the fight against HIV (Grant et al., 2010; Keller & Smith, 2011), or antiretroviral therapy (ART), which is a combination of medications used to treat the HIV virus (Trickey et al., 2017), may have change the meaning of "risky" sex. Indeed, based on the recently emerging scientific evidence and erratic nature of individual-level factors, the ways in which one can engage in safer sex is continuously changing.

1.6.4. Synergy of Syndemic Conditions

Evidence suggested a link between substance use and sexual risk taking. In the recent years, growing body of literature have documented that gay and bisexual men (GBM) are engaging in polydrug use in the context of sex, a phenomenon known as "chemsex". GBM are at greater risk of illicit drug use (Cochran et al., 2004; Hickson et al., 2010) and illicit drug use in the context of sex has been linked to sexual risk behavior and HIV infection among GBM (Halkitis, 2005; Vosburgh et al., 2012). Drug use and sexual risk behaviour were also frequently associated with poorer mental health (Halkitis et al., 2005; Rosario et al., 2011). Therefore, it is important to consider a syndemic framework to be able to grasp the simultaneity of factors associated with each other affecting health disparities further.

1.7. Coping Responses (AKA Community Resilience)

Briefly, I believe that it is important to note that, in consistency with general stress theories, sexual minority stressors and previously mentioned vulnerabilities can lead to coping responses as a way of avoidance and attempt to reducing adverse outcomes (Meyer, 2015). It has been documented that at the times of mentally detrimental events, LGB individuals are likely to cope with substance use (Boyle et al., 2017). Similarly, at the times of severe state neglect of HIV crisis, responsibility for the community through self-care and auto-education has developed among sexual minorities (Webber, 2018). Coping strategies for sexual minorities, in other words, community resilience, is associated with personal acceptance of sexual and/or gender identity as a minority and

affiliation with the LGBT community (Meyer, 2015) and it can help overcome inter-personal health disparities. Thus, it is the aim of this dissertation to consider self-identity acceptance, community belonging, and coping mechanisms within framing each chapter's objectives and discussions.

1.8. Use of MSM throughout this study

In the first two research included in this chapter, we are using the term men who have sex with men with the abbreviation of MSM. This term has been widely used in the HIV literature since the 1990s because of medical needs (Dowsett, 1990; Young & Meyer, 2005). In an epidemiological perspective, terms that avoided social constructions and culture-related identity connotations are favoured because then researchers could focus on behaviour that may lead to disease risk instead of identities (Herek & Capitanio, 1993). This approach, of course, has faced a double-edged sword. On one hand, employment of such a term has led to a consensus that it diminished the stigmatizing role of associating identities with diseases (i.e. gay identity as a risk factor for HIV/AIDS), which made researchers to act in favour of this using this term (Herek & Capitanio, 1993). On the other hand, holist researchers have criticised the use of this term as "reductionist", since it may cause that those outside the community of MSM to view those men as "issues" rather than as human beings whose life choices include a set of behaviours (Khan & Khan, 2006). Furthermore, social construction perspective suggests that sexualities are mere products of social processes, which could not be assumed to align on identity, behaviour, and desire at all times given. While this perspective is useful in not homogenizing individuals in identity groups, it does not meet the current public health needs. Considering both perspectives, we are prioritizing epidemiological needs, which may be considered as forcing a conceptual shift in public health studies from identity-based to behaviourally based notions of sexuality, so that we can better target who bears greater HIV disease risk. Therefore, we focus on MSM as a risk category in the first two chapters of this study.

1.9. Sexual minorities in context: the cases of Spain, Turkey and the United States

To be able to better understand the health-related disparities experienced by sexual minorities, whether based on sexual minority stressors or cognitive dissonance, it is

important to bear in mind what sort of political, demographical and cultural environment the countries included in the analysis are located in regarding LGBT rights. In this section, I present brief discussions on the environments sexual minorities live in different contexts, specifically Spain, Turkey, and the United States (US), and explain why these three cases are chosen to be included in the analysis.

1.9.1. Spain

Although homosexuality was highly illegal under the Franco regime, the LGBT movements have come a long way in Spain after the overturn of this rule by Spanish Kingdom in 1979. Especially since the legalization of same-sex marriage in Spain in 2005, Spain is considered to be one of the most accepting contexts towards sexual minorities. According to the Pew Research Centre's Spring 2019 Global Attitudes Survey, 89% of the Spanish population have reported that homosexuality should be accepted by society (Poushter & Kent, 2020).

But if something makes Spain an important and crucial context in studying is the relatively high prevalence of HIV and STDs among key populations, such as people who inject drugs (PWID) (European Monitoring Centre for Drugs and Drug Addiction., 2019; Saludes et al., 2017), male and trans women sex workers (Saludes et al., 2017), and MSM (Mirandola et al., 2018). Among many explanations, the high prevalence of HIV infection among MSM in Spain can be partially explained by high prevalence of chemsex practices among this population.

Gay, bisexual and other men who have sex with men (GBMSM) is observed to be situated in circles where drug is, to some extent, normalized within sexual contexts and this is associated with increased sexual risk behaviours (Folch et al., 2015; Halkitis & Singer, 2018). Chemsex is the intentional use of any drug that is available for sexual intercourse over a long period of time, which can last from several hours to several days (Van Hout et al., 2019). In Spain, this phenomenon is commonly referred as "chills;" or "colocón;" among participants (D. P. Fernández-Dávila, 2016). Although it is hard to pin down the current prevalence, studies found that 6 to 8% of MSM in Spain had reported using stimulant drugs to make sex more intense or last longer in the last four weeks (European Centre for Disease Prevention and Control. et al., 2019). Specifically, results from a multi-site MSM survey showed that more than half of MSM in Barcelona (55.5%) had reported using any substances, and 4.5% reported using chemsex drugs during their

last sexual encounter (Rosińska, 2018). Drugs commonly used within chemsex practices include: 3,4-methylenedioxy-N-methylamphetamine (MDMA, or ecstasy) (Folch et al., 2015), methamphetamine (crystal meth) (Semple et al., 2002), gamma-hydroxybutyrate (GHB) and gamma-butyrolactone (GBL) (Drevin et al., 2021), erectile dysfunction drugs (Giorgetti et al., 2017) and ketamine (Mor et al., 2008). Unlike other drugs commonly used among MSM in the nightlife club scenes (Halkitis & Palamar, 2008), drugs commonly used at Chemsex sessions indeed are sexually arousing and disinhibit in their nature (Semple et al., 2002), which puts these men at risk of sexual risk behaviour (P. Fernández-Dávila & Zaragoza Lorca, 2009).

Overall, current cultural and political characteristics of Spain regarding sexual minority rights, relatively high prevalence of HIV and other STD infections among key populations, especially among MSM, and high levels of sexualized substance use among MSM make this context important for further investigation.

1.9.2. Turkey

Republic of Turkey was first established as a secular country back in the 1923, however, current rise of elitist pro-Turkish nationalists alongside with religious conservatism have changed the political, cultural, and inter-personal domains dramatically. In the contemporary Turkey, same-sex relationships are not criminalized by law but there are no anti-discrimination laws that protect the well-being of sexual minorities (Engin, 2015) which results in exposure to hate crimes and discrimination at many levels simultaneously (Engin & Özbarlas, 2021).

The lack of protection and support for sexual minority rights at different macro-levels in Turkey has been documented. Macro-level analysis of four representative party debates conducted by Engin (2015) has shown that the majority of Turkish representatives are not in favor of sexual minority rights. Similarly, in a 2015 poll, 27% of the surveyed population was in favor of same-sex marriage and 19% was in favor of civil unions instead, and 25% was against any kind of same-sex partnership type and 29% did not know which option to choose (Ipsos, 2015). In the lack of protection against distal and structural sexual minority stressors, political and social environment in Turkey regarding sexual minorities make this context an important and interesting one for studying further.

There is only a handful of empirical evidence regarding the relationship between sexual minority identity and personal and social outcomes in the Turkish context. Among those few, in one study among 15 self-identified homosexual students in Turkey, Bakacak & Ōktem (2014) documented that hiding one's sexual identity by disguise and distancing oneself was a major strategy employed by students to manage experienced heterosexism in daily life. As discussed before, concealing one's sexual identity was found to be a determinant of several health-related adverse outcomes (Quinn & Chaudoir, 2009; Smart & Wegner, 2000; Ullrich et al., 2003). Likewise, recently emerging evidence on discriminatory experiences at workspaces by sexual minority employees suggests that discrimination based on sexual orientation is diffused through a plethora of work environments (Bilgehan Ozturk, 2011). For example, in a study interviewing 20 individuals from NGOs to explore the inclusion and exclusion of LGBTs at their work spaces, the hardship faced by LGBT individuals to thrive in both public and private sectors because of high discrimination faced (Aydin & Ozeren, 2020). Not surprisingly, internalization of negative societal attitudes among sexual minorities in Turkey is also common. A meta-analysis of 35 studies regarding internalized homonegativity in among sexual minorities in Turkey has shown that IH to be common among study respondents and levels of IH were associated with depression, anxiety, and low self-esteem (Orta & Camgöz, 2018). More specifically, a study found that among 210 homosexual or bisexual men, 21.9% of men had reported IH and high levels of IH was associated with daily alcohol consumption (Yalçinoglu & Önal, 2014).

Overall, current political and social environment in Turkey negatively effects sexual minorities' well-being (Güney et al., 2004) and the lack of empirical evidence regarding this population highlights the need for future research (Orta & Camgöz, 2018).

1.9.2.1. Epidemiology of HIV/AIDS in Turkey

One of the major issues concerning the epidemiology of HIV/AIDS in Turkey is the uncertainty regarding the number of people living with HIV (ECDC, 2015). There is estimated to be a total of 24,543 people living with HIV in Turkey in 2020 (ECDC, 2021). While in the recent reports it has been documented that majority of HIV transmission occurred through heterosexual contact and secondly by transmission among MSM, 59% of the HIV transmission was via an unknown transmission mode (ECDC, 2021). Empirical studies documenting epidemiological profile of new HIV infections

showed the increasing trends in the number of newly diagnosed men identifying as MSM (Erdinc et al., 2020).

Correspondingly, people living with HIV (PLWH) in Turkey suffers from high levels of discrimination and stigma due to their HIV serostatus. Among the few studies including PLWH in Turkey, a study found that 23% of the respondents have reported being gossiped about after their positive diagnosis (Gökengin et al., 2017). Likewise, among the 30% who had lost their jobs in the past-year, 47% reported that they have lost their job due to their HIV diagnosis, and, 39% and 35% reported being discriminated by their employers and health care professionals respectively (Gökengin et al., 2017). Being discriminated by health care professionals may not be surprising due to insufficient and incorrect knowledge of HIV transmission reported by nurses in another study from Turkey (Koç et al., 2017). This study also showed that the insufficient knowledge regarding HIV transmission among nurses was also associated with negative attitudes towards patients with HIV/AIDS (Koç et al., 2017).

Epidemiological and social environment regarding HIV/AIDS transmission and PLWH portrays Turkey as an important case to, first, produce much needed empirical evidence to contribute epidemiological research in the country, and second, delineate future research areas to be studied.

1.9.3. The United States

Until 1962, all 50 states of The United States (US) criminalized same-sex sexual activity. Since then, LGBT rights movement gained momentum during the late 1960's which led to legalization of same-sex marriage across all 50 states in 2015. Between 2002 and 2019, the acceptance of homosexuality has increased from 51% to 72% according the Pew Research Centre's Spring 2019 Global Attitudes Survey (Poushter & Kent, 2020). Between 2012 and 2016, it has been shown that the proportion of Americans identifying as LGBT increased from 3.5% to 4.1%, with 7.3% of millennials (those who were born between 1980-1998) were identified as LGBT (J. M. Jones, 2021).

With an increase in the numbers of LGBT acceptance and those who identify as LGBT, the prevalence of particular risks which disproportionately effects this population is also increasing. In the US, it is extensively documented that relative to their

heterosexual counterparts, lesbian, gay, and bisexual (LGB) individuals tend to have higher rates of psychoactive drug use (Schuler et al., 2019), especially regarding club drug use (Griffin et al., 2020; Kelly et al., 2006), and are at the risk of developing substance use disorder (Kerridge et al., 2017). Similarly, data from the US showed that LGB individuals are more likely to experience depression (Bostwick et al., 2014) and abuse (Chaudhry & Reisner, 2019). Correspondingly, LGB individuals in the US based datasets have shown to report greater suicidality when compared to their heterosexual counterparts (Guz et al., 2021; Miranda-Mendizábal et al., 2017; Sönmez & Palamar, 2022b). Thus, high prevalence of these important variables characterizes the US as an important context to study adverse health-related outcomes concerning sexual minorities.

Another important characteristic to note is that the US provides a unique opportunity to study health-related disparities among sexual minorities as there is an abundance of available data including participant's sexual orientation, especially in the periodic prevalence surveys (Baams et al., 2015). Data availability allows us to be able to conduct methodologically sound research, which is important to do so given the lack of data related to sexual minorities in many contexts (Vrangalova & Savin-Williams, 2014).

1.10. Research Questions and Aims

As abovementioned, although there has been an increase in the well-being of sexual minorities over the last decade, health-related disparities among LGB individuals still exists. The holistic objective of this dissertation is to determine whether and how particular individual level variables are associated with adverse health-related outcomes in diverse samples from different contexts. In order to comply with this holistic objective, below I present each chapters' specific research questions and aims. All chapters are based on analysed conducted with cross-sectional data. Chapter 2 and 3 utilizes the European Men Internet Survey (EMIS) Data from Spain and Turkey and a methodology of structural equation modelling has been utilized. In Chapter 4 and 5, I analyse six-year pooled cross-sectional data from National Survey on Drug Use and Health from the US. Chapter 4 is based on analysis from logistic regression and Chapter 5 has a methodology of structural equation modelling.

In Chapter 2, we are investigating how internalised homonegativity (IH) is associated with the number of non-steady male partners with condomless intercourse (as

a proxy of sexual risk behaviour [SRB]), among a sample of men who have sex with men (MSM) (N=3436) in Spain who bear intrinsic HIV risk. Second, we examine mediating effects of HIV/PrEP knowledge and substance use during sex on this relationship. Our main research questions are; "How does internalised homonegativity influences sexual risk behaviour?" and "Do HIV/PrEP knowledge and substance use during sex mediate the relationship between internalised homonegativity and sexual risk behaviour?"

In Chapter 3, we take a comparison approach for the research questions asked in the Chapter 2, and we compare how IH is associated with SRB among MSM in Spain and Turkey. Our main research questions are; "Does the effect of internalised homonegativity on sexual risk behaviour vary across contexts?", "Do HIV/PrEP knowledge and substance use during sex mediate the relationship between internalised homonegativity and sexual risk behaviour across different contexts?

In Chapter 4, I aim to discover the association between sexual identity-attraction discordance and self-injurious thoughts and behaviours (SITBs), namely suicidal thoughts, suicide plans, and suicide attempts among males in the United States (US). I use the most recent six waves of data from National Survey on Drug Use and Health (NSDUH, 2015-2020). This chapter's main research questions are; "Is sexual identity-attraction discordance associated with SITBs?" and "Does the effect of sexual-identity discordance vary across sexual identities?"

In Chapter 5, I investigate the relationship between sexual identity, early substance use imitation (prior to age 14), and alcohol and drug abuse and dependence later in life. Using the most recent six waves of data from NSDUH, I aim to dismantle, firstly, whether or not gay, lesbian, and bisexual identity is associated with early initiation of cocaine, ecstasy, methamphetamine, inhalants, marijuana, and alcohol; secondly, whether early initiation of these drugs is associated with alcohol and drug abuse and dependence later in life. Lastly, I examine whether or not early initiation mediates the relationship between sexual identity and drug dependence later in life. Thus, the main research questions of this chapter are the following: "Does sexual orientation associate with early substance use initiation?"; "Does early substance initiation associate with alcohol and drug dependence later in life?"; and "Does early substance use initiation mediate the relationship between sexual identity and alcohol and drug dependence later in life?"

1.11. Contributions

The relationship among sexual minority identity and substance use, sexual risk behaviours, disease risk, and mental health have been documented extensively. Many of the previous work in this area focused on (1) bivariate associations between variables controlled for certain characteristics, (2) focused on a single country, or (3) focused on a conceptualization of traditional binary sexual identity. With each chapter, this dissertation aims to fill at least one of these gaps in the literature. Below, I provide a summary of the detailed contributions, separately for each chapter.

Second Chapter – The main aim of this chapter is to examine the mediator role of HIV/PrEP knowledge and substance use during sex on the relationship between IH and sexual risk behaviour. As previously mentioned, HIV sexual transmission risk among MSM depends on multiple factors (Baral et al., 2013). Previous evidence on the relationship between IH and sexual risk behaviour point to inconsistencies (Newcomb & Mustanski, 2010), which suggests the potential existence of mediator variables (Kashubeck-West & Szymanski, 2008). Therefore, it is the contribution of this chapter to fill this gap by examining the role of possible two mediator variables that affect the relation between IH and sexual risk behaviours. Furthermore, the data analysed for this chapter includes the largest sample of MSM from Spain.

Third Chapter - In the third chapter, we re-constructed the structural equation modelling (SEM) from the second chapter and estimated it across countries (Spain and Turkey) using a multigroup SEM, which leads to particular distinct results that allow us to compare latent variables across context. Therefore, in the third chapter, we use the same dataset from Spain to be able to make scientific comparison between dataset from Turkey, and for the purposes of reliable comparison across contexts and studies; we did not modify how the variables and methodology from Spain has been constructed. We have successfully acknowledged the paper in our manuscript and we state the following in our manuscript: "We employed a similar structural model developed in the study of Sönmez et al. (2021)." Likewise, EMIS study has been conducted in both contexts with a similar methodology; therefore, explaining this has led to overlaps in both papers.

The third chapter makes substantially contributions to the research field that second paper did not. First and foremost, to our best knowledge, our paper is the first to investigate the influence of internalized homonegativity on sexual risk behaviour in

Turkey and on a large sample including men who have sex with men in Turkey, a country with very limited research on the field. Second, our paper makes comparisons of Spain and Turkey regarding meanings of risky sex and its evolution within different contexts and makes a substantial contribution by comparing two contexts that differs in terms of previous exploration on the topic vastly. We believe that a study only focusing on Turkey instead of a comparison between contexts based on a previously published paper would not provide a contribution to this extent. Lastly, our paper provides an elaborate methodological example for future studies. In our paper, we provide an extensive methodological development where we explain how we constructed a previously published SEM (from our previous paper) into a multigroup SEM step-by-step and how we established reliability of variances across countries. This methodological development presents as a blueprint for future studies.

Fourth Chapter – Suicide still is one of the common leading causes of death in the US (Hedegaard, 2021) and LGB populations are disproportionately affected from self-injurious thoughts and behaviours (SITBs) (Guz et al., 2021; Miranda-Mendizábal et al., 2017). While the link between sexual identity and SITBs has long been established, only a few studies investigated the relationship between sexual identity-attraction discordance (i.e. identifying as heterosexual but only reporting same-sex behaviour) and SITBs. Furthermore, studies that focused on sexual identity-attraction discordance usually focused on women and over-simplification of concordant-discordant identity and attraction (Vrangalova & Savin-Williams, 2014). Therefore, this chapter has three main contributions. Firstly, it examines the relationship between sexual identity-attraction discordance and SITBs; second, it provides analysed within samples of men and women; third, it analyses sexual identity-attraction within each sexual identity (i.e. only among bisexual identified individuals).

Fifth Chapter – Certain LGB sub-populations are at risk of early substance use initiation (Sönmez & Palamar, 2022a) and early substance use initiation has been associated with substance use dependence later in life (Douglas et al., 2010). Similarly, it has been documented that LGB individuals are more likely to develop substance dependency (Cochran et al., 2004; McCabe et al., 2009b). However, no study has examined the possible mediator role of early substance use initiation on the relationship between sexual identity and substance dependency later in life. It is the aim of this chapter to provide evidence whether or not early substance use initiation mediates this relationship.

Overall contribution of the dissertation – The first and foremost contribution of this Ph.D. dissertation as a whole is the socio-epidemiological nature of the scientific research included in the following chapters[1]. Second, the said chapters of this dissertation examine important public health concerns which are disproportionately experienced by either LGB populations as a whole or sub-population from this group. Therefore, results and discussions of these articles can help reducing public health inequities concerning LGB populations. Third, scientific chapters of this dissertation focus on three different contexts, namely, Spain, Turkey, and the US, which are inherently distinct from one another in terms of current social and epidemiological needs, availability of data, and cultural and political environment. Discussion of results from three distinct context can help better contextualize current public health needs for prevention policies and future studies.

---

[1] Which, to a certain extent, explains the format of the scientific articles included in this dissertation. While the all research is based on theoretical discussions, extended rationalization of theoretical development is omitted and replaced with strong methodological developments to predict inequities in health. The prioritized aim of the following articles is to, first, to incorporate the social experience of populations in the traditional etiological approach to public health, and second, publish in peer-review public health journals.

1.12. References

Adams, H. E., Wright Jr, L. W., & Lohr, B. A. (1996). Is homophobia associated with homosexual arousal? *Journal of Abnormal Psychology*, *105*(3), 440.

American Psychological Association. (2015). Guidelines for psychological practice with transgender and gender nonconforming people. *American Psychologist*, *70*(9), 832–864.

Annor, F. B., Clayton, H. B., Gilbert, L. K., Ivey-Stephenson, A. Z., Irving, S. M., David-Ferdon, C., & Kann, L. K. (2018). Sexual Orientation Discordance and Nonfatal Suicidal Behaviors in U.S. High School Students. *American Journal of Preventive Medicine*, *54*(4), 530–538. https://doi.org/10.1016/j.amepre.2018.01.013

Aydin, E., & Ozeren, E. (2020). Inclusion and exclusion of sexual minorities at organisations: Evidence from LGBT NGOs in Turkey and the UK. *Journal of Organizational Change Management*, *33*(3), 567–578.

Badgett, M. V. L., Waaldijk, K., & Rodgers, Y. van der M. (2019). The relationship between LGBT inclusion and economic development: Macro-level evidence. *World Development*, *120*, 1–14. https://doi.org/10.1016/j.worlddev.2019.03.011

Badgett, M. V. L., Waaldijk, K., & van der Meulen Rodgers, Y. (2014). *The relationship between LGBT inclusion and economic development: An analysis of emerging economies*. Williams Institute.

Bakacak, A. G., & Ōktem, P. (2014). Homosexuality in Turkey: Strategies for managing heterosexism. *Journal of Homosexuality*, *61*(6), 817–846.

Balsam, K. F., & Mohr, J. J. (2007). Adaptation to sexual orientation stigma: A comparison of bisexual and lesbian/gay adults. *Journal of Counseling Psychology*, *54*(3), 306–319. https://doi.org/10.1037/0022-0167.54.3.306

Baral, S., Logie, C. H., Grosso, A., Wirtz, A. L., & Beyrer, C. (2013). Modified social ecological model: A tool to guide the assessment of the risks and risk contexts of HIV epidemics. *BMC Public Health*, *13*(1). https://doi.org/10.1186/1471-2458-13-482

Barron, L. G., & Hebl, M. (2013). The force of law: The effects of sexual orientation antidiscrimination legislation on interpersonal discrimination in employment. *Psychology, Public Policy, and Law*, *19*(2), 191–205. https://doi.org/10.1037/a0028350

Berg, R. C., Munthe-Kaas, H. M., & Ross, M. W. (2016). Internalized Homonegativity: A Systematic Mapping Review of Empirical Research. *Journal of Homosexuality*, *63*(4), 541–558. https://doi.org/10.1080/00918369.2015.1083788

Bilgehan Ozturk, M. (2011). Sexual orientation discrimination: Exploring the experiences of
lesbian, gay and bisexual employees in Turkey. *Human Relations*, *64*(8), 1099–1118.
https://doi.org/10.1177/0018726710396249

Bishop, M. D., Fish, J. N., Hammack, P. L., & Russell, S. T. (2020). Sexual identity development
milestones in three generations of sexual minority people: A national probability
sample. *Developmental Psychology*, *56*(11), 2177–2193.
https://doi.org/10.1037/dev0001105

Bockting, W. O., Miner, M. H., Swinburne Romine, R. E., Hamilton, A., & Coleman, E. (2013).
Stigma, Mental Health, and Resilience in an Online Sample of the US Transgender
Population. *American Journal of Public Health*, *103*(5), 943–951.
https://doi.org/10.2105/AJPH.2013.301241

Bostwick, W. B., Boyd, C. J., Hughes, T. L., West, B. T., & McCabe, S. E. (2014). Discrimination
and mental health among lesbian, gay, and bisexual adults in the United States.
American Journal of Orthopsychiatry, *84*(1), 35–45. https://doi.org/10.1037/h0098851

Boyle, S. C., LaBrie, J. W., Costine, L. D., & Witkovic, Y. D. (2017). "It's how we deal":
Perceptions of LGB peers' use of alcohol and other drugs to cope and sexual minority
adults' own coping motivated substance use following the Pulse nightclub shooting.
Addictive Behaviors, *65*, 51–55. https://doi.org/10.1016/j.addbeh.2016.10.001

Branscombe, N. R., & Wann, D. L. (1994). Collective self-esteem consequences of outgroup
derogation when a valued social identity is on trial. *European Journal of Social
Psychology*, *24*(6), 641–657. https://doi.org/10.1002/ejsp.2420240603

Brewster, M. E., & Moradi, B. (2010). Perceived experiences of anti-bisexual prejudice:
Instrument development and evaluation. *Journal of Counseling Psychology*, *57*, 451–
468. https://doi.org/10.1037/a0021116

Bry, L. J., Mustanski, B., Garofalo, R., & Burns, M. N. (2017). Management of a Concealable
Stigmatized Identity: A Qualitative Study of Concealment, Disclosure, and Role Flexing
Among Young, Resilient Sexual and Gender Minority Individuals. *Journal of
Homosexuality*, *64*(6), 745–769. https://doi.org/10.1080/00918369.2016.1236574

Burgard, S. A., Cochran, S. D., & Mays, V. M. (2005). Alcohol and tobacco use patterns among
heterosexually and homosexually experienced California women. *Drug and Alcohol
Dependence*, *77*(1), 61–70. https://doi.org/10.1016/j.drugalcdep.2004.07.007

Camp, J., Vitoratou, S., & Rimes, K. A. (2020). LGBQ+ Self-Acceptance and Its Relationship with
Minority Stressors and Mental Health: A Systematic Literature Review. *Archives of
Sexual Behavior*, *49*(7), 2353–2373. https://doi.org/10.1007/s10508-020-01755-2

Chakrapani, V. (2019). Syndemic Classes, Stigma, and Sexual Risk Among Transgender Women in India. *AIDS and Behavior*, 12.

Chakrapani, V., Newman, P. A., Shunmugam, M., Logie, C. H., & Samuel, M. (2017). Syndemics of depression, alcohol use, and victimisation, and their association with HIV-related sexual risk among men who have sex with men and transgender women in India. *Global Public Health*, *12*(2), 250–265. https://doi.org/10.1080/17441692.2015.1091024

Chandra, A., Copen, C. E., & Mosher, W. D. (2013). Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data from the 2006–2010 National Survey of Family Growth. In A. K. Baumle (Ed.), *International Handbook on the Demography of Sexuality* (pp. 45–66). Springer Netherlands. https://doi.org/10.1007/978-94-007-5512-3_4

Chandra, A., Mosher, W., Copen, C., & Sionean, C. (2011). Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data From the 2006-2008 National Survey of Family Growth. *National Health Statistics Reports*, 1–36.

Chaudhry, A. B., & Reisner, S. L. (2019). Disparities by Sexual Orientation Persist for Major Depressive Episode and Substance Abuse or Dependence: Findings from a National Probability Study of Adults in the United States. *LGBT Health*, *6*(5), 261–266. https://doi.org/10.1089/lgbt.2018.0207

Chuang, D.-M., Newman, P. A., Fang, L., & Lai, M.-C. (2021). Syndemic Conditions, Sexual Risk Behavior, and HIV Infection Among Men Who Have Sex with Men in Taiwan. *AIDS and Behavior*, *25*(11), 3503–3518. https://doi.org/10.1007/s10461-021-03269-x

Cochran, S. D., Ackerman, D., Mays, V. M., & Ross, M. W. (2004). *Prevalence of non-medical drug use and dependence among homosexually active men and women in the US population*. 10.

Corrigan, P. W., Markowitz, F. E., & Watson, A. C. (2004). Structural Levels of Mental Illness Stigma and Discrimination. *Schizophrenia Bulletin*, *30*(3), 481–491. https://doi.org/10.1093/oxfordjournals.schbul.a007096

Coulter, R. W. S., Kinsky, S. M., Herrick, A. L., Stall, R. D., & Bauermeister, J. A. (2015). Evidence of Syndemics and Sexuality-Related Discrimination Among Young Sexual-Minority Women. *LGBT Health*, *2*(3), 250–257. https://doi.org/10.1089/lgbt.2014.0063

Cunningham, T. J., Xu, F., & Town, M. (2018). Prevalence of Five Health-Related Behaviors for Chronic Disease Prevention Among Sexual and Gender Minority Adults—25 U.S. States and Guam, 2016. *MMWR. Morbidity and Mortality Weekly Report*, *67*(32), 888–893. https://doi.org/10.15585/mmwr.mm6732a4

de Voux, A., Kidd, S., Grey, J. A., Rosenberg, E. S., Gift, T. L., Weinstock, H., & Bernstein, K. T. (2017). State-Specific Rates of Primary and Secondary Syphilis Among Men Who Have Sex with Men—United States, 2015. *MMWR. Morbidity and Mortality Weekly Report*, *66*(13), 349–354. https://doi.org/10.15585/mmwr.mm6613a1

Demant, D., Hides, L., Kavanagh, D. J., White, K. M., Winstock, A. R., & Ferris, J. (2016). Differences in substance use between sexual orientations in a multi-country sample: Findings from the Global Drug Survey 2015. *Journal of Public Health*, *39*(3), 532–541. https://doi.org/10.1093/pubmed/fdw069

Diagnoses of HIV Infection in the United States and Dependent Areas, 2019 (No. 32; HIV Surveillance Report). (2021). CDC. https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html

Douglas, K. R., Chan, G., Gelernter, J., Arias, A. J., Anton, R. F., Weiss, R. D., Brady, K., Poling, J., Farrer, L., & Kranzler, H. R. (2010). Adverse childhood events as risk factors for substance dependence: Partial mediation by mood and anxiety disorders. *Addictive Behaviors*, *35*(1), 7–13. https://doi.org/10.1016/j.addbeh.2009.07.004

Dowsett, G. W. (1990). Reaching men who have sex with men in Australia. An overview of AIDS education: Community intervention and community attachment strategies. *Australian Journal of Social Issues*, *25*(3), 186–198.

Drevin, G., Rossi, L.-H., Férec, S., Briet, M., & Abbara, C. (2021). Chemsex/slamsex-related intoxications: A case report involving gamma-hydroxybutyrate (GHB) and 3-methylmethcathinone (3-MMC) and a review of the literature. *Forensic Science International*, *321*, 110743. https://doi.org/10.1016/j.forsciint.2021.110743

Duncan, D. T., Zweig, S., Hambrick, H. R., & Palamar, J. J. (2019). Sexual Orientation Disparities in Prescription Opioid Misuse Among U.S. Adults. *American Journal of Preventive Medicine*, *56*(1), 17–26. https://doi.org/10.1016/j.amepre.2018.07.032

ECDC, W. (2015). *HIV/AIDS surveillance in Europe, 2014. Surveillance report*.

ECDC, W. (2021). *HIV/AIDS surveillance in Europe, 2021 (2020 data). Surveillance report*. https://www.ecdc.europa.eu/sites/default/files/documents/2021-Annual_HIV_Report_0.pdf

Elmslie, B., & Tebaldi, E. (2007). Sexual Orientation and Labor Market Discrimination. *Journal of Labor Research*, *28*(3), 436–453. https://doi.org/10.1007/s12122-007-9006-1

Engin, C. (2015). LGBT in Turkey: Policies and Experiences. *Social Sciences*, *4*(3), 838–858. https://doi.org/10.3390/socsci4030838

Engin, C., & Özbarlas, Z. (2021). Tracing the reverse history of homosexuality from the Ottoman Empire to contemporary Turkey: From tolerance to discrimination. In *The Routledge Handbook on Contemporary Turkey* (pp. 219–229). Routledge.

Erdinc, F. S., Dokuzoguz, B., Unal, S., Komur, S., Inkaya, A. C., Inan, D., Karaoglan, I., Deveci, A., Celen, M. K., Kose, S., Erben, N., Senturk, G. C., Heper, Y., Kutlu, S. S., Hatipoglu, C. A., Sumer, S., Kandemir, B., Sirmatel, F., Bayindir, Y., … Multicentric HIV Study Group. (2020). Temporal Trends in the Epidemiology of HIV in Turkey. *Current HIV Research*, *18*(4), 258–266. https://doi.org/10.2174/1570162X18666200427223823

European Centre for Disease Prevention and Control., Sigma Research (London School of Hygiene and Tropical Medicine)., & Robert Koch Institute. (2019). *EMIS-2017: The European men who have sex with men Internet survey : key findings from 50 countries.* Publications Office. https://data.europa.eu/doi/10.2900/690387

European Centre for Disease Prevention and Control & World Health Organization. (2020). *HIV/AIDS surveillance in Europe 2020: 2019 data*. Publications Office. https://data.europa.eu/doi/10.2900/073965

European Monitoring Centre for Drugs and Drug Addiction. (2019). *Monitoring the elimination of viral hepatitis as a public health threat among people who inject drugs in Europe: The elimination barometer.* Publications Office. https://data.europa.eu/doi/10.2810/143997

Feinstein, B. A., & Dyar, C. (2017). Bisexuality, Minority Stress, and Health. *Current Sexual Health Reports*, *9*(1), 42–49. https://doi.org/10.1007/s11930-017-0096-3

Fernández-Dávila, D. P. (2016). *"Sesión de sexo, morbo y vicio": Una aproximación holística para entender la aparición del fenómeno ChemSex entre hombres gais, bisexuales y otros hombres que tienen sexo con hombres en España*. *4*, 26.

Fernández-Dávila, P., & Zaragoza Lorca, K. (2009). Internet y riesgo sexual en hombres que tienen sexo con hombres. *Gaceta Sanitaria*, *23*(5), 380–387. https://doi.org/10.1016/j.gaceta.2008.11.004

Festinger, L. (1957). *A theory of cognitive dissonance.* (pp. xi, 291). Stanford University Press.

Fish, J. N., & Pasley, K. (2015). Sexual (Minority) Trajectories, Mental Health, and Alcohol Use: A Longitudinal Study of Youth as They Transition to Adulthood. *Journal of Youth and Adolescence*, *44*(8), 1508–1527. https://doi.org/10.1007/s10964-015-0280-6

Flanders, C. E. (2015). Bisexual Health: A Daily Diary Analysis of Stress and Anxiety. *Basic and Applied Social Psychology*, *37*(6), 319–335. https://doi.org/10.1080/01973533.2015.1079202

Foglia, M. B., & Fredriksen-Goldsen, K. I. (2014). Health Disparities among LGBT Older Adults and the Role of Nonconscious Bias. *Hastings Center Report*, *44*(s4), S40–S44. https://doi.org/10.1002/hast.369

Folch, C., Fernández-Dávila, P., Ferrer, L., Soriano, R., Díez, M., & Casabona, J. (2015). Alto consumo de drogas recreativas y conductas sexuales de riesgo en hombres que tienen relaciones sexuales con hombres. *Medicina Clínica*, *145*(3), 102–107. https://doi.org/10.1016/j.medcli.2014.04.030

Folch, C., Marks, G., Esteve, A., Zaragoza, K., Muñoz, R., & Casabona, J. (2006). Factors Associated with Unprotected Sexual Intercourse with Steady Male, Casual Male, and Female Partners Among Men Who Have Sex with Men in Barcelona, Spain. *AIDS Education and Prevention*, *18*(3), 227–242. https://doi.org/10.1521/aeap.2006.18.3.227

Foucault, M. (1978). *The history of sexuality* (1st American ed). Pantheon Books.

Giorgetti, R., Tagliabracci, A., Schifano, F., Zaami, S., Marinelli, E., & Busardò, F. P. (2017). When "Chems" Meet Sex: A Rising Phenomenon Called "ChemSex." *Current Neuropharmacology*, *15*(5). https://doi.org/10.2174/1570159X15666161117151148

Gökengin, D., Çalık, Ş., & Öktem, P. (2017). Türkiye'de HIV'le ilgili damgalama ve ayrımcılığın analizi: HIV'le yaşayan kişiler için damgalanma göstergesi sonuçları. *Klimik Dergisi*, *30*(1), 15–21.

Goldbach, J. T., Tanner-Smith, E. E., Bagwell, M., & Dunlap, S. (2014). Minority Stress and Substance Use in Sexual Minority Adolescents: A Meta-analysis. *Prevention Science*, *15*(3), 350–363. https://doi.org/10.1007/s11121-013-0393-7

González-Baeza, A., Dolengevich-Segal, H., Pérez-Valero, I., Cabello, A., Téllez, M. J., Sanz, J., Pérez-Latorre, L., Bernardino, J. I., Troya, J., De La Fuente, S., Bisbal, O., Santos, I., Arponen, S., Hontañon, V., Casado, J. L., Ryan, P., & the U-SEX GESIDA 9416 Study. (2018). Sexualized Drug Use (Chemsex) Is Associated with High-Risk Sexual Behaviors and Sexually Transmitted Infections in HIV-Positive Men Who Have Sex with Men: Data from the U-SEX GESIDA 9416 Study. *AIDS Patient Care and STDs*, *32*(3), 112–118. https://doi.org/10.1089/apc.2017.0263

Grant, R. M., Lama, J. R., Anderson, P. L., McMahan, V., Liu, A. Y., Vargas, L., Goicochea, P., Casapía, M., Guanira-Carranza, J. V., Ramirez-Cardich, M. E., Montoya-Herrera, O., Fernández, T., Veloso, V. G., Buchbinder, S. P., Chariyalertsak, S., Schechter, M., Bekker, L.-G., Mayer, K. H., Kallás, E. G., … Glidden, D. V. (2010). Preexposure Chemoprophylaxis for HIV Prevention in Men Who Have Sex with Men. *New England Journal of Medicine*, *363*(27), 2587–2599. https://doi.org/10.1056/NEJMoa1011205

Greene, D. C., & Britton, P. J. (2012). Stage of Sexual Minority Identity Formation: The Impact of Shame, Internalized Homophobia, Ambivalence Over Emotional Expression, and Personal Mastery. *Journal of Gay & Lesbian Mental Health*, *16*(3), 188–214. https://doi.org/10.1080/19359705.2012.671126

Griffin, M., Callander, D., Duncan, D. T., & Palamar, J. J. (2020). Differential Risk for Drug Use by Sexual Minority Status among Electronic Dance Music Party Attendees in New York City. *Substance Use & Misuse*, *55*(2), 230–240. https://doi.org/10.1080/10826084.2019.1662811

Güney, N., Kargı, E., & Çorbacı-Oruç, A. (2004). Üniversite öğrencilerinin eşcinsellik konusundaki görüşlerinin incelenmesi. *Turkish Journal Of HIV/AIDS*, *7*(4), 131–137.

Guz, S., Kattari, S. K., Atteberry-Ash, B., Klemmer, C. L., Call, J., & Kattari, L. (2021). Depression and Suicide Risk at the Cross-Section of Sexual Orientation and Gender Identity for Youth. *Journal of Adolescent Health*, *68*(2), 317–323. https://doi.org/10.1016/j.jadohealth.2020.06.008

Halkitis, P. N. (2005). Longitudinal Investigation of Methamphetamine Use Among Gay and Bisexual Men in New York City: Findings from Project BUMPS. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *82*(1_suppl_1), i18–i25. https://doi.org/10.1093/jurban/jti020

Halkitis, P. N., Fischgrund, B. N., & Parsons, J. T. (2005). Explanations for Methamphetamine Use Among Gay and Bisexual Men in New York City. *Substance Use & Misuse*, *40*(9–10), 1331–1345. https://doi.org/10.1081/JA-200066900

Halkitis, P. N., & Palamar, J. J. (2008). Multivariate Modeling of Club Drug Use Initiation Among Gay and Bisexual Men. *Substance Use & Misuse*, *43*(7), 871–879. https://doi.org/10.1080/10826080701801337

Halkitis, P. N., & Singer, S. N. (2018). Chemsex and mental health as part of syndemic in gay and bisexual men. *International Journal of Drug Policy*, *55*, 180–182. https://doi.org/10.1016/j.drugpo.2018.04.002

Han, B. H., Duncan, D. T., Arcila-Mesa, M., & Palamar, J. J. (2020). Co-occurring mental illness, drug use, and medical multimorbidity among lesbian, gay, and bisexual middle-aged and older adults in the United States: A nationally representative study. *BMC Public Health*, *20*(1), 1123. https://doi.org/10.1186/s12889-020-09210-6

Harmon-Jones, E., & Mills, J. (2019). An introduction to cognitive dissonance theory and an overview of current perspectives on the theory. In E. Harmon-Jones (Ed.), *Cognitive dissonance: Reexamining a pivotal theory in psychology (2nd ed.).* (pp. 3–24). American Psychological Association. https://doi.org/10.1037/0000135-001

Hatzenbuehler, M. L. (2016). Structural stigma: Research evidence and implications for psychological science. *American Psychologist*, *71*(8), 742–751. https://doi.org/10.1037/amp0000068

Hatzenbuehler, M. L., Keyes, K. M., & Hasin, D. S. (2009). State-level policies and psychiatric morbidity in lesbian, gay, and bisexual populations. *American Journal of Public Health*, *99*(12), 2275–2281.

Hatzenbuehler, M. L., & Link, B. G. (2014). Introduction to the special issue on structural stigma and health. *Social Science & Medicine*.

Hedegaard, H. (2021). *Suicide Mortality in the United States, 1999-2019*. National Center for Health Statistics. https://doi.org/10.15620/cdc:101761

Hequembourg, A. L., & Brallier, S. A. (2009). An exploration of sexual minority stress across the lines of gender and sexual identity. *Journal of Homosexuality*, *56*(3), 273–298. https://doi.org/10.1080/00918360902728517

Herek, G. M. (2004). Beyond "Homophobia": Thinking about sexual prejudice and stigma in the twenty-first century. *Sexuality Research and Social Policy*, *1*(2), 6–24. https://doi.org/10.1525/srsp.2004.1.2.6

Herek, G. M. (2007). Confronting Sexual Stigma and Prejudice: Theory and Practice: Confronting Sexual Stigma and Prejudice. *Journal of Social Issues*, *63*(4), 905–925. https://doi.org/10.1111/j.1540-4560.2007.00544.x

Herek, G. M., & Capitanio, J. P. (1993). Public reactions to AIDS in the United States: A second decade of stigma. *American Journal of Public Health*, *83*(4), 574–577.

Herek, G. M., Gillis, J. R., & Cogan, J. C. (2009). Internalized stigma among sexual minority adults: Insights from a social psychological perspective. *Journal of Counseling Psychology*, *56*(1), 32–43. https://doi.org/10.1037/a0014672

Herek, G. M., & McLemore, K. A. (2013). Sexual Prejudice. *Annual Review of Psychology*, *64*(1), 309–333. https://doi.org/10.1146/annurev-psych-113011-143826

Hickson, F., Bonell, C., Weatherburn, P., & Reid, D. (2010). Illicit drug use among men who have sex with men in England and Wales. *Addiction Research & Theory*, *18*(1), 14–22. https://doi.org/10.3109/16066350902770433

Horn, K., & Swartz, J. A. (2019). A Comparative Analysis of Lifetime Medical Conditions and Infectious Diseases by Sexual Identity, Attraction, and Concordance among Women: Results from a National U.S. Survey. *International Journal of Environmental Research and Public Health*, *16*(8), 1399. https://doi.org/10.3390/ijerph16081399

Horowitz, J. L., & Newcomb, M. D. (2001). A multidimensional approach to homosexual identity. *Journal of Homosexuality*, *42*(2), 1–19. https://doi.org/10.1300/J082v42n02_01

Hottes, T. S., Bogaert, L., Rhodes, A. E., Brennan, D. J., & Gesink, D. (2016). Lifetime Prevalence of Suicide Attempts Among Sexual Minority Adults by Study Sampling Strategies: A Systematic Review and Meta-Analysis. *American Journal of Public Health*, *106*(5), e1–e12. https://doi.org/10.2105/AJPH.2016.303088

Hudson, W. W., & Ricketts, W. A. (1980). A strategy for the measurement of homophobia. *Journal of Homosexuality*, *5*(4), 357–372.

Ipsos. (2015). *Of 23 Countries Surveyed, Majority (65%) in 20 Countries Support Legal Recognition of Same-Sex Unions*. https://web.archive.org/web/20150603194659/http://www.ipsos-na.com/news-polls/pressrelease.aspx?id=6866

Jones, A., Robinson, E., Oginni, O., Rahman, Q., & Rimes, K. A. (2017). Anxiety disorders, gender nonconformity, bullying and self-esteem in sexual minority adolescents: Prospective birth cohort study. *Journal of Child Psychology and Psychiatry*, *58*(11), 1201–1209. https://doi.org/10.1111/jcpp.12757

Jones, J. M. (2021, February 24). LGBT Identification Rises to 5.6% in Latest U.S. Estimate. *Gallup*. https://news.gallup.com/poll/329708/lgbt-identification-rises-latest-estimate.aspx

Jost, J., & Hunyady, O. (2003). The psychology of system justification and the palliative function of ideology. *European Review of Social Psychology*, *13*(1), 111–153. https://doi.org/10.1080/10463280240000046

Kashubeck-West, S., & Szymanski, D. M. (2008). Risky Sexual Behavior in Gay and Bisexual Men: Internalized Heterosexism, Sensation Seeking, and Substance Use. *The Counseling Psychologist*, *36*(4), 595–614. https://doi.org/10.1177/0011000007309633

Katz-Wise, S. L., & Hyde, J. S. (2012). Victimization Experiences of Lesbian, Gay, and Bisexual Individuals: A Meta-Analysis. *The Journal of Sex Research*, *49*(2–3), 142–167. https://doi.org/10.1080/00224499.2011.637247

Katz-Wise, S. L., Rosario, M., Calzo, J. P., Scherer, E. A., Sarda, V., & Austin, S. B. (2017). Associations of Timing of Sexual Orientation Developmental Milestones and Other Sexual Minority Stressors with Internalizing Mental Health Symptoms Among Sexual Minority Young Adults. *Archives of Sexual Behavior*, *46*(5), 1441–1452. https://doi.org/10.1007/s10508-017-0964-y

Keller, S. B., & Smith, D. M. (2011). The price of tenofovir-emtricitabine undermines the cost-effectiveness and advancement of pre-exposure prophylaxis. *AIDS*, *25*(18), 2308–2310. https://doi.org/10.1097/QAD.0b013e32834d3cab

Kelly, B. C., Parsons, J. T., & Wells, B. E. (2006). Prevalence and Predictors of Club Drug Use among Club-Going Young Adults in New York City. *Journal of Urban Health*, *83*(5), 884–895. https://doi.org/10.1007/s11524-006-9057-2

Kerridge, B. T., Pickering, R. P., Saha, T. D., Ruan, W. J., Chou, S. P., Zhang, H., Jung, J., & Hasin, D. S. (2017). Prevalence, sociodemographic correlates and DSM-5 substance use disorders and other psychiatric disorders among sexual minorities in the United States. *Drug and Alcohol Dependence*, *170*, 82–92. https://doi.org/10.1016/j.drugalcdep.2016.10.038

Khan, S., & Khan, O. A. (2006). The trouble with MSM. *American Journal of Public Health*, *96*(5), 765-a.

Koç, A., Öztaş, D., & Ceylan, E. (2017). Correlation of misperceptions in Turkish nurses' knowledge regarding HIV and their attitude toward patients with HIV/AIDS. *Medical Journal of Islamic World Academy of Sciences*, *25*(3), 81–88.

Kosciw, J. G., Greytak, E. A., Bartkiewicz, M. J., Boesen, M. J., Palmer, N. A., & Gay, L. and S. E. N. (GLSEN). (2012). *The 2011 National School Climate Survey The Experiences of Lesbian, Gay, Bisexual and Transgender Youth in Our Nation's Schools*. Distributed by ERIC Clearinghouse.

Kress, A. C., Asberry, A., Taillepierre, J. D., Johns, M. M., Tucker, P., & Penman-Aguilar, A. (2021). Collection of Data on Sex, Sexual Orientation, and Gender Identity by U.S. Public Health Data and Monitoring Systems, 2015–2018. *International Journal of Environmental Research and Public Health*, *18*(22), 12189. https://doi.org/10.3390/ijerph182212189

Le, A., Yockey, A., & Palamar, J. J. (2020). Use of "Poppers" among Adults in the United States, 2015-2017. *Journal of Psychoactive Drugs*, *52*(5), 433–439. https://doi.org/10.1080/02791072.2020.1791373

Lee, J. H., Gamarel, K. E., Bryant, K. J., Zaller, N. D., & Operario, D. (2016). Discrimination, Mental Health, and Substance Use Disorders Among Sexual Minority Populations. *LGBT Health*, *3*(4), 258–265. https://doi.org/10.1089/lgbt.2015.0135

Lourie, M. A., & Needham, B. L. (2017). Sexual Orientation Discordance and Young Adult Mental Health. *Journal of Youth and Adolescence*, *46*(5), 943–954. https://doi.org/10.1007/s10964-016-0553-8

Lozano-Verduzco, I., Fernández-Niño, J. A., Baruch-Domínguez, R., Área Académica 3, Universidad Pedagógica Nacional, Ciudad de México, México., ActúaDF, A.C., Ciudad de México, México., Departamento de Salud Pública, Universidad del Norte, Barranquilla, Colombia., & Escuela de Salud Pública de México, Instituto Nacional de Salud Pública, Morelos, México. (2017). Association between internalized homophobia and mental health indicators in LGBT individuals in Mexico City. *Salud Mental*, *40*(5), 219–226. https://doi.org/10.17711/SM.0185-3325.2017.028

Lunsing, W. (2005). LGBT Rights in Japan. *Peace Review*, *17*(2–3), 143–148. https://doi.org/10.1080/14631370500332858

Masci, D., Podrebarac Sciupac, E., & Lipka, M. (2019). *Same-Sex Marriage Around the World*. Pew Research Center. https://www.pewresearch.org/religion/fact-sheet/gay-marriage-around-the-world/

McCabe, S. E., Hughes, T. L., Bostwick, W. B., West, B. T., & Boyd, C. J. (2009a). Sexual orientation, substance use behaviors and substance dependence in the United States. *Addiction*, *104*(8), 1333–1345. https://doi.org/10.1111/j.1360-0443.2009.02596.x

McCabe, S. E., Hughes, T. L., Bostwick, W. B., West, B. T., & Boyd, C. J. (2009b). Sexual orientation, substance use behaviors and substance dependence in the United States. *Addiction*, *104*(8), 1333–1345. https://doi.org/10.1111/j.1360-0443.2009.02596.x

McLaren, S., Jude, B., & McLachlan, A. (2007). Sexual Orientation, Sense of Belonging and Depression in Australian Men. *International Journal of Men's Health*, *6*(3), 259–272. https://doi.org/10.3149/jmh.0603.259

Medley, G., Lipari, R. N., Bose, J., Cribb, D. S., Kroutil, L. A., & McHenry, G. (2015). *Sexual Orientation and Estimates of Adult Substance Use and Mental Health: Results from the 2015 National Survey on Drug Use and Health*. 54.

Meyer, I. H. (1995). Minority Stress and Mental Health in Gay Men. *Journal of Health and Social Behavior*, *36*(1), 38. https://doi.org/10.2307/2137286

Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence. *Psychol Bull*, *129*(5), 674–697.

Meyer, I. H. (2015). Resilience in the study of minority stress and health of sexual and gender minorities. *Psychology of Sexual Orientation and Gender Diversity*, *2*(3), 209–213. https://doi.org/doi:10.1037/sgd0000132

Meyer, I. H., & Dean, L. (1998). Internalized homophobia, intimacy, and sexual behavior among gay and bisexual men. In G. Herek (Ed.), *Stigma and sexual orientation: Understanding prejudice against lesbians, gay men, and bisexuals*. Sage Publications.

Mimiaga, M. J., O'Cleirigh, C., Biello, K. B., Robertson, A. M., Safren, S. A., Coates, T. J., Koblin, B. A., Chesney, M. A., Donnell, D. J., Stall, R. D., & Mayer, K. H. (2015). The Effect of Psychosocial Syndemic Production on 4-Year HIV Incidence and Risk Behavior in a Large Cohort of Sexually Active Men Who Have Sex With Men. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *68*(3), 329–336. https://doi.org/10.1097/QAI.0000000000000475

Mink, M. D., Lindley, L. L., & Weinstein, A. A. (2014). Stress, Stigma, and Sexual Minority Status: The Intersectional Ecology Model of LGBTQ Health. *Journal of Gay & Lesbian Social Services*, *26*(4), 502–521. https://doi.org/10.1080/10538720.2014.953660

Miranda-Mendizábal, A., Castellví, P., Parés-Badell, O., Almenara, J., Alonso, I., Blasco, M. J., Cebrià, A., Gabilondo, A., Gili, M., Lagares, C., Piqueras, J. A., Roca, M., Rodríguez-Marín, J., Rodríguez-Jiménez, T., Soto-Sanz, V., Vilagut, G., & Alonso, J. (2017). Sexual orientation and suicidal behaviour in adolescents and young adults: Systematic review and meta-analysis. *British Journal of Psychiatry*, *211*(2), 77–87. https://doi.org/10.1192/bjp.bp.116.196345

Mirandola, M., Gios, L., Sherriff, N., Marcus, U., Toskin, I., Rosinska, M., Schink, S., Kühlmann-Berenzon, S., Suligoi, B., Folch, C., Nöstlinger, C., Dias, S., Stanekova, D., Klavs, I., Caplinskas, S., Rafila, A., Marin, C., Alexiev, I., Zohrabyan, L., … on behalf of the SIALON II Network. (2018). Quantifying unmet prevention needs among MSM in Europe through a multi-site bio-behavioural survey. *Eurosurveillance*, *23*(49). https://doi.org/10.2807/1560-7917.ES.2018.23.49.1800097

Mock, S. E., & Eibach, R. P. (2012). Stability and Change in Sexual Orientation Identity Over a 10-Year Period in Adulthood. *Archives of Sexual Behavior*, *41*(3), 641–648. https://doi.org/10.1007/s10508-011-9761-1

Mohr, J. J., Jackson, S. D., & Sheets, R. L. (2017). Sexual Orientation Self-Presentation Among Bisexual-Identified Women and Men: Patterns and Predictors. *Archives of Sexual Behavior*, *46*(5), 1465–1479. https://doi.org/10.1007/s10508-016-0808-1

Mongelli, F., Perrone, D., Balducci, J., Sacchetti, A., Ferrari, S., Mattei, G., & Galeazzi, G. M. (2019). Minority stress and mental health among LGBT populations: An update on the evidence. *Minerva Psichiatrica*, *60*(1). https://doi.org/10.23736/S0391-1772.18.01995-7

Monroe, S. M., & Slavich, G. M. (2007). Psychological Stressors, Overview. *Encyclopedia of Stress*, *3*, 7.

Mor, Z., Davidovich, U., Mcfarlane, M., Feldshtein, G., & Chemtob, D. (2008). Gay men who engage in substance use and sexual risk behaviour: A dual-risk group with unique

characteristics. *International Journal of STD & AIDS*, *19*(10), 698–703.

https://doi.org/10.1258/ijsa.2008.008061

Mustanski, B., Andrews, R., & Puckett, J. A. (2016). *The Effects of Cumulative Victimization on Mental Health Among Lesbian, Gay, Bisexual, and Transgender Adolescents and Young Adults*. *106*(3), 7.

Negy, C., & Eisenman, R. (2005). A comparison of African American and white college students' affective and attitudinal reactions to lesbian, gay, and bisexual individuals: An exploratory study. *Journal of Sex Research*, *42*(4), 291–298.

https://doi.org/10.1080/00224490509552284

Newcomb, M. E., Birkett, M., Corliss, H. L., & Mustanski, B. (2014). Sexual Orientation, Gender, and Racial Differences in Illicit Drug Use in a Sample of US High School Students. *American Journal of Public Health*, *104*(2), 304–310.

https://doi.org/10.2105/AJPH.2013.301702

Newcomb, M. E., & Mustanski, B. (2010). Internalized homophobia and internalizing mental health problems: A meta-analytic review. *Clinical Psychology Review*, *30*(8), 1019–1029. https://doi.org/10.1016/j.cpr.2010.07.003

Nield, J., Magnusson, B., Brooks, C., Chapman, D., & Lapane, K. L. (2015). Sexual Discordance and Sexual Partnering Among Heterosexual Women. *Archives of Sexual Behavior*, *44*(4), 885–894. https://doi.org/10.1007/s10508-014-0287-1

Nuttbrock, L., Bockting, W., Rosenblum, A., Hwahng, S., Mason, M., Macri, M., & Becker, J. (2014). Gender abuse and major depression among transgender women: A prospective study of vulnerability and resilience. *American Journal of Public Health*, *104*(11), 2191–2198.

Nystedt, T., Rosvall, M., & Lindström, M. (2019). Sexual orientation, suicide ideation and suicide attempt: A population-based study. *Psychiatry Research*, *275*, 359–365.

https://doi.org/10.1016/j.psychres.2019.04.007

O'Brien, L. T., & Major, B. (2005). System-Justifying Beliefs and Psychological Well-Being: The Roles of Group Status and Identity. *Personality and Social Psychology Bulletin*, *31*(12), 1718–1729. https://doi.org/10.1177/0146167205278261

Orta, İ. M., & Camgöz, S. M. (2018). Türkiye'de Yapılan Homofobi Çalışmalarına Genel Bir Bakış. *Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi*, *58*(1), 409–439.

Pachankis, J. E. (2007). The psychological implications of concealing a stigma: A cognitive-affective-behavioral model. *Psychological Bulletin*, *133*(2), 328–345.

https://doi.org/10.1037/0033-2909.133.2.328

Pachankis, J. E., Cochran, S. D., & Mays, V. M. (2015). The mental health of sexual minority adults in and out of the closet: A population-based study. *Journal of Consulting and Clinical Psychology*, *83*(5), 890–901. https://doi.org/10.1037/ccp0000047

Perales, F., & Todd, A. (2018). Structural stigma and the health and wellbeing of Australian LGB populations: Exploiting geographic variation in the results of the 2017 same-sex marriage plebiscite. *Social Science & Medicine*, *208*, 190–199. https://doi.org/10.1016/j.socscimed.2018.05.015

Philbin, M. M., Greene, E. R., Martins, S. S., LaBossier, N. J., & Mauro, P. M. (2020). Medical, Nonmedical, and Illegal Stimulant Use by Sexual Identity and Gender. *American Journal of Preventive Medicine*, *59*(5), 686–696. https://doi.org/10.1016/j.amepre.2020.05.025

Poushter, J., & Kent, N. O. (2020). The Global Divide on Homosexuality Persists. *Pew Research Center*, 27.

Puckett, J. A., Newcomb, M. E., Garofalo, R., & Mustanski, B. (2017). Examining the Conditions Under Which Internalized Homophobia Is Associated with Substance Use and Condomless Sex in Young MSM: The Moderating Role of Impulsivity. *Annals of Behavioral Medicine*, *51*(4), 567–577. https://doi.org/10.1007/s12160-017-9878-0

Qeadan, F., Barbeau, W. A., Shan, L., & Azagba, S. (2021). Associations between sexual identity-attraction discordance, and prescription opioid misuse among adults. *Preventive Medicine*, *145*, 106401. https://doi.org/10.1016/j.ypmed.2020.106401

Quarshie, E. N.-B., Waterman, M. G., & House, A. O. (2020). Prevalence of self-harm among lesbian, gay, bisexual, and transgender adolescents: A comparison of personal and social adversity with a heterosexual sample in Ghana. *BMC Research Notes*, *13*(1), 271. https://doi.org/10.1186/s13104-020-05111-4

Quinn, D. M., & Chaudoir, S. R. (2009). Living with a concealable stigmatized identity: The impact of anticipated stigma, centrality, salience, and cultural stigma on psychological distress and health. *Journal of Personality and Social Psychology*, *97*(4), 634–651. https://doi.org/10.1037/a0015815

Ramirez, J. L., & Paz Galupo, M. (2019). Multiple minority stress: The role of proximal and distal stress on mental health outcomes among lesbian, gay, and bisexual people of color. *Journal of Gay & Lesbian Mental Health*, *23*(2), 145–167. https://doi.org/10.1080/19359705.2019.1568946

Reisner, S. L., White Hughto, J. M., Pardee, D., & Sevelius, J. (2016). Syndemics and gender affirmation: HIV sexual risk in female-to-male trans masculine adults reporting sexual

contact with cisgender males. *International Journal of STD & AIDS*, *27*(11), 955–966. https://doi.org/10.1177/0956462415602418

Richardson, D. (1984). The Dilemma of Essentiality in Homosexual Theory. *Journal of Homosexuality*, *9*(2–3), 79–90. https://doi.org/10.1300/J082v09n02_05

Rosario, M., Schrimshaw, E. W., & Hunter, J. (2011). *A Model of Sexual Risk Behaviors Among Young Gay and Bisexual Men: Longitudinal Associations of Mental Health, Substance Abuse, Sexual Abuse, and the Coming-Out Process*. 17.

Rosińska, M. (2018). Prevalence of drug use during sex amongst MSM in Europe: Results from a multi-site bio-behavioural survey. *International Journal of Drug Policy*, 11.

Ross, M. W., Rosser, B. R. S., Bauer, G. R., Bockting, W. O., Robinson, E., Rugg, D. L., & Coleman, E. (2001). Drug Use, Unsafe Sexual Behavior, and Internalized Homonegativity in Men Who Have Sex With Men. *AIDS and Behavior*, 7.

Rosser, B. R. S., Bockting, W. O., Ross, M. W., Miner, M. H., & Coleman, E. (2008). The Relationship Between Homosexuality, Internalized Homo-Negativity, and Mental Health in Men Who Have Sex with Men. *Journal of Homosexuality*, *55*(2), 185–203. https://doi.org/10.1080/00918360802129394

Rowen, C. J., & Malcolm, J. P. (2003). Correlates of Internalized Homophobia and Homosexual Identity Formation in a Sample of Gay Men. *Journal of Homosexuality*, *43*(2), 77–92. https://doi.org/10.1300/J082v43n02_05

Saewyc, E. M. (2011). Research on adolescent sexual orientation: Development, health disparities, stigma, and resilience. *Journal of Research on Adolescence*, *21*(1), 256–272.

Saludes, V., Folch, C., Antuori, A., González, N., Ibáñez, N., Colom, J., Casabona, J., Martró, E., & HepCdetect II Study Group. (2017). *A one-step diagnosis algorithm reveals high burden of hepatitis C among people who inject drugs in Spain and the urgency for improved linkage-to-care*. 6–8.

Scheepers, D., & Ellemers, N. (2005). When the pressure is up: The assessment of social identity threat in low and high status groups. *Journal of Experimental Social Psychology*, *41*, 192–200. https://doi.org/10.1016/j.jesp.2004.06.002

Schuler, M. S., & Collins, R. L. (2019). Early Alcohol and Smoking Initiation: A Contributor to Sexual Minority Disparities in Adult Use. *American Journal of Preventive Medicine*, *57*(6), 808–817. https://doi.org/10.1016/j.amepre.2019.07.020

Schuler, M. S., & Collins, R. L. (2020). Sexual minority substance use disparities: Bisexual women at elevated risk relative to other sexual minority groups. *Drug and Alcohol Dependence*, *206*, 107755. https://doi.org/10.1016/j.drugalcdep.2019.107755

Schuler, M. S., Rice, C. E., Evans-Polce, R. J., & Collins, R. L. (2018). Disparities in substance use behaviors and disorders among adult sexual minorities by age, gender, and sexual identity. *Drug and Alcohol Dependence*, *189*, 139–146. https://doi.org/10.1016/j.drugalcdep.2018.05.008

Schuler, M. S., Stein, B. D., & Collins, R. L. (2019). Differences in Substance Use Disparities Across Age Groups in a National Cross-Sectional Survey of Lesbian, Gay, and Bisexual Adults. *LGBT Health*, *6*(2), 68–76. https://doi.org/10.1089/lgbt.2018.0125

Semple, S. J., Patterson, T. L., & Grant, I. (2002). Motivations associated with methamphetamine use among HIV men who have sex with men. *Journal of Substance Abuse Treatment*, *22*(3), 149–156. https://doi.org/10.1016/S0740-5472(02)00223-4

Shields, S. A., & Harriman, R. E. (1984). Fear of Male Homosexuality: Cardiac Responses of Low and High Homonegative Males. *Journal of Homosexuality*, *10*(1–2), 53–67. https://doi.org/10.1300/J082v10n01_04

Singer, M. (2009). *Introduction to syndemics: A critical systems approach to public and community health.* John Wiley & Sons.

Smart, L., & Wegner, D. M. (2000). The hidden costs of stigma. In R. E. Heatheton, M. R. Kleck, M. R. Hebl, & J. G. Hull (Eds.), *The social psychology of stigma* (pp. 220–242). Guilford Press.

Smith, A. M. A., Rissel, C. E., Richters, J., Grulich, A. E., & de Visser, R. O. (2003). Sex in Australia: Sexual identity, sexual attraction and sexual experience among a representative sample of adults. *Australian and New Zealand Journal of Public Health*, *27*(2), 138–145. https://doi.org/10.1111/j.1467-842X.2003.tb00801.x

Sönmez, İ., & Palamar, J. J. (2022a). Sexual Orientation and Age of First Drug Use Among Adults in the United States. *Substance Use & Misuse*, *57*(8), 1313–1321. https://doi.org/10.1080/10826084.2022.2079138

Sönmez, İ., & Palamar, J. J. (2022b). Trends in Self-Injurious Thoughts and Behaviors Among US Adults, 2015–2019: Differential Risk According to Sexual Orientation. *Archives of Suicide Research*, 1–10. https://doi.org/10.1080/13811118.2022.2096519

Steensma, T. D., Kreukels, B. P., de Vries, A. L., & Cohen-Kettenis, P. T. (2013). Gender identity development in adolescence. *Hormones and Behavior*, *64*(2), 288–297.

Stenger, M. R., Pathela, P., Anschuetz, G., Bauer, H., Simon, J., Kohn, R., Schumacher, C., & Torrone, E. (2017). Increases in the Rate of Neisseria gonorrhoeae Among Gay, Bisexual and Other Men Who Have Sex With Men—Findings From the Sexually Transmitted Disease Surveillance Network 2010–2015. *Sexually Transmitted Diseases*, *44*(7), 393–397. https://doi.org/10.1097/OLQ.0000000000000623

Swannell, S., Martin, G., & Page, A. (2016). Suicidal ideation, suicide attempts and non-suicidal self-injury among lesbian, gay, bisexual and heterosexual adults: Findings from an Australian national study. *Australian & New Zealand Journal of Psychiatry*, *50*(2), 145–153. https://doi.org/10.1177/0004867415615949

Szymanski, D. M., & Carr, E. R. (2008). The roles of gender role conflict and internalized heterosexism in gay and bisexual men's psychological distress: Testing two mediation models. *Psychology of Men & Masculinity*, *9*(1), 40.

Tajfel, H., & Turner. (1979). An integrative theory of intergroup conflict. In M. J. Hatch & M. Schultz (Eds.), *Organizational identity: A reader*. Oxford University Press.

Talley, A. E., Aranda, F., Hughes, T. L., Everett, B., & Johnson, T. P. (2015). Longitudinal Associations among Discordant Sexual Orientation Dimensions and Hazardous Drinking in a Cohort of Sexual Minority Women. *Journal of Health and Social Behavior*, *56*(2), 225–245. https://doi.org/10.1177/0022146515582099

Toomey, R. B. (2021). Advancing Research on Minority Stress and Resilience in Trans Children and Adolescents in the 21st Century. *Child Development Perspectives*, *15*(2), 96–102. https://doi.org/10.1111/cdep.12405

Trickey, A., May, M. T., Vehreschild, J.-J., Obel, N., Gill, M. J., Crane, H. M., Boesecke, C., Patterson, S., Grabar, S., Cazanave, C., Cavassini, M., Shepherd, L., Monforte, A. d'Arminio, van Sighem, A., Saag, M., Lampe, F., Hernando, V., Montero, M., Zangerle, R., … Sterne, J. A. C. (2017). Survival of HIV-positive patients starting antiretroviral therapy between 1996 and 2013: A collaborative analysis of cohort studies. *The Lancet HIV*, *4*(8), e349–e356. https://doi.org/10.1016/S2352-3018(17)30066-8

Tucker, J. S., Ellickson, P. L., & Klein, D. J. (2008). Understanding Differences in Substance Use Among Bisexual and Heterosexual Young Women. *Women's Health Issues*, *18*(5), 387–398. https://doi.org/10.1016/j.whi.2008.04.004

Ullrich, P. M., Lutgendorf, S. K., & Stapleton, J. T. (2003). Concealment of homosexual identity, social support and CD4 cell count among HIV-seropositive gay men. *Journal of Psychosomatic Research*, *54*(3), 205–212. https://doi.org/10.1016/S0022-3999(02)00481-6

Van Hout, M. C., Crowley, D., O'Dea, S., & Clarke, S. (2019). Chasing the rainbow: Pleasure, sex-based sociality and consumerism in navigating and exiting the Irish Chemsex scene. *Culture, Health & Sexuality*, *21*(9), 1074–1086. https://doi.org/10.1080/13691058.2018.1529336

Vosburgh, H. W., Mansergh, G., Sullivan, P. S., & Purcell, D. W. (2012). A Review of the Literature on Event-Level Substance Use and Sexual Risk Behavior Among Men Who

Have Sex with Men. *AIDS and Behavior*, *16*(6), 1394–1410.
https://doi.org/10.1007/s10461-011-0131-8

Vrangalova, Z., & Savin-Williams, R. C. (2014). Psychological and Physical Health of Mostly
Heterosexuals: A Systematic Review. *The Journal of Sex Research*, *51*(4), 410–445.
https://doi.org/10.1080/00224499.2014.883589

Webber, V. (2018). "I'm Not Gonna Run Around and Put a Condom on Every Dick I See":
Tensions in Safer Sex Activism Among Queer Communities in Montréal, Quebec.
Sexuality & Culture, *22*(3), 758–777. https://doi.org/10.1007/s12119-017-9490-2

Weinberg, G. H. (1972). *Society and the healthy homosexual*. St. Martin's Press.

Yalçinoglu, N., & Önal, A. E. (2014). Escinsel ve biseksuel erkeklerin icsellestirilmis homofobi
duzeyi ve saglik uzerine etkileri. *Turkish Journal of Public Health*, *12*(2), 100.

Ybarra, M. L., Mitchell, K. J., Palmer, N. A., & Reisner, S. L. (2015). Online social support as a
buffer against online and offline peer and sexual victimization among U.S. LGBT and
non-LGBT youth. *Child Abuse & Neglect*, *39*, 123–136.
https://doi.org/10.1016/j.chiabu.2014.08.006

Yep, G. A. (2003). The Violence of Heteronormativity in Communication Studies: Notes on
Injury, Healing, and Queer World-Making. *Journal of Homosexuality*, *45*(2–4), 11–59.
https://doi.org/10.1300/J082v45n02_02

Yilmaz, V., & Göçmen, İ. (2016). Denied Citizens of Turkey: Experiences of Discrimination
Among LGBT Individuals in Employment, Housing and Health Care. *Gender, Work and
Organization*, *23*(5), 470–488.

Young, R. M., & Meyer, I. H. (2005). The trouble with "MSM" and "WSW": Erasure of the
sexual-minority person in public health discourse. *American Journal of Public Health*,
95(7), 1144–1149.

CHAPTER 2. Influence of Internalised Homonegativity on Sexual Risk Behaviour of Men Who Have Sex with Men in Spain

Abstract

In a sample of men who have sex with men (MSM) (N=3,436) in Spain who bear intrinsic HIV risk, we investigated how internalised homonegativity (IH) is associated with the number of non-steady male partners with condomless intercourse (as a proxy of sexual risk behaviour). Using structural equation modelling (SEM), we examined the relationship between IH and sexual risk behaviour, and, mediating effects of HIV/PrEP knowledge and substance use during sex on this relationship. We found no direct association between IH and sexual risk behaviour, nor did IH influence substance use during sex. In line with our hypothesis, association between IH and sexual risk behaviour was significant when mediated by HIV/PrEP knowledge. We found that as IH increased, sexual risk behaviour decreased, because higher IH was associated with lower HIV/PrEP knowledge while higher HIV/PrEP knowledge was associated with increased non-condom use with non-steady partners. Substance use during sex was significantly associated with sexual risk behaviour. Our results emphasize the continuing importance of prevention strategies focused on behavioural changes and community level interventions, especially targeting substance use.

Keywords: Internalised homonegativity, sexual risk behaviour, HIV knowledge, substance use, MSM, structural equation modelling

2.1. Introduction

Forty years into the epidemic, sex between men remains the predominant mode of HIV transmission in the countries of the European Economic Area, accounting for 38.7% of all new HIV diagnoses in 2019 (European Centre for Disease Prevention and Control & World Health Organization, 2020). In Spain, 3,381 new HIV diagnoses were reported in 2017, with more than half (54.3%) of these in men who have sex with men (MSM) (Centro Nacional de Epidemiología, 2018). A recent bio-behavioural study conducted in 13 European cities showed that Barcelona (Spain) has one of the highest rates of HIV among MSM (Mirandola et al., 2018). In addition to the spread of HIV, increasing numbers of sexually transmitted infections (STIs) have been reported in Spain after 2005 (Centro Nacional de Epidemiología, 2020).

Sexual transmission risk among MSM is mediated by multiple social and structural factors that influence individuals' sexual practices (Baral et al., 2013). These factors not only influence risk behaviours, but also directly limit options for accessing prevention services for HIV and other STIs and jeopardise prevention efforts (Andrinopoulos et al., 2015; Velter et al., 2015). Meyer (2003) developed the minority stress model, which refers to the "excess stress to which individuals from stigmatized social categories are exposed as a result of their social, often a minority, position", and which may partly explain behaviours that increase HIV transmission risk, such as substance use and condomless sex (Meyer, 2003). Internalised Homonegativity (IH), defined as negative feelings about one's homosexuality (Herek, 2004), is the product of social and political stigma and bias instead of a response which stems from within individuals. IH is one of the minority stressors that has been expanded upon in Meyer's (2003) minority stress model, and has a documented damaging effect on the mental health and well-being of sexual minorities (Newcomb & Mustanski, 2010a). However, inconsistent research results point to uncertainties about the extent to which IH influences engagement in sexual risk behaviours (Newcomb & Mustanski, 2010a; Puckett et al., 2017). In Catalonia, an autonomous community of Spain, previous research among gay, bisexual and other MSM found that IH was an independent predictor of sexual risk behaviours (SRB). This has also been shown for European (Berg et al., 2015) and non-European countries (Ross et al., 2013). However, other studies have not found significant associations between IH and SRB (Dudley et al., 2004; Kashubeck-West & Szymanski, 2008a). These inconsistencies on the literature may reflect, in part, the existence of

potential mediating variables that affect the relation between IH and sexual risk behaviours (Kashubeck-West & Szymanski, 2008a; Newcomb & Mustanski, 2010b).

Similar inconsistent research results exist regarding the relation between IH and drug use. Some researchers found that IH was associated with higher levels of drug use, whereas others found either no significant relation with drug use or negative associations (Puckett et al., 2017; Ross et al., 2001). The effect of sexualized drug use on SRB has also been studied extensively. Previous studies in Spain found evidence that a higher prevalence of drug use consumption was associated with a higher prevalence of condomless anal sex or sex with multiple partners (Fernández-Dávila & Zaragoza Lorca, 2009; Folch et al., 2006, 2010; González-Baeza et al., 2018).

Men with high level of IH are less likely to be involved in the gay community and likewise more isolated from getting informed about HIV prevention and risk reduction programs. Among 569 gay and bisexual men (Huebner et al., 2002) found that IH was negatively associated with the number of HIV-related services that these men were aware of. Further, of the 443 MSM who had heard about at least one service, IH was not a significant predictor for participation in these services, when controlled for education levels. Therefore, high IH was a barrier for men to be aware of these services in the first place. On the other hand, the results of the 2010 wave of EMIS among more than 144,000 MSM across 38 countries in Europe provide evidence that IH was positively associated with less knowledge about HIV and HIV testing (Berg et al., 2013). Likewise, in a sample of substance using HIV-negative and unknown status gay and bisexual men in New York City, it was found that community connection was protective against sexual risk and drug use, especially among younger men (Lelutiu-Weinberger et al., 2013). Previous research also documented that IH can hinder gay men's connection to the gay community (Goldbach et al., 2015; Moody et al., 2018), which can, in part, explain a possible link between IH and SRB, through a lack of gay community acculturation and where the targeted information is available for gay and bisexual men (Williamson, 2000).

An improved understanding of the impact of critical factors that mediate the relation between IH and SRB would be important in general, and in Spain specifically, in order to tailor community services to those MSM with higher levels of IH and in turn at higher risk of HIV infection. Therefore, using structural equation modelling (SEM), our study aimed to disentangle the possible influence of drug use and knowledge regarding HIV and PrEP on the relation between IH and SRB in a national sample of MSM living in Spain and recruited online. We had three hypotheses. First, we tested the 'IH will be

positively associated with sexual risk behaviour (SRB)' hypothesis. As abovementioned, we argue that inconsistencies in previous research regarding the relationship between IH and SRB may reflect particular roles of mediator variables, such as frequency of sex under the influence of substances and HIV/PrEP knowledge. Thus, we tested our second and third hypotheses; HIV/PrEP knowledge will strongly mediate the relationship between IH and SRB' and 'sex under the influence of substances will strongly mediate the relationship between IH and SRB.'

2.2. Methods

2.2.1. Sample and Data

We used data from the 2017 wave of the European MSM Internet Survey (EMIS-2017). The detailed methods have been reported elsewhere (Weatherburn et al., 2020). In summary, EMIS-2017 was a 33-language, internet-based, self-completion survey for men living in Europe who have sex with men and/or are sexually attracted to other men. No financial incentives were given to participants; no personal identifying information (including IP addresses) were collected. More background information is available at www.emis2017.eu. The sub-sample of MSM living in Spain consisted of 10,652 respondents, including men living in the autonomous provinces of Canarias, Ceuta, Melilla (geographically outside Europe) as well as men living in the Principality of Andorra (but not in the British Overseas Territory of Gibraltar), with 92.1% using the Spanish (Castilian) version of the survey (no other co-official languages of Spain, such as Catalan/Valencian, Galician, or Basque were offered). Recruitment occurred through trans-national dating apps (Grindr accounted for 48% of recruits living in Spain, PlanetRomeo for 19%, SCRUFF, GROWLr, RECON, Gaydar, Hornet, and Manhunt/Jack'd, collectively for 11%) , through national partners via websites (16%) and social media (1%) (Ministerio de Sanidad, 2020).

The Short Internalised Homonegativity Scale (SIHS) was randomly distributed to half of respondents (N=5,310) of which 4,632 answered all SIHS items. This random distribution has been done to avoid losing participants because of asking too many questions. MSM who did not provide answers to all seven items were excluded. We also excluded 583 HIV-diagnosed MSM who reported having undetectable viral load, and 78 PrEP users, because condomless anal intercourse among men with undetectable

viral load or using PrEP does not bear any intrinsic HIV risk. The analytic sample thus consists of 3,436 MSM living in Spain.

2.2.2. Measures

Internalised homonegativity - To assess IH, we used the 7-item SIHS (Berg et al., 2013; Tran et al., 2018). This term was defined by Ross and colleagues (Berg et al., 2013), and the construct of IH commonly refers to internalization of homophobic attitudes within lesbian, gay, and bisexual individuals (Newcomb & Mustanski, 2011), thus an attachment of external homonegativity (often incorrectly referred to as 'homophobia') to the sense of self (Malyon, 1982; Stein & Cohen, 1986). EMIS-2017 participants answered 7 items on a 7-point disagree-agree (with does-not-apply) scale. These items were "social situations with gay men make me feel uncomfortable"; "homosexuality is morally acceptable to me"; "even if I could change my sexual orientation, I wouldn't"; "I feel comfortable in gay bars"; "I feel comfortable being seen in public with an obviously gay person"; "I feel comfortable being a homosexual man"; "even if I could change my sexual orientation, I wouldn't". The validity and reliability of SIHS were also confirmed across 38 European countries, with multigroup validation for 7-item scale fit indices showing good fit to data from 38 country groups (CFI=0.982, TLI=0.983, and RMSEA=0.032) (see, Tran et al. (2018) for further statistics).

Sexual Risk Behaviour (SRB) – SRB of the respondents was assessed with a single question: "how many non-steady male partners have you had intercourse without a condom with in the last 12 months?" Here, participants were informed that non-steady partners mean "men you have had sex with once only, and men you have sex with more than once but who you don't think of as a steady partner (including one-night stands, anonymous and casual partners, regular sex buddies)". The possible answer options for this question in the survey ranged from 0 to 15; with numbers 0 to 10 equivalent to their values, and numbers 11 to 15 indicating 11–20, 21–30, 31–40, 41–50, and more than 50 partners respondents had condomless intercourse with. We recoded this variable into seven categories: 0; 1; 2–5; 6–10; 11–20; 20–50; and more than 50. Previous research on SEM have shown that an outcome latent variable with at least seven categories is favourable for robust outcomes (Martens, 2005; Raykov et al., 1991; Weston & Gore, 2006). We would like to highlight that our definition of the risk behaviour is related to HIV risk and does not relate directly to other STIs.

HIV/PrEP Knowledge – To construct the HIV/PrEP knowledge latent variable, two measures were used: HIV knowledge and PrEP knowledge. HIV knowledge was constructed from seven items, assessed with a 5-point knowledge response set, with possible answers including "I do not believe this", "I wasn't sure about this", and "I knew this already". These items were "AIDS is caused by a virus called HIV"; "if someone becomes infected with HIV it may take several weeks before it can be detected in a test"; "you cannot be confident about whether someone has HIV or not from their appearance"; "there is a medical test that can show whether or not you have HIV"; "There is currently no cure for HIV infection"; "HIV infection can be controlled with medicines so that its impact on health is much less"; "a person with HIV who is on effective treatment (called 'undetectable viral load') cannot pass their virus to someone else during sex." PrEP knowledge included three items assessed with the same response set: "Pre-Exposure Prophylaxis (PrEP) involves someone who does not have HIV taking pills before as well as after sex to prevent them getting HIV"; "PrEP can be taken as a single daily pill if someone does not know in advance when they will have sex"; "If someone knows in advance when they will have sex, PrEP needs to be taken as a double dose approximately 24 hours before sex and then at both 24 and 48 hours after the double dose." Each of these 10 items were recoded into a dummy variable, with value 1 indicating "I knew this already," and value 0 indicating all the other answers. Then, we created an additive scale with these 10 items, ranging from 0 to 10. With each factual knowledge (I knew this already) of each question, respondents scored one point in the additive scale.

Substance Use – We used six observed variables for the substance use latent variable, based on how long-ago respondents used substances in any context. The six substances (see table 1) were assessed with an 8-point recency scale, ranging from (1) "never" to (8) "in the past 24 hours" (after inverting the original scale).

Sex Under the Influence of Substances (SUIS) – For this variable, the respondents were asked, "in the last 12 months, how much of the sex you've had with men has been under the influence of alcohol or any other drug?" The possible answers for this question ranged from (1) "none of it" to (7) "all of it".

2.3. Statistical Analysis

We use RStudio and the 'lavaan' package (Rosseel, 2012) to analyse the hypothesized structural equation model. Prior to the analysis, the data was checked for multicollinearity, missing data, departures from normality and distributions. Multicollinearity was not present. Missing data were handled with pairwise deletion.

Figure 2.1. Hypothesized Structural Equation Model
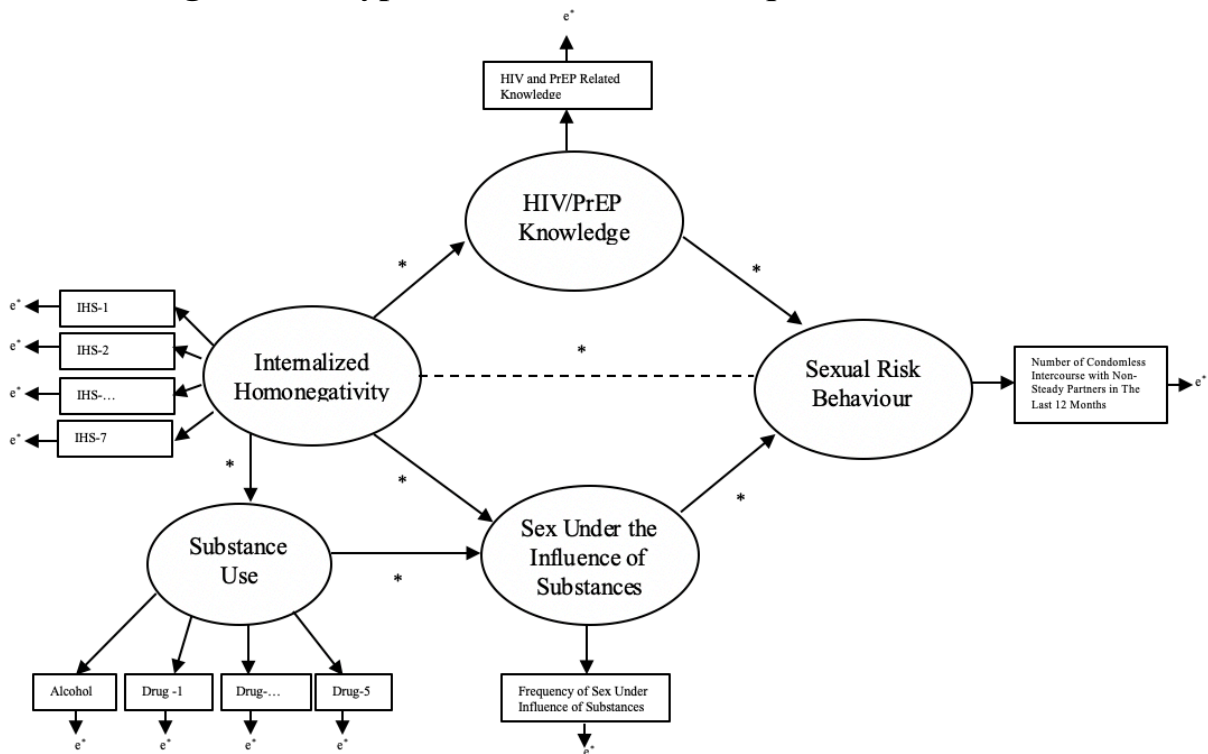
Circles represent latent variables. **Rectangles** represent observed (manifest) variables. e* represent errors of observed variables to be estimated. **Dashed paths** represent the direct relationship (Hypothesis 1) to be mediated between Internalised Homonegativity and sexual risk behaviour. **IHS1…7**: Seven internalised homonegativity scale items. **Drug-1…Drug-5**: Ecstasy (pill), ecstasy (powder), speed, GHB/GHL (gamma-Hydroxybutyric acid/Butyrolactone), and cocaine use recency scales (in this order). Refer to Table 1 for detailed summary of the variables.

First, we examined descriptive statistics and correlation among variables used. Second, we estimated the confirmatory factor analysis (CFA) model. Finally, we estimated the hypothesized SEM presented in Figure 1. Since we will be testing mediation effects, we follow the study of Shrout & Bolger, (2002) and use bias-corrected bootstrap method for estimating our model. This estimation method allows interval estimated without relying on a distribution assumption. Bias-corrected bootstrap estimation adjusts for possible bias and problematic skewness, if any, in the bootstrap samples' distribution

(Beaujean, 2014). Therefore, we estimated our SEM using a bootstrapped MLM estimator. The SEM had 16 observed variables, and 136 known parameters ((16*17) * ½ =136). The total number of unknowns were 36 and constitutive of; 4 covariances, 16 factor loadings, 16 error variances. Thus, our model was over-identified with 100 (136-36) degrees of freedom, and over-identification is a necessary factor in structural model's fit to data (Weston & Gore, 2006).

Proceeding to the structural model, we examine its fit to the data. Evaluation of the structural model's fit to the data is not a simple procedure (Raykov et al., 1991), and there are no universally accepted fit indices (Raykov et al., 1991; Saris et al., 2009; Thoemmes et al., 2018; Weston & Gore, 2006). To assess our model's fit to our data, we examine both global and local fit indices. We do not pay attention to the significance of the $\chi 2$ statistic, as in large samples (N>500) the $\chi 2$ is affected by sample size (Martens, 2005; Raykov et al., 1991; Weston & Gore, 2006). Furthermore, $\chi 2$ test statistics and global fit indices are asymmetrically sensitive to different misspecifications (Saris et al., 2009), thus we also look at the local fit indices; expected parameters change (EPC) and modification index (MI) test (Saris et al., 1987). These tests are done with examining the power of the EPC's and significance of MI's; whereas the combination of high-power EPC's and nonsignificant MI's indicate no misspecification, and the combination of low-power EPC's and significant MI's indicate the misspecification of the parameter(s).

For our SEM, we provide both unstandardized and standardized estimates of coefficients and errors. Unstandardized estimates do not depend on equal variances from our specific sample, therefore they serve as more generalizable estimates of the relationships (Grace & Bollen, 2005) and interpret the unstandardized coefficients of the estimates and errors of the hypothesized measurement model.

2.4. Results

In this section we provide results from our descriptive statistics, correlations matrix, CFA, and SEM. From Table 1, we see that possible scores for this scale ranged from 0 to 6, with higher scores indicating greater IH, and MSM in our sample had a mean score of 1.34 (SD=1.22). For SRB, out of 3,694 MSM 59.7% (N=2,205) reported no no-steady partners that they had condomless sex with, while 0.5% (N=17) reported more than 50 partners in the last twelve months. In the HIV/PrEP additive scale, out of 3,838

69

MSM in Spain in our sample 432 respondents has acquired a score of 10, and 3 has acquired a score of 0; the mean score was 7.15. Almost half of respondents (46.2%, N=1,717) reported no SUIS in the last twelve months, while a small portion reported almost all of it and all of it (4.74%, N=176).

Table 2.1. Summary statistics of variables used

	N	Percent	Mean - *Median*	SD-	*IQR*
Variable					
Age	**3,902**		**34.2**		
Number of condomless non-steady partners (SRB)	**3,694**	-	**0**	**-**	**0–1**
0	2,205	59.69	-	-	-
1	574	15.54	-	-	-
2–5	688	18.62	-	-	-
6–10	96	2.60	-	-	-
11–20	77	2.08	-	-	-
20–50	37	1.00	-	-	-
50+	17	0.46	-	-	-
			-	-	-
SIHS (range: 0–6)			1.348	1.22	-
IH1	3,902	-	1.612	1.917	-
IH2	3,902	-	1.711	2.011	-
IH3	3,902	-	1.624	1.934	-
IH4	3,902	-	1.661	1.909	-
IH5	3,902	-	1.049	1.645	-
IH6	3,902	-	.426	1.257	-
IH7	3,902	-	1.355	1.971	-
HPK Score (range: 1–10)	**3,838**	-	**7.145**	**1.844**	
		-			
SUIS	**3,713**	-	**Almost none of it**	**-**	**None of it – Less than half**
None of it	1,717	46.24	-	-	-
Almost none of it	1,124	30.27	-	-	-
Less than half	373	10.05	-	-	-
About half	179	4.82	-	-	-
More than half	144	3.88	-	-	-
Almost all of it	119	3.20	-	-	-
All of it	57	1.54	-	-	-
Substance Use					
Alcohol	3,897	-	In the last 7 days	-	In the last 24h – In the

					last 4 weeks
E (pill)	3,870	-	Never[a]	-	Never
E (crystal)	3,873	-	Never	-	Never
GHB/L	3,874	-	Never	-	Never
Speed	3,872	-	Never	-	Never
Cocaine	3,871	-	Never	-	Never

Notes. SD, standard deviation; **IQR**, Interquartile Range; **SRB,** Sexual Risk Behaviour; **SIHS,** Short Internalised Homonegativity Scale. **IHS1…7**: Seven Internalised Homonegativity Scale items **HPK,** HIV/PrEP Knowledge Additive Scale; **SUIS,** Sex Under the Influence of Substances; **GHB/L**, gamma-Hydroxybutyric acid/Butyrolactone. [a] Median and IQR value for these substances were the response "never".

In Table 2 correlational analysis among main study variables is presented in order to examine the relationship between variables. Due to the nature of the variables used, some of them are highly correlated. For this reason, we use a p-value of .001 in order to reduce the possible Type I Error threat, following the study of Kashubeck-West & Szymanski (2008). From Table 2 we note that we did not find a relationship between IH and SRB, nor with each of the items of IH (except for the first item, IH1). On the other hand, we found that HIV/PrEP knowledge (r = .11) and SUIS (r = .18) were positively related to SRB, meaning that when these variables increased, SRB also increased. Similarly, more recent use of each substance was positively related to SRB, expect for alcohol. We will further test these relationships with using CFA and SEM.

Table 2.2. Pairwise correlations among main study variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) SRB	1.000																
(2) SIHS	-0.049*	1.000															
(3) IH1	-0.065*	0.660*	1.000														
(4) IH2	-0.042*	0.536*	0.276*	1.000													
(5) IH3	0.004	0.733*	0.395*	0.284*	1.000												
(6) IH4	-0.050*	0.754*	0.386*	0.292*	0.571*	1.000											
(7) IH5	-0.044*	0.788*	0.438*	0.244*	0.491*	0.539*	1.000										
(8) IH6	-0.001	0.588*	0.300*	0.132*	0.336*	0.359*	0.534*	1.000									
(9) IH7	-0.024	0.665*	0.288*	0.186*	0.345*	0.386*	0.565*	0.361*	1.000								
(10) HPK	0.112*	-0.220*	-0.159*	-0.142*	-0.151*	-0.183*	-0.177*	-0.114*	-0.108*	1.000							
(11) SUIS	0.185*	-0.066*	-0.100*	-0.036	-0.034	-0.072*	-0.030	-0.011	-0.019	0.085*	1.000						
(12) Alcohol	0.039	-0.114*	-0.135*	-0.046*	-0.086*	-0.113*	-0.056*	-0.065*	-0.032	0.068*	0.242*	1.000					
(13) E (pill)	0.155*	-0.086*	-0.092*	-0.054*	-0.063*	-0.075*	-0.061*	0.009	-0.046*	0.151*	0.327*	0.135*	1.000				
(14) E (crystal)	0.143*	-0.079*	-0.072*	-0.050*	-0.059*	-0.079*	-0.045*	-0.011	-0.042*	0.122*	0.350*	0.157*	0.724*	1.000			
(15) GHB/L	0.150*	-0.064*	-0.052*	-0.052*	-0.048*	-0.060*	-0.032	-0.013	-0.034	0.094*	0.310*	0.143*	0.659*	0.645*	1.000		
(16) Speed	0.199*	-0.068*	-0.084*	-0.047*	-0.033	-0.039	-0.053*	-0.004	-0.046*	0.146*	0.331*	0.080*	0.611*	0.577*	0.555*	1.000	
(17) Cocaine	0.159*	-0.096*	-0.098*	-0.070*	-0.061*	-0.084*	-0.052*	-0.012	-0.059*	0.112*	0.372*	0.165*	0.662*	0.662*	0.649*	0.540*	1.000

Note: * significance shown at 0.001 level.

SRB, Sexual Risk Behaviour, *i.e.* the number of condomless non-steady sex partners in the previous 12 months. **SIHS,** Short Internalised Homonegativity Scale. **IH1...7,** Internalised Homonegativity Scale Variables. **HPK,** HIV/PrEP Knowledge Scale. **SUIS,** Sex Under the Influence of Substances. **E (pill/crystal),** Ecstasy (pill/crystal). **GHB/L,** Gamma-Hydroxybutyric acid/Butyrolactone.

2.4.1. Confirmatory Factor Analysis

As the first step in SEM, we test the model's fit to the data using a CFA. For both CFA and SEM, there are copious measures to test model fit to the data (Meuleners et al., 2003). As commonly used global fit indices and based on Raykov et al. (1991), Hu & Bentler (1999) and Martens (2005), we used the following; (a) the Comparative Fit Index (CFI); (b) the Tucker-Lewis Index (TLI); (c) the root mean square error of approximation (RMSEA), and (d) Standardized root mean squared residual (SRMR). The majority of studies suggest that values higher than .95 for CFI and TLI indicate good fit (Hu & Bentler, 1999; Weston & Gore, 2006); while others suggest that CFI and TLI > .90 indicate a good fit to data (Moonie et al., 2009), as these fit indicates are susceptible to factors such as estimators and complexity (Xia & Yang, 2019). We use the cut-off value set by Hu & Bentler (1999). Further, Hu & Bentler (1999) suggested that values of RMSEA and SRMR < .06 are acceptable, and these values are widely accepted (Weston & Gore, 2006).

The results of the CFA proved that the model is a good fit to the data; CFI=0.95, TLI=0.95, RMSEA=0.044 (90% confidence interval [CI] for the RMSEA lower bound=0.041 and upper bound=0.047), and SRMR=0.03. A summary of these (and also for SEM, see below) fit indices can be found in Table 3.

Table 2.3. Fit Indices References for SEM and CFA

Fit Index	Recommended Value / Cut-off	Value in the SEM	Value in the CFA
Global Fit Indices [a]			
CFI	**> 0.95**	0.96	0.95
TLI	**> 0.95**	0.95	0.95
RMSEA	**< 0.06**	0.04	0.04
SRMR	**< 0.08**	0.03	0.03
Local Fit Indices [b]			
EPC's Power	**High Power** (all parameters)	High Power	-
MI	**Not significant** (all parameters)	Not significant	-

a. (Hu & Bentler, 1999; Weston & Gore, 2006)
b. (Saris et al., 1987, 2009)
CFI, Comparative Fit Index. **TLI,** Tucker-Lewis Index. **RMSEA,** Root Mean Square Error of Approximation. **SRMR,** Standardized Root Mean Square Residual. **EPC,** Expected Parameter Change. **MI,** Modification Index.

2.4.2. Structural Equation Modelling

The SEM output for these global fit indices suggested that the measurement model (Figure 1) was a good fit to the data; CFI=0.96, TLI=0.95, RMSEA=0.044 (90% confidence interval [CI] for the RMSEA lower bound=0.041 and upper bound=0.047), and SRMR=0.03. All of the parameter estimates were significant. Further, expected parameters change (EPC) and modification index (MI) test's fit indices recommendations and cut-off values can be found in Table 3. All EPC's and MI's of the measurement model's parameters are not mis-specified and each value meets the criteria suggested by Saris et al. (1987, 2009).

Figure 2.2. Estimated SEM Results
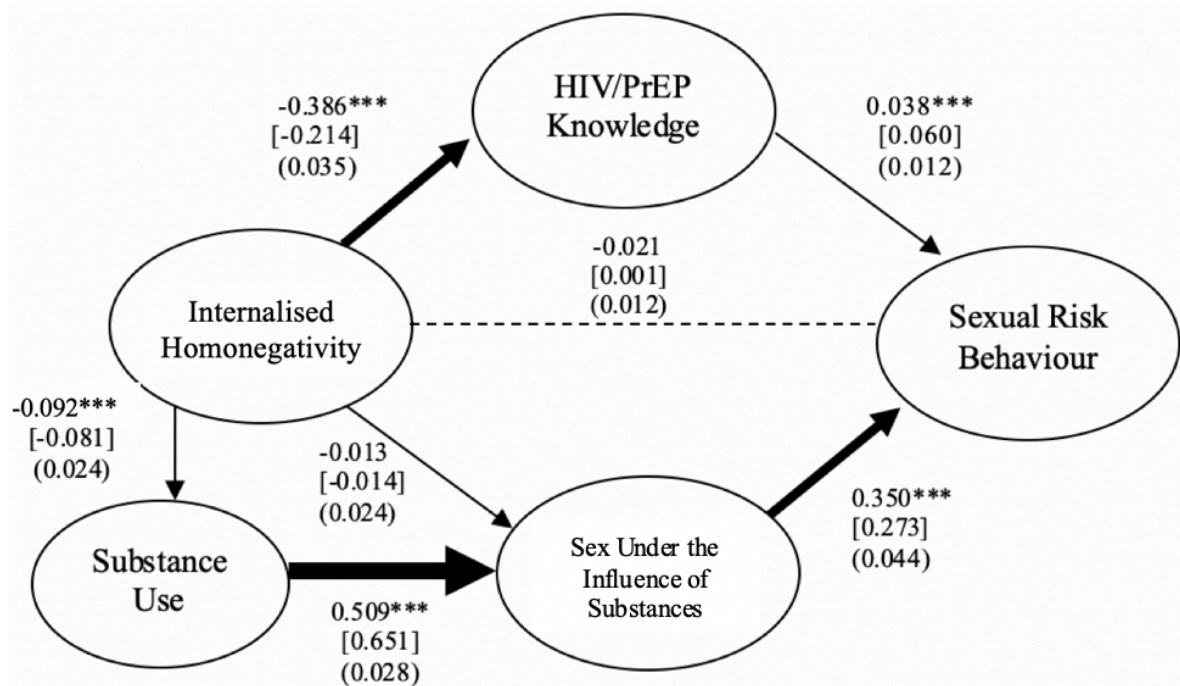
Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.1. Arrow width represents the strength of the relationships. Upper numbers are the **unstandardized path coefficients**; numbers in brackets are **standardized coefficients**; and numbers in parenthesis are **robust standard errors**. **Dashed paths**

represent the direct relationship to be mediated between Internalised Homonegativity and sexual risk behaviour. Coefficients of observed variables and their standard errors are not shown.

Table 2.4. Defined Parameters of the structural equation modelling

Defined Parameters	Estimate	Std. Error.	P-Value
(1) IH → HPK → SRB	-0.015 [-0.013]	0.005	0.002***
(2) IH → SUDS → SRB	-0.004 [-0.004]	0.008	0.592
(3) IH → SU → SUIS	-0.047 [-0.053]	0.012	0.000***
(4) Direct Effect (IH → SRB)	-0.001 [-0.001]	0.021	0.962

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Upper numbers are the **unstandardized path coefficients**; numbers in brackets are **standardized coefficients**. (1) Relationship between IH and SRB mediated by HIV/PrEP knowledge. (2) Relationship between IH and SRB mediated by substance use during sex. (3) Relationship between IH and substance use during sex mediated by substance use. (4) Direct effect of IH on SRB. **IH,** Internalised Homonegativity; **HPK,** HIV/PrEP Knowledge; **SRB,** Sexual Risk Behaviour (*i.e.* number of condomless non-steady sex partners in the previous 12 months), SU, substance use, **SUIS,** Sex Under the Influence of Substances.

The unstandardized estimation results of SEM are presented in Figure 2 and Table 4. In Figure 2, we present the estimated SEM results, with upper numbers presenting the unstandardized path coefficients, numbers in brackets presenting standardized coefficients, and numbers in parenthesis presenting robust standard errors. In Table 4, we present the estimated results for the defined parameters (i.e. mediation effects) from the structural model.

The direct path from IH to SRB (dashed line, Figure 2) was statistically insignificant. Similarly, the defined parameter for the direct effect of IH to SRB (Table 4) was also insignificant. We did not find evidence for our first hypothesis, IH will be positively associated with SRB, at least not within a single country, in the specified SEM model.

As can be seen in Figure 2, IH was negatively associated with HIV/PrEP knowledge, each unit increase in the IH latent variable was significantly associated with 0.39 decrease in the HIV/PrEP knowledge units. On the other hand, HIV/PrEP knowledge increases SRB, each unit increase in the HIV/PrEP knowledge was significantly associated with 0.04 increase in the SRB units. The indirect relationship between IH and SRB through HIV/PrEP knowledge was statistically significant (Table 4). An increase of 0.38 units in the IH latent variable was associated with 0.01 decrease SRB units, when

mediated by the HIV/PrEP knowledge. Therefore, we found that as IH increased, the number of condomless intercourse with non-steady partners reported (SRB) decreased; because higher IH decreases HIV/PrEP knowledge while higher HIV knowledge predicted increased SRB. Thus, we found evidence for our second hypothesis, that HIV/PrEP knowledge will fully mediate the relationship between IH and sexual risk behaviour.

With respect to the relationship among IH, SUIS and SRB, we see that the relationship between IH and SUIS is insignificant, while the association between SUIS latent variable and SRB was positive and significant. Expectedly, Figure 2 shows that a unit increase in SUIS was significantly associated with a 0.35 increase in the SRB units. The indirect path between IH and SRB mediated by SUIS was statistically insignificant (Table 4). Therefore, we did not find evidence for our third hypothesis that, sex under the influence of substances will fully mediate the relationship between IH and sexual risk behaviour.

In Figure 2, we found that as IH decreased the recency of substance use. On the other hand, recency of substance use predicted SUIS significantly and positively. As can be seen in Table 4 (row 3), the indirect path from IH to SUIS when mediated by substance use recency, however, was statistically significant. As IH increased, SUIS decreased; because higher IH predicted less recent use of substances and more recent use of substances predicted higher numbers of sex under the influence of substances (SUIS). When looking at the variances, as expected, the role of alcohol in explaining the variances in SRB in comparison to rest of the substances is relatively small (0.032). The analysis has shown that particular substances in the SEM had greater influence than the rest, with 'ecstasy', regardless of its form, explaining the biggest share of the variances in the model (pill=0.728; crystal=0.701).

In another model (not shown here, available upon request), we added total number of partners (regardless of condom use or intercourse) in the last 12 months for controlling the HIV/PrEP knowledge latent variable. We found that the total number of partners is associated with increased HIV/PrEP knowledge significantly, and the rest of the results reported above stayed same or changed slightly. However, this model's fit indices were very different than the accepted criteria (CFI=0.89, TLI=0.87, RMSEA=0.073, SRMR=0.064). Therefore, we did not include this variable in our SEM model. Implications of this variable on our current results will be discussed.

2.5. Discussion

In this study, we investigated the relation between two variables, IH and SRB, and the possible mediating effects of HIV/PrEP knowledge and SUIS in a sample of non-PrEP using MSM living in Spain, who are HIV-negative or have been diagnosed with HIV but have detectable or unknown viral load. Contrary to our hypothesis that IH will be positively associated with SRB, we did not find any direct effect of IH on SRB. Some studies found that higher levels of IH leads to SRB (Folch et al., 2009; Newcomb & Mustanski, 2010a; Puckett et al., 2017), while some studies did not find evidence for this direct relationship (Dawson et al., 2019; Newcomb & Mustanski, 2010a; Puckett et al., 2017), including ours. Therefore, our study further contributes to the literature which suggest that there might be potential mediating variables that affect the relation between IH and SRB (Kashubeck-West & Szymanski, 2008a; Newcomb & Mustanski, 2010b). On one hand, in line with this and our expectations, results of our SEM analysis showed that HIV/PrEP knowledge mediated the relationship between IH and SRB. On the other hand, the results indicated that while SUIS was significantly associated with SRB, it did not mediate the relationship between IH and SRB.

We found that the more knowledgeable men are about how HIV is transmitted and PrEP works, the higher the numbers of condomless sexual intercourse with non-steady partners reported. One explanation for this surprising result might be that these men, in particular, take their sexual health seriously and are confident in knowing when to use condom and in their condom negotiation skills with non-steady partners. For example, Klein (2013) found that condom use self-efficacy, which refers to an individual's self-confidence in their ability to use condoms, was significantly and positively associated with HIV knowledge. Therefore, these men may be more comfortable initiating conversation about how long ago they have been tested, whether their non-steady partner is using PrEP, or negotiate safeness that go into sex (i.e. knowing that no HIV transmissions from the HIV-positive partner to the HIV-negative partner would occur if their viral load is undetectable ("U=U; Undetectable=Untransmittable")). Our additional analysis (not shown in the paper, available upon request) has shown that the total number of partners may, in return, influence HIV/PrEP knowledge. Similarly, men who have a higher number of partners might have a better connection to the gay community and an increased chance of acquiring more knowledge about protecting themselves. Empirical theories about the link between behaviour and knowledge suggest

that self-perceived vulnerability to HIV is probably the main factor underlying SRB, more so than knowledge (McKusik et al., 1985). That is, when people perceive that they are less vulnerable to HIV, they would be more likely to engage in potential sexual risk behaviour, independent of their knowledge about HIV. Moreover, HIV knowledge showed to be necessary, but not sufficient, to motivate individuals to avoid HIV-related risks (Pando et al., 2013). Therefore, HIV prevention programs should consider focusing on communicating what actually makes one less vulnerable to HIV, which is the knowledge that goes into the ability to negotiate safe sex.

We found that as IH increased, the number of condomless intercourse with non-steady partners reported (SRB) decreased; because higher IH decreases HIV/PrEP knowledge while higher HIV knowledge predicted increased SRB. A high level of IH may serve as a barrier to participation in HIV testing and other health-promoting behaviours, and less contact with prevention and educational interventions. From previous studies we know that men with higher IH showed a reduced perception of their self-efficacy for condom use, even after intervention (Huebner et al., 2002). This finding may be indicative of certain men with high IH who are not confident and knowledgeable enough to communicate safer sex practices with non-steady partners. Alternatively, it is possible that the men with higher IH in our sample are less likely to be involved in sexual intercourse with non-steady partners in the first place. However, our conclusions are in consistency with the notion that IH is most likely harmful; higher levels of IH may lead to reduced number of non-steady partners, but it also reduces relevant knowledge to protect oneself (Ross et al., 2013), or is associated with condom use frequency in general, and is not directly associated with the number of non-steady partners. As discussed, with the development of PrEP the meaning of 'risky' sex may also change for MSM; with the number of partners not relating to risk if one knows how to protect oneself. Therefore, future research and prevention programs should consider different indicators for 'risky sex' in an aim to target those who not only have condomless sex with random partners, but those who do not know how to protect themselves.

MSM in our sample who were more prone to use alcohol or any other drug during sexual intercourse reported higher frequency of anal sex with non-steady partners without using condom. Provided they are, or their partner is seropositive (in the case of not knowing one's own or partner's HIV status), use of substances during sex can be of immediate relevance for risk of HIV exposure, for each individual. Further, higher IH was not associated with increased SUIS, nor was SUIS a variable through which IH

influenced sexual risk behaviour. Connection to the gay community may promote unhealthy behaviours through submersion into a subculture that promotes drug use and provides easier access to drugs (Halkitis et al., 2005). High levels of IH may serve as a barrier to engagement with the gay community, thereby also serving as a barrier from community level factors that lead to greater substance use (Moody et al., 2018). These results emphasize the continuing importance of community level interventions that address substance use in the gay community.

Our results show that SUIS predicted the higher numbers of condomless intercourse with non-steady partners reported, without IH influencing SUIS. We found that substance use recency mediated the relationship between IH and SUIS. As IH increased, SUIS decreased; because higher IH predicted less recent use of substances and more recent use of substances predicted higher numbers of SUIS. When looking at the variances, as expected, the role of alcohol in explaining the variances in SRB in comparison to rest of the substances is relatively small (0.032). The analysis has shown that particular substances in the SEM had greater influence than the rest, with ecstasy explaining the largest share of the variances in the model (pill=0.728; crystal=0.701) – which is in line with how the question was asked (i.e. the question was asked as the most recent use of substances, and not the recent use of substances in amounts that would affect one's thinking or decision-making).

2.6.   Strength and Limitations

Our study has several methodological strengths, including being the largest dataset of MSM living in Spain and use of SEM. We also note its limitations. We use recency time formats (when did you last…) for substance use variables, which further reduces the chance of recall bias – unlike frequency formats, which is not natural for most people. Similarly, there is no recall bias in knowledge, or the proportion of sex under the influence of substances. Accurately reporting partner numbers is generally a problem; but that does not affect our conclusions. Another strength of this survey lies in its anonymous character, through which the risk of social desirability bias is reduced (as opposed to the interview setting). While we used a large, diverse sample of MSM, the data come from a non-probability sample, potentially limiting generalizability, especially to those who are older, have lower education, fewer LGBT community attachments, or are more likely to conceal their sexual orientation (Prah et al., 2016). Yet, our analyses assume that the

distribution of variables in the EMIS-2017 sample matches the distribution of these variables in the population. Further, non-probability sampling can also lead to higher estimates of sexual risk, drug use, or knowledge among MSM. These concerns are somewhat attenuated given that the present study was not focused on establishing population estimates or risk behaviours, HIV/PrEP knowledge, or IH, but instead sought to examine associations among variables, for which non-probability sampling is more appropriate (Meyer & Wilson, 2009). Further, probability-based studies typically include relatively small numbers of sexual minorities in one country only, and thus would not have provided an adequate sample size across numerous countries with which to evaluate our research aims.

2.7. Conclusion

The impacts of IH on the sexual risk behaviours of gay, bisexual and other MSM have been extensively studied, and we extend knowledge of the nature of the relation by attempting to disentangle the potential influence of HIV-related knowledge and substance use. Our SEM results suggest that IH is not directly implicated in the path to SRB and that HIV/PrEP knowledge, but not SUIS, mediate the relationship between IH and SRB. Future prevention strategies should also target specific counselling for MSM with low IH, and who are relatively knowledgeable about HIV risks and how PrEP works, in order to ensure that they are included within the prevention messages. Similarly, future interventions should consider addressing particular problems at the community level, such as substance use in general, sex under the influence of substances, and social homophobia which is exercised structurally against individuals.

2.8. Manuscript Data

Declarations

Funding (information that explains whether and by whom the research was supported) EMIS-2017 was carried out as part of ESTICOM, under the service contract 2015 71 01 with The Consumers, Health, Agriculture and Food Executive Agency (Chafea), acting under powers delegated by the Commission of the European Union. The contract arises from the Call for tender No Chafea/2015/Health/38.

Conflicts of interest/Competing interests (include appropriate disclosures)

None.

Ethics approval (include appropriate approvals or waivers)

The Observational Research Ethics Committee at the London School of Hygiene and Tropical Medicine approved the original study (reference 14421/RR/8805).

Consent to participate (include appropriate consent statements)

All participants included in this analysis indicated online, prior to providing their answers, that they understand the nature and purpose of the study and consented to take part.

Consent for publication (consent statement regarding publishing an individual's data or image)

Not applicable.

Availability of data and material (data transparency)

Data is property of the LSHTM and can be accessed upon reasonable request to coordinator@emis-project.eu.

Code availability (software application or custom code)

Not applicable.

Authors' contributions

This section is written here as it is in the published version. Therefore, all the authors have signed it and did not report any conflict of interests.

Methodology, formal analysis and investigation: İbrahim Sönmez. Conceptualization and design: İbrahim Sönmez, Axel J. Schmidt, Cinta Folch, Nicolas Lorente, and Rigmor Berg. Resources and data: Axel J. Schmidt. Writing - original draft preparation: İbrahim Sönmez. Writing - introduction: Cinta Folch, Nicolas Lorente. Writing – sample and data: Axel J. Schmidt. Writing – discussion: İbrahim Sönmez, Axel J. Schmidt, Cinta Folch, Nicolas Lorente, Rigmor Berg, Natalie Thurlby. Writing – conclusion: Rigmor Berg. Supervision of development: Axel J. Schmidt. Supervision of statistical analysis: Natalie Thurlby.

Acknowledgements:

2.9. References

Andrinopoulos, K., Hembling, J., Guardado, M. E., de Maria Hernández, F., Nieto, A. I., & Melendez, G. (2015). Evidence of the Negative Effect of Sexual Minority Stigma on HIV Testing Among MSM and Transgender Women in San Salvador, El Salvador. AIDS and Behavior, 19(1), 60–71. https://doi.org/10.1007/s10461-014-0813-0

Baral, S., Logie, C. H., Grosso, A., Wirtz, A. L., & Beyrer, C. (2013). Modified social ecological model: A tool to guide the assessment of the risks and risk contexts of HIV epidemics. BMC Public Health, 13(1). https://doi.org/10.1186/1471-2458-13-482

Beaujean, A. A. (2014). Appendix: Bootstrapping Latent Variable Models, in Latent Variable Modeling using R: A Step-by-Step Guide. Routledge. https://cpb-us-w2.wpmucdn.com/blogs.baylor.edu/dist/0/4392/files/2013/12/AppendixBootstrapping-1gyf69b.pdf

Berg, R. C., Ross, M. W., Weatherburn, P., & Schmidt, A. J. (2013). Structural and environmental factors are associated with internalised homonegativity in men who have sex with men: Findings from the European MSM Internet Survey (EMIS) in 38 countries. Social Science & Medicine, 78, 61–69. https://doi.org/10.1016/j.socscimed.2012.11.033

Berg, R. C., Weatherburn, P., Ross, M. W., & Schmidt, A. J. (2015). The Relationship of Internalized Homonegativity to Sexual Health and Well-Being Among Men in 38 European Countries Who Have Sex with Men. Journal of Gay & Lesbian Mental Health, 19(3), 285–302. https://doi.org/10.1080/19359705.2015.1024375

Centro Nacional de Epidemiología. (2018). Plan Nacional sobre el Sida, 2017 (Vigilancia Epidemiológica Del VIH y Sida En España. Sistema de Información Sobre Nuevos Diagnósticos de VIH y Registro Nacional de Casos de Sida). https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/vigilancia/doc/InformeVIH_SIDA_2018_21112018.pdf

Centro Nacional de Epidemiología. (2020). Vigilancia Epidemiológica del VIH y SIDA en España 2019. Instituto de Salud Carlos III/Plan Nacional sobre el Sida, Dirección General de Salud Pública, Calidad e Innovación. https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/vigilancia/Informe_VIH_SIDA_20201130.pdf

Dawson, E. L., Mendoza, M. C. B., Gaul, Z., Jeffries IV, W. L., Sutton, M. Y., & Wilson, P. A. (2019). Resilience, condom use self-efficacy, internalized homophobia, and condomless anal sex among black men who have sex with men, New York City. PLOS ONE, 14(4), e0215455. https://doi.org/10.1371/journal.pone.0215455

Dudley, M. G., Rostosky, S. S., Korfhage, B. A., & Zimmerman, R. S. (2004). Correlates of High-Risk Sexual Behavior among Young Men Who Have Sex with Men. AIDS Education and Prevention, 16(4), 328–340. https://doi.org/10.1521/aeap.16.4.328.40397

European Centre for Disease Prevention and Control & World Health Organization. (2020). HIV/AIDS surveillance in Europe 2020: 2019 data. Publications Office. https://data.europa.eu/doi/10.2900/073965

Fernández-Dávila, P., & Zaragoza Lorca, K. (2009). Internet y riesgo sexual en hombres que tienen sexo con hombres. Gaceta Sanitaria, 23(5), 380–387. https://doi.org/10.1016/j.gaceta.2008.11.004

Folch, C., Esteve, A., Zaragoza, K., Munoz, R., & Casabona, J. (2010). Correlates of intensive alcohol and drug use in men who have sex with men in Catalonia, Spain. The European Journal of Public Health, 20(2), 139–145. https://doi.org/10.1093/eurpub/ckp091

Folch, C., Marks, G., Esteve, A., Zaragoza, K., Muñoz, R., & Casabona, J. (2006). Factors Associated with Unprotected Sexual Intercourse with Steady Male, Casual Male, and Female Partners Among Men Who Have Sex with Men in Barcelona, Spain. AIDS Education and Prevention, 18(3), 227–242. https://doi.org/10.1521/aeap.2006.18.3.227

Folch, C., Muñoz, R., Zaragoza, K., & Casabona, J. (2009). Sexual risk behaviour and its determinants among men who have sex with men in Catalonia, Spain. Eurosurveillance, 14(47). https://doi.org/10.2807/ese.14.47.19415-en

Goldbach, J. T., Schrager, S. M., Dunlap, S. L., & Holloway, I. W. (2015). The Application of Minority Stress Theory to Marijuana Use Among Sexual Minority Adolescents. Substance Use & Misuse, 50(3), 366–375. https://doi.org/10.3109/10826084.2014.980958

González-Baeza, A., Dolengevich-Segal, H., Pérez-Valero, I., Cabello, A., Téllez, M. J., Sanz, J., Pérez-Latorre, L., Bernardino, J. I., Troya, J., De La Fuente, S., Bisbal, O., Santos, I., Arponen, S., Hontañon, V., Casado, J. L., Ryan, P., & the U-SEX GESIDA 9416 Study. (2018). Sexualized Drug Use (Chemsex) Is Associated with High-Risk Sexual Behaviors and Sexually Transmitted Infections in HIV-Positive Men Who Have Sex with Men: Data from the U-SEX GESIDA 9416 Study. AIDS Patient Care and STDs, 32(3), 112–118. https://doi.org/10.1089/apc.2017.0263

Grace, J. B., & Bollen, K. A. (2005). Interpreting the Results from Multiple Regression and Structural Equation Models. Bulletin of the Ecological Society of America, 86(4), 283–295. https://doi.org/10.1890/0012-9623(2005)86[283:ITRFMR]2.0.CO;2

Halkitis, P. N., Fischgrund, B. N., & Parsons, J. T. (2005). Explanations for Methamphetamine Use Among Gay and Bisexual Men in New York City. Substance Use & Misuse, 40(9–10), 1331–1345. https://doi.org/10.1081/JA-200066900

Herek, G. M. (2004). Beyond "Homophobia": Thinking about sexual prejudice and stigma in the twenty-first century. Sexuality Research and Social Policy, 1(2), 6–24. https://doi.org/10.1525/srsp.2004.1.2.6

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1–55. https://doi.org/10.1080/10705519909540118

Huebner, D. M., Davis, M. C., Nemeroff, C. J., & Aiken, L. S. (2002). The Impact of Internalized Homophobia on HIV Preventive Interventions. American Journal of Community Psychology, 30(3), 327–348. https://doi.org/10.1023/A:1015325303002

Kashubeck-West, S., & Szymanski, D. M. (2008a). Risky Sexual Behavior in Gay and Bisexual Men: Internalized Heterosexism, Sensation Seeking, and Substance Use. The Counseling Psychologist, 36(4), 595–614. https://doi.org/10.1177/0011000007309633

Kashubeck-West, S., & Szymanski, D. M. (2008b). Risky Sexual Behavior in Gay and Bisexual Men: Internalized Heterosexism, Sensation Seeking, and Substance Use. The Counseling Psychologist, 36(4), 595–614. https://doi.org/10.1177/0011000007309633

Klein, H. (2013). Condom Use Self-Efficacy and HIV Risk Practices Among Men Who Use the Internet to Find Male Partners for Unprotected Sex. American Journal of Men's Health, 8(3), 190–204. https://doi.org/10.1177/1557988313492172

Lelutiu-Weinberger, C., Pachankis, J. E., Golub, S. A., Walker, J. J., Bamonte, A. J., & Parsons, J. T. (2013). Age Cohort Differences in the Effects of Gay-Related Stigma, Anxiety and Identification with the Gay Community on Sexual Risk and Substance Use. AIDS and Behavior, 17(1), 340–349. https://doi.org/10.1007/s10461-011-0070-4

Malyon, A. K. (1982). Psychotherapeutic Implications of Internalized Homophobia in Gay Men. Journal of Homosexuality, 7(2–3), 59–69. https://doi.org/10.1300/J082v07n02_08

Martens, M. P. (2005). The Use of Structural Equation Modeling in Counseling Psychology Research. The Counseling Psychologist, 33(3), 269–298. https://doi.org/10.1177/0011000004272260

McKusik, L., Wiley, J., Coates, T. J., Stall, R., Glen, S., Morin, S., Charles, K., Horstman, W., & Conant, M. A. (1985). Reported Changes in the Sexual Behavior of Men at Risk for AIDS, San Francisco, 1982-84 the AIDS Behavioral Research Project. Public Health Reports, 100(6), 622–629.

Meuleners, L. B., Lee, A. H., Binns, C. W., & Lower, A. (2003). Quality of life for adolescents: Assessing measurement properties using structural equation modelling. Quality of Life Research, 12, 283–290.

Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence. Psychol Bull, 129(5), 674–697.

Meyer, I. H., & Wilson, P. A. (2009). Sampling lesbian, gay, and bisexual populations. Journal of Counseling Psychology, 56(1), 23–31. https://doi.org/10.1037/a0014587

Ministerio de Sanidad. (2020). Encuesta europea on-line para hombres que tienen sexo con hombres (EMIS-2017): Resultados en España.

Mirandola, M., Gios, L., Sherriff, N., Marcus, U., Toskin, I., Rosinska, M., Schink, S., Kühlmann-Berenzon, S., Suligoi, B., Folch, C., Nöstlinger, C., Dias, S., Stanekova, D., Klavs, I., Caplinskas, S., Rafila, A., Marin, C., Alexiev, I., Zohrabyan, L., … on behalf of the SIALON II Network. (2018). Quantifying unmet prevention needs among MSM in Europe through a multi-site bio-behavioural survey. Eurosurveillance, 23(49). https://doi.org/10.2807/1560-7917.ES.2018.23.49.1800097

Moody, R. L., Starks, T. J., Grov, C., & Parsons, J. T. (2018). Internalized Homophobia and Drug Use in a National Cohort of Gay and Bisexual Men: Examining Depression, Sexual Anxiety, and Gay Community Attachment as Mediating Factors. Archives of Sexual Behavior, 47(4), 1133–1144. https://doi.org/10.1007/s10508-017-1009-2

Moonie, S., Huang, X., & Sterling, D. A. (2009). Quality of Life Estimation with Structural Equation Modeling in School Aged Children with Asthma. 3, 1–16.

Newcomb, M. E., & Mustanski, B. (2010a). Internalized homophobia and internalizing mental health problems: A meta-analytic review. Clinical Psychology Review, 30(8), 1019–1029. https://doi.org/10.1016/j.cpr.2010.07.003

Newcomb, M. E., & Mustanski, B. (2010b). The Importance of Measuring Internalized Homophobia/Homonegativity: Reply to Ross, Rosser, and Smolenski (2010a). Archives of Sexual Behavior, 39(6), 1209–1211. https://doi.org/10.1007/s10508-010-9655-7

Newcomb, M. E., & Mustanski, B. (2011). Moderators of the Relationship Between Internalized Homophobia and Risky Sexual Behavior in Men Who Have Sex with Men: A Meta-Analysis. Archives of Sexual Behavior, 40(1), 189–199. https://doi.org/10.1007/s10508-009-9573-8

Pando, M. A., Balan, I., Marone, R., Dolezal, C., Barreda, V., Carballo Dieguez, A., & Avila, M. M. (2013). HIV Knowledge and Beliefs Among Men Who Have Sex With Men (MSM) in Buenos Aires, Argentina. AIDS and Behavior, 17(4), 1305–1312. https://doi.org/10.1007/s10461-012-0404-x

Prah, P., Hickson, F., Bonell, C., McDaid, L. M., Johnson, A. M., Wayal, S., Clifton, S., Sonnenberg, P., Nardone, A., Erens, B., Copas, A. J., Riddell, J., Weatherburn, P., & Mercer, C. H. (2016). Men who have sex with men in Great Britain: Comparing methods and estimates from probability and convenience sample surveys. Sexually Transmitted Infections, 92(6), 455–463. https://doi.org/10.1136/sextrans-2015-052389

Puckett, J. A., Newcomb, M. E., Garofalo, R., & Mustanski, B. (2017). Examining the Conditions Under Which Internalized Homophobia Is Associated with Substance Use

and Condomless Sex in Young MSM: The Moderating Role of Impulsivity. Annals of Behavioral Medicine, 51(4), 567–577. https://doi.org/10.1007/s12160-017-9878-0

Raykov, T., Tomer, A., & Nesselroade, J. R. (1991). Reporting structural equation modeling results in Psychology and Aging: Some proposed guidelines. Psychology and Aging, 6(4), 499–503. https://doi.org/10.1037//0882-7974.6.4.499

Ross, M. W., Kajubi, P., Mandel, J. S., McFarland, W., & Raymond, H. F. (2013). Internalized homonegativity/homophobia is associated with HIV-risk behaviours among Ugandan gay and bisexual men. International Journal of STD & AIDS, 24(5), 409–413. https://doi.org/10.1177/0956462412472793

Ross, M. W., Rosser, B. R. S., Bauer, G. R., Bockting, W. O., Robinson, E., Rugg, D. L., & Coleman, E. (2001). Drug Use, Unsafe Sexual Behavior, and Internalized Homonegativity in Men Who Have Sex With Men. AIDS and Behavior, 7.

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1–36.

Saris, W. E., Satorra, A., & Sorbom, D. (1987). The Detection and Correction of Specification Errors in Structural Equation Models. Sociological Methodology, 17, 105–129. https://doi.org/10.2307/271030

Saris, W. E., Satorra, A., & van der Veld, W. M. (2009). Testing Structural Equation Models or Detection of Misspecifications? Structural Equation Modeling: A Multidisciplinary Journal, 16(4), 561–582. https://doi.org/10.1080/10705510903203433

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. Psychological Methods, 7(4), 422–445. https://doi.org/10.1037/1082-989X.7.4.422

Stein, T. S., & Cohen, C. J. (Eds.). (1986). Contemporary Perspectives on Psychotherapy with Lesbians and Gay Men. Springer US. https://doi.org/10.1007/978-1-4757-9832-6

Thoemmes, F., Rosseel, Y., & Textor, J. (2018). Local fit evaluation of structural equation models using graphical criteria. Psychological Methods, 23(1), 27–41. https://doi.org/10.1037/met0000147

Tran, H., Ross, M. W., Diamond, P. M., Berg, R. C., Weatherburn, P., & Schmidt, A. J. (2018). Structural Validation and Multiple Group Assessment of the Short Internalized Homonegativity Scale in Homosexual and Bisexual Men in 38 European Countries: Results From the European MSM Internet Survey. The Journal of Sex Research, 55(4–5), 617–629. https://doi.org/10.1080/00224499.2017.1380158

Velter, A., Saboni, L., Sommen, C., Bernillon, P., Bajos, N., & Semaille, C. (2015). Sexual and prevention practices in men who have sex with men in the era of combination HIV prevention: Results from the Presse Gays et Lesbiennes survey, France, 2011. Eurosurveillance, 20(14). https://doi.org/10.2807/1560-7917.ES2015.20.14.21090

Weatherburn, P., Hickson, F., Reid, D. S., Marcus, U., & Schmidt, A. J. (2020). European Men-Who-Have-Sex-With-Men Internet Survey (EMIS-2017): Design and Methods. Sexuality Research and Social Policy, 17(4), 543–557. https://doi.org/10.1007/s13178-019-00413-0

Weston, R., & Gore, P. A. (2006). A Brief Guide to Structural Equation Modeling. The Counseling Psychologist, 34(5), 719–751. https://doi.org/10.1177/0011000006286345

Williamson, I. R. (2000). Internalized homophobia and health issues affecting lesbians and gay men. Health Education Research, 15(1), 97–107. https://doi.org/10.1093/her/15.1.97

Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. Behavior Research Methods, 51(1), 409–428. https://doi.org/10.3758/s13428-018-1055-2

CHAPTER 3. What makes sex "risky"? The role of Internalized Homonegativity on Sexual Risk Behaviour in Spain and Turkey

Abstract

In a sample of men who have sex with men (MSM) in Spain (N=3,336) and Turkey (N=550) who are at risk of HIV, we examined how internalised homonegativity (IH) is associated with the number of non-steady male condomless intercourse partners (as a proxy of sexual risk behaviour). We employed multigroup structural equation modelling (MG-SEM) and estimated the relationship between IH and sexual risk behaviour and possible mediating effects of HIV/PrEP knowledge, substance use, and sex under the influence of substances on this relationship. Measurement and structural invariance across countries were established. We found no direct effect of IH on sexual risk behaviour, neither for MSM in Spain nor Turkey. HIV/PrEP knowledge mediated the relationship between IH and sexual risk behaviour among MSM in Spain, but not among men in Turkey. Neither substance use nor sex under the influence of substances mediated the relationship. However, in both samples, IH was negatively associated with HIV/PrEP knowledge and sex under the influence of substances was positively associated with sexual risk behaviour. Higher HIV/PrEP knowledge was associated with higher sexual risk behaviour among MSM in Spain, while among MSM in Turkey the association was in the opposite direction. Our results underscore the differences in country-specific needs for HIV prevention programs. The different mechanisms through which IH operates in Spain and Turkey should be taken into consideration when tailoring these programs.

Keywords: Internalised homonegativity, sexual risk behaviour, HIV knowledge, substance use, MSM, structural equation modelling

3.1. Introduction

In 2019, sex between men accounted for 38.7% of all new HIV diagnoses in the countries of the European Economic Area (European Centre for Disease Prevention and Control & World Health Organization, 2020). Rates of HIV among men who have sex with men (MSM) are particularly high in Spain and Turkey (Centro Nacional de Epidemiología, 2018; Mirandola et al., 2018; T.C. Sağlık Bakanlığı, 2021).

There are many explanations for behaviors that may increase HIV transmission risk among MSM, of which Meyer's minority stress model (Meyer, 2003) is an often cited explanatory model. The model refers to the "excess stress to which individuals from stigmatized social categories are exposed as a result of their social, often minority, position." A minority stressor relevant to HIV transmission risk that has been expanded upon in Meyer's (2003) model is Internalized Homonegativity (IH). It is defined as negative feelings about one's homosexuality, as a product of social and political stigma and bias rather than a response which stems from within individuals (Herek, 2004). IH has been found to be associated with reduced mental health and well-being (Newcomb & Mustanski, 2010a), problems with coming out (Costa et al., 2013), and depression and drug use (Moody et al., 2018). Importantly, findings about the associations between IH and well-being, depression, and drug use are factors that are known to be associated with sexual risk behaviors (SRB) and transmission of STIs among MSM. However, inconsistent results point to uncertainties about the extent to which IH influences engagement in SRB (Newcomb & Mustanski, 2010a; Puckett et al., 2017a). While some studies found that higher levels of IH was associated with more frequent SRB (Folch et al., 2009; Newcomb & Mustanski, 2010a; Puckett et al., 2017a; Sietins et al., 2020), other studies did not find evidence for a direct relationship (Dawson et al., 2019; Dudley et al., 2004; Newcomb & Mustanski, 2010a; Puckett et al., 2017a).

The inconsistent evidence regarding the relationship between IH and SRB can be partly explained with the existence of potential mediator variables (Kashubeck-West & Szymanski, 2008). Researchers explain that in general, transmission risk of STIs among MSM is mediated by multiple social and structural factors that influence their sexual practices (Baral et al., 2013). These factors jeopardize prevention efforts by limiting MSM's options for accessing prevention services for HIV and other STIs (Andrinopoulos et al., 2015; Velter et al., 2015). Specifically, higher levels of IH seem to hinder their connection to the gay community (Goldbach et al., 2015; Moody et al., 2018),

thus, they may also miss information about HIV prevention and risk reduction programs (Williamson, 2000). Similarly, higher levels of IH was found to be associated with higher prevalence of drug use (Moody et al., 2018; Puckett et al., 2017a; Sewell et al., 2017). In turn, higher prevalence of drug use consumption was associated with a higher prevalence of condomless anal sex or sex with multiple partners in Spain (Fernández-Dávila & Zaragoza Lorca, 2009; Folch et al., 2006, 2010; González-Baeza et al., 2018) and in other contexts (Choi et al., 2005; Drumright et al., 2006; Kashubeck-West & Szymanski, 2008).

It is also possible that the relationship between IH and SRB differs across different socio-cultural contexts, as sexual minority men's daily experiences and identity development are context-specific. A global study of 109,000 gay and bisexual men recently documented that socio-political and cultural homonegativity varies in its manifestation and intensity, and that both manifest socio-political stigma and actual discriminatory events independently contribute to high levels of IH (Berg et al., 2017). For example, while Spain is among the countries with the least hostility toward sexual minorities and offers social protection laws against sexual identity discrimination, Tukey is among the countries with the greatest hostility, with >90% of the population believing that homosexuality is morally unacceptable (Berg et al., 2013). Although Turkey is among the very few countries worldwide that has never criminalized homosexuality, sex between men – particularly taking the receptive role in anal sex – has been a stigmatized behaviour both among MSM and general society, despite being culturally prevalent for centuries. Unsurprisingly, studies show that IH among Turkish MSM was considerably higher than among Spanish MSM (The EMIS Network, 2013, 2019) and previous cross-cultural research regarding IH levels suggests that there are numerous variables impacting stigmatization of sexual behaviour between men, such as religious motivation and different minority stressors (Brown et al., 2016).

Further, as mentioned, in both Spain and Turkey, an important mode of HIV transmission is sex between men (30.6% in Turkey and 38% in Spain) (Erdinc et al., 2020). However, compared to MSM in Spain, MSM in Turkey suffer from a lack of health services that are tailored for them (Doran et al., 2021; Schmidt et al., 2013). The European MSM Internet Survey (EMIS-2017), showed that while 12.6% of MSM reported lacking control of safer sex in Spain, this rate was 16.7% in Turkey (The EMIS Network, 2019). Similarly, in the same study, MSM in Turkey reported less awareness of PrEP, less certainty about their HIV status, and less social support in general when compared to MSM in Spain. Unfortunately, there are only a handful of empirical studies concerning

Turkish MSM. Among the few studies is a cross-sectional study including 562 sexual minority men in Portugal and Turkey. It found that Turkish men reported significantly higher IH and identity stigma compared to Portuguese men. These differences, in turn, were associated with Turkish men's reduced probability of sexual identity disclosure to family and friends (Torres & Rodrigues, 2021).

Given the inconsistent evidence regarding the relationship between IH and SRB, the uncertainty of the influence of moderators, the contextual differences between Spain and Turkey, and the limited research on IH in Turkey, further research on IH is important. Documenting the association between IH and SRB and possible mediator variables of this relationship within both Spain and Turkey will help determine varying needs in prevention efforts. Thus, using a multi-group structural equation modelling (MG-SEM), our study aimed to disentangle the possible influence of drug use and knowledge regarding HIV and PrEP on the relation between IH and SRB in national samples of MSM living in Spain and Turkey

3.2.   Sample and Methods

3.2.1. Study Sample

We used data from the 2017 wave of the European MSM Internet Survey (EMIS-2017). The detailed methods have been reported elsewhere (Weatherburn et al., 2020). EMIS-2017 was an internet based, self-completion survey conducted in 33-languages for men living in Europe who have sex with men and/or are sexually attracted to other men. No financial incentives were given to participants and no personal identifying information (including IP addresses) were collected. More background information is available at www.emis2017.eu.

The sub-sample of MSM living in Turkey consisted of 1,855 respondents, with 94.3% using the Turkish language version of the survey, followed by 3.5% using the English version. Recruitment largely occurred through trans-national dating apps. Hornet accounted for 31% of recruits, PlanetRomeo for 25%, and Grindr, SCRUFF, GROWLr, RECON, Gaydar, and Manhunt/Jack'd collectively for 4%. Recruitment was also through national partners via websites (3%) and social media (3%). For 34% of respondents, the source of recruitment remained unknown.

The sub-sample of MSM living in Spain consisted of 10,652 respondents, with 92.1% using the Spanish (Castilian) version of the survey (no other co-official languages of Spain, such as Catalan/Valencian, Galician, or Basque were offered). Grindr accounted for 48%, PlanetRomeo 19%, and SCRUFF, GROWLr, RECON, Gaydar, Hornet, and Manhunt/Jack'd collectively 11% of recruits living in Spain. MSM were also recruited through national partners via websites (16%) and social media (1%) (Ministerio de Sanidad, 2020).

The IH scale questions were randomly distributed to half of the survey respondents (Spain n=5,310; Turkey n=926), to avoid losing participants because of asking too many questions. We excluded MSM who did not provide answers to all seven items of the scale (Spain n=678; Turkey n=163), MSM who reported having undetectable HIV viral load (Spain n=613; Turkey n=80), and those using PrEP (Spain n=117; Turkey n=11), because condomless anal intercourse among men with undetectable viral load or using PrEP bear no intrinsic HIV risk. Therefore, our final analytical sample consisted of 3,902 MSM in Spain and 672 MSM in Turkey.

3.2.2. Measurements

Internalized homonegativity (IH). To assess IH, we used the 7-item SIHS (Berg et al., 2013; Tran et al., 2018). EMIS-2017 participants answered the items on a 7-point disagree-agree (with does-not-apply) scale. The SIHS items are "Social situations with gay men make me feel uncomfortable"; "Homosexuality is morally acceptable to me"; "Even if I could change my sexual orientation, I wouldn't"; "I feel comfortable in gay bars"; "I feel comfortable being seen in public with an obviously gay person"; "I feel comfortable being a homosexual man"; "I feel comfortable discussing homosexuality in a public situation." The validity and reliability of SIHS were confirmed across 38 European countries, with multigroup validation for 7-item scale fit indices showing good fit to data from 38 country groups (CFI=0.982, TLI=0.983, and RMSEA=0.032) (see Tran et al. (2018) for further statistics).

Sexual Risk Behavior (SRB). SRB of the respondents was assessed with a single question: "How many non-steady male partners have you had intercourse without a condom with in the last 12 months?" Participants were informed that non-steady partners mean "men you have had sex with once only, and men you have sex with more than once but who you don't think of as a steady partner (including one-night stands,

anonymous and casual partners, regular sex buddies)". The possible answer options for this question in the survey ranged from 0 to 15; with numbers 0 to 10 equivalent to their values, and numbers 11 to 15 indicating 11–20, 21–30, 31–40, 41–50, and more than 50 partners respondents had condomless intercourse with. We recoded this variable into seven categories: 0; 1; 2–5; 6–10; 11–20; 20–50; and more than 50. Note that our definition of the risk behavior is related to HIV risk and does not relate directly to other STIs.

HIV/PrEP Knowledge (HPK). We used two measures to construct the HIV/PrEP knowledge latent variable: HIV knowledge and PrEP knowledge. HIV knowledge was constructed from seven items, assessed with a 5-point knowledge response set, with possible answers including "I do not believe this", "I wasn't sure about this", and "I knew this already". These items were "AIDS is caused by a virus called HIV"; "If someone becomes infected with HIV it may take several weeks before it can be detected in a test"; "You cannot be confident about whether someone has HIV or not from their appearance"; "There is a medical test that can show whether or not you have HIV"; "There is currently no cure for HIV infection"; "HIV infection can be controlled with medicines so that its impact on health is much less"; "A person with HIV who is on effective treatment (called 'undetectable viral load') cannot pass their virus to someone else during sex." PrEP knowledge included three items assessed with the same response set: "Pre-Exposure Prophylaxis (PrEP) involves someone who does not have HIV taking pills before as well as after sex to prevent them getting HIV"; "PrEP can be taken as a single daily pill if someone does not know in advance when they will have sex"; "If someone knows in advance when they will have sex, PrEP needs to be taken as a double dose approximately 24 hours before sex and then at both 24 and 48 hours after the double dose." Each of these 10 items were recoded into a dummy variable, with value 1 indicating "I knew this already," and value 0 indicating all the other answers. Then, we created an additive scale with these 10 items. With each factual knowledge (I knew this already), respondents scored one point on the additive scale, thus the score ranged from 0 to 10.

Substance Use (SU). We used six observed variables for the substance use latent variable, based on how long-ago respondents used substances in any context. The six substances (see table 1) were assessed with an 8-point recency scale, ranging from (1) "never" to (8) "in the past 24 hours" (after inverting the original scale).

Sex Under the Influence of Substances (SUIS). The respondents were asked, "In the last 12 months, how much of the sex you've had with men has been under the influence of alcohol or any other drug?" The possible answers for this question ranged from (1) "none of it" to (7) "all of it".

3.3. Methods

We use RStudio and the 'lavaan' package (Rosseel, 2012) to run our structural equation model. We employed a similar structural model developed in the study of Sönmez et al. (2021). Prior to the analysis, the data was checked for multicollinearity, missing data, departures from normality and distributions. Multicollinearity was not present. Missing data were handled with pairwise deletion and after this step, our sample consisted of 3,694 MSM in Spain and 550 MSM in Turkey. For descriptive purposes, we first estimated the prevalence and means (if applicable) of all variables, by country. Comparisons of variables between each category were conducted using Rao-Scott chi-square. We used a multi-group structural equation modelling (MG-SEM) approach. It is useful if the research sample involves more than one sample and the concern is to determine whether or not the components of the estimations are equivalent across groups (Byrne, 2016).

We applied the two-step approach proposed by Byrne (2016), whereby we first established invariance of the measurement model's groups, and then of the structural model (for a similar example, see Sihombing (2012)). First, we established a baseline model for the samples from Spain and Turkey separately. Measurement invariance of a multiple-group confirmatory factor analysis (MG-CFA) is necessary when a construct is to be tested across groups or points in time, and to determine whether the compared groups are based on instruments that measure the same construct (Chen, 2007). Levels of measurement invariance has implications on the interpretation of differences across groups (Hirschfeld & von Brachel, 2014). Therefore, the goal is to determine and establish the measurement invariance, so that we can have a statistical model in which we can assume that the constructs are interpreted in the same way by the participants across groups (van de Schoot et al., 2012). Briefly, measurement invariance is established by first having a baseline CFA model where the paths are the same across groups, but parameter loadings, intercepts, and residuals are allowed to vary across groups. Then, a series of model comparisons are examined, into which we introduce stricter equality

constrains to be able to test the model fit's change. If all the equality constrains and the model fit the data well, then the interpretation of the relationship can be attributed to pure differences across groups. These steps are explained in greater detail elsewhere (Chen, 2007; Hirschfeld & von Brachel, 2014; van de Schoot et al., 2012).

Following the above-mentioned steps, we established the model's fit using confirmatory factor analysis (CFA) for each sample separately, to determine how well the models fit the data across groups when no cross-groups constraints are imposed. Next, we introduced equality constraints on parameters step-by-step and analyzed the data simultaneously. When the multi-group CFA's measurement validity was established, we introduced structural constraints to our multi-group SEM model to determine whether our SEM model's results were attributable to actual differences across groups, instead of differences of coefficients and parameters estimated from covariances derived from different subsets.

3.3.1. Measurement Invariance and Multi-group Confirmatory Factor Analysis

Following Hirschfeld & von Brachel (2014) to test measurement invariance of a MG-CFA, the first step was to run a confirmatory factor analysis (CFA) for each group separately and the validity of CFA for each group is established (Spain, CFI=0.97, TLI=0.96, RMSEA=0.03; Turkey, CFI=0.95; TLI=0.94; RMSEA=0.04). Then, we ran a multigroup CFA with no equality constraints, in other words Configural invariance, (Table 1, Model 1 (M1)) and this model also had a good fit (CFI=0.97; TLI=0.96; RMSEA=0.03).

Then, we ran a model where we only constrained the factor loadings to be equal across groups (Table 1, Model 2 (M2)). This is called metric invariance test and it determines whether the respondents of different groups attribute the same meaning to the latent constructs (van de Schoot et al., 2012). When compared to M1, M2 had lower CFI and RMSEA (ΔCFI=0.004, ΔRMSEA=0.002), but M2 still had a good fit (CFI=0.96, RMSEA=0.04). Our CFA model showed metric invariance across groups.

Next, we ran a model where both the factor loadings and intercepts were constrained to be equal across groups (Table 1, Model 3 (M3)). In addition to the meaning of latent constructs, the levels of the underlying manifest variables (intercepts) were held equal in both groups, allowing us to measure scale invariance. When compared to M2, M3 had a lower CFI and RMSEA (ΔCFI=0.009, ΔRMSEA=0.004), but M3 still had a

good fit (CFI=0.90, RMSEA=0.04), which gave evidence for our model's scalar invariance.

Finally, we tested the residual invariance of our model, by adding the additional constraint of equal residual variances for the observed variables across the groups (Table 1, Model 4 (M4)). In other words, this final step determines whether the latent construct is measured identically across groups (van de Schoot et al., 2012). When compared to M3, M4 had lower CFI and RMSEA, which suggested a poor fit to data. Thus, we rejected M4, as M3 comparatively showed a better fit and residual invariance could not be established.

In the given situation, the next step was to determine partial residual invariance (Hirschfeld & von Brachel, 2014) and identify which individual parameters should be set free so that residual invariance could be established. We step-by-step freed and constrained several individual parameters of M4 based on the modification indices. The results showed that particular observed variables' parameters should be set free in our model. These were: IH5 "I feel comfortable being a homosexual man;" IH6 "Homosexuality is morally acceptable to me;" IH7 "Even if I could change my sexual orientation, I wouldn't" as shown in Table 1, Model 4a (M4a). In other words, we needed to set these observed variables to be estimated differently across the two samples, so that we could establish residual invariance across groups and therefore, attribute the CFA model's results to the differences across groups. M4a showed good fit on its own (CFI=0.94, RMSEA=0.05) and when compared to the M3 (ΔCFI=0.017, ΔRMSEA=0.007). In conclusion, measurement invariance of our MG-CFA is established.

Table 3.1. Measurement Invariance of Multigroup Confirmatory Factor Analysis

Model	$\chi2$ (df)	CFI	RMSEA (90% CI)	Model Comparison	$\Delta\chi2$ (Δdf)	ΔCFI	ΔRMSEA	Decision
M1: Configural Invariance	740.55 (186)	0.972	0.039 (0.036–0.042)	-	-	-	-	Accept
M2: Metric Invariance (Loadings)	8,40.21 (197)	0.968	0.040 (0.038–0.043)	M1	11*** (99.66)	0.004	0.002	Accept
M3: Scalar Invariance (Loadings + intercepts)	1,023.14 (208)	0.960	0.044 (0.042–0.047)	M2	11*** (182.94)	0.009	0.004	Accept
M4: Residual Invariance (Loadings + intercepts + residuals)	1,874.94 (221)	0.918	0.061 (0.059–0.064)	M3	9*** (851.80)	0.008	0.003	Reject
M4a: Partial Residual Invariance (Loadings + intercepts + residuals)	1,704.08 (223)	0.943	0.052 (0.049–0.054)	M3	5*** (348.72)	0.017	0.007	Accept

Note: **CFI,** Comparative Fit Index. **TLI,** Tucker-Lewis Index. **RMSEA,** Root Mean Square Error of Approximation. **SRMR,** Standardized Root Mean Square Residual. ***p<0.01.

3.3.2. Structural Equation Modelling: Model Fit and Structural Constraints

3.3.2.1. Model Fit

The fit indices for the SEM models are shown in Table 2. The SEM output for these fit indices suggested that the hypothesized model for Spain (CFI=0.97, TLI=0.96, RMSEA=0.038 (90% CI: 0.035-0.041)), for Turkey (CFI=0.95, TLI=0.94, RMSEA=0.042 (90% CI: 0.033-0.051)), and for the multigroup model (CFI=0.97, TLI=0.96, RMSEA=0.039 (90% CI: 0.039-0.042)) were a good fit to data.

3.3.2.2. Structural Constraints

The last step in determining whether our SEM model's results were attributable to actual differences across groups, instead of differences of coefficients and parameters estimated from covariances derived from different subsets. Row 4 in Table 2 shows the comparison results of the free multigroup model versus constrained (paths and intercepts) multigroup model. The result (P-value = 0.30) allowed us to conclude that the constrained model was equivalent to the free model. In other words, the coefficients did not vary by group and comparisons across groups could be interpreted validly within a multigroup model.

Table 3.2. SEM Fit Indices and Structural Constraints

Model	N	χ^2 (df)	CFI	TLI	RMSEA (90% CI)	$\Delta\chi^2$	Δdf	P-Value
(1) Hypothesized Model for Spain	3,336	555.619 (93)	0.975	0.967	0.038 (0.035–0.041)	-	-	-
(2) Hypothesized Model for Turkey	550	184.932 (93)	0.953	0.940	0.042 (0.033–0.051)	-	-	-
(3) Multigroup Hypothesized Model	3,986	740.550 (186)	0.972	0.964	0.039 (0.036–0.042)	-	-	-
(4) Multigroup Free versus Constrained[a]	-	-	-	-	-	1.059	1	0.3034

[a] Model 3 constrained on the paths and intercepts.

CFI, Comparative Fit Index. **TLI,** Tucker-Lewis Index. **RMSEA,** Root Mean Square Error of Approximation. **SRMR,** Standardized Root Mean Square Residual.

At all steps mentioned, we used commonly employed key fit indices, such as (a) the Comparative Fit Index (CFI); (b) the Tucker-Lewis Index (TLI); (c) the root mean square error of approximation (RMSEA), and (d) Standardized root mean squared residual (SRMR) (Hu & Bentler, 1999; Weston & Gore, 2006). Most studies suggest that values higher than .95 for CFI and TLI indicate good fit (Hu & Bentler, 1999; Weston & Gore, 2006), while some suggest that CFI and TLI > .90 indicate a good fit to data (Moonie et al., 2009) as these fits indicates are susceptible to factors such as estimators and complexity (Xia & Yang, 2019). Given the complexity of our MG-SEM, we employ CFI and TLI > .90 as our fit indices criteria. Further, Hu & Bentler (1999) suggested that values of RMSEA and SRMR < .06 are acceptable, and these values are widely accepted (Weston & Gore, 2006).

3.4.   Results

3.4.1. Descriptive Statistics

Table 3 presents the descriptive results for the variables. The estimated prevalence for all variables differed by country (p<0.001, except for SUIS (P=0.001) and use of GHB/GBL (P=0.005)). Out of 3,694 MSM in Spain, 59.7% (n=2,205) reported no non-steady partners that they had condomless sex with, while 0.5% (n=17) reported more than 50 partners in the previous twelve months. In Turkey, about half of the 616 MSM reported no non-steady partners that they had condomless sex with, while only two respondents reported having more than 50 partners in the previous twelve months. MSM in Turkey had higher IH score overall (2.4 vs. 1.3 in Spain). In the HPK additive scale, MSM in Spain had an overall score of 7.14, while MSM in Turkey scored 6.0. Almost half of respondents in both Spain and Turkey (46.2%, n=1,717; 42.7%, n=261, respectively) reported no SUIS in the previous twelve months, while a small portion reported all of it (1.5%, n=57; 1.1%, n=7, respectively).

Table 3.3. Summary Statistics of Variables, by Country

Variable	Spain N	Spain Percent (mean – *median*)	Turkey N	Turkey Percent (mean – *median*)
Age	3,902	34.2	672	29.8
Number of condomless non-steady partners (SRB)	3,694	-	616	-
0	2,205	59.7	307	49.8
1	574	15.5	63	10.2
2–5	688	18.6	152	24.7
6–10	96	2.6	38	6.1
11–20	77	2.0	29	4.7
20–50	37	1.0	25	4.1
50+	17	0.5	2	0.3
SIHS (range: 0–6)		1.3		2.4
HPK Score (range: 1–10)	3,838	7.1	660	6.0
SUIS	3,713	-	611	-
None of it	1,717	46.2	261	42.7
Almost none of it	1,124	30.3	159	26.0
Less than half	373	10.0	93	15.2
About half	179	4.8	40	6.5
More than half	144	3.9	26	4.3
Almost all of it	119	3.2	25	4.1
All of it	57	1.5	7	1.1
Substance Use				
Alcohol	3,897	*In the last 7 days*	672	*Within the last 6 months*
Ecstasy (pill)	3,870	*Never*	670	*Never*
Ecstasy (crystal)	3,873	*Never*	669	*Never*
GHB/GBL	3,874	*Never*	669	*Never*
Amphetamines ("speed")	3,872	*Never*	669	*Never*
Cocaine	3,871	*Never*	670	*Never*

Notes: Differences between Spain and Turkey for all variables were all significant and P<0.001 (except for SUIS (P=0.001) and GHB/L (P=0.005)). **SRB,** Sexual Risk Behaviour; **SIHS,** Short Internalised Homonegativity Scale. **IHS1…7**: Seven Internalised Homonegativity Scale items **HPK,** HIV/PrEP Knowledge Additive Scale; **SUIS,** Sex Under the Influence of Substances; **GHB/GBL**, gamma-Hydroxybutyric acid/Butyrolactone.

3.4.2. Confirmatory Factor Analysis

The CFA model for each country showed a good fit to the data separately: Spain, CFI=0.97, TLI=0.96, RMSEA=0.03; Turkey, CFI=0.95, TLI =0.94; RMSEA=0.04. We established the measurement invariance for the multi-group CFA

step-by-step (see Appendix) and also the final CFA model showed a good fit to data (CFI=0.95, RMSEA=0.04).

3.4.3. Structural Equation Modelling: Model Fit

Before establishing SEM's fit to the data, we introduced constraints on the intercepts and paths of the model and compared the results to the free model (see Appendix). The comparison did not show statistical significance (p=0.30), which allowed us to conclude that the constrained model was equivalent to the free model. The final multi-group SEM model showed good fit to data (CFI=0.97, TLI=0.96, RMSEA=0.039 (90%-CI: 0.039–0.042)).

3.4.4. Structural Equation Modelling: Estimations

We provide standardized estimates of coefficients and errors for both groups. The results are presented in Figure 1 and Table 4. The direct path from IH to SRB (dashed line, Figure 1) did not reach statistical significance for either sample.

For both samples of MSM from Spain and Turkey, IH was negatively associated with HIV/PrEP knowledge. Each standard deviation (SD) increase in the IH latent variable was significantly associated with 0.226 and 0.263 decrease in the HIV/PrEP knowledge units, respectively. The relationship between HIV/PrEP knowledge and SRB, however, was different across the two samples. For MSM in Spain, each SD increase in the HIV/PrEP knowledge was significantly associated with 0.063 increase in the SRB units. While for MSM in Turkey, each SD increase in HIV/PrEP knowledge was significantly associated with 0.084 decrease in the SRB units. The effect of IH on HIV/PrEP knowledge was slightly larger in the Turkey sample. Similarly, as shown in Table 2, the indirect relationship between IH and SRB through HIV/PrEP knowledge varied across groups. For MSM in Spain, we found that an increase of 0.226 SD in the IH latent variable was associated with 0.01 decrease SRB units, when mediated by the HIV/PrEP knowledge. In contrast, the indirect relationship between IH and SRB through HIV/PrEP knowledge was statistically non-significant in the Turkey sample.

Figure 3.1. Estimated Multigroup SEM Results for Spain and Turkey
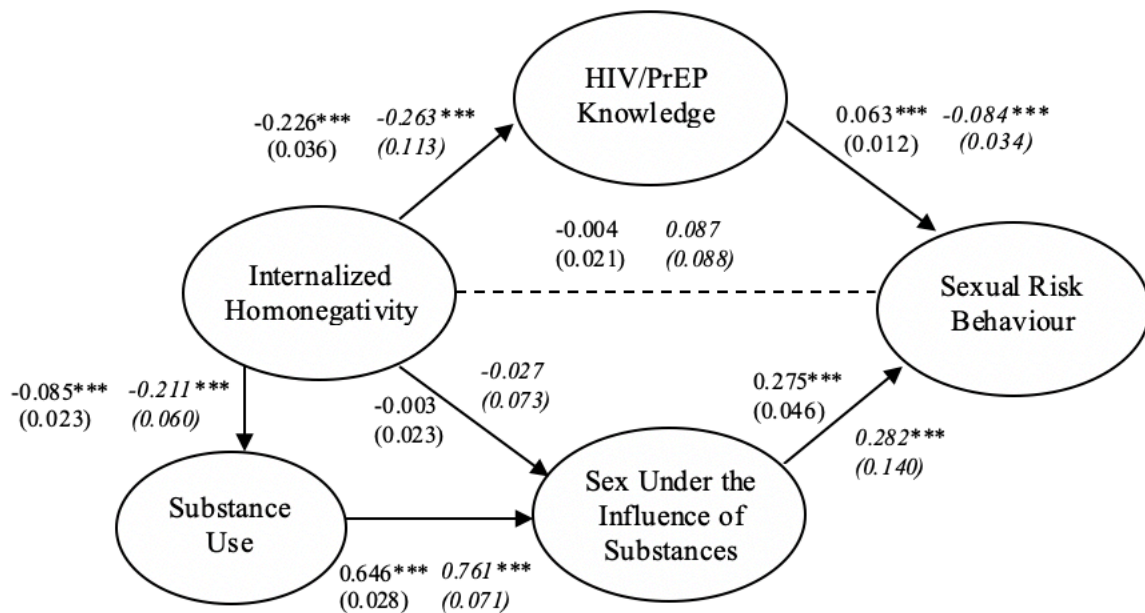
Significance levels: ***p<0.01, **p<0.05, *p<0.1. Standardized coefficients shown for comparability across groups. Coefficients on the left show the results for Spain and coefficients on the right (in italic) show the results for Turkey, and numbers in parenthesis are **robust standard errors**. **Dashed paths** represent the direct relationship to be mediated between Internalised Homonegativity and Sexual Risk Behaviour. Coefficients of observed variables and their standard errors are not shown.

In both samples, with respect to the relationship among IH, SUIS and SRB, we found that the relationship between IH and SUIS was non-significant, while the association between the SUIS latent variable and SRB was positive and significant. Expectedly, Figure 1 shows that a standard deviation increase in SUIS was significantly associated with a 0.275 and 0.282 increase in the SRB units, in the Spain and Turkey samples, respectively. The indirect path between IH and SRB mediated by SUIS was statistically non-significant for both groups (Table 3).

Figure 1 shows that as IH decreased, the recency of substance use and the coefficient were considerably larger in the Turkey sample than in the Spain sample. Each SD increase in the IH latent variable was significantly associated with 0.085 and 0.211 decrease in the substance use units, for the Spain and Turkey samples, respectively. Further, recency of substance use predicted SUIS significantly and positively in both samples. There was also a statistically significant indirect path from IH to SUIS when mediated by substance use recency. As IH increased (0.646 and 0.761 SD), SUIS

decreased (0.055 and 0.160 units for the Spain and Turkey samples, respectively); because higher IH predicted less recent use of substances and more recent use of substances predicted higher frequency of SUIS for both groups.

Table 3.4. Defined Parameters of the Multigroup SEM

Defined Parameters	Standardized Estimates (Std. Errors)		Model Fit
	Spain	Turkey	
(1) IH → HPK → SRB	-0.014*** (0.005)	0.022 (0.019)	$\chi 2$ = 740.550 **DF** = (186)
(2) IH → SUIS → SRB	0.001 (0.008)	-0.008 (0.038)	**CFI** = 0.972 **TLI** = 0.964
(3) IH → SU → SUIS	-0.055*** (0.011)	-0.160*** (0.036)	**RMSEA (90% CI)** = 0.039 (0.036–0.042) **SRMR** = 0.033
(4) Direct Effect (IH → SRB)	-0.004 (0.021)	0.087 (0.088)	

***p<0.01, **p<0.05, *p<0.1. (1) Relationship between IH and SRB mediated by HIV/PrEP knowledge. (2) Relationship between IH and SRB mediated by frequency of SUIS. (3) Relationship between IH and sex under the influence of substances mediated by substance use. (4) Direct effect of IH on SRB. **IH,** Internalised Homonegativity; **HPK,** HIV/PrEP Knowledge; **SRB,** Sexual Risk Behaviour (*i.e.* number of condomless non-steady sex partners in the previous 12 months), **SU,** substance use, **SUIS,** Sex under the influence of substances. **CFI,** Comparative Fit Index. **TLI,** Tucker-Lewis Index. **RMSEA,** Root Mean Square Error of Approximation. **SRMR,** Standardised Root Mean Square Residual. **DF,** Degrees of Freedom. **CI,** Confidence Interval.

3.5. Discussion

In this study, we examined the relationship between IH and SRB, and possible mediators of this relationship across samples of MSM in Spain and Turkey. Among MSM in both countries, we found no direct relationship between IH and SRB, which is consistent with previous research (Dawson et al., 2019; Newcomb & Mustanski, 2010b; Puckett et al., 2017b) and suggestive of there being potential mediators on this relationship (Kashubeck-West & Szymanski, 2008; Newcomb & Mustanski, 2010b). While HIV/PrEP knowledge mediated the relationship between IH and SRB for Spain, we did not find evidence of mediation for Turkey. For both countries, SUIS was not a significant mediator of the relationship between IH and SRB, but substance use significantly mediated the relationship between IH and SUIS.

We found that, for both countries, higher IH was associated with reduced HIV/PrEP knowledge. That is, MSM with higher IH were less likely to be knowledgeable

about HIV and PrEP. This finding is consistent with previous studies documenting that IH can reduce awareness of information related to MSM's sexual health. Lower IH has been found to be a predictor of greater sexual identity certainty among gay men (Morandini et al., 2015), and because IH can hinder gay men's connection to and involvement in the gay community (Goldbach et al., 2015; Moody et al., 2018), it may limit their exposure to HIV/PrEP knowledge. Gay communities and venues are where the targeted information is available for gay and bisexual men (Williamson, 2000). It is also worth noting that generational differences can influence gay men's ambivalence of what 'gay community' mean due to the changing status of homosexuality and the HIV epidemic (Holt, 2011). Future studies should consider variables related to community connectedness when examining the relationship between IH and HIV/PrEP knowledge.

An important finding of this study is that while increased HIV/PrEP knowledge was associated with increased number of condomless sexual intercourse with non-steady partners for MSM in Spain, it reduced the number of condomless sexual intercourse with non-steady partners for MSM in Turkey. One explanation for this inconsistent result could be that MSM in Spain, who have much lower IH than MSM in Turkey, are also more likely to be a part of a gay community and therefore have an increased chance of acquiring more knowledge about HIV/AIDS related information and about protecting themselves.

In the sample of MSM in Turkey, HIV/PrEP knowledge did not mediate IH and SRB. For MSM in Spain, however, we found that as IH increased, the number of condomless intercourse with non-steady partners reported – that is, SRB – decreased; because higher IH was associated with reduced HIV/PrEP knowledge while higher HIV/PrEP knowledge was associated with increased SRB. Therefore, we found that, when mediated with HIV/PrEP knowledge, there was a positive association between IH and SRB among MSM in Spain. On one hand, this finding may be because men with higher IH tend to have reduced self-efficacy for condom use (Huebner et al., 2002) and those who are less knowledgeable about self-prevention strategies may not be confident enough, given their high IH, to communicate safer sex practices with non-steady partners. On the other hand, it is likely that those men who are able to negotiate sexual safeness (e.g., knowing that no HIV transmissions from the HIV-positive partner to the HIV-negative partner would occur if their viral load is undetectable ["U=U"], e.g., communicating about how long ago they have been tested or whether their non-steady partner is using PrEP are more knowledgeable about specific compartments of the

HIV/PrEP knowledge scale than those who cannot). For example, the EMIS-2017 documented that while 63.6% of MSM in Spain were aware of PrEP, this rate was only 29.1% for MSM in Turkey (The EMIS Network, 2019). Similarly, in Spain, 54.5% of MSM had awareness of U=U while this rate was 37.6% in Turkey. Thus, it is possible that MSM in Spain are more likely than MSM in Turkey to protect themselves although they have more condomless sex.

For MSM in both countries, we found that sex under the influence of substances (SUIS) predicted SRB, without IH influencing SUIS. This finding corroborates previous evidence. For example, a study among the attendees of a clinic in Amsterdam reported that among HIV-negative MSM, sex-related drug use was associated with sexually transmitted infections (chlamydia, gonorrhea, or syphilis) even after adjusting for high-risk sexual behavior (Heiligenberg et al., 2012). Another study showed that MSM in the UK who reported drug use were more likely to have condomless anal sex with a causal partner in the past year (Sewell et al., 2017). Similarly, we found that substance use recency mediated the relationship between IH and SUIS. As IH increased, SUIS decreased; because higher IH predicted less recent use of substances and more recent use of substances predicted more frequent SUIS. This suggests that higher IH levels can protect MSM from the risk of SUIS and SRB, indirectly. It is possible that this result emerged because MSM with higher IH in our sample perhaps are less likely to be involved in anal intercourse with non-steady partners in the first place. Alternatively, it is possible these MSM are less likely to attend gay or queer specific venues, where substance use is frequent, as some studies suggest that community attachment for gay men is directly linked with substance use (Carpiano et al., 2011; Moody et al., 2018).

3.6. Strengths and Limitations

Our study has several methodological strengths, including being one of the largest datasets of MSM living in Turkey and use of SEM. We used recency time formats (when did you last…) for substance use variables, which reduces the chance of recall bias. Unlike frequency formats, recency format is intuitive for most people. Similarly, there is no recall bias in questions about knowledge and the proportion of sex under the influence of substances. While accurately reporting number of partners is generally a challenge, we do not believe this affects our conclusions. Another strength of this study lies in its

anonymous character, through which the risk of social desirability bias is reduced (as opposed to the interview setting).

We also acknowledge that the study has limitations. While we used a large, diverse sample of MSM, the data come from a non-probability sample, potentially limiting generalizability, especially to those who are older, have lower education, fewer LGBT community attachments, or are more likely to conceal their sexual orientation (Prah et al., 2016). Yet, our analyses assume that the distribution of variables in the EMIS-2017 sample matches the distribution of these variables in the population. Further, non-probability sampling can also lead to higher estimates of sexual risk, drug use, or knowledge among MSM. These concerns are somewhat attenuated given that the present study was not focused on establishing population estimates of risk behaviours, HIV/PrEP knowledge, or IH, but instead sought to examine associations among variables, for which non-probability sampling is more appropriate (Meyer & Wilson, 2009). Further, probability-based studies typically include relatively small numbers of sexual minorities in one country only, and thus would not have provided an adequate sample size across numerous countries with which to evaluate our research aims.

3.7.   Conclusion

To our knowledge, this is the first study to examine the impact of internalized homonegativity on sexual risk behaviour of MSM in Turkey. Our SEM results suggest that IH is not directly implicated in the path to SRB. We also found that HIV/PrEP knowledge mediated the relationship between IH and SRB for MSM in Spain, but not MSM in Turkey. Future studies and HIV prevention programs should consider focusing on communicating what actually makes one less vulnerable to HIV, which is the knowledge that goes into the ability to negotiate sexual safety, especially in the context of Turkey. Likewise, attention should be paid to diverse ways one can enjoy sexual pleasure (Ford et al., 2021) and how it might be effected by cross-cultural differences between understanding of IH and sexual risk behaviour. Similarly, for MSM in Spain, future prevention strategies should also target specific counselling for MSM with low IH and who are relatively knowledgeable about HIV risks and how PrEP works, in order to ensure that they are included within the prevention messages. Lastly, in both contexts, it is important that future interventions consider addressing substance use in general and sex under the influence of substances, for this population.

2.10. Manuscript Data

Funding (information that explains whether and by whom the research was supported)

EMIS-2017 was carried out as part of ESTICOM, under the service contract 2015 71 01 with The Consumers, Health, Agriculture and Food Executive Agency (Chafea), acting under powers delegated by the Commission of the European Union. The contract arises from the Call for tender No Chafea/2015/Health/38.

Conflicts of interest/Competing interests (include appropriate disclosures)

None.

Ethics approval (include appropriate approvals or waivers)

The Observational Research Ethics Committee at the London School of Hygiene and Tropical Medicine approved the original study (reference 14421/RR/8805).

Consent to participate (include appropriate consent statements)

All participants included in this analysis indicated online, prior to providing their answers, that they understand the nature and purpose of the study and consented to take part.

Consent for publication (consent statement regarding publishing an individual's data or image)

Not applicable.

Availability of data and material (data transparency)

Data is property of the LSHTM and can be accessed upon reasonable request to coordinator@emis-project.eu.

Code availability (software application or custom code)

Not applicable.

Authors' contributions

This section is written here as it is in the published version. Therefore, all the authors have signed it and did not report any conflict of interests.

Acknowledgments

3.8. References

Andrinopoulos, K., Hembling, J., Guardado, M. E., de Maria Hernández, F., Nieto, A. I., & Melendez, G. (2015). Evidence of the Negative Effect of Sexual Minority Stigma on HIV Testing Among MSM and Transgender Women in San Salvador, El Salvador. AIDS and Behavior, 19(1), 60–71. https://doi.org/10.1007/s10461-014-0813-0

Baral, S., Logie, C. H., Grosso, A., Wirtz, A. L., & Beyrer, C. (2013). Modified social ecological model: A tool to guide the assessment of the risks and risk contexts of HIV epidemics. BMC Public Health, 13(1). https://doi.org/10.1186/1471-2458-13-482

Berg, R. C., Lemke, R., & Ross, M. W. (2017). Sociopolitical and Cultural Correlates of Internalized Homonegativity in Gay and Bisexual Men: Findings from a Global Study. International Journal of Sexual Health, 29(1), 97–111. https://doi.org/10.1080/19317611.2016.1247125

Berg, R. C., Ross, M. W., Weatherburn, P., & Schmidt, A. J. (2013). Structural and environmental factors are associated with internalised homonegativity in men who have sex with men: Findings from the European MSM Internet Survey (EMIS) in 38 countries. Social Science & Medicine, 78, 61–69. https://doi.org/10.1016/j.socscimed.2012.11.033

Brown, J., Low, W. Y., Tai, R., & Tong, W. T. (2016). Shame, Internalized Homonegativity, and Religiosity: A Comparison of the Stigmatization Associated with Minority Stress with Gay Men in Australia and Malaysia. International Journal of Sexual Health, 28(1), 28–36. https://doi.org/10.1080/19317611.2015.1068902

Byrne, B. M. (2016). Structural equation modeling with AMOS: basic concepts, applications, and programming (Third Edition (3rd ed.)). Routledge.

Carpiano, R. M., Kelly, B. C., Easterbrook, A., & Parsons, J. T. (2011). Community and Drug Use among Gay Men: The Role of Neighborhoods and Networks. Journal of Health and Social Behavior, 52(1), 74–90. https://doi.org/10.1177/0022146510395026

Centro Nacional de Epidemiología. (2018). Plan Nacional sobre el Sida, 2017 (Vigilancia Epidemiológica Del VIH y Sida En España. Sistema de Información Sobre Nuevos Diagnósticos de VIH y Registro Nacional de Casos de Sida). https://www.mscbs.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/vigilancia/doc/InformeVIH_SIDA_2018_21112018.pdf

Chen, F. F. (2007). Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. Structural Equation Modeling: A Multidisciplinary Journal, 14(3), 464–504. https://doi.org/10.1080/10705510701301834

Choi, K., Operario, D., Gregorich, S. E., McFarland, W., MacKellar, D., & Valleroy, L. (2005). Substance Use, Substance Choice, and Unprotected Anal Intercourse among Young

Asian American and Pacific Islander Men Who Have Sex with Men. AIDS Education and Prevention, 17(5), 418–429. https://doi.org/10.1521/aeap.2005.17.5.418

Costa, P. A., Pereira, H., & Leal, I. (2013). Internalized Homonegativity, Disclosure, and Acceptance of Sexual Orientation in a Sample of Portuguese Gay and Bisexual Men, and Lesbian and Bisexual Women. Journal of Bisexuality, 13(2), 229–244. https://doi.org/10.1080/15299716.2013.782481

Dawson, E. L., Mendoza, M. C. B., Gaul, Z., Jeffries IV, W. L., Sutton, M. Y., & Wilson, P. A. (2019). Resilience, condom use self-efficacy, internalized homophobia, and condomless anal sex among black men who have sex with men, New York City. PLOS ONE, 14(4), e0215455. https://doi.org/10.1371/journal.pone.0215455

Doran, J., Weatherburn, P., Hickson, F., Marcus, U., Reid, D., & Schmidt, A. J. (2021). An update on the performance of STI services for gay and bisexual men across European cities: Results from the 2017 European MSM Internet Survey. Sexually Transmitted Infections, 97(3), 201–208. https://doi.org/10.1136/sextrans-2020-054681

Drumright, L. N., Little, S. J., Strathdee, S. A., Slymen, D. J., Araneta, M. R. G., Malcarne, V. L., Daar, E. S., & Gorbach, P. M. (2006). Unprotected Anal Intercourse and Substance Use Among Men Who Have Sex With Men With Recent HIV Infection: JAIDS Journal of Acquired Immune Deficiency Syndromes, 43(3), 344–350. https://doi.org/10.1097/01.qai.0000230530.02212.86

Dudley, M. G., Rostosky, S. S., Korfhage, B. A., & Zimmerman, R. S. (2004). Correlates of High-Risk Sexual Behavior among Young Men Who Have Sex with Men. AIDS Education and Prevention, 16(4), 328–340. https://doi.org/10.1521/aeap.16.4.328.40397

Erdinc, F. S., Dokuzoguz, B., Unal, S., Komur, S., Inkaya, A. C., Inan, D., Karaoglan, I., Deveci, A., Celen, M. K., Kose, S., Erben, N., Senturk, G. C., Heper, Y., Kutlu, S. S., Hatipoglu, C. A., Sumer, S., Kandemir, B., Sirmatel, F., Bayindir, Y., … Multicentric HIV Study Group. (2020). Temporal Trends in the Epidemiology of HIV in Turkey. Current HIV Research, 18(4), 258–266. https://doi.org/10.2174/1570162X18666200427223823

European Centre for Disease Prevention and Control & World Health Organization. (2020). HIV/AIDS surveillance in Europe 2020: 2019 data. Publications Office. https://data.europa.eu/doi/10.2900/073965

Fernández-Dávila, P., & Zaragoza Lorca, K. (2009). Internet y riesgo sexual en hombres que tienen sexo con hombres. Gaceta Sanitaria, 23(5), 380–387. https://doi.org/10.1016/j.gaceta.2008.11.004

Folch, C., Esteve, A., Zaragoza, K., Munoz, R., & Casabona, J. (2010). Correlates of intensive alcohol and drug use in men who have sex with men in Catalonia, Spain. The European Journal of Public Health, 20(2), 139–145. https://doi.org/10.1093/eurpub/ckp091

Folch, C., Marks, G., Esteve, A., Zaragoza, K., Muñoz, R., & Casabona, J. (2006). Factors Associated with Unprotected Sexual Intercourse with Steady Male, Casual Male, and Female Partners Among Men Who Have Sex with Men in Barcelona, Spain. AIDS Education and Prevention, 18(3), 227–242. https://doi.org/10.1521/aeap.2006.18.3.227

Folch, C., Muñoz, R., Zaragoza, K., & Casabona, J. (2009). Sexual risk behaviour and its determinants among men who have sex with men in Catalonia, Spain. Eurosurveillance, 14(47). https://doi.org/10.2807/ese.14.47.19415-en

Ford, J. V., Corona-Vargas, E., Cruz, M., Fortenberry, J. D., Kismodi, E., Philpott, A., Rubio-Aurioles, E., & Coleman, E. (2021). The World Association for Sexual Health's Declaration on Sexual Pleasure: A Technical Guide. International Journal of Sexual Health, 33(4), 612–642. https://doi.org/10.1080/19317611.2021.2023718

Goldbach, J. T., Schrager, S. M., Dunlap, S. L., & Holloway, I. W. (2015). The Application of Minority Stress Theory to Marijuana Use Among Sexual Minority Adolescents. Substance Use & Misuse, 50(3), 366–375. https://doi.org/10.3109/10826084.2014.980958

González-Baeza, A., Dolengevich-Segal, H., Pérez-Valero, I., Cabello, A., Téllez, M. J., Sanz, J., Pérez-Latorre, L., Bernardino, J. I., Troya, J., De La Fuente, S., Bisbal, O., Santos, I., Arponen, S., Hontañon, V., Casado, J. L., Ryan, P., & the U-SEX GESIDA 9416 Study. (2018). Sexualized Drug Use (Chemsex) Is Associated with High-Risk Sexual Behaviors and Sexually Transmitted Infections in HIV-Positive Men Who Have Sex with Men: Data from the U-SEX GESIDA 9416 Study. AIDS Patient Care and STDs, 32(3), 112–118. https://doi.org/10.1089/apc.2017.0263

Heiligenberg, M., Wermeling, P. R., van Rooijen, M. S., Urbanus, A. T., Speksnijder, A. G. C. L., Heijman, T., Prins, M., Coutinho, R. A., & van der Loeff, M. F. S. (2012). Recreational Drug Use During Sex and Sexually Transmitted Infections Among Clients of a City Sexually Transmitted Infections Clinic in Amsterdam, The Netherlands. Sexually Transmitted Diseases, 39(7), 518–527. https://doi.org/10.1097/OLQ.0b013e3182515601

Herek, G. M. (2004). Beyond "Homophobia": Thinking about sexual prejudice and stigma in the twenty-first century. Sexuality Research and Social Policy, 1(2), 6–24. https://doi.org/10.1525/srsp.2004.1.2.6

Hirschfeld, G., & von Brachel, R. (2014). Multiple-Group confirmatory factor analysis in R – A tutorial in measurement invariance with continuous and ordinal indicators. Practical Assessment, Research & Evaluation, 19(7), 1–13.

Holt, M. (2011). Gay men and ambivalence about 'gay community': From gay community attachment to personal communities. Culture, Health & Sexuality, 13(8), 857–871. https://doi.org/10.1080/13691058.2011.581390

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1–55. https://doi.org/10.1080/10705519909540118

Huebner, D. M., Davis, M. C., Nemeroff, C. J., & Aiken, L. S. (2002). The Impact of Internalized Homophobia on HIV Preventive Interventions. American Journal of Community Psychology, 30(3), 327–348. https://doi.org/10.1023/A:1015325303002

Kashubeck-West, S., & Szymanski, D. M. (2008). Risky Sexual Behavior in Gay and Bisexual Men: Internalized Heterosexism, Sensation Seeking, and Substance Use. The Counseling Psychologist, 36(4), 595–614. https://doi.org/10.1177/0011000007309633

Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence. Psychol Bull, 129(5), 674–697.

Meyer, I. H., & Wilson, P. A. (2009). Sampling lesbian, gay, and bisexual populations. Journal of Counseling Psychology, 56(1), 23–31. https://doi.org/10.1037/a0014587

Mirandola, M., Gios, L., Sherriff, N., Marcus, U., Toskin, I., Rosinska, M., Schink, S., Kühlmann-Berenzon, S., Suligoi, B., Folch, C., Nöstlinger, C., Dias, S., Stanekova, D., Klavs, I., Caplinskas, S., Rafila, A., Marin, C., Alexiev, I., Zohrabyan, L., … on behalf of the SIALON II Network. (2018). Quantifying unmet prevention needs among MSM in Europe through a multi-site bio-behavioural survey. Eurosurveillance, 23(49). https://doi.org/10.2807/1560-7917.ES.2018.23.49.1800097

Moody, R. L., Starks, T. J., Grov, C., & Parsons, J. T. (2018). Internalized Homophobia and Drug Use in a National Cohort of Gay and Bisexual Men: Examining Depression, Sexual Anxiety, and Gay Community Attachment as Mediating Factors. Archives of Sexual Behavior, 47(4), 1133–1144. https://doi.org/10.1007/s10508-017-1009-2

Moonie, S., Huang, X., & Sterling, D. A. (2009). Quality of Life Estimation with Structural Equation Modeling in School Aged Children with Asthma. 3, 1–16.

Morandini, J. S., Blaszczynski, A., Ross, M. W., Costa, D. S. J., & Dar-Nimrod, I. (2015). Essentialist beliefs, sexual identity uncertainty, internalized homonegativity and psychological wellbeing in gay men. Journal of Counseling Psychology, 62(3), 413–424. https://doi.org/10.1037/cou0000072

Newcomb, M. E., & Mustanski, B. (2010a). Internalized homophobia and internalizing mental health problems: A meta-analytic review. Clinical Psychology Review, 30(8), 1019–1029. https://doi.org/10.1016/j.cpr.2010.07.003

Newcomb, M. E., & Mustanski, B. (2010b). The Importance of Measuring Internalized Homophobia/Homonegativity: Reply to Ross, Rosser, and Smolenski (2010a). Archives of Sexual Behavior, 39(6), 1209–1211. https://doi.org/10.1007/s10508-010-9655-7

Prah, P., Hickson, F., Bonell, C., McDaid, L. M., Johnson, A. M., Wayal, S., Clifton, S., Sonnenberg, P., Nardone, A., Erens, B., Copas, A. J., Riddell, J., Weatherburn, P., &

Mercer, C. H. (2016). Men who have sex with men in Great Britain: Comparing methods and estimates from probability and convenience sample surveys. Sexually Transmitted Infections, 92(6), 455–463. https://doi.org/10.1136/sextrans-2015-052389

Puckett, J. A., Newcomb, M. E., Garofalo, R., & Mustanski, B. (2017a). Examining the Conditions Under Which Internalized Homophobia Is Associated with Substance Use and Condomless Sex in Young MSM: The Moderating Role of Impulsivity. Annals of Behavioral Medicine, 51(4), 567–577. https://doi.org/10.1007/s12160-017-9878-0

Puckett, J. A., Newcomb, M. E., Garofalo, R., & Mustanski, B. (2017b). Examining the Conditions Under Which Internalized Homophobia Is Associated with Substance Use and Condomless Sex in Young MSM: The Moderating Role of Impulsivity. Annals of Behavioral Medicine, 51(4), 567–577. https://doi.org/10.1007/s12160-017-9878-0

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1–36.

Schmidt, A. J., Hickson, F., Weatherburn, P., Marcus, U., & The EMIS Network. (2013). Comparison of the performance of STI Screening Services for gay and bisexual men across 40 European cities: Results from the European MSM Internet Survey. Sexually Transmitted Infections, 89(7), 575–582. https://doi.org/10.1136/sextrans-2012-050973

Sewell, J., Miltz, A., Lampe, F. C., Cambiano, V., Speakman, A., Phillips, A. N., Stuart, D., Gilson, R., Asboe, D., Nwokolo, N., Clarke, A., Collins, S., Hart, G., Elford, J., & Rodger, A. J. (2017). Poly drug use, chemsex drug use, and associations with sexual risk behaviour in HIV-negative men who have sex with men attending sexual health clinics. International Journal of Drug Policy, 43, 33–43. https://doi.org/10.1016/j.drugpo.2017.01.001

Sietins, E., Wongsomboon, V., & Webster, G. D. (2020). Effects of Internalized Homonegativity and Face Visibility on HIV-Risk-Taking Behaviour in Gay Men Who Had Casual Sex Using Online-Dating Applications. International Journal of Sexual Health, 32(2), 165–170. https://doi.org/10.1080/19317611.2020.1739186

Sihombing, S. O. (2012). Comparing Entrepreneurship Intention: A Multigroup Structural Equation Modeling Approach. International Research Journal of Business Studies, 5(1), 57–71. https://doi.org/10.21632/irjbs.5.1.57-71

Sönmez, İ., Folch, C., Lorente, N., Berg, R. C., Thurlby, N., & Schmidt, A. J. (2021). Influence of Internalised Homonegativity on Sexual Risk Behaviour of Men Who Have Sex with Men in Spain. Sexuality & Culture. https://doi.org/10.1007/s12119-021-09925-7

T.C. Sağlık Bakanlığı. (2021). HIV-AIDS İstatistik. https://hsgm.saglik.gov.tr/tr/bulasici-hastaliklar/hiv-aids/hiv-aids-liste/hiv-aids-istatislik.html

The EMIS Network. (2013). EMIS 2010-The European Men-Who-Have-Sex-With-Men Internet Survey: Findings from 38 countries. European Centre for Disease Prevention and Control. https://data.europa.eu/doi/10.2900/79639

The EMIS Network. (2019). EMIS-2017: European Men-Who-Have-Sex-With-Men Internet Survey: Key findings from 50 countries. European Centre for Disease Prevention and Control. https://data.europa.eu/doi/10.2900/690387

Torres, C. A., & Rodrigues, D. L. (2021). Heteronormative Beliefs and Internalized Homonegativity in the Coming Out Process of Portuguese and Turkish Sexual Minority Men. Sexuality Research and Social Policy. https://doi.org/10.1007/s13178-021-00582-x

Tran, H., Ross, M. W., Diamond, P. M., Berg, R. C., Weatherburn, P., & Schmidt, A. J. (2018). Structural Validation and Multiple Group Assessment of the Short Internalized Homonegativity Scale in Homosexual and Bisexual Men in 38 European Countries: Results from the European MSM Internet Survey. The Journal of Sex Research, 55(4–5), 617–629. https://doi.org/10.1080/00224499.2017.1380158

van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. European Journal of Developmental Psychology, 9(4), 486–492. https://doi.org/10.1080/17405629.2012.686740

Velter, A., Saboni, L., Sommen, C., Bernillon, P., Bajos, N., & Semaille, C. (2015). Sexual and prevention practices in men who have sex with men in the era of combination HIV prevention: Results from the Presse Gays et Lesbiennes survey, France, 2011. Eurosurveillance, 20(14). https://doi.org/10.2807/1560-7917.ES2015.20.14.21090

Weatherburn, P., Hickson, F., Reid, D. S., Marcus, U., & Schmidt, A. J. (2020). European Men-Who-Have-Sex-With-Men Internet Survey (EMIS-2017): Design and Methods. Sexuality Research and Social Policy, 17(4), 543–557. https://doi.org/10.1007/s13178-019-00413-0

Weston, R., & Gore, P. A. (2006). A Brief Guide to Structural Equation Modeling. The Counseling Psychologist, 34(5), 719–751. https://doi.org/10.1177/0011000006286345

Williamson, I. R. (2000). Internalized homophobia and health issues affecting lesbians and gay men. Health Education Research, 15(1), 97–107. https://doi.org/10.1093/her/15.1.97

Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. Behavior Research Methods, 51(1), 409–428. https://doi.org/10.3758/s13428-018-1055-2

CHAPTER 4 How Does Sexual Identity-Attraction Discordance Influence Suicide Risk? A Study on Male and Female Adults in the U.S.

Abstract

Suicide continues to be one of the main causes of death among adults in the U.S. Sexual identity-attraction discordance (IAD) has been shown to be linked to adverse health outcomes, including suicidal ideation. We sought to determine whether sexual IAD is associated with self-injurious thoughts and behaviours (SITBs), namely suicidal thoughts, plans, and suicide attempts, in the past year. We examined data from adults participating in the most recent six waves (2015-2020) of the National Survey on Drug Use and Health. Men who report sexual identity-attraction discordance were at greater risk of reporting past-year suicidal thoughts (aOR=3.67, 95% CI: 2.24-6.00) and plans (aOR=5.71, 95% CI: 3.32-9.81). Stratified by sexual identity, results showed that gay (aOR=5.92, 95% CI: 1.54-22.7) and bisexual men (aOR=4.38, 95% CI: 2.17-8.83) had higher odds of reporting suicide plans and heterosexual (aOR=2.66, 95% CI: 1.06-6.68), gay (aOR=7.05, 95% CI: 1.88-26.4), and bisexual men (aOR=5.30, 95% CI: 4.37-22.9) had higher odds of suicide attempts when compared to men with concordant sexual identity-attraction. We found that bisexual women who report sexual identity-attraction discordance had less odds of reporting suicidal thoughts (aOR=0.36, 95% CI: 0.21-0.63) and suicide plans (aOR=0.43, 95% CI: 0.20-0.89) than women with concordant sexual identity-attraction. Finally, among bisexual-identified males, those who report sexual identity-attraction discordance were at greater risk for past-year suicidal thoughts (aOR=3.82, 95% CI: 2.12-6.91) and suicide attempts (aOR=5.30, 95% CI: 2.13-13.1) when compared to bisexual men with concordant sexual identity-attraction. Results are discussed in relation to future SITB prevention efforts, especially concerning sexual minorities.

Keywords: Suicide, self-injurious thoughts and behaviours, sexual identity-attraction discordance, National Survey on Drug Use and Health

4.1. Introduction

Suicide continues to be one of the leading causes for death in the United States. The age-adjusted suicide rate among the general population increased by 32.3% from 1999 to 2019 (Hedegaard, 2021). In recent years, studies have shown that lesbian, gay, and bisexual (LGB) individuals are at greater risk of self-injurious thoughts and behaviours (SITBs), including suicidal thoughts, suicide plans, and suicide attempts, when compared to heterosexuals (Guz et al., 2021; Miranda-Mendizábal et al., 2017; Quarshie et al., 2020). In a meta-analysis of 30 cross-sectional studies, while estimates of lifetime prevalence of suicide attempts among heterosexual adults was 4%, prevalence among LGB adults was 11% in population surveys, and 20% in community surveys (Hottes et al., 2016). Similarly, in a recent study among 45,918 individuals, LGB youth had almost four times the odds of reporting suicide plans and attempted suicide in the past year when compared to heterosexual youth (Guz et al., 2021).

While numerous studies have examined the relationship between SITBs and sexual orientation, in most studies, sexual orientation is overly simplified as LGB or non-LGB. Little is known about how sexual identity-attraction discordance (IAD) among adults associate with SITBs. Sexual IAD refers to individuals with a mismatch in their reported sexual identity and sexes they are attracted to. Development of sexual identity can show relative fluidity (Saewyc, 2011) and sexual identity can shift over time (Katz-Wise et al., 2017; Mock & Eibach, 2012). Reported sexual attraction, behaviour, and identities are neither always synonymous (Chandra et al., 2011; Fish & Pasley, 2015) nor is sexual identity always concordant with individuals' behaviours (Burgard et al., 2005; Chandra et al., 2013; Smith et al., 2003). Likewise, a qualitative study among university students found that identification with a sexual identity depends on not only behaviour but also other variables such as attraction, place, and even dependent on the event (Baldwin et al., 2015). According to a major tenet of cognitive dissonance theory, lack of alignment of individuals' cognitions with their normative self-standards can lead to adverse outcomes (Festinger, 1957; Talley et al., 2015). In short, cognitive dissonance postulated by Festinger (1957) argues that if two cognitions are relevant to one another (i.e. sexual identity and sexual attraction), they are either consonant or dissonant. If dissonance between the two exists, it can lead to disturbance, for example, psychological discomfort. This psychological discomfort motivates individual to reduce the dissonance, at least to a degree, and to avoidance of information or situations that can increase the

dissonance (Festinger, 1957; Harmon-Jones & Mills, 2019, p. 3). An example for how cognitive dissonance works could be as simple as an habitual smoker experiencing disturbance after learning that smoking is bad for your health, but still experiencing a cognition to wanting to smoke (Festinger, 1957). To ease this disturbance, habitual smoker may compare the danger associated with it to danger from dying in an accident, or, think about positive sides of smoking such as losing weight (Harmon-Jones & Mills, 2019b). Although our study does not aim to directly test the cognitive dissonance theory, it does provide us insight, to a particular extent, to understand the possible consequences of sexual IAD.

In consistency with cognitive dissonance theory, evidence suggests that sexual IAD can lead to adverse health outcomes, such as depression, sexual risk behaviour, and substance misuse. For example, in a meta-analysis of 60 studies, mostly-heterosexuals reported higher levels of risk in most reviewed mental and physical health outcomes, such as internalizing problems, substance use, and victimization, compared to heterosexuals (Vrangalova & Savin-Williams, 2014). More specifically, in a longitudinal study among young adults, it is shown that current sexual orientation discordance among mostly heterosexual males was associated with increased symptoms of depression (Lourie & Needham, 2017). In an another study among 4,193 men in New York City, men who had sex with men exclusively, but self-identified as heterosexual (8.9%) were less likely to have used condoms during their last sexual encounter and were less likely to have been tested for HIV than their gay-identified counterparts (Pathela et al., 2006). Similarly, Qeadan et al. (2021) found that discordant sexual identity-attractions had higher odds of prescription opioid misuse in their lifetime when compared to those with concordant sexual identity-attractions.

Under the cognitive dissonance theory, abovementioned findings about the associations between sexual IAD and depression and drug use are factors that are also known to be associated with suicidal ideation and suicide attempts (Lourie & Needham, 2017; Talley et al., 2015). A handful of studies have demonstrated how sexual IAD could be associated with SITBs. For example, a longitudinal study by Fish & Pasley (2015) demonstrated that those who identified as hetero-flexible were the highest at-risk group for depressive symptoms in adulthood and displayed high risk suicidality in early adulthood. However, hetero-flexibles had the lowest suicidality by ages 27-34, when compared to other sexual minorities (Fish & Pasley, 2015). Perhaps more importantly, a study among 6,790 high school students found evidence that high risk nonfatal suicidal

behaviours, including suicidal thoughts, plans, and attempts, were more prevalent among sexually discordant students compared with concordant students (Annor et al., 2018).

Minority stress theory also posits that sexual minority identity could be a correlate of suicide risk, given that LGB persons tend to experience elevated social stress because of perception of negative social attitudes towards their sexual identity (Meyer, 1995, 2003). Minority stressors are commonly examined under structural, distal, and proximal processes. For example, structural level stigma refers to community-level negative attitudes which are linked to individual-level outcomes (e.g. elimination of protective policies for LGBT rights) (Hatzenbuehler & Link, 2014). Distal processes refer to experienced discrimination, being victims of prejudice events, and homophobia at the societal level, while proximal processes refer to internalized homonegativity, and internalization and endorsement of negative societal attitudes (Mongelli et al., 2019). These negatives impact on the stressors could be buffered with social support or coping abilities. Previous research linked sexual minority identity and its stressors with unique coping strategies (Hequembourg & Brallier, 2009) such as substance use (Boyle et al., 2017). Likewise, stigma and victimization experienced due sexual minority identity status, which is part of the minority stress model, can contribute to STIB risk among LGB individuals (Meyer, 2003; Smith et al., 2020).

There is a higher prevalence of SITBs among male and LGB populations and few studies on the relationship between sexual minority status and SITBs exist. Additionally, although associations between sexual IAD and certain health outcomes are well established, much remains to be investigated with especially data on men being particularly scarce or missing (Vrangalova & Savin-Williams, 2014, p. 439), and more exploration of how bisexual IAD is affected is needed (Vrangalova & Savin-Williams, 2014, p. 439). Therefore, in order to inform future prevention efforts, this study aims to investigate how sexual IAD is associated with STIBs, namely suicidal thoughts, plans, and suicide attempts, with nuanced categories of sexual IAD among a nationally representative sample of noninstitutionalized adults, both males and females, in the U.S.

4.2. Methodology

4.2.1. Data

For the current study, we aggregated the most recent six waves of data from the National Survey on Drug Use and Health (NSDUH 2015-2020, N=217,332). NSDUH data are derived from nationally representative probability samples of populations living in households, noninstitutionalized group quarters, and shelters, obtained through four sampling stages (Center for Behavioral Health Statistics and Quality, 2020). we focused on adults (age >18) because only adults were asked about their sexual identity. We only include males and females in our study, because the sex variable in the NSDUH dataset is binary-coded. These cross-sectional surveys were administered via computer-assisted interviewing conducted by an interviewer and audio computer-assisted self-interviewing. The weighted interview response rates were 69.7% (2015), 68.4% (2016), 67.1% (2017), 66.6% (2018), 64.9% (2019), 60.41% (2020).

4.2.2. Measures

Participants were asked about past year SITBs. NSDUH recoded suicide information based on suicidal ideation screening, and we used the following three variables as the dependent variables: suicidal thoughts (seriously thought about killing self in past year), suicide plans (made plans to kill self in past year), and suicide attempts (attempted to kill self in past year). SITB variables were kept binary-coded, as they appear in the NSDUH dataset.

With respect to sexual identity, participants were asked "which one of the following do you consider yourself to be?" and answer options were "heterosexual", "lesbian or gay", and "bisexual". Respondents who refused to answer (2.3%) or reported not knowing (0.6%) were excluded from the analysis.

With respect to sexual attraction, NSDUH first mentioned to participants that "people are different in their sexual attraction to other people", and they were then asked, "Which statement best describes your feelings?" The following were the possible answers: "I am only attracted to opposite sex", "I am mostly attracted to opposite sex", "I am mostly attracted to opposite sex", "I am equally attracted to males and females", "I am mostly attracted to same sex", "I am only attracted to same sex", and "I am not sure". we excluded those who answered the sexual attraction question as 'not sure' (1.54%), as previous studies have shown that this is a separate indicator that should be considered for adverse health outcomes, including SITBs (Zhao et al., 2010). Also, respondents who

refused to answer (0.9%) or reported not knowing (0.3%) were excluded from the analysis.

We created a categorical sexual identity-attraction concordant/discordant variable based on the aforementioned sexual identity and sexual attraction variables. Sexual identity-attraction concordance refers to heterosexual adults reporting sexual attraction only to individuals of the opposite sex, gay and lesbian adults reporting an attraction only to individuals of the same-sex, and bisexual adults reporting an attraction to individuals of both sexes equally or an attraction mostly to either sexes. Sexual identity-attraction discordance refers to any other combination. For example, a bisexual man reporting having only attraction to males or only to females is considered as sexual IAD, because by definition bisexual refers to an individual who is sexually or romantically attracted to both men and women, or to more than one sex or gender (Baeth, 2021).

We included whether respondents experienced a depression period in the past year as a covariate. Likewise, we included whether respondents reported alcohol, illegal substances (other than marijuana), or marijuana dependence or abuse in the past year as control variables. Previous research has shown that depression and substance use problems were associated with SITBs (Rodríguez-Cintas et al., 2018).

We included several other control variables. We included participants' age as a categorical variable, with categories indicating age 18-25, 26-34, and 35 or older. Participants' race/ethnicity was included as a recoded variable indicating non-Hispanic white, non-Hispanic black, Hispanic, and Asian or another race. Participants' education level was included with values indicating less than high school, high school graduate, some college or associate degree, and college graduate. Participants were also asked about their annual family income, and we included a recoded version of this variable with values indicating <$20,000, $20,000-$49,999, $50,000-$74,999, and >$75,000. Participants' marital status and variable indicating whether they are insured (i.e., private insurance, Medicare, Medicaid, Champus/ChampusVA/Military, or other insurance) were included as the imputed versions of dummy variables. We included insurance status as a control variable because previous research suggests that insurance status is associated with illicit substance use including club drugs (Whittle et al., 2019) and with mental health treatment among adults with substance use disorder (Jones & McCance-Katz, 2019), which are also associated with particular SITB outcomes (Lourie & Needham, 2017; Talley et al., 2015). Lastly, we included county metro/nonmetro status with a 3-level variable indicating

counties with more than a million people, 250,000 to a million people, and less than 250,000 people.

4.3. Statistical Analysis

All statistical analyses are sex-stratified. For descriptive purposes, we estimated the prevalence of sexual identity-attraction concordance/discordance and past-year STIBs according to sexual identity among male and female adults and the combined prevalence within each sex. Comparisons of prevalence of each outcome and between each category of sexual identity-attraction concordance/discordance were conducted using Rao-Scott chi-square. We then examined whether sexual IAD was associated with all three SITB outcomes. We specified suicidal thoughts, suicide plans, and suicide attempt in the past year as the dependent variables in separate models. First, we examined multivariable models including the sexual IAD variable and all aforementioned demographic and medical variables as covariates, regardless of sexual identity of individuals, to estimate adjusted odd ratios (aORs). Next, we estimated these aORs with stratifying the sexual IAD variable by sexual identity. Then, we examined multivariable models including the sexual IAD variable and all aforementioned demographic and medical variables within each sexual identity group (i.e. in a sample of heterosexual-identified respondents only). Sample weights were utilized in all analyses which were provided by NSDUH to address unit- and individual-level non-response, complex survey design, selection probability, and population distribution. Data were analysed using survey ("svy") commands in Stata MP 13 (StataCorp, 2015).

4.4. Results

Table 4.1. Sample Characteristics

	Males		Females	
	%	N	%	N
Sexual Identity				
Sexual Identity-Attraction Concordant	99.3	102,528	99.1	111,369
Sexual Identity-Attraction Discordant: Heterosexual	0.4	478	0.6	666
Sexual Identity-Attraction Discordant: Gay/Lesbian	0.1	48	0.1	63
Sexual Identity-Attraction Discordant: Bisexual	0.2	201	0.3	323
Education				
Less than High School	13.7	15,328	11.4	14,771
High School	28.6	32,041	23.7	30,700
Some College	30.9	34,580	35.3	45,772
College	26.8	30,005	29.7	38,478
Income				
<$20,000	17.2	19,278	21.5	27,923
$20,000-$49,999	29.8	33,389	31.1	40,438
$50,000-$74,999	16.3	17,948	15.2	19,798
≥$75,000	36.9	41,339	32.0	41,562
Race				
White	61.5	68,867	60.2	78,201
Black	11.5	12,918	12.8	16,600
Hispanic	16.7	18,676	17.0	22,067
Asian/Other	10.2	11,493	9.91	12,853
Age				
18-25	33.3	37,270	31.3	40,592
26-34	20.2	22,660	20.9	27,067
35+	46.5	52,024	47.8	62,062
Marital Status				

Ever Married, Separated, or Widowed	51.9	58,096	58.0	75,231
Never Married	48.1	53,858	42.0	54,490
Insurance				
No	13.6	15,279	9.82	12,734
Yes	86.3	96,675	90.2	116,987
Metropolitan Area				
>1,000,000	45.0	50,483	45.0	58,368
250,000 – 1,000,000	35.4	39,660	35.7	46,326
<250,000	19.4	21,811	19.3	25,027
Survey Year				
2015	17.7	19,828	18.3	23,733
2016	17.7	19,853	17.5	22,772
2017	17.8	19,987	17.4	22,567
2018	18.0	20,169	17.6	22,857
2019	17.8	19,932	17.6	22,807
2020	10.9	12,185	11.5	14,985

Table 4.2. Prevalence of Sexual Identity-Attraction Concordance/Discordance and Past-Year Self-Injurious Thoughts and Behaviours According to Sexual Identity Among Adults in United States, 2015-2020

	Suicidal Thoughts Weighted % (95% CI)	Suicide Plan Weighted % (95% CI)	Suicide Attempt Weighted % (95% CI)
Males			
Sexual Identity-Attraction Concordant	3.86 (3.69-4.04)	1.03 (0.95-1.11)	0.39 (0.35-0.43)
Sexual Identity-Attraction Discordant: Heterosexual	5.39 (3.03-9.39)	0.58 (0.23-1.44)	0.73 (0.31-1.74)
Sexual Identity-Attraction Discordant: Gay	9.72 (3.63-23.6)	6.66 (2.00-20.0)	4.68 (1.33-15.2)
Sexual Identity-Attraction Discordant: Bisexual	11.2 (7.05-17.3)	7.10 (4.36-11.4)	4.74 (2.74-8.09)
Combined	3.89 (3.71-4.06)	1.04 (0.96-1.13)	0.40 (0.36-0.44)
p-value	0.002	<0.001	<0.001
	Suicidal Thoughts Weighted % (95% CI)	Suicide Plan Weighted % (95% CI)	Suicide Attempt Weighted % (95% CI)
Females			
Sexual Identity-Attraction Concordant	4.32 (4.12-4.52)	1.27 (1.18-1.36)	0.60 (0.55-0.66)
Sexual Identity-Attraction Discordant: Heterosexual	3.87 (2.10-7.02)	1.41 (0.47-4.09)	0.71 (0.12-3.90)
Sexual Identity-Attraction Discordant: Gay	3.28 (0.95-10.7)	0.48 (0.06-3.66)	0.79 (0.17-3.51)
Sexual Identity-Attraction Discordant: Bisexual	5.45 (3.41-8.58)	2.15 (1.19-3.84)	1.75 (0.82-3.66)
Combined	4.32 (4.12-4.53)	1.27 (1.18-1.37)	0.61 (0.55-0.67)
p-value	0.751	0.554	0.308

Note: CI = Confidence interval.

Table 1 presents the sample characteristics. Table 2 presents estimated prevalence of STIBs according to sexual identity-attraction concordance/discordance according to sexual identity. Differences among sexual identities for all three self-injurious thoughts and behaviours outcomes were all significant (suicidal thoughts, p-value=0.002; suicide plans and attempts, p-value=<0.001) for males. Among men, men who reported sexual identity-attraction concordance had the lowest prevalence of all three SITB outcomes, while bisexual-identified men who report sexual IAD had the highest prevalence of all three outcomes (suicidal thoughts: 11.2%, suicide plans: 7.10%, suicide attempts: 4.74%). Among women bisexual-identified women who report sexual IAD had the highest prevalence of all three outcomes as well (suicidal thoughts: 5.45%, suicide plans: 2.15%, suicide attempts: 1.75%), although these differences were not significant.

In Table 3, we present multivariable logistic models including sexual IAD variable. Compared to sexual identity-attraction concordant men, sexual identity-attraction discordant men were more likely to report suicidal thoughts (aOR=2.04, 95% CI:1.29-3.21) and suicide plans (aOR=3.67, 95% CI: 2.24-6.00) in the past year. We found no significant for results for women.

In Table 4, we present adjusted multivariate logistic models including subcategories of sexual IAD variable. Compared to sexual identity-attraction concordant men, sexual identity-attraction discordant gay- (aOR=5.92, 95% CI:1.54-22.7) and bisexual-identifying men (aOR=4.38, 95% CI: 2.17-8.83) were more likely to report past-year suicidal plans. Further, men who identify as heterosexual (aOR=2.66, 95% CI:1.06-6.68), gay (aOR=7.05, 95% CI:1.88-26.4), and bisexual (aOR=10.0, 95% CI:4.37-22.9) and report sexual IAD were at greater risk of reporting past-year suicide attempt when compared to sexual identity-attraction concordant men. Among women, we found that women who identify as bisexual but report sexual IAD (aOR=0.38, 95% CI:0.21-0.70) were at less risk of reporting suicidal thoughts when compared to women with concordant sexual identity-attraction.

Table 4.3. Adjusted Logistic Regressions Examining Associations Between Sexual Identity-Attraction Concordance/Discordance and Past-Year Self-Injurious Thoughts and Behaviours Among Adults in United States, 2015-2020

Males	Suicidal Thoughts aOR (95% CI)		Suicide Plan aOR (95% CI)		Suicide Attempt aOR (95% CI)	
Sexual Identity-Attraction Concordant	1.00		1.00		1.00	
Sexual Identity-Attraction Discordant	2.04	(1.29-3.21) [b]	3.67	(2.24-6.00) [c]	5.71	(3.32-9.81)
Observations	110,045		110,035		110,038	
Females	Suicidal Thoughts aOR (95% CI)		Suicide Plan aOR (95% CI)		Suicide Attempt aOR (95% CI)	
Sexual Identity-Attraction Concordant	1.00		1.00		1.00	
Sexual Identity-Attraction Discordant	0.95	(0.58-1.58)	1.38	(0.58-3.31)	1.72	(0.59-5.05)
Observations	127,531		127,516		127,522	

Note: CI = Confidence interval. aOR = Adjusted Odd Ratio. Multivariate adjusted models are controlled for past year depression, education, income, race/ethnicity, age, alcohol dependence or abuse, illegal substance dependence or abuse, marijuana dependence or abuse, marital status, insurance status, county metro status, year of the survey.
[a] p < .05
[b] p < .01
[c] p < .001

Table 4.4. Adjusted Logistic Regressions Examining Associations Between Sexual Identity-Attraction Concordance/Discordance and Past-Year Self-Injurious Thoughts and Behaviours According to Sexual Identity Among Adults in United States, 2015-2020

Males	Suicidal Thoughts aOR (95% CI)		Suicide Plan aOR (95% CI)		Suicide Attempt aOR (95% CI)	
Sexual Identity-Attraction Concordant	1.00		1.00		1.00	
Sexual Identity-Attraction Discordant: Heterosexual	1.86	(0.98-2.51)	0.75	(0.29-1.92)	2.66	(1.06-6.68) [a]
Sexual Identity-Attraction Discordant: Gay	1.68	(0.62-2.48)	5.92	(1.54-22.7) [b]	7.05	(1.88-26.4) [b]
Sexual Identity-Attraction Discordant: Bisexual	1.67	(0.85-3.29)	4.38	(2.17-8.83) [c]	10.0	(4.37-22.9) [c]
Observations	102,432		102,426		102,429	
Females	Suicidal Thoughts aOR (95% CI)		Suicide Plan aOR (95% CI)		Suicide Attempt aOR (95% CI)	
Sexual Identity-Attraction Concordant	1.00		1.00		1.00	
Sexual Identity-Attraction Discordant: Heterosexual	1.21	(0.64-2.29)	1.83	(0.57-5.88)	1.82	(0.30-11.0)
Sexual Identity-Attraction Discordant: Lesbian	0.44	(0.12-1.61)	0.18	(0.02-1.54)	0.50	(0.09-2.52)
Sexual Identity-Attraction Discordant: Bisexual	0.38	(0.21-0.70) [b]	0.48	(0.23-1.00)	0.82	(0.36-1.87)
Observations	111,470		111,460		111,462	

Note: CI = Confidence interval. aOR = Adjusted Odd Ratio. Multivariate adjusted models are controlled for sexual identity, past year depression, education, income, race/ethnicity, age, alcohol dependence or abuse, illegal substance dependence or abuse, marijuana dependence or abuse, marital status, insurance status, county metro status, year of the survey.
[a] p < .05
[b] p < .01
[c] p < .001

Table 4.5. Adjusted Logistic Regressions Examining Associations Between Sexual Identity-Attraction Concordance/Discordance and Past-Year Self-Injurious Thoughts and Behaviours Among Bisexual-Identified Adults in United States, 2015-2020

Males	Suicidal Thoughts aOR (95% CI)		Suicide Plan aOR (95% CI)		Suicide Attempt aOR (95% CI)	
Sexual Identity-Attraction Concordant	1.00		1.00		1.00	
Sexual Identity-Attraction Discordant	1.54	(0.82-2.89)	3.82	(2.12-6.91) [c]	5.30	(2.13-13.1) [c]
Observations	2,718		2,717		2,717	

Females	Suicidal Thoughts aOR (95% CI)		Suicide Plan aOR (95% CI)		Suicide Attempt aOR (95% CI)	
Sexual Identity-Attraction Concordant	1.00		1.00		1.00	
Sexual Identity-Attraction Discordant	0.36	(0.21-0.63) [b]	0.43	(0.20-0.89) [b]	0.70	(0.30-1.64)
Observations	9,394		9,390		9,390	

Note: CI = Confidence interval. aOR = Adjusted Odd Ratio. Multivariate adjusted models are controlled for past year depression, education, income, race/ethnicity, age, alcohol dependence or abuse, illegal substance dependence or abuse, marijuana dependence or abuse, marital status, insurance status, county metro status, year of the survey.
[a] $p < .05$
[b] $p < .01$
[c] $p < .001$

Finally, we present the results of multivariable models among bisexual-identified adults in Table 5. The results for the rest of sexual identity groups are not shown, since all of the results were insignificant (available upon request). In Table 5, we found that bisexual-identified men who experience sexual identity-attraction discordance are at greater risk of reporting past-year suicide plans (aOR=3.82, 95% CI:2.12-6.91) and suicide attempts (aOR=5.30, 95% CI:2.13-13.1), when compared to bisexual men with concordant sexual identity-attraction. Among women, we found that women who identify as bisexual but report sexual IAD were at less risk of reporting suicidal thoughts (aOR=0.36, 95% CI:0.21-0.63) and plans (aOR=0.43, 95% CI:0.20-0.89) when compared to bisexual women with concordant sexual identity-attraction.

4.5. Discussion

Many studies suggest that LGB populations are disproportionately affected by suicide (Guz et al., 2021; Miranda-Mendizábal et al., 2017; Quarshie et al., 2020) and that sexual IAD is associated with SITBs (Annor et al., 2018; Fish & Pasley, 2015). However, research was needed to examine whether nuanced categories of sexual IAD, such as bisexual IAD, is associated with SITBs among a nationally representative sample of noninstitutionalized adults in the U.S. Results have implications for clinical practice and future research.

To our best knowledge, this is the first study to examine the relationship between sexual identity-attraction discordance and SITB outcomes among adults which adds complexity to this relationship by considering nuanced sexual IAD categories based on sexual identity and sex. Firstly, regardless of self-reported sexual identity, results of this study suggest that men with sexual identity-attraction discordance are at greater risk of reporting particular SITB outcomes, namely suicide plans and suicide attempts in the past-year. These results are in line with previous studies which associate sexual IAD and suicidal outcomes (Annor et al., 2018). Furthermore, we found significant results when we stratified our analysis by sexual identity. Results indicate the need to address suicide risk factors within identity-attraction discordant heterosexuals and sexual minorities. We found that heterosexual men who report sexual IAD are at greater risk of reporting suicide attempts in the past-year when compared to men with concordant sexual-identity attraction. Normative sexual identity-attraction standards set by societal heterosexism

instructs heterosexual identity and heterosexual attraction as common norm (Szymanski et al., 2008). The notion that individuals who experience conflicting or incompatible cognitions, whether between actual- and ideal-self or actual- and ought by society self-states, are at risk of experiencing discomfort has been discussed decades ago (Higgins, 1987). In line with the cognitive dissonance theory, in response to this conflict, an individual may attempt to resolve this conflict (Festinger, 1957). Therefore, heterosexual-identified individuals in our sample may have increased risk of past-year suicide attempt in an effort to ease this conflict. Future research should directly test cognitive dissonance levels when studying sexual IAD and SITB risks among heterosexual-identified men.

We found similar results for sexual minorities who reported sexual IAD. We found that gay and bisexual men who report sexual IAD are more likely to report past-year suicide plan and suicide attempts when compared to men with concordant sexual identity-attraction. These findings corroborate previous studies which showed that sexual minorities are at greater risk of experiencing SITBs (Guz et al., 2021; Hottes et al., 2016; Miranda-Mendizábal et al., 2017; Quarshie et al., 2020). In the present study, we found that the effect of discordant sexual orientation on SITBs was higher among bisexual men. Particularly, we have shown that bisexual men, who are already disproportionately affected by SITBs when compared to other sexual minority identities (Marshal et al., 2013; Saewyc et al., 2007), are at even greater risk if they report sexual IAD. In order to understand this disparity further, we focused on how sexual IAD among each sexual identity is associated with SITBs. We found no significant differences between sexual identity-attraction concordance and discordance within heterosexual, gay, and lesbian identified groups. Therefore, to a certain extent, our study showed the previous differences between concordant/discordant groups are attributable to sexual identity among these groups, more so than sexual IAD. However, we found that among bisexual individuals, those who report sexual identity-attraction discordance are at greater risk of reporting suicidal thoughts and behaviours when compared to those who report concordant sexual identity-attraction. These results add to the literature on sexual identity-attraction discordance among individuals who belong to sexual minority groups (Goethe et al., 2018), by providing important results concerning bisexual identified men.

In addition to the cognitive conflict between their identity-attraction, heterosexism, and internalized homonegativity, bisexual individuals must deal with bisexism (Szymanski et al., 2008). According to the minority stress theory, bisexual individuals experience the risks of social stress because of the negative attitudes toward

135

their sexual identity from heterosexual and gay/lesbian individuals (Feinstein & Dyar, 2017). This may be, to a certain extent, due to the belief that many bisexual individuals are promiscuous (Brewster & Moradi, 2010), or that bisexuality is not a legitimate identity (Feinstein & Dyar, 2017). These negative attitudes may hinder one´s acceptance of their bisexual identity (Higgins, 1987) and be visible at societal level (Mohr et al., 2017; Schuler et al., 2018). Combination of bisexism and cognitive conflict, therefore, may contribute in explaining the SITB risks between sexual identity-attraction concordant/discordant bisexual men.

Among sexual minority women, sexual identity-attraction discordance may work as a protective factor against SITB risks. This finding is in consistency with several studies examining the relationship between sexual IAD and risk factors associated with suicide risks. For example, a study among young adults found that while sexual identity discordance among heterosexual females was associated with depressive symptoms, they did not find a similar association among sexual minority women (Lourie & Needham, 2017). Regarding substance use among sexual IAD women, results are mixed. A study among sexual minority women found no superordinate relationship between discordance among sexual orientation dimensions and hazardous drinking (Talley et al., 2015), while a few studies documented sexual IAD as a risk factor for alcohol misuse (Bauer et al., 2010; Drabble et al., 2005; Gattis et al., 2012) and tobacco use disorders (McCabe et al., 2018) among heterosexual women. Future research in sexual IAD and SITBs should focus on bisexual women and continue to combine even more nuances sexual identity and attraction dimensions.

Based on these findings, it is possible to suggest that the outcomes of sexual IAD depend on multiple factors simultaneously, depending on different combinations of how sexual IAD is conceptualized (i.e. identity versus attraction, identity versus behaviour), gender identity, and the outcome studied (Qeadan et al., 2021). Future research should consider these possible combinations.

4.6.   Limitations

Our study has its limitations. Firstly, NSDUH is a self-reported survey and self-reported responses are susceptible to limited recall and social desirability bias. Secondly, another limitation to our study is that NSDUH does not ask whether the participants are transgender. It has been shown that gender identity is a risk factor for

suicide risk (Barboza et al., 2016). Unfortunately, gender of the respondents is binary-coded in the NSDUH dataset; therefore, we could not go beyond analysing males and females. Future research should consider including various gender categories in the possible combinations of sexual identity-attraction concordance/discordance. Thirdly, similar to the majority of the studies in the field of sexual IAD, our results are based on quantitative data. We invite future research to investigate these associations using qualitative data. Fourth, sexual identity and attraction can shift over time, simultaneously or not, and future studies should determine the associations between sexual orientation and age at the first drug use using longitudinal data. Similarly, the cross-sectional design of this study does not allow us to infer causality between variables. Finally, NSDUH only samples noninstitutionalized U.S. population and thus adults who live in long-term care, individuals experiencing homelessness, and incarcerated are underrepresented.

4.7. Conclusion

Men who report sexual identity-attraction discordance are at risk of certain suicidal outcomes. Especially alarming results emerged for bisexual men with sexual IAD. These findings highlight the need to prioritize sexual attraction as much as identity in the prevention efforts, particularly concerning sexual minorities.

4.8. Manuscript Data

Funding

Acknowledgements

Disclosure Statement

The author reports there are no competing interests to declare.

Data Availability Statement

NSDUH data is publicly available at NSDUH website.

4.9. References

Annor, F. B., Clayton, H. B., Gilbert, L. K., Ivey-Stephenson, A. Z., Irving, S. M., David-Ferdon, C., & Kann, L. K. (2018). Sexual Orientation Discordance and Nonfatal Suicidal Behaviors in U.S. High School Students. *American Journal of Preventive Medicine*, *54*(4), 530–538. https://doi.org/10.1016/j.amepre.2018.01.013

Baeth, A. (2021). Sexual orientation. In *Encyclopedia of Sport Management* (pp. 430–431). Edward Elgar Publishing.

Baldwin, A., Dodge, B., Schick, V., Hubach, R. D., Bowling, J., Malebranche, D., Goncalves, G., Schnarrs, P. W., Reece, M., & Fortenberry, J. D. (2015). Sexual self-identification among behaviorally bisexual men in the midwestern United States. *Archives of Sexual Behavior*, *44*, 2015–2026.

Barboza, G. E., Dominguez, S., & Chace, E. (2016). Physical victimization, gender identity and suicide risk among transgender men and women. *Preventive Medicine Reports*, *4*, 385–390. https://doi.org/10.1016/j.pmedr.2016.08.003

Bauer, G. R., Jairam, J. A., & Baidoobonso, S. M. (2010). Sexual Health, Risk Behaviors, and Substance Use in Heterosexual-Identified Women With Female Sex Partners: 2002 US National Survey of Family Growth. *Sexually Transmitted Diseases*, *37*(9), 531–537. https://doi.org/10.1097/OLQ.0b013e3181d785f4

Boyle, S. C., LaBrie, J. W., Costine, L. D., & Witkovic, Y. D. (2017). "It's how we deal": Perceptions of LGB peers' use of alcohol and other drugs to cope and sexual minority adults' own coping motivated substance use following the Pulse nightclub shooting. *Addictive Behaviors*, *65*, 51–55. https://doi.org/10.1016/j.addbeh.2016.10.001

Burgard, S. A., Cochran, S. D., & Mays, V. M. (2005). Alcohol and tobacco use patterns among heterosexually and homosexually experienced California women. *Drug and Alcohol Dependence*, *77*(1), 61–70. https://doi.org/10.1016/j.drugalcdep.2004.07.007

Center for Behavioral Health Statistics and Quality. (2020). *Substance Abuse and Mental Health Services Administration (SAMHSA). 2019 National Survey of Drug Use and Health (NSDUH)*. SAMHSA. Rockville: Substance Abuse and Mental Health Services Administration.

Chandra, A., Copen, C. E., & Mosher, W. D. (2013). Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data from the 2006–2010 National Survey of Family Growth. In A. K. Baumle (Ed.), *International Handbook on the Demography of Sexuality* (pp. 45–66). Springer Netherlands. https://doi.org/10.1007/978-94-007-5512-3_4

Chandra, A., Mosher, W., Copen, C., & Sionean, C. (2011). Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data From the 2006-2008 National Survey of Family Growth. *National Health Statistics Reports*, 1–36.

Drabble, L., Midanik, L. T., & Trocki, K. (2005). Reports of alcohol consumption and alcohol-related problems among homosexual, bisexual and heterosexual respondents: Results from the 2000 National Alcohol Survey. *Journal of Studies on Alcohol*, *66*(1), 111–120. https://doi.org/10.15288/jsa.2005.66.111

Festinger, L. (1957). *A theory of cognitive dissonance.* (pp. xi, 291). Stanford University Press.

Fish, J. N., & Pasley, K. (2015). Sexual (Minority) Trajectories, Mental Health, and Alcohol Use: A Longitudinal Study of Youth as They Transition to Adulthood. *Journal of Youth and Adolescence*, *44*(8), 1508–1527. https://doi.org/10.1007/s10964-015-0280-6

Gattis, M. N., Sacco, P., & Cunningham-Williams, R. M. (2012). Substance Use and Mental Health Disorders Among Heterosexual Identified Men and Women Who Have Same-Sex Partners or Same-Sex Attraction: Results from the National Epidemiological Survey on Alcohol and Related Conditions. *Archives of Sexual Behavior*, *41*(5), 1185–1197. https://doi.org/10.1007/s10508-012-9910-1

Goethe, V. E., Angerer, H., Dinkel, A., Arsov, C., Hadaschik, B., Imkamp, F., Gschwend, J. E., & Herkommer, K. (2018). Concordance and Discordance of Sexual Identity, Sexual Experience, and Current Sexual Behavior in 45-Year-Old Men: Results From the German Male Sex-Study. *Sexual Medicine*, *6*(4), 282–290. https://doi.org/10.1016/j.esxm.2018.08.001

Guz, S., Kattari, S. K., Atteberry-Ash, B., Klemmer, C. L., Call, J., & Kattari, L. (2021). Depression and Suicide Risk at the Cross-Section of Sexual Orientation and Gender Identity for Youth. *Journal of Adolescent Health*, *68*(2), 317–323. https://doi.org/10.1016/j.jadohealth.2020.06.008

Harmon-Jones, E., & Mills, J. (2019a). An introduction to cognitive dissonance theory and an overview of current perspectives on the theory. In E. Harmon-Jones (Ed.), *Cognitive dissonance: Reexamining a pivotal theory in psychology (2nd ed.).* (pp. 3–24). American Psychological Association. https://doi.org/10.1037/0000135-001

Harmon-Jones, E., & Mills, J. (2019b). *An introduction to cognitive dissonance theory and an overview of current perspectives on the theory.*

Hatzenbuehler, M. L., & Link, B. G. (2014). Introduction to the special issue on structural stigma and health. *Social Science & Medicine*.

Hedegaard, H. (2021). *Suicide Mortality in the United States, 1999-2019*. National Center for Health Statistics. https://doi.org/10.15620/cdc:101761

Hequembourg, A. L., & Brallier, S. A. (2009). An exploration of sexual minority stress across the lines of gender and sexual identity. *Journal of Homosexuality*, *56*(3), 273–298. https://doi.org/10.1080/00918360902728517

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, *94*(3), 319.

Hottes, T. S., Bogaert, L., Rhodes, A. E., Brennan, D. J., & Gesink, D. (2016). Lifetime
Prevalence of Suicide Attempts Among Sexual Minority Adults by Study Sampling
Strategies: A Systematic Review and Meta-Analysis. *American Journal of Public
Health*, *106*(5), e1–e12. https://doi.org/10.2105/AJPH.2016.303088

Jones, C. M., & McCance-Katz, E. F. (2019). Co-occurring substance use and mental disorders
among adults with opioid use disorder. *Drug and Alcohol Dependence*, *197*, 78–82.
https://doi.org/10.1016/j.drugalcdep.2018.12.030

Katz-Wise, S. L., Rosario, M., Calzo, J. P., Scherer, E. A., Sarda, V., & Austin, S. B. (2017).
Associations of Timing of Sexual Orientation Developmental Milestones and Other
Sexual Minority Stressors with Internalizing Mental Health Symptoms Among Sexual
Minority Young Adults. *Archives of Sexual Behavior*, *46*(5), 1441–1452.
https://doi.org/10.1007/s10508-017-0964-y

Lourie, M. A., & Needham, B. L. (2017). Sexual Orientation Discordance and Young Adult
Mental Health. *Journal of Youth and Adolescence*, *46*(5), 943–954.
https://doi.org/10.1007/s10964-016-0553-8

Marshal, M. P., Dermody, S. S., Cheong, J., Burton, C. M., Friedman, M. S., Aranda, F., &
Hughes, T. L. (2013). Trajectories of Depressive Symptoms and Suicidality Among
Heterosexual and Sexual Minority Youth. *Journal of Youth and Adolescence*, *42*(8),
1243–1256. https://doi.org/10.1007/s10964-013-9970-0

McCabe, S. E., Matthews, A. K., Lee, J. G. L., Veliz, P., Hughes, T. L., & Boyd, C. J. (2018).
Tobacco Use and Sexual Orientation in a National Cross-sectional Study: Age,
Race/Ethnicity, and Sexual Identity–Attraction Differences. *American Journal of
Preventive Medicine*, *54*(6), 736–745. https://doi.org/10.1016/j.amepre.2018.03.009

Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual
Populations: Conceptual Issues and Research Evidence. *Psychol Bull*, *129*(5), 674–697.

Miranda-Mendizábal, A., Castellví, P., Parés-Badell, O., Almenara, J., Alonso, I., Blasco, M. J.,
Cebrià, A., Gabilondo, A., Gili, M., Lagares, C., Piqueras, J. A., Roca, M., Rodríguez-
Marín, J., Rodríguez-Jiménez, T., Soto-Sanz, V., Vilagut, G., & Alonso, J. (2017).
Sexual orientation and suicidal behaviour in adolescents and young adults: Systematic
review and meta-analysis. *British Journal of Psychiatry*, *211*(2), 77–87.
https://doi.org/10.1192/bjp.bp.116.196345

Mock, S. E., & Eibach, R. P. (2012). Stability and Change in Sexual Orientation Identity Over a
10-Year Period in Adulthood. *Archives of Sexual Behavior*, *41*(3), 641–648.
https://doi.org/10.1007/s10508-011-9761-1

Mongelli, F., Perrone, D., Balducci, J., Sacchetti, A., Ferrari, S., Mattei, G., & Galeazzi, G. M.
(2019). Minority stress and mental health among LGBT populations: An update on the

evidence. *Minerva Psichiatrica*, *60*(1). https://doi.org/10.23736/S0391-1772.18.01995-7

Pathela, P., Hajat, A., Schillinger, J., Blank, S., Sell, R., & Mostashari, F. (2006). Discordance between Sexual Behavior and Self-Reported Sexual Identity: A Population-Based Survey of New York City Men. *Annals of Internal Medicine*, *145*(6), 416. https://doi.org/10.7326/0003-4819-145-6-200609190-00005

Qeadan, F., Barbeau, W. A., Shan, L., & Azagba, S. (2021). Associations between sexual identity-attraction discordance, and prescription opioid misuse among adults. *Preventive Medicine*, *145*, 106401. https://doi.org/10.1016/j.ypmed.2020.106401

Quarshie, E. N.-B., Waterman, M. G., & House, A. O. (2020). Prevalence of self-harm among lesbian, gay, bisexual, and transgender adolescents: A comparison of personal and social adversity with a heterosexual sample in Ghana. *BMC Research Notes*, *13*(1), 271. https://doi.org/10.1186/s13104-020-05111-4

Rodríguez-Cintas, L., Daigre, C., Braquehais, M. D., Palma-Alvarez, R. F., Grau-López, L., Ros-Cucurull, E., Rodríguez-Martos, L., Abad, A. C., & Roncero, C. (2018). Factors associated with lifetime suicidal ideation and suicide attempts in outpatients with substance use disorders. *Psychiatry Research*, *262*, 440–445. https://doi.org/10.1016/j.psychres.2017.09.021

Saewyc, E. M. (2011). Research on adolescent sexual orientation: Development, health disparities, stigma, and resilience. *Journal of Research on Adolescence*, *21*(1), 256–272.

Saewyc, E. M., Skay, C. L., Hynds, P., Pettingell, S., Bearinger, L. H., Resnick, M. D., & Reis, E. (2007). Suicidal Ideation and Attempts in North American School-Based Surveys: Are Bisexual Youth at Increasing Risk? *Journal of LGBT Health Research*, *3*(2), 25–36. https://doi.org/10.1300/J463v03n02_04

Smith, A. M. A., Rissel, C. E., Richters, J., Grulich, A. E., & de Visser, R. O. (2003). Sex in Australia: Sexual identity, sexual attraction and sexual experience among a representative sample of adults. *Australian and New Zealand Journal of Public Health*, *27*(2), 138–145. https://doi.org/10.1111/j.1467-842X.2003.tb00801.x

Smith, D. M., Wang, S. B., Carter, M. L., Fox, K. R., & Hooley, J. M. (2020). Longitudinal predictors of self-injurious thoughts and behaviors in sexual and gender minority adolescents. *Journal of Abnormal Psychology*, *129*(1), 114–121. https://doi.org/10.1037/abn0000483

Szymanski, D. M., Kashubeck-West, S., & Meyer, J. (2008). Internalized Heterosexism: A Historical and Theoretical Overview. *The Counseling Psychologist*, *36*(4), 510–524. https://doi.org/10.1177/0011000007309488

Talley, A. E., Aranda, F., Hughes, T. L., Everett, B., & Johnson, T. P. (2015). Longitudinal Associations among Discordant Sexual Orientation Dimensions and Hazardous

Drinking in a Cohort of Sexual Minority Women. *Journal of Health and Social Behavior*, *56*(2), 225–245. https://doi.org/10.1177/0022146515582099

Vrangalova, Z., & Savin-Williams, R. C. (2014). Psychological and Physical Health of Mostly Heterosexuals: A Systematic Review. *The Journal of Sex Research*, *51*(4), 410–445. https://doi.org/10.1080/00224499.2014.883589

Whittle, H. J., Sheira, L. A., Frongillo, E. A., Palar, K., Cohen, J., Merenstein, D., Wilson, T. E., Adedimeji, A., Cohen, M. H., Adimora, A. A., Ofotokun, I., Metsch, L., Turan, J. M., Wentz, E. L., Tien, P. C., & Weiser, S. D. (2019). Longitudinal associations between food insecurity and substance use in a cohort of women with or at risk for HIV in the United States: Food insecurity and substance use in the US. *Addiction*, *114*(1), 127–136. https://doi.org/10.1111/add.14418

Zhao, Y., Montoro, R., Igartua, K., & Thombs, B. D. (2010). Suicidal ideation and attempt among adolescents reporting "unsure" sexual identity or heterosexual identity plus same-sex attraction or behavior: Forgotten groups? *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*(2), 104–113.

CHAPTER 5. Early Substance Use Initiation and Substance Use Disorders: Elevated Risk for Lesbian, Gay, and Bisexual Individuals

Abstract

Substance use disorders (SUDs) are one of the life-threatening problems and lesbian, gay, and bisexual (LGB) identified individuals are disproportionately affected by it. Early onset on certain substances have also been linked to SUDs. However, the link among sexual identity, early substance use initiation, and SUDs is unknown. We aimed to determine whether early initiation to particular substance mediate the relationship between sexual identity and SUDs. We examined data from adults participating in the most recent six waves (2015-2020) of the National Survey on Drug Use and Health, using structural equation modelling. Early substance use initiation was associated with greater SUDs. Our results showed that gay men were at greater odds of SUDs but not had less odds of early substance use initiation compared to other men. Lesbian women at greater odds of early substance use initiation compared to other women. Both bisexual men and women were at greater odds of both SUDs and early substance use initiation. Our analyses showed that early substance use initiation mediated the relationship between sexual identity and SUDs. While for lesbians and bisexual men and women this mediation has led to an increase in SUD, for gay men we found that results in the opposite direction. The implications for future studies and substance use prevention efforts are discussed.

Keywords: Substance use disorders, early substance use initiation, LGB, sexual identity, National Survey on Drug Use and Health

5.1. Introduction

Substance use disorders are life-threatening health problems. In the United States (US), the age-adjusted rate of drug overdose rate has increased 31% between 2019 to 2020 ("Drug Overdose Deaths Remain High," 2022) and substance use disorders are responsible for a vast global burden (Patel et al., 2016; Whiteford et al., 2013) effecting social, family, and work life (Jun et al., 2019). According to the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5), substance use disorder refers to a combination of substance dependence on or substance abuse (Center for Behavioral Health Statistics and Quality, 2016). Previous researchers have asked the question of who develops substance use disorder several times. A meta-analysis (Meier et al., 2016) showed that particular childhood and adolescent risk factors, such as low family socioeconomic status, family history of substance dependence, childhood conduct disorder, childhood depression, and frequent use of alcohol, cannabis, and tobacco use during adolescence, are associated with substance dependence in adult life.

Several approaches have taken to understand the risks for developing substance use disorders. It is well documented that sexual minorities, lesbian, gay, and bisexual (LGB) individuals, are at greater risk of substance use when compared to heterosexual populations (Griffin et al., 2020; Halkitis et al., 2005a; Lea et al., 2013; O'Byrne & Holmes, 2011; Schuler et al., 2019; Schuler & Collins, 2020a). Substance use disorders are also highly prevalent among LGB populations. Research also noted substantial differences across sexual identity and sex. For example, in the study of McCabe et al. (2009), odds of past-year drug dependency was elevated among lesbian women, gay and bisexual men when compared to heterosexuals of their respective sex, with the results relatively larger for lesbian women.

Sexual minority theory provides an explanatory theoretical framework to understand, to a certain extent, possible early substance use initiation, and disparities of substance use disorder between sexual minorities and heterosexuals (Felner et al., 2020). The sexual minority hypothesis posits that prejudice, stigma, and discrimination experienced by sexual minority identity can lead to distress and mental health problems (Meyer, 1995, 2003). Minority stressors have certain elements, such as proximal (personal stressors, i.e., internalized homonegativity), distal (hostile environments, i.e., experiencing victimization), and structural stressors (societal level stressors, i.e., policies against LGBT rights), which have been studied by previous scholars to explain disproportionate health disparities across sexual identities. These experiences of

discrimination have been associated with victimization (Kosciw et al., 2012; Ybarra et al., 2015), developing depressive symptoms (Mustanski et al., 2016), psychiatric disorders (Mays & Cochran, 2001), and psychological distress. Experienced discrimination may be directly associated with developing substance use disorder (Slater et al., 2017). The study of McCabe et al. (2010) documents that among LGB individuals, those who reported experiencing three types of discrimination (i.e. based on gender, racial, and sexual identity) were at greater odds of developing substance use disorder. Similar evidence emerged among sexual minorities who experience internalized homophobia and heterosexism (Weber, 2008).

Another body of research suggested that early substance use initiation might be an underlying factor for subsequent substance use disorders. Previous research showed that early onset of substance use is associated with psychiatric disorder (Poudel & Gautam, 2017), conduct disorder (Hser et al., 2003), sexual risk behavior (Gordon et al., 2004), and problems related to schooling (Gordon et al., 2004; Kelly et al., 2015). Furthermore, it is possible to that the early age of substance use initiation is a risk factor for subsequent substance use disorders because early onset users may have more accumulated time to consume substances and develop a disorder or extended time to consume regularly (Magid & Moreland, 2014). Substantial research on early substance use initiation and its relation to developing substance use disorder have been conducted (Hayatbakhsh et al., 2008; Moss et al., 2014; Warner & White, 2003). Research showed that people who report beginning drinking before age of 14 years were at greater risk of alcohol dependence within the 10 years of first drinking (Hingson et al., 2006). The longitudinal study of King and Chassin (2007) documented that early substance use initiation, which was defined based on both alcohol and drug use, was associated with drug dependency in young adulthood. However, they also note that while substance use initiation prior to age 14 was a predictor of alcoholism later in life, it was not a predictor of its development (King & Chassin, 2007). This result, to a certain extent, may be suggestive of a possible mediator variable between early substance use initiation and substance dependency. Furthermore, previous studies suggest that there are differences across sexual identities and type of substance consumed (Poudel & Gautam, 2017) regarding early onset of initiation. For example, the study of Sönmez & Palamar (2022) examined the relationship between sexual orientation and early onset, prior to the age of 15, of club drug use. Their results show that bisexual and lesbian women were at greater risk of early marijuana, cocaine, and ecstasy use initiation, while bisexual men were at

greater risk of early cocaine use initiation, compared to their respective sexes. Sönmez & Palamar (2022) also found that gay men had lower odds of initiation prior to age 15 for marijuana, inhalants, and methamphetamine.

Previous studies extensively documented the associations between sexual minority identity and early substance use initiation and SUD, and, between early substance use initiation and SUD. However, to our knowledge, no study has investigated whether substance use initiation prior to age 14 mediates the relationship between sexual identity and SUD. We analyze the data from the six latest waves of National Survey on Drug Use and Health, a representative sample of noninstitutionalized adults in the United States. Results of this study can help future prevention efforts to better target who is at the risk of alcohol and substance use dependence.

5.2. Methods

5.2.1. Data

We aggregated the most recent six waves of data (2015-2020) from the National Survey on Drug Use and Health (NSDUH; N=315,661). We focused on adults (aged ≥18) because only adults were asked about their sexual identity. Data are derived from nationally representative probability samples of populations living in households, noninstitutionalized group quarters, and shelters, obtained through a multi-stage sampling design (Center for Behavioral Health Statistics and Quality, 2020). These cross-sectional surveys were administered via computer-assisted interviewing conducted by an interviewer and audio computer-assisted self-interviewing.

5.2.2. Measures

Substance Use Disorder (SUD) - The primary outcome variables are the alcohol dependence or abuse, illicit drug dependence or abuse, and marijuana dependence or abuse variables, based on the criteria in the American Psychiatric Association (APA) Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM V). These three dichomatized variables are used to create substance use disorder latent variable.

Early Substance Use Initiation – In the NSDUH survey, participants were asked about their lifetime use of particular substances. Those who reported a lifetime use of a particular substance then were asked about their age at first use of that substance, which participants filled in their age at first use. Based on the reported age, we created a binary-coded variable with the value of 1 if the respondent reported use of that substance prior to the age 15. Early substance use initiation has been defined as initiation prior to the age of 15 (Ahuja et al., 2021; Sönmez & Palamar, 2022; Trujillo et al., 2019). In our analysis, we focused on the following substances: marijuana, cocaine, inhalants (e.g., amyl nitrite [poppers], or nitrous oxide [whippets], gasoline or lighter fluid), ecstasy (MDMA, Molly), methamphetamine, and alcohol.

Sexual Identity - With respect to sexual identity, participants were asked "which one of the following do you consider yourself to be?" and answer options were "heterosexual, "lesbian or gay," and "bisexual." Respondents could also report that they do not know (0.6%) or that they refuse to answer (1.2%) and participants reporting either of these responses were selected out of analyses. Based on the sexual orientation variable and respondents' reported sex, male or female, (imputation revised by NSDUH), we created an updated sexual identity variable indicating both the reported sex and sexual orientation of respondents. Specifically, the categories of this variable are "heterosexual man", "heterosexual woman", "gay man", bisexual man," "lesbian woman", and "bisexual woman".

Covariates – We included several control variables into our analysis. We included the participants' age at the time of the study as a categorical variable, with categories indicating ages 18–25, 26–34, 35–49, and 50 or older. Participants' race/ethnicity was included as a recoded variable indicating non-Hispanic white, non-Hispanic black, Hispanic, and Asian or other race. Participants' education level was included with values indicating less than high school, high school graduate, some college or the associate's degree, and college graduate. Participants were also asked about their annual family income, and we included a recoded version of this variable with values indicating <$20,000, $20,000-$49,999, $50,000-$74,999, and ≥$75,000. Variable for the participants' marital status was included with the following categories; ever married, separated, or divorced, and never married. Respondents' insurance status (i.e., private insurance, Medicare, Medicaid, Champus/ChampusVA/Military, or other insurance) was included as the already imputed version in the NSDUH dataset. Lastly, we included county metro/nonmetro status with a

three-level variable indicating counties with more than a million people, 250,000 to a million people, and less than 250,000 people.

5.2.3. Statistical Analysis

We use RStudio and the 'lavaan' package (Rosseel, 2012) to analyze the hypothesized structural equation model. Prior to the analysis, the data was checked for multicollinearity, missing data, departures from normality and distributions. Multicollinearity was not present. Missing data were handled with pairwise deletion.

Firstly, for descriptive purposes, we estimated the prevalence and means (if applicable) of all variables, by sex. Comparisons of variables for the outcome variables were conducted using Rao-Scott chi-square. Then, as a first step into our SEM analysis, we conducted Confirmatory Factor Analysis (CFA). Finally, we estimated our hypothesized SEM (Figure 1) in two different models, for men and women separately. Since we will be estimating mediator effects, we have followed the study of (Shrout & Bolger, 2002) and used bias-corrected bootstrap method for estimating our model. Bootstrapping allows intervals to be estimated without relying on the normal distribution assumption and adjusts for possible bias and problematic skewness, if any, in the bootstrap samples' distribution (Beaujean, 2014). Thus, we estimated our SEM for men and women separately using a bootstrapped ML estimator. The SEM was conducted with controlling for effects of covariates (education level, income, age, marital status, race, insurance, county, and year of the survey on both the mediator and outcome variables.

Figure 5.1. Hypothesized Structural Equation Model
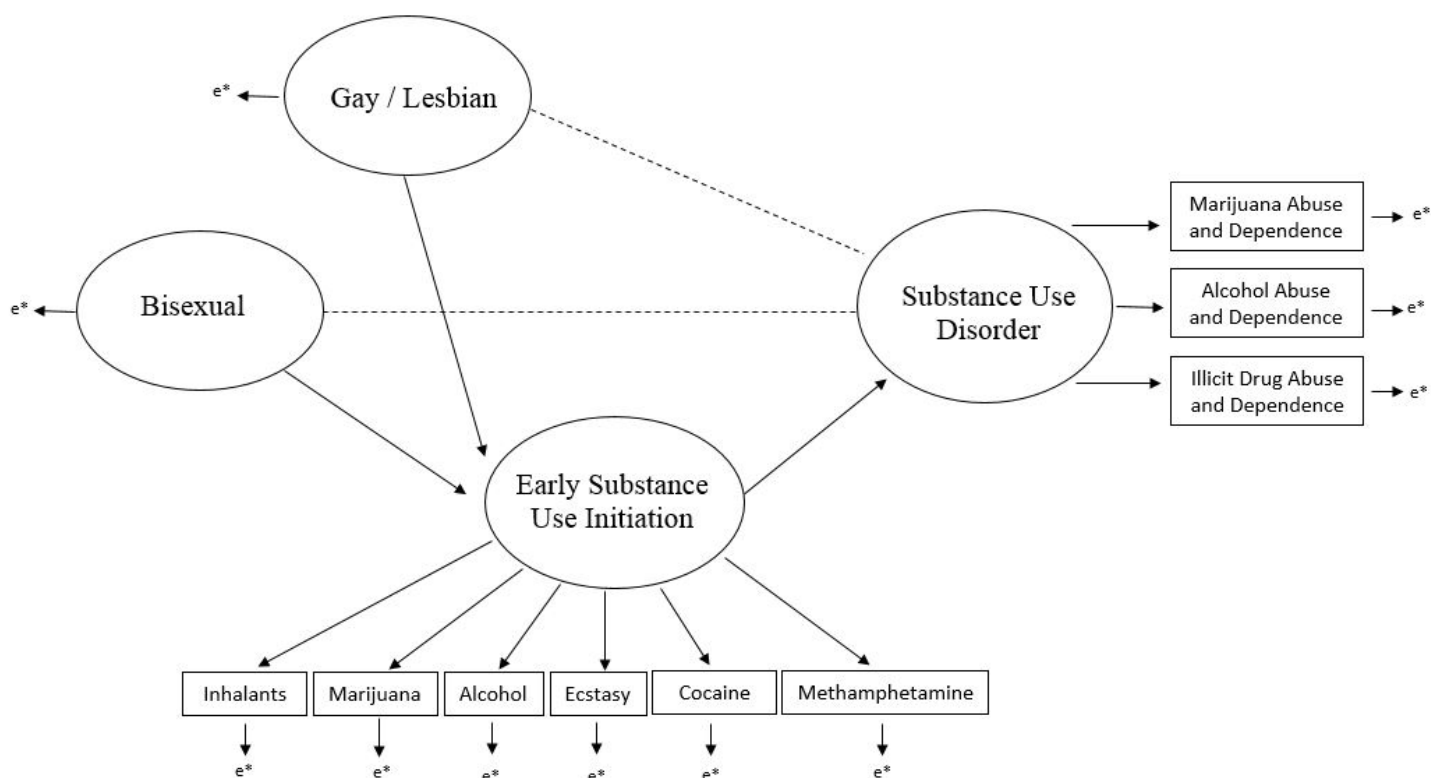
Notes: Circles represent latent variables. Rectangles represent observed (manifest) variables. e* represent errors of observed variables to be estimated. As the mediator and outcome variables, both early substance use initiation (mediator) and substance use disorder (outcome) latent variables are controlled for education level, income, age, marital status, race, insurance, county, and year of the survey.

CFA model's and SEM's fit to data has to be examined before proceeding to the results. We used commonly employed key fit indices, such as (a) the comparative fit Index (CFI); (b) the Tucker-Lewis Index (TLI); (c) the root mean square error of approximation (RMSEA), and (d) standardized root mean squared residual (SRMR) (Hu & Bentler, 1999; Weston & Gore, 2006). Most studies suggest that values higher than .95 for CFI and TLI indicate good fit, and values of RMSEA and SRMR <.06 are acceptable (Hu & Bentler, 1999; Weston & Gore, 2006). For our SEM, we provide standardized estimations since it depends on the equal variances from our specific sample (Grace & Bollen, 2005) and that we can compare the estimated coefficients across groups.

5.3.   Results

5.3.1. Descriptive Statistics

Table 1 presents the sample characteristics. Our final sample was consistent of 95.0% and 90.3% heterosexual identified males and females, respectively. Among men, 2.49% were gay and 2.51% were bisexual, while among women, 2.07% were lesbian and 7.55% were bisexual. Both for males and females, the highest percentage for education was some college degree, the majority earned more than $75.000 per year, majority were white and older than 35 years old, and ever married, separated, or widowed.

Table 2 prevalence of early substance use initiation according to current sexual identity among adults. Bisexual women had the highest prevalence of initiation prior to age of 15 to all drugs examined: marijuana, cocaine, inhalants, ecstasy, and methamphetamine. Gay men had the lowest prevalence for early initiation to marijuana and methamphetamine, heterosexual women for cocaine, inhalants, and ecstasy.

In Table 3, we present the prevalence of substance use disorders according to current sexual identity. Globally, highest prevalence was for alcohol abuse or dependence. Gay men and bisexual women had the same, and the highest among the sample, prevalence for alcohol abuse and disorder (12.4%). Bisexual women had the highest prevalence of marijuana and illicit drug abuse and dependence (5.39% and 5.56%, respectively). Heterosexual women had the lowest prevalence for all three substance use disorders examined.

Table 5.1. Sample Characteristics

	Males		Females	
	%	N	%	N
Sexual Identity				
Heterosexual	95.0	104,326	90.3	114,177
Gay/Lesbian	2.49	2,736	2.07	2,615
Bisexual	2.51	2,754	7.55	9,537
Education				
Less than High School	13.7	15,328	11.4	14,771
High School	28.6	32,041	23.7	30,700
Some College	30.9	34,580	35.3	45,772
College	26.8	30,005	29.7	38,478
Income				
<$20,000	17.2	19,278	21.5	27,923
$20,000-$49,999	29.8	33,389	31.1	40,438
$50,000-$74,999	16.3	17,948	15.2	19,798
≥$75,000	36.9	41,339	32.0	41,562
Race				
White	61.5	68,867	60.2	78,201
Black	11.5	12,918	12.8	16,600
Hispanic	16.7	18,676	17.0	22,067
Asian/Other	10.2	11,493	9.91	12,853
Age				
18-25	33.3	37,270	31.3	40,592
26-34	20.2	22,660	20.9	27,067
35+	46.5	52,024	47.8	62,062
Marital Status				
Ever Married,	51.9	58,096	58.0	75,231

Separated, or Widowed				
Never Married	48.1	53,858	42.0	54,490
Insurance				
No	13.6	15,279	9.82	12,734
Yes	86.3	96,675	90.2	116,987
Metropolitan Area				
>1,000,000	45.0	50,483	45.0	58,368
250,000 – 1,000,000	35.4	39,660	35.7	46,326
<250,000	19.4	21,811	19.3	25,027
Survey Year				
2015	17.7	19,828	18.3	23,733
2016	17.7	19,853	17.5	22,772
2017	17.8	19,987	17.4	22,567
2018	18.0	20,169	17.6	22,857
2019	17.8	19,932	17.6	22,807
2020	10.9	12,185	11.5	14,985

Table 5.2. Prevalence of Early Substance Use Initiation According to Current Sexual Identity Among Adults in United States, 2015-2020

	Global Weighted % (95% CI)	Heterosexual Men Weighted % (95% CI)	Gay Men Weighted % (95% CI)	Bisexual Men Weighted % (95% CI)	Heterosexual Women Weighted % (95% CI)	Lesbian Women Weighted % (95% CI)	Bisexual Women Weighted % (95% CI)
Marijuana	15.0 (14.7-15.3)	17.0 (16.6-17.4)	10.5 (8.64-12.8)	15.1 (13.3-17.1)	12.0 (11.6-12.4)	19.1 (16.2-22.4)	26.0 (24.5-27.6)
Cocaine	1.63 (1.43-1.85)	1.79 (1.52-2.12)	1.88 (0.97-3.59)	2.74 (1.53-4.88)	1.12 (0.95-1.32)	2.91 (1.68-5.01)	4.53 (3.42-5.98)
Inhalants	9.11 (8.72-9.51)	9.87 (9.24-10.5)	9.41 (7.21-12.2)	13.0 (9.86-17.0)	7.24 (6.78-7.72)	14.6 (11.5-18.3)	17.1 (14.8-19.6)
Ecstasy	0.62 (0.55-0.70)	0.64 (0.52-0.79)	0.88 (0.28-0.44)	2.23 (1.05-4.67)	0.35 (0.28-0.44)	0.95 (0.48-1.86)	2.67 (2.04-3.50)
Methamphetamine	1.52 (1.35-1.72)	1.54 (1.30-1.83)	0.73 (0.29-1.84)	2.41 (1.38-4.17)	1.34 (1.13-1.58)	2.41 (1.12-5.09)	3.31 (2.35-4.64)

Note: CI = Confidence interval. Differences among sexual orientations within marijuana, cocaine, inhalants, ecstasy were $p < .001$; methamphetamine was $p = 0.001$.

Table 5.3. Prevalence of Substance Use Disorders According to Current Sexual Identity Among Adults in United States, 2015-2020

	Global Weighted % (95% CI)	Heterosexual Men Weighted % (95% CI)	Gay Men Weighted % (95% CI)	Bisexual Men Weighted % (95% CI)	Heterosexual Women Weighted % (95% CI)	Lesbian Women Weighted % (95% CI)	Bisexual Women Weighted % (95% CI)
Alcohol AOD	5.93 (5.77-6.08)	7.53 (7.24-7.84)	12.4 (10.9-14.1)	8.09 (6.59-9.89)	3.75 (3.57-3.94)	12.3 (10.5-14.4)	12.4 (11.4-13.5)
Marijuana AOD	1.53 (1.47-1.60)	2.01 (1.91-2.11)	3.77 (3.09-4.58)	2.59 (2.00-3.34)	0.73 (0.67-0.80)	5.38 (4.37-6.62)	5.39 (4.76-6.09)
Illicit Drug AOD	1.62 (1.54-1.70)	1.83 (1.73-1.94)	5.15 (4.20-6.29)	2.15 (1.59-2.89)	1.09 (1.00-1.19)	3.69 (2.94-4.61)	5.56 (4.90-6.29)

Note: CI = Confidence interval. AOD = abuse or dependence. Differences among sexual orientations within all substance use disorders were all *p* = 0.001.

5.3.2. Confirmatory Factor Analysis

The results of the CFA proved that the model is a good fit to the data. For the sample including males, the fit indices for CFA were: CFI = 0.96, TLI=0.94, RMSEA=0.027 (90% confidence interval [CI] for the RMSEA lower bound=0.026 and upper bound=0.029), and SRMR=0.01. For the sample including females, the fit indices for CFA were: CFI = 0.95, TLI=0.92, RMSEA=0.031 (90% confidence interval [CI] for the RMSEA lower bound=0.030 and upper bound=0.033), and SRMR=0.02.

5.3.3. Structural Equation Modelling

We provide standardized estimates of coefficients and errors for both groups. The results are presented in Figure 2 and Table 2. The SEM output for these global fit indices suggested that the measurement model (Fig. 1) was a good fit to the data for both groups (Men; CFI = 0.96; TLI = 0.94; RMSEA = 0.02, Women; CFI = 0.95; TLI = 0.92; RMSEA = 0.03.).

Figure 5.2. Estimated SEM results
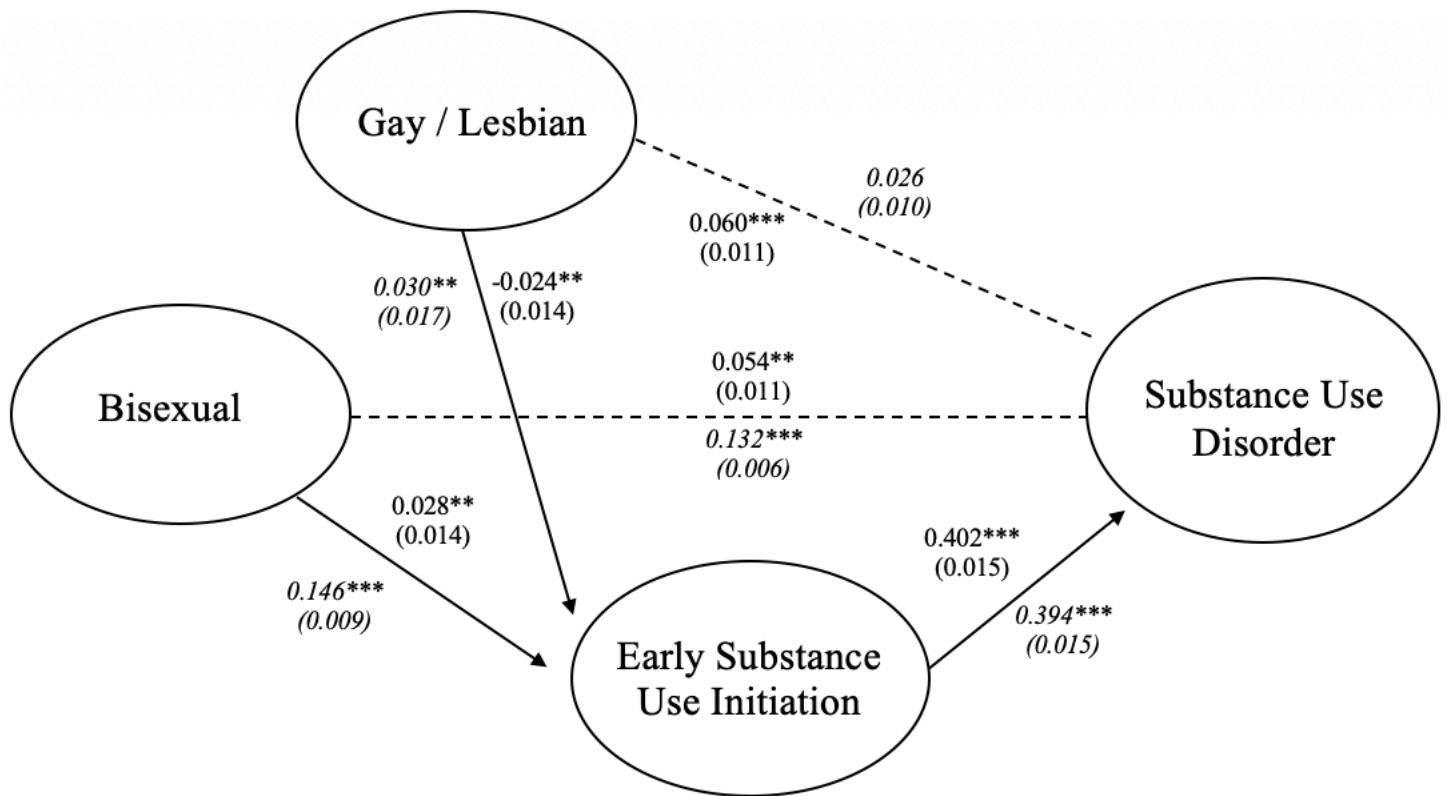
Notes. Significance levels: ***p < 0.01, **p < 0.05, *p < 0.1. Standardized coefficients shown for comparability across groups. Coefficients show the results for men and coefficients in italic show the results for women, and numbers in parenthesis are robust standard errors. Dashed paths represent the direct relationship to be mediated between sexual identity latent variables and SUD. Latent variables gay/lesbian and bisexual identity are interpreted as a comparison to heterosexual identity individually. Coefficients of observed variables and their standard errors are not shown. As the mediator and outcome variables, both early substance use initiation (mediator) and substance use disorder (outcome) latent variables are controlled for education level, income, age, marital status, race, insurance, county, and year of the survey. Sample sizes for both groups were: Men; n=13,539, Women; n=15,344. Fit indices for SEMs were the following: Men; CFI = 0.96; TLI = 0.94; RMSEA = 0.02, Women; CFI = 0.95; TLI = 0.92; RMSEA = 0.03.

For both samples of men and women, we found that early substance use initiation was associated with an increase in SUD latent variable, with 0.405 and 0.398 standard deviation (SD) increase, respectively. Among men, gay sexual identity was positively associated with substance use disorder. We found that gay sexual identity was associated with a 0.061 standard deviation (SD) increase in the SUD units. Similar results emerged for bisexual identity, where we found that it was associated with 0.057 SD increase in the SUD units. Furthermore, we found that while bisexual identity was associated with increased risk (0.030 SD) of early substance use initiation among men, gay identity was associated with a reduced risk (-0.024 SD).

159

The relationship among sexual identity, early substance use initiation, and SUD was different for gay and bisexual men. We found that, the relationship between gay identity and SUD was negative when mediated by early substance use initiation; because gay identity predicted later substance use initiation and later substance use initiation was associated with decreased SUD. We found that gay identity was associated with 0.010 SD decrease in SUD units, mediated by early substance use initiation. Our SEM model showed that bisexual identity among men was positively associated with SUD when mediated by early substance use initiation. Our results showed that bisexual identity was associated with 0.012 SD increase in SUD units, mediated by early substance use initiation.

Table 5.4. Estimated Defined Parameters

Defined Parameters	Standardized Estimates (Std. Errors)	
	Men	Women
(1) Gay/Lesbian → Early Substance Use → SUD	-0.010*	0.012**
	(0.003)	(0.003)
(2) Bisexual → Early Substance Use → SUD	0.011**	0.058***
	(0.003)	(0.002)
(3) Direct Effect (Gay/Lesbian → SUD)	0.060***	0.026
	(0.011)	(0.010)
(4) Direct Effect (Bisexual → SUD)	0.054***	0.132***
	(0.012)	(0.006)

Notes: Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standardized coefficients shown for comparability across groups. (1) Relationship between gay or lesbian sexual identity and SUD mediated by early substance use initiation. (2) Relationship between bisexual sexual identity and SUD mediated by early substance use initiation. (3) Direct effect of between gay or lesbian sexual identity on SUD. (4) Direct effect of between bisexual sexual identity on SUD. Sample sizes for both groups were: Men; n=13,539, Women; n=15,344. Fit indices for SEMs were the following: Men; CFI = 0.96; TLI = 0.94; RMSEA = 0.02, Women; CFI = 0.95; TLI = 0.92; RMSEA = 0.03.

Among women, we found that bisexual identity was associated with an increase in the SUD latent variable. Results showed that an increase in the bisexual identity was associated with 0.137 SD increase in SUD latent variable. We did not find any significant result for the relationship between lesbian identity and SUD. For lesbian and bisexual women, mediation analyses showed that early substance use initiation mediated the relationship between sexual identity and SUD. We found that, among women, lesbian and bisexual identity was associated with 0.012 and 0.059 SD increase, respectively, in the SUD latent variable when mediated by early substance use initiation.

5.4. Discussion

In this study, we examined the relationship among sexual identity, early substance use initiation, and substance use disorders among a nationally representative sample of men and women who participated for the National Survey on Drug Use and Health between 2015 and 2020. Firstly, for both men and women, we found that early substance use initiation was associated with increased likelihood of reporting substance use disorders.

We did not find any significant association between lesbian identity and SUD. This finding is in contrast with previous studies that showed that lesbian women were at greater risk of substance dependence when compared to heterosexual women (Drabble et al., 2005; McCabe et al., 2009). However, we found that lesbian women are at risk of early substance use initiation, which corroborates the previous research (Sönmez & Palamar, 2022). More importantly, our mediation results showed that early substance use initiation mediated the relationship between lesbian identity and SUD among women. This result, to a certain extent, may be interpreted as while lesbian women in our sample are not at the risk of SUD, lesbian women who report early substance use initiation are at risk of developing SUD later in life. Prevention strategies against substance use disorders should consider targeting lesbian youth who are at risk of early substance use initiation.

Our results showed that while gay men had later initiation to certain drugs examined, they had the highest prevalence of alcohol abuse and dependence disorder. Our SEM results also showed that gay men were not risk of developing substance use disorders, particularly because of later initiation to use of substances. These results could be due to several reasons. Firstly, it is well-documented that gay men (Griffin et al., 2020),

especially those who frequently attend to gay venues (Petersson et al., 2016) and consider themselves a part of the gay community (Carpiano et al., 2011; Moody et al., 2018), are at greater risk of normalized substance use. However, particular minority stressors, such as internalized homonegativity (Berg et al., 2013; Meyer, 1995, 2003), can play a role in delaying or impeding gay men´s connection to the community (Goldbach et al., 2015; Moody et al., 2018). Similarly, gay men may not attend to gay venues until the legal age of club attendance (reaching the age of 21) and not be exposed to substance use behaviors. Although we did not find SUD risks for gay men, future studies are still needed to understand substance use behaviors among this group, given that the gay men are at disproportioned risk of life-time use of substances (Griffin et al., 2020; Halkitis et al., 2005b; Sönmez & Palamar, 2022).

We found important associations between bisexual identity and adverse outcomes examined. Firstly, our results showed that bisexual women have the highest prevalence for early substance use initiation to all five drugs and all substance use disorders we examined. Second, our results showed that both bisexual men and women were more likely to report early substance use initiation and substance use disorder, with results being larger for bisexual women. Thus, bisexual individuals who report early substance use initiation are at the risk of developing substance use disorders. Unique minority stressors experienced by bisexual-identified individuals could explain the elevated risk experienced by bisexual individuals, especially bisexual women. According to the sexual minority theory posited by Meyer (1995, 2003), LGB individuals experience an elevated risk of stress from broader community, and bisexual individuals can experience this stress from other lesbian and gay individuals as well (Feinstein & Dyar, 2017). There are certain stereotypical beliefs that render bisexual individuals invisible (Mohr et al., 2017), such as bisexuals are naturally promiscuous (Mohr et al., 2017) or that bisexual identity is not real (Feinstein & Dyar, 2017). Although we are not directly testing the sexual minority stressors in our study, our results indicate the higher vulnerability of bisexual identified individuals together with previous empirical evidence that corroborates to the unique minority stressors experienced by bisexual individuals. Bisexual women are not only at increased odds of substance use and alcohol use disorder when compared to heterosexual women, but also when compared to lesbian women (Schuler & Collins, 2020b). Therefore, our results highlight a need for future studies to investigate further how bisexual identity development and experienced unique minority stressors by bisexual-identified individuals may influence early substance use initiation.

Likewise, our results inform future prevention efforts to better target who is at risk of developing substance use disorder later in life. Future prevention strategies should consider targeting sexual minority youth to prevent substance use problems.

Another model of explanation for subsequent substance use disorders hinge upon victimization (Turner & Lloyd, 2003), especially victimization during childhood (Pilowsky et al., 2009). Explanation for why sexual minority identities are associated with early substance use initiation and substance use disorder could be related to experienced victimization. It has been shown that repeated or co-occurrence of adverse childhood events such as abuse experiences increase the risk of developing substance dependence later in life (Douglas et al., 2010; Hughes et al., 2010).

LGBT individuals are at proportionate risk of victimization, especially during adolescence (Kosciw et al., 2012). For example, a meta-analysis showed that LGBTQ identification is a moderate and consistent risk factor for victimization at school (Myers et al., 2020). Likewise, LGBT youth are a victim of cyberbullying (Abreu & Kenny, 2018). Research also showed that reported victimization was associated with developing substance use disorders among lesbian women and bisexual men and women, when compared to the heterosexuals of their respective sexes (Hughes et al., 2010). Thus, victimization can bear a risk factor for sexual minority youth and lead to their first consumption of substances.

Our study raises several questions for future studies. Given the rates of victimization among sexual minorities and substance use patterns, future research should consider examining how victimization associates with early substance use initiation. Furthermore, the link between victimization and substance use disorders is well-established, but the role of early substance use initiation in this relationship remains unclear. Future prevention strategies would benefit from evidence on these associations.

5.5.   Limitations

NSDUH is a self-reported survey and self-reported responses are susceptible to limited recall and social desirability bias. Another limitation to our study is that NSDUH does not ask whether the participants are transgender, which studies increasingly show that is a factor in determining health-related disparities and can play a role in determining sexual identity and attraction. Similarly, sexual orientation and attraction can shift over time and future studies should determine the associations between sexual IAD

and STIBs using longitudinal data. The cross-sectional design of this study does not allow us to infer causality between variables. Finally, NSDUH only samples noninstitutionalized US population and thus adults who live in long-term care, individuals experiencing homelessness, and incarcerated are underrepresented.

5.6. Conclusions

Our findings showed that particular subpopulations from the sexual minorities' individuals are at greater risk of early substance use initiation and therefore, developing substance use disorders. Especially particular results showed that bisexual women present a certain level of vulnerability for early substance use initiation and substance use disorders that are alarming. Our results also highlight the gendered differences for examined adverse health outcomes. Findings of this study highlight the need for prioritizing certain groups in prevention efforts to eliminate substance use initiation among sexual minority youth.

5.7. Manuscript Data

Data Availability Statement

NSDUH data is publicly available at NSDUH website.

5.8. References

Annor, F. B., Clayton, H. B., Gilbert, L. K., Ivey-Stephenson, A. Z., Irving, S. M., David-Ferdon, C., & Kann, L. K. (2018). Sexual Orientation Discordance and Nonfatal Suicidal Behaviors in U.S. High School Students. American Journal of Preventive Medicine, 54(4), 530–538. https://doi.org/10.1016/j.amepre.2018.01.013

Barboza, G. E., Dominguez, S., & Chace, E. (2016). Physical victimization, gender identity and suicide risk among transgender men and women. Preventive Medicine Reports, 4, 385–390. https://doi.org/10.1016/j.pmedr.2016.08.003

Bauer, G. R., Jairam, J. A., & Baidoobonso, S. M. (2010). Sexual Health, Risk Behaviors, and Substance Use in Heterosexual-Identified Women With Female Sex Partners: 2002 US National Survey of Family Growth. Sexually Transmitted Diseases, 37(9), 531–537. https://doi.org/10.1097/OLQ.0b013e3181d785f4

Boyle, S. C., LaBrie, J. W., Costine, L. D., & Witkovic, Y. D. (2017). "It's how we deal": Perceptions of LGB peers' use of alcohol and other drugs to cope and sexual minority adults' own coping motivated substance use following the Pulse nightclub shooting. Addictive Behaviors, 65, 51–55. https://doi.org/10.1016/j.addbeh.2016.10.001

Burgard, S. A., Cochran, S. D., & Mays, V. M. (2005). Alcohol and tobacco use patterns among heterosexually and homosexually experienced California women. Drug and Alcohol Dependence, 77(1), 61–70. https://doi.org/10.1016/j.drugalcdep.2004.07.007

Center for Behavioral Health Statistics and Quality. (2020). Substance Abuse and Mental Health Services Administration (SAMHSA). 2019 National Survey of Drug Use and Health (NSDUH). SAMHSA. Rockville: Substance Abuse and Mental Health Services Administration.

Chandra, A., Copen, C. E., & Mosher, W. D. (2013). Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data from the 2006–2010 National Survey of Family Growth. In A. K. Baumle (Ed.), International Handbook on the Demography of Sexuality (pp. 45–66). Springer Netherlands. https://doi.org/10.1007/978-94-007-5512-3_4

Chandra, A., Mosher, W., Copen, C., & Sionean, C. (2011). Sexual Behavior, Sexual Attraction, and Sexual Identity in the United States: Data From the 2006-2008 National Survey of Family Growth. National Health Statistics Reports, 1–36.

Drabble, L., Midanik, L. T., & Trocki, K. (2005). Reports of alcohol consumption and alcohol-related problems among homosexual, bisexual and heterosexual respondents: Results from the 2000 National Alcohol Survey. Journal of Studies on Alcohol, 66(1), 111–120. https://doi.org/10.15288/jsa.2005.66.111

Festinger, L. (1957). A theory of cognitive dissonance. (pp. xi, 291). Stanford University Press.

Fish, J. N., & Pasley, K. (2015). Sexual (Minority) Trajectories, Mental Health, and Alcohol Use: A Longitudinal Study of Youth as They Transition to Adulthood. Journal of Youth and Adolescence, 44(8), 1508–1527. https://doi.org/10.1007/s10964-015-0280-6

Gattis, M. N., Sacco, P., & Cunningham-Williams, R. M. (2012). Substance Use and Mental Health Disorders Among Heterosexual Identified Men and Women Who Have Same-Sex Partners or Same-Sex Attraction: Results from the National Epidemiological Survey on Alcohol and Related Conditions. Archives of Sexual Behavior, 41(5), 1185–1197. https://doi.org/10.1007/s10508-012-9910-1

Goethe, V. E., Angerer, H., Dinkel, A., Arsov, C., Hadaschik, B., Imkamp, F., Gschwend, J. E., & Herkommer, K. (2018). Concordance and Discordance of Sexual Identity, Sexual Experience, and Current Sexual Behavior in 45-Year-Old Men: Results From the German Male Sex-Study. Sexual Medicine, 6(4), 282–290. https://doi.org/10.1016/j.esxm.2018.08.001

Guz, S., Kattari, S. K., Atteberry-Ash, B., Klemmer, C. L., Call, J., & Kattari, L. (2021). Depression and Suicide Risk at the Cross-Section of Sexual Orientation and Gender Identity for Youth. Journal of Adolescent Health, 68(2), 317–323. https://doi.org/10.1016/j.jadohealth.2020.06.008

Harmon-Jones, E., & Mills, J. (2019). An introduction to cognitive dissonance theory and an overview of current perspectives on the theory. In E. Harmon-Jones (Ed.), Cognitive dissonance: Reexamining a pivotal theory in psychology (2nd ed.). (pp. 3–24). American Psychological Association. https://doi.org/10.1037/0000135-001

Hatzenbuehler, M. L., & Link, B. G. (2014). Introduction to the special issue on structural stigma and health. Social Science & Medicine.

Hedegaard, H. (2021). Suicide Mortality in the United States, 1999-2019. National Center for Health Statistics. https://doi.org/10.15620/cdc:101761

Hequembourg, A. L., & Brallier, S. A. (2009). An exploration of sexual minority stress across the lines of gender and sexual identity. Journal of Homosexuality, 56(3), 273–298. https://doi.org/10.1080/00918360902728517

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. Psychological Review, 94(3), 319.

Hottes, T. S., Bogaert, L., Rhodes, A. E., Brennan, D. J., & Gesink, D. (2016). Lifetime Prevalence of Suicide Attempts Among Sexual Minority Adults by Study Sampling Strategies: A Systematic Review and Meta-Analysis. American Journal of Public Health, 106(5), e1–e12. https://doi.org/10.2105/AJPH.2016.303088

Jones, C. M., & McCance-Katz, E. F. (2019). Co-occurring substance use and mental disorders among adults with opioid use disorder. Drug and Alcohol Dependence, 197, 78–82. https://doi.org/10.1016/j.drugalcdep.2018.12.030

Katz-Wise, S. L., Rosario, M., Calzo, J. P., Scherer, E. A., Sarda, V., & Austin, S. B. (2017). Associations of Timing of Sexual Orientation Developmental Milestones and Other Sexual Minority Stressors with Internalizing Mental Health Symptoms Among Sexual Minority Young Adults. Archives of Sexual Behavior, 46(5), 1441–1452. https://doi.org/10.1007/s10508-017-0964-y

Lourie, M. A., & Needham, B. L. (2017). Sexual Orientation Discordance and Young Adult Mental Health. Journal of Youth and Adolescence, 46(5), 943–954. https://doi.org/10.1007/s10964-016-0553-8

Marshal, M. P., Dermody, S. S., Cheong, J., Burton, C. M., Friedman, M. S., Aranda, F., & Hughes, T. L. (2013). Trajectories of Depressive Symptoms and Suicidality Among Heterosexual and Sexual Minority Youth. Journal of Youth and Adolescence, 42(8), 1243–1256. https://doi.org/10.1007/s10964-013-9970-0

McCabe, S. E., Matthews, A. K., Lee, J. G. L., Veliz, P., Hughes, T. L., & Boyd, C. J. (2018). Tobacco Use and Sexual Orientation in a National Cross-sectional Study: Age, Race/Ethnicity, and Sexual Identity–Attraction Differences. American Journal of Preventive Medicine, 54(6), 736–745. https://doi.org/10.1016/j.amepre.2018.03.009

Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence. Psychol Bull, 129(5), 674–697.

Miranda-Mendizábal, A., Castellví, P., Parés-Badell, O., Almenara, J., Alonso, I., Blasco, M. J., Cebrià, A., Gabilondo, A., Gili, M., Lagares, C., Piqueras, J. A., Roca, M., Rodríguez-Marín, J., Rodríguez-Jiménez, T., Soto-Sanz, V., Vilagut, G., & Alonso, J. (2017). Sexual orientation and suicidal behaviour in adolescents and young adults: Systematic review and meta-analysis. British Journal of Psychiatry, 211(2), 77–87. https://doi.org/10.1192/bjp.bp.116.196345

Mock, S. E., & Eibach, R. P. (2012). Stability and Change in Sexual Orientation Identity Over a 10-Year Period in Adulthood. Archives of Sexual Behavior, 41(3), 641–648. https://doi.org/10.1007/s10508-011-9761-1

Mongelli, F., Perrone, D., Balducci, J., Sacchetti, A., Ferrari, S., Mattei, G., & Galeazzi, G. M. (2019). Minority stress and mental health among LGBT populations: An update on the evidence. Minerva Psichiatrica, 60(1). https://doi.org/10.23736/S0391-1772.18.01995-7

Pathela, P., Hajat, A., Schillinger, J., Blank, S., Sell, R., & Mostashari, F. (2006). Discordance between Sexual Behavior and Self-Reported Sexual Identity: A Population-Based Survey of New York City Men. Annals of Internal Medicine, 145(6), 416. https://doi.org/10.7326/0003-4819-145-6-200609190-00005

Qeadan, F., Barbeau, W. A., Shan, L., & Azagba, S. (2021). Associations between sexual identity-attraction discordance, and prescription opioid misuse among adults. Preventive Medicine, 145, 106401. https://doi.org/10.1016/j.ypmed.2020.106401

Quarshie, E. N.-B., Waterman, M. G., & House, A. O. (2020). Prevalence of self-harm among lesbian, gay, bisexual, and transgender adolescents: A comparison of personal and social adversity with a heterosexual sample in Ghana. BMC Research Notes, 13(1), 271. https://doi.org/10.1186/s13104-020-05111-4

Rodríguez-Cintas, L., Daigre, C., Braquehais, M. D., Palma-Alvarez, R. F., Grau-López, L., Ros-Cucurull, E., Rodríguez-Martos, L., Abad, A. C., & Roncero, C. (2018). Factors associated with lifetime suicidal ideation and suicide attempts in outpatients with substance use disorders. Psychiatry Research, 262, 440–445. https://doi.org/10.1016/j.psychres.2017.09.021

Saewyc, E. M. (2011). Research on adolescent sexual orientation: Development, health disparities, stigma, and resilience. Journal of Research on Adolescence, 21(1), 256–272.

Saewyc, E. M., Skay, C. L., Hynds, P., Pettingell, S., Bearinger, L. H., Resnick, M. D., & Reis, E. (2007). Suicidal Ideation and Attempts in North American School-Based Surveys: Are Bisexual Youth at Increasing Risk? Journal of LGBT Health Research, 3(2), 25–36. https://doi.org/10.1300/J463v03n02_04

Smith, A. M. A., Rissel, C. E., Richters, J., Grulich, A. E., & de Visser, R. O. (2003). Sex in Australia: Sexual identity, sexual attraction and sexual experience among a representative sample of adults. Australian and New Zealand Journal of Public Health, 27(2), 138–145. https://doi.org/10.1111/j.1467-842X.2003.tb00801.x

Smith, D. M., Wang, S. B., Carter, M. L., Fox, K. R., & Hooley, J. M. (2020). Longitudinal predictors of self-injurious thoughts and behaviors in sexual and gender minority adolescents. Journal of Abnormal Psychology, 129(1), 114–121. https://doi.org/10.1037/abn0000483

Szymanski, D. M., Kashubeck-West, S., & Meyer, J. (2008). Internalized Heterosexism: A Historical and Theoretical Overview. The Counseling Psychologist, 36(4), 510–524. https://doi.org/10.1177/0011000007309488

Talley, A. E., Aranda, F., Hughes, T. L., Everett, B., & Johnson, T. P. (2015). Longitudinal Associations among Discordant Sexual Orientation Dimensions and Hazardous Drinking in a Cohort of Sexual Minority Women. Journal of Health and Social Behavior, 56(2), 225–245. https://doi.org/10.1177/0022146515582099

Vrangalova, Z., & Savin-Williams, R. C. (2014). Psychological and Physical Health of Mostly Heterosexuals: A Systematic Review. The Journal of Sex Research, 51(4), 410–445. https://doi.org/10.1080/00224499.2014.883589

Whittle, H. J., Sheira, L. A., Frongillo, E. A., Palar, K., Cohen, J., Merenstein, D., Wilson, T. E., Adedimeji, A., Cohen, M. H., Adimora, A. A., Ofotokun, I., Metsch, L., Turan, J. M., Wentz, E. L., Tien, P. C., & Weiser, S. D. (2019). Longitudinal associations between food insecurity and substance use in a cohort of women with or at risk for HIV

in the United States: Food insecurity and substance use in the US. *Addiction, 114*(1),
127–136. https://doi.org/10.1111/add.14418

Zhao, Y., Montoro, R., Igartua, K., & Thombs, B. D. (2010). Suicidal ideation and attempt
among adolescents reporting "unsure" sexual identity or heterosexual identity plus
same-sex attraction or behavior: Forgotten groups? *Journal of the American Academy
of Child & Adolescent Psychiatry, 49*(2), 104–113.

CHAPTER 6. General Conclusions

6.1. General Conclusions

In the last chapter of this dissertation, first, I briefly summarize the main findings from each article chapter and discuss their relevance to the literature. Second, in the light of these findings, I extend macro and micro-level policy implications. Lastly, based on the findings and limitations of each article chapter, I present directions for future scientific studies.

6.2. Main Findings

Chapter 2 – This chapter aimed to determine to a what extent does internalized homonegativity influences sexual risk behaviour and whether HIV/PrEP knowledge and substance use during sex mediate the relationship between internalized homonegativity and sexual risk behaviour.

The findings from a large sample of MSM in Spain clearly showed that men who scored higher on the internalized homonegativity scale were less likely to report HIV/PrEP related knowledge. This finding is in consistency with the notion that IH is mostly likely harmful, because it impedes MSM to know more about how to protect oneself. Furthermore, the results showed that men who report having sex under the influence of substance were more likely to report sexual risk behaviour, with the coefficient of this relationship being the largest in the analysis. This result suggests a harmful outcome of using of substances to enhance sexual experience. Finally, we did not find any direct relationship between IH and sexual risk behaviour. Our analyses showed that, however, the relationship between IH and sexual risk behaviour was significantly mediated by HIV/PrEP variable. We found that, men who score more on the IH scale are less likely to know about HIV/PrEP, and those who know less are reporting less sexual risk behaviour. These results imply that, men who are knowledgeable about how HIV transmitted and how PrEP works are more likely to have unprotected sex, because they may know how to protect themselves. These results contribute to the literature by providing initial evidence that meaning of risky sex may be changing among MSM. Policy implications and future lines of research are discussed below.

Chapter 3 – This chapter examined the effect of internalized homonegativity on sexual risk behaviour and whether it varies across contexts and whether HIV/PrEP knowledge and substance use during sex mediate the relationship between internalized homonegativity and sexual risk behaviour across different contexts.

The findings from chapter three provides a comparative evidence, among large samples of MSM in Spain and Turkey, on the relationship between IH and sexual risk behaviour. The results have showed that HIV/PrEP knowledge mediated the relationship between IH and sexual risk behaviour, however: in different directions across contexts. We found that, while those who scored low on HIV/PrEP scale in Spain had reported decreased sexual risk behaviour, while in Turkey, those who scored low on HIV/PrEP scale had reported increased sexual risk behaviour. Given the socio cultural and political climate differences concerning LGBT rights across contexts and lack of health services directed to MSM in Turkey (Doran et al., 2021; Schmidt et al., 2013), these results are not surprising. It is very likely that while in Spain, HIV related knowledge leads to protect oneself better and engage in more risky sex, while in Turkey greater knowledge about HIV may lead to more fear and not engage in risky sex given the lack of sexual health services available and possible discrimination to be faced with.

Our second and third chapter`s results showed that men who report having had sex under the influence of substances were more likely to engage in sexual risk behaviour, therefore, are at risk of HIV infection. Previous research demonstrated that men who engage in chemsex report self-perceived negative impact of chemsex, which is the practice of use of substances during sex to enhance sexual experience, on their lives. In a study among 1,648 MSM in the UK, while respondents reported sexualized drug use increasing their sexual satisfaction, they were more likely to report lower satisfaction with their life (Hibbert et al., 2019). In another study among MSM attending to Gay Men's Health Service (GMHS) in Dublin, Glynn et al. (2018) found that one in four respondents had reported that chemsex is negatively affecting their lives and almost one third (31%) had reported that they would like help or advice about chemsex. Furthermore, a study among 785 MSM in the Netherlands reported that MSM who believe that their lives are negatively affected by chemsex are more likely to report adverse health-related outcomes such as dependency on drugs, loneliness and HIV infection (Evers et al., 2020). Together with these studies, and findings from chapter two and three of this dissertation, policy implications related to substance use will be discussed later in this chapter.

Chapter 4 – This chapter investigated whether sexual identity-attraction discordance was associated with SITBs and the effect of sexual-identity discordance vary across sexual identities.

The results from chapter 4 provides evidence that not only sexual identity, but also sexual attraction, and the discordant interaction of the two could be associated with

self-injurious thoughts and behaviours. We found that, in the general population, men who report a discordance between their sexual identity and attraction were at greater risk of reporting past-year suicidal thoughts and plans, when compared to men with concordant sexual identity-attraction. When we stratified our analyses by sexual identity, the results showed that gay and bisexual men with discordant sexual identity-attraction were at greater odds of reporting suicide plans when compared to men with concordant sexual identity-attraction. Furthermore, heterosexual, gay, and bisexual men with discordance reported more suicide attempts when compared to men with concordance. Among women, bisexual women with discordant sexual identity-attraction were had less odds of reporting suicidal thoughts and plans than women with concordant sexual identity-attraction. Finally, we analysed the NSDUH data only within sex and sexual identity groups. Among bisexual-identified males, those who report sexual identity-attraction discordance were at greater risk for past-year suicidal thoughts and suicide attempts when compared to bisexual men with concordant sexual identity-attraction. The results within other sex and sexual identity groups were insignificant. The findings from chapter four helps us to better understand the influence of sexual identity-attraction discordance/concordance on an important outcome such as self-injurious thoughts and behaviours. These results are discussed later within the framework of suicide prevention later in this chapter.

Chapter 5 – Finally, this chapter examined whether sexual orientation was associated with early substance use initiation and early substance initiation was associated with alcohol and drug dependence later in life. Later, this chapter investigated whether early substance use initiation mediated the relationship between sexual identity and alcohol and drug dependence later in life.

This chapter provides evidence that early substance use initiation is harmful, and particular subgroups from LGB communities are at greater risk of developing substance use disorders. Using a structural equation modelling with the 5-year pooled NSDUH dataset, chapter five of this dissertation has documented that firstly, gay identity among men, and bisexual identity among men and women are associated with developing substance use disorders in the US. Second, the results showed that lesbian identity among women, and bisexual identity among men and women are associated with early substance use initiation (initiation prior to or at the age of 14). Next, among both men and women, we found that early substance use initiation is associated with developing substance use disorders.

We found gendered and sexual orientation-based differences for both directional and mediational analyses. We found that gay identity is associated with later substance use initiation among men. This is in corroboration with other studies (Sönmez & Palamar, 2022). This result, in turn, has influenced the mediational analysis. Our structural equation modelling has shown that gay men are likely to have later onset to substance use and therefore, gay identity provides a protective factor against developing substance use disorders. On the contrary, we found that lesbians are more likely to have an early onset to substance use and the reported early onset is associated with developing substance use disorders. Similar results emerged for bisexual men and women. The results showed that bisexual men and women are at the risk of substance use disorders, and even more so if they initiated substance use early, probably due to heightened minority stressors experienced due to unique bisexual minority stressors. These results inform substance use prevention efforts substantially. Findings from chapter five can inform prevention strategies about who is at greater risk of developing substance use disorders and who should be prioritized in the targeted efforts. These will be discussed in the policy implications section.

Overall findings – The findings from all four chapters within this dissertation present harmonious results. Our results throughout the chapters have shown that sexual identity, in different contexts, across different definitions, and even among different sexes, may have an important implication on adverse health related outcomes. Furthermore, these different findings are in interplay with each other. For example, we found that development of sexual identity in MSM can lead to sexual risk behaviour in the context of Spain and Turkey. In the fifth chapter, we also documented that minority sexual identity among men, especially bisexual men, is associated with increased substance use and earlier substance use initiation. A vast number of studies have found associations among sexual minority identity development and substance use, and how this relationship can influence sexual risk behaviour (Amadio & Chung, 2004; Colfax, 2005; Halkitis & Palamar, 2008; Klitzman et al., 2002).

Similarly, in the fifth chapter, we revealed important information on the age of substance use initiation and how it associates with sexual identity. We found interesting results for gay men, which indicated a later onset of particular substances, while in the first two chapters of this dissertation we discovered important relationships between variables of sexual identity development and involvement in sex under influence of substances. These results, considered together, implies interesting patterns for MSM's

sexual identity development and the risk of addiction and substance use during sex. Therefore, our findings communicate with one another and provide future lines of research, which will be discussed in greater detail later in this chapter.

6.3.   Policy Implications

Abovementioned main findings of the chapters of this dissertation have particular implications, which are in the area of HIV, suicide, and substance use prevention policies. The second and third chapter of this dissertation have provided evidence of both MSM behaviour and their needs, both in the HIV prevention and substance use areas. The fourth chapter provides evidence on the varying needs of LGB populations that depend not only on sexual identity, but also attraction, and the interaction of the two could be beneficial for preventing suicidality. The fifth chapter have provided important evidence for preventing development of substance use disorders among LGB populations. These points are discussed below.

6.3.1. HIV Prevention

Since the diagnosis of the first HIV case, HIV/AIDS became a part of the epidemiological landscape affecting every population (Merson et al., 2008). In 2021, 38.4 million people were living with HIV and 1.5 million people became newly infected with HIV (UNAIDS, 2021). A fundamental goal of HIV/AIDS prevention efforts included an attempt to change individual behaviour that puts an individual at risk of exposure (Gupta et al., 2008). Alongside to the attempts of behavioural changes, HIV prevention strategies have proven to be more successful when structural factors, such as poverty, gender, age, and policy, have been taken into account (Gupta et al., 2008). The results of this dissertation have implications for macro-level institutional policies. Our results have shown that levels of internalized homonegativity in men who have sex with men is associations with HIV and PrEP knowledge levels. Clearly, policy interventions targeting men with higher levels of IH would improve these men´s sexual health.

Furthermore, as Coates et al. (2008) argued, the effect of behavioural strategies can be amplified by aiming for many goals within populations which are both uninfected and infected with HIV. Future of prevention policies is affected by changing meanings of risky sex due to newly emerged prevention tools, such as PrEP. Pre-Exposure

Prophylaxis (PrEP) has been proved to be safe, effective, and cost-effective HIV prevention tool among those who are not infected with HIV (Logie, 2021). As we discussed in chapter three, countries such as Spain and Turkey show very distinctive levels of PrEP acceptability and adherence in general and within the vulnerable populations. For example, the EMIS-2017 report documented that while 63.6% of MSM in Spain were aware of PrEP, this rate was only 29.1% for MSM in Turkey (The EMIS Network, 2019). The results of dissertation provide evidence that countries with distinct levels of PrEP adherence, with considering cultural differences, may have different understandings of what risky sex might mean to MSM. Based on our results, future studies should consider examining this difference. Prevention efforts including individual behaviours, and what constitutes of risky sex in different contexts, would benefit more efficient results.

6.3.2. Suicidality

In the United States, disorders related to mental health problems account for more than 15% of all disease-related causes (Novick, 2003). Furthermore, LGB individuals are disproportionately affected by mental health outcomes (Kidd et al., 2016; Rhoades et al., 2018) and are at almost five times more at risk of suicidality compared to their heterosexual counterparts (Wilder & Wilder, 2012). National Strategy for Suicide Prevention published by U.S. Department of Health and Human Services (HHS), aimed to provide training to mental health and substance abuse providers for management of at-risk behaviour and at-risk individuals (HHS, 2012). These guidelines provide a socio ecological model which includes individual level factors such as cultural competency training components including LGBT identity development. These guidelines acknowledge the disproportionate risk of LGBT individuals at risk of suicide due to experienced sexual minority stressors and discrimination. The results of the fourth chapter of this dissertation has provided evidence that alongside with sexual identity, sexual attraction should be considered to better target who is at risk of suicidality. It is clear that individuals who experience an ambivalence through their sexual identity development, or when experiencing changes within their sexual identity, should be included in suicide prevention strategies. Another policy implication that should be stated is that, generally, suicide-related death data across sexual orientation and gender identities is not collected

(HHS, 2012). We invite future studies to include sexual identity, attraction, behaviour, and gender identity variables to possibly calculate a reliable suicide rate for LGBT people.

6.3.3. Substance Use Prevention

A major challenge regarding substance use is the relatively new-emerging practice of combining of sex and stimulant drugs, which is referred as chemsex, among MSM. Chemsex practices can be linked to harmful outcomes, such as harming psychological well-being (Bourne et al., 2015), and increased sexually transmitted disease (STD) risks (Drückler et al., 2018; Hegazi et al., 2017). Our results also have corroborated these studies and the need for prevention efforts attempting to reduce sexualized substance use. In the European Union Drugs Strategy 2021-2025 report, it has been communicated that the strategy for drug harm reduction aims to protect and improve the well-being of society and of the individual, and promote public health through multi-level communication and coordination (Council of the European Union & General Secretariat of the Council, 2022). In the report, however, there is no mention of MSM nor LGBT communities in particular. The second and third chapter of this dissertation provides evidence that LGBT communities, and especially MSM, should be targeted in the drug use prevention efforts.

Another major challenge that has been affecting LGB populations over the years has been the development of substance use disorders. In the United States, 29.1% of adults have met the criteria for alcohol use disorder and 9.9% have met the criteria for drug use disorder, such as opioid, cocaine, or marijuana (World Health Organization, 2018). The Substance Abuse and Mental Health Administration (SAMHSA) has provided guidelines for combatting substance use disorders. In these guidelines, it has been set particular prevention priorities that aims to influence community level factors which would lead to individual-level changes (Substance Abuse and Mental Health Services Administration, 2018). However, in these guidelines, individual-level risk factors are not identified. Similar shortage of identifying individuals who are at risk also exists in the public health system (Compton et al., 2019; Guerrero et al., 2019).

Indeed, the study of Afuseh et al. (2020) has identified individual-level risk factors for SUD across all age groups, based on 370 articles between the years 1989 and 2019. Their results showed that there are different individual level risks at different stages of life which are associated with unique developmental variables (Afuseh et al., 2020). In

corroboration of this notion, the fifth chapter of this dissertation has provided evidence that sexual identity is an individual level risk factor which should be specifically identified in the SUD prevention strategies. It has been documented that targeting younger LGB individual in the SUD prevention would benefit, firstly, increasing the age at substance use initiation, and secondly, prevalence of SUD among this population.

6.4. Future Lines of Research

The findings of this dissertation advance the understanding of health-related disparities across sexual identities in different contexts, based on particular individual level variables. The findings also have implications for future research. One of the main directions for future research should be delineating further meaning of risky sex among MSM, and among other populations. Similar to the other studies (Carey & Schroder, 2002; Edeza et al., 2020; Pando et al., 2013), we have tested factual knowledge related to how HIV transmission occurs and how prevention tools such as PrEP works. While these scales are important to test for their associations with particular risky sexual behaviours, they are not sufficiently explanatory in measuring one`s understanding of, first, what risky sex is, and second, how to protect oneself based on this understanding.

Therefore, I encourage future studies to delineate new definitions of 'risk' that is associated with sex. The current state of the literature would benefit from the following questions: What is the meaning of risky sex among PrEP users when compared to non-PrEP users? What counts as risky sex among people living with HIV with undetectable viral load? What risky sex constitute of in different contexts? While these questions were out of the scope of this dissertation, future research should consider responding to these calls.

Another future direction demarcated by this dissertation is the possible role of community connectedness in the adverse health-related outcomes among sexual minorities. The crucial role of gay community connectedness on HIV prevention is well-documented (Davis, 2008). With the advances in HIV prevention and antiretroviral treatments, the patterns of socializing among LGB populations have been constantly changing (Elford, 2006). Similarly, with changes in the political climate and expansions in identity politics, there has been an increase in the number of people who identify as LGB (Jones, 2021). Therefore, gay community should no longer be considered as a homo-social community and empirical evidence regarding this notion has been documented. A

study from Australia has showed that gay men's homo-socialization (i.e. only with other gay identified men) has been declined over the years (Zablotska et al., 2012). Traditional venues of physical interaction have largely been replaced by online interactions with the technological advancements (Zablotska et al., 2012). Similarly, identification with different gay community subcultures have been documented to be important in determining differential rates of risk behaviour (Prestage et al., 2015). Thus, we invite future studies to incorporate the new meanings attached to the LGB community and its dynamic role in health-related outcomes.

Below, I explain three subsections that are essential to further methodological advancement of the field, which are based on the main findings and limitations of this dissertation. These subsections are: use of longitudinal data, gender identity, and incorporation of qualitative studies.

6.4.1. Longitudinal Data

Although this dissertation´s findings are based on strong theoretical and methodological foundations, the data used in all four individual chapters are cross-sectional. Firstly, each original article chapter of this dissertation has implications about sexual identity and sexual identity development. Sexual identity has been documented to be a dynamic process which can shift overtime (Katz-Wise et al., 2017; Mock & Eibach, 2012). Rindfleisch et al. (2008) argued that longitudinal data and analyses are appropriate when the "temporal nature of the phenomena is clear" (p. 276). Longitudinal studies thus can better capture this process; therefore, we invite future studies to extent our results with using longitudinal data. Secondly, one of the main strengths of this dissertation is that we use structural equation modelling in chapter two, three, and five, and the structural modelling "is a general methodological framework for causal analysis" (Wunsch et al., 2010, p. 11). Furthermore, the nature of causal relations in the structural frameworks lie within (1) use of background knowledge; (2) specification of multivariate distribution and its interpretation; (3) and, the favourable results of invariance tests (Wunsch et al., 2010). In chapter three, for example, we establish all of these steps and provide a methodologically accepted causality between variables. However, we still invite future studies to first, follow the steps provided by Wunsch et al. (2010) to establish possible causality using cross sectional data, second, use longitudinal data to back up their

causality arguments, third and most importantly, always base their arguments on the foundations of previous research and theory.

6.4.2. Gender Identity

While the second and third chapter of this dissertation's strength is to focus only on men who sex with men; the fourth and fifth chapter only includes binary-coded gender as males and females. Previous research increasingly shows that gender of the respondents, especially transgender identity, is a risk factor for adverse health-related outcomes, such as suicidality (Barboza et al., 2016), depression symptoms (Su et al., 2016), victimization (Jauk, 2013), and HIV risks (Baral et al., 2013). While the NSDUH dataset we analysed for the fourth and fifth chapters of this study includes a large institutionally representative sample, unfortunately, it does not ask whether the participants are transgender, or any other possible gender identity. Future research should consider including a wide range of gender identity options for reliable and representative understanding of health-related outcomes.

6.4.3. Qualitative Studies

The role of qualitative studies in sociological and epidemiological research is undoubtedly crucial. Surveys and quantitative analyses can be useful in documenting risk factors and vulnerable populations, while qualitative research can be useful in developing a complex and nuanced framework for comparative analyses of behavioural data (Parker et al., 1991). For example, qualitative research has shown that factors such as lifestyle fit, emotional impacts, and medical communication can play an important role in consistent medication adherence among people living with HIV (Beusterien et al., 2008). While these factors could be quantified to a certain extent, however, the complex reality of unique personal experience would be lost in the process. Therefore, the current state of the literature would benefit from more qualitative studies.

6.5. References

Afuseh, E., Pike, C. A., & Oruche, U. M. (2020). Individualized approach to primary prevention of substance use disorder: Age-related risks. *Substance Abuse Treatment, Prevention, and Policy*, *15*(1), 58. https://doi.org/10.1186/s13011-020-00300-7

Amadio, D. M., & Chung, Y. B. (2004). Internalized Homophobia and Substance Use Among Lesbian, Gay, and Bisexual Persons. *Journal of Gay & Lesbian Social Services*, *17*(1), 83–101. https://doi.org/10.1300/J041v17n01_06

Baral, S. D., Poteat, T., Strömdahl, S., Wirtz, A. L., Guadamuz, T. E., & Beyrer, C. (2013). Worldwide burden of HIV in transgender women: A systematic review and meta-analysis. *The Lancet Infectious Diseases*, *13*(3), 214–222. https://doi.org/10.1016/S1473-3099(12)70315-8

Barboza, G. E., Dominguez, S., & Chace, E. (2016). Physical victimization, gender identity and suicide risk among transgender men and women. *Preventive Medicine Reports*, *4*, 385–390. https://doi.org/10.1016/j.pmedr.2016.08.003

Beusterien, K. M., Davis, E. A., Flood, R., Howard, K., & Jordan, J. (2008). HIV patient insight on adhering to medication: A qualitative analysis. *AIDS Care*, *20*(2), 244–252. https://doi.org/10.1080/09540120701487666

Carey, M. P., & Schroder, K. E. E. (2002). Development and Psychometric Evaluation of the Brief HIV Knowledge Questionnaire. *AIDS Education and Prevention*, *14*(2), 172–182. https://doi.org/10.1521/aeap.14.2.172.23902

Coates, T. J., Richter, L., & Caceres, C. (2008). Behavioural strategies to reduce HIV transmission: How to make them work better. *The Lancet*, *372*(9639), 669–684. https://doi.org/10.1016/S0140-6736(08)60886-7

Colfax, G. (2005). Longitudinal Patterns of Methamphetamine, Popper (Amyl Nitrite), and Cocaine Use and High-Risk Sexual Behavior Among a Cohort of San Francisco Men Who Have Sex with Men. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *82*(1_suppl_1), i62–i70. https://doi.org/10.1093/jurban/jti025

Compton, W. M., Jones, C. M., Baldwin, G. T., Harding, F. M., Blanco, C., & Wargo, E. M. (2019). Targeting Youth to Prevent Later Substance Use Disorder: An Underutilized Response to the US Opioid Crisis. *American Journal of Public Health*, *109*(S3), S185–S189. https://doi.org/10.2105/AJPH.2019.305020

Council of the European Union & General Secretariat of the Council. (2022). *EU drugs action plan 2021-2025*. Publications Office of the European Union. https://doi.org/10.2860/698571

Davis, M. (2008). The 'loss of community' and other problems for sexual citizenship in recent HIV prevention. *Sociology of Health & Illness*, *30*(2), 182–196. https://doi.org/10.1111/j.1467-9566.2007.01050.x

Doran, J., Weatherburn, P., Hickson, F., Marcus, U., Reid, D., & Schmidt, A. J. (2021). An update on the performance of STI services for gay and bisexual men across European cities: Results from the 2017 European MSM Internet Survey. *Sexually Transmitted Infections*, *97*(3), 201–208. https://doi.org/10.1136/sextrans-2020-054681

Edeza, A., Galárraga, O., Santamaria, E. K., Sosa-Rubí, S., Operario, D., & Biello, K. B. (2020). "I Do Try To Use Condoms, But…": Knowledge and Interest in PrEP Among Male Sex Workers in Mexico City. *Archives of Sexual Behavior*, *49*(1), 355–363. https://doi.org/10.1007/s10508-019-01473-4

Elford, J. (2006). Changing patterns of sexual behaviour in the era of highly active antiretroviral therapy. *Current Opinion in Infectious Diseases*, *19*(1), 26–32.

Guerrero, E. G., Padwa, H., Serret, V., Rico, M., Hunter, S., & Gelberg, L. (2019). Program Capacity to Deliver Prevention Services to Children of Adult Clients Receiving Substance Use Disorder Treatment. *The Journal of Primary Prevention*, *40*(3), 343–355. https://doi.org/10.1007/s10935-019-00551-6

Gupta, G. R., Parkhurst, J. O., Ogden, J. A., Aggleton, P., & Mahal, A. (2008). Structural approaches to HIV prevention. *The Lancet*, *372*(9640), 764–775. https://doi.org/10.1016/S0140-6736(08)60887-9

Halkitis, P. N., & Palamar, J. J. (2008). Multivariate Modeling of Club Drug Use Initiation Among Gay and Bisexual Men. *Substance Use & Misuse*, *43*(7), 871–879. https://doi.org/10.1080/10826080701801337

HHS. (2012). *National Strategy for Suicide Prevention: Goals and Objectives for Action*. 2012 National Strategy for Suicide Prevention: Goals and Objectives for Action. https://www.ncbi.nlm.nih.gov/books/NBK109917/pdf/Bookshelf_NBK109917.pdf

Jauk, D. (2013). Gender violence revisited: Lessons from violent victimization of transgender identified individuals. *Sexualities*, *16*(7), 807–825. https://doi.org/10.1177/1363460713497215

Jones, J. M. (2021, February 24). LGBT Identification Rises to 5.6% in Latest U.S. Estimate. *Gallup*. https://news.gallup.com/poll/329708/lgbt-identification-rises-latest-estimate.aspx

Katz-Wise, S. L., Rosario, M., Calzo, J. P., Scherer, E. A., Sarda, V., & Austin, S. B. (2017). Associations of Timing of Sexual Orientation Developmental Milestones and Other Sexual Minority Stressors with Internalizing Mental Health Symptoms Among Sexual Minority Young Adults. *Archives of Sexual Behavior*, *46*(5), 1441–1452. https://doi.org/10.1007/s10508-017-0964-y

Kidd, S. A., Howison, M., Pilling, M., Ross, L. E., & McKenzie, K. (2016). Severe Mental Illness in LGBT Populations: A Scoping Review. *Psychiatric Services*, *67*(7), 779–783. https://doi.org/10.1176/appi.ps.201500209

Klitzman, R. L., Greenberg, J. D., Pollack, L. M., & Dolezal, C. (2002). MDMA ('ecstasy') use, and its association with high risk behaviors, mental health, and other factors among gay/bisexual men in New York City. *Drug and Alcohol Dependence*, *66*(2), 115–125. https://doi.org/10.1016/S0376-8716(01)00189-2

Logie, C. H. (2021). Pre and Post-exposure Prophylaxis Awareness and Acceptability Among Sex Workers in Jamaica: A Cross-Sectional Study. *AIDS and Behavior*, 14.

Merson, M. H., O'Malley, J., Serwadda, D., & Apisuk, C. (2008). *HIV Prevention 1 The history and challenge of HIV prevention*. *372*, 14.

Mock, S. E., & Eibach, R. P. (2012). Stability and Change in Sexual Orientation Identity Over a 10-Year Period in Adulthood. *Archives of Sexual Behavior*, *41*(3), 641–648. https://doi.org/10.1007/s10508-011-9761-1

Novick, L. (2003). Adolescent suicide prevention. *American Journal of Preventive Medicine*, *24*(4), 150–156. https://doi.org/10.1016/S0749-3797(03)00043-6

Pando, M. A., Balan, I., Marone, R., Dolezal, C., Barreda, V., Carballo Dieguez, A., & Avila, M. M. (2013). HIV Knowledge and Beliefs Among Men Who Have Sex With Men (MSM) in Buenos Aires, Argentina. *AIDS and Behavior*, *17*(4), 1305–1312. https://doi.org/10.1007/s10461-012-0404-x

Parker, R. G., Herdt, G., & Carballo, M. (1991). Sexual culture, HIV transmission, and AIDS research. *Journal of Sex Research*, *28*(1), 77–98.

Prestage, G., Brown, G., De Wit, J., Bavinton, B., Fairley, C., Maycock, B., Batrouney, C., Keen, P., Down, I., Hammoud, M., & Zablotska, I. (2015). Understanding Gay Community Subcultures: Implications for HIV Prevention. *AIDS and Behavior*, *19*(12), 2224–2233. https://doi.org/10.1007/s10461-015-1027-9

Rhoades, H., Rusow, J. A., Bond, D., Lanteigne, A., Fulginiti, A., & Goldbach, J. T. (2018). Homelessness, Mental Health and Suicidality Among LGBTQ Youth Accessing Crisis Services. *Child Psychiatry & Human Development*, *49*(4), 643–651. https://doi.org/10.1007/s10578-018-0780-1

Rindfleisch, A., Malter, A. J., Ganesan, S., & Moorman, C. (2008). Cross-sectional versus longitudinal survey research: Concepts, findings, and guidelines. *Journal of Marketing Research*, *45*(3), 261–279.

Schmidt, A. J., Hickson, F., Weatherburn, P., Marcus, U., & The EMIS Network. (2013). Comparison of the performance of STI Screening Services for gay and bisexual men across 40 European cities: Results from the European MSM Internet Survey. *Sexually Transmitted Infections*, *89*(7), 575–582. https://doi.org/10.1136/sextrans-2012-050973

Sönmez, İ., & Palamar, J. J. (2022). Sexual Orientation and Age of First Drug Use Among Adults in the United States. *Substance Use & Misuse*, *57*(8), 1313–1321. https://doi.org/10.1080/10826084.2022.2079138

Su, D., Irwin, J. A., Fisher, C., Ramos, A., Kelley, M., Mendoza, D. A. R., & Coleman, J. D. (2016). Mental health disparities within the LGBT population: A comparison between transgender and nontransgender individuals. *Transgender Health*, *1*(1), 12–20.

Substance Abuse and Mental Health Services Administration. (2018). *Selecting best- fit programs and practices: Guidance for substance misuse prevention practitioners*. https://www.samhsa.gov/sites/default/files/ebp_prevention_guidance_document_241.pdf

The EMIS Network. (2019). *EMIS-2017: European Men-Who-Have-Sex-With-Men Internet Survey: Key findings from 50 countries*. European Centre for Disease Prevention and Control. https://data.europa.eu/doi/10.2900/690387

UNAIDS. (2021). *Global HIV & AIDS statistics—Fact sheet*. https://www.unaids.org/en/resources/fact-sheet

Wilder, H., & Wilder, J. (2012). In the Wake of Don't Ask Don't Tell: Suicide Prevention and Outreach for LGB Service Members. *Military Psychology*, *24*(6), 624–642. https://doi.org/10.1080/08995605.2012.737725

World Health Organization. (2018). *Global status report on alcohol and health*. https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1

Wunsch, G., Russo, F., & Mouchart, M. (2010). Do we necessarily need longitudinal data to infer causal relations? *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique*, *106*(1), 5–18.

Zablotska, I. B., Holt, M., & Prestage, G. (2012). Changes in Gay Men's Participation in Gay Community Life: Implications for HIV Surveillance and Research. *AIDS and Behavior*, *16*(3), 669–675. https://doi.org/10.1007/s10461-011-9919-9