

RELATIONSHIP BETWEEN DISCRIMINATION AND MENTAL HEALTH AMONG
SEXUAL MINORITY INDIVIDUALS: THE ROLES OF LONELINESS, SOCIAL SUPPORT,
AND WEIGHT DISCRIMINATION

By

Kaitlyn DeRouen

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Director of Thesis: Robert A. Carels, PhD

Major Department: Psychology

ABSTRACT

Sexual minority adults experience elevated rates of depression and anxiety, in part due to exposure to minority stressors such as discrimination. Loneliness may be one mechanism through which discrimination contributes to poor mental health, while perceived social support may buffer these associations. In addition, weight discrimination may represent an important but understudied form of stigma that can compound the psychological burden of perceived discrimination. Guided by Minority Stress Theory, this thesis examined whether loneliness mediated the associations between perceived discrimination and depressive and anxiety symptoms, and whether perceived social support and weight discrimination moderated these relationships. Data were drawn from 8,493 sexual minority adults in the National Institutes of Health's All of Us Research Program. Structural equation modeling was used to test separate moderated mediation models for depressive symptoms and anxiety symptoms. Greater perceived

discrimination was associated with greater loneliness, which in turn was associated with higher depressive and anxiety symptoms. Perceived social support buffered both the association between loneliness and mental health symptoms and the direct association between perceived discrimination and mental health symptoms. Weight discrimination strengthened the direct association between perceived discrimination and both depressive and anxiety symptoms. These findings support loneliness as an important pathway linking perceived discrimination to mental health among sexual minority adults. Results also suggest that social support may reduce, while weight discrimination may intensify, the mental health impact of discrimination. This thesis contributes to the minority stress literature by highlighting the importance of loneliness, social support, and intersecting forms of stigma in understanding depression and anxiety among sexual minority adults.

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By: Kaitlyn DeRouen

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Director of Thesis: Robert A. Carels, Ph.D., MBA

Thesis Committee Members:

Ascher K. Munion, PhD

Samuel Sears, Ph.D.

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Chapter 1: Introduction

1.1 Mental Health Disparities in Sexual Minority (SM) Populations

In the United States, mental health concerns remain a pressing public issue affecting more than one in five adults annually (National Alliance on Mental Illness [NAMI], 2025). Among the most common conditions are anxiety and depressive disorders, which not only affect millions but also contribute significantly to disability and functional impairment. Globally, depression is recognized as the leading cause of disability, and in the U.S., major depressive episodes and anxiety disorders have annual prevalence rates of 15.5% and 19.1%, respectively (World Health Organization, 2021; NAMI, 2025).

While these conditions are prevalent across the general population, they disproportionately affect sexual minority (SM) individuals, a broad category that includes people who identify as lesbian, gay, bisexual, queer, questioning, or any non-heterosexual orientation (Plöderl & Tremblay, 2015). Research consistently shows that SM individuals face elevated rates of psychological distress relative to their heterosexual peers (Plöderl & Tremblay, 2015). For example, 53.2% of lesbian, gay, or bisexual adults report experiencing a mental illness, more than double the national average (NAMI, 2025). More recent data reveal that nearly half of SM adults screened positive for symptoms of depression (49.0%) and anxiety (44.3%), compared to 19.5% and 16.4%, among heterosexual adults (Miller et al., 2024). Additionally, national survey data from the Gallup National Health and Well-Being Index and the Behavioral Risk Factor Surveillance System suggest that sexual and gender minority (SGM) individuals are 4.5 to 7.3 times more likely to be diagnosed with depression compared to their non-SGM counterparts (Skopec et al., 2014). These disparities are particularly concerning because they reflect deep and persistent inequities in social, structural, and mental health conditions for LGBTQ+ individuals.

The disproportionate burden of mental illness within this population highlights the urgency of addressing mental health disparities as a public health, clinical, and policy priority.

These mental health disparities are further compounded by inequities in access to care. SM individuals experience not only elevated rates of mental health problems but also persistent barriers to effective treatment, which make them more likely than heterosexual individuals to report unmet treatment needs and receive inadequate care (Platt et al., 2018). Structural factors such as stigma in healthcare settings, limited availability of providers trained in LGBTQ+ health, financial constraints, and logistical difficulties in accessing services reduce the likelihood of timely and effective treatment (Dahlhamer et al., 2016; Buchmueller & Carpenter, 2010; Clift & Kirby, 2012). Empirical evidence highlights this disparity, as Roxo et al. (2025) found that despite greater utilization of mental health services by SM relative to heterosexual adults, 17.6% of SM individuals nonetheless reported unmet treatment needs versus 11.8% of heterosexuals, with disparities particularly pronounced among men (56% of SM men versus 37% of heterosexual men). Consequently, SM individuals are more likely to experience psychological distress without receiving care (Bränström, 2017; Chakraborty et al., 2011; Filice & Meyer, 2018). These barriers frequently intersect with other sociodemographic factors, including gender and race or ethnicity, further constraining access to high-quality, timely mental health care (Dahlhamer et al., 2016).

1.2 Minority Stress, Stigma, and Intersectionality

A foundational explanation for these mental health disparities is provided by the minority stress model, which proposes that SM individuals are chronically exposed to unique stressors rooted in societal stigma, discrimination, and marginalization (Meyer, 2003). These stressors, ranging from direct discrimination to internalized stigma, contribute to a cumulative

psychological burden that increases vulnerability to mental illness (Hatzenbuehler et al., 2008; Lehavot & Simoni, 2011). Discrimination may manifest at institutional levels, such as unequal access to healthcare or education (Frost, 2011), and at interpersonal levels through social rejection, harassment, or more covert expressions of bias, including microaggressions (McConahay, 1983; Swim & Cohen, 1997). These experiences do not simply reflect individual hardship but are part of broader systemic inequalities that shape mental health outcomes across the lifespan.

Central to these processes are stigma and discrimination, which operate at multiple, interconnected levels. Stigma refers to the social devaluation of individuals based on their membership in a marginalized group, whereas discrimination describes the behaviors and actions that result from these negative societal attitudes (Sartorius, 2007). At the interpersonal level, SM individuals may encounter microaggressions, verbal harassment, social exclusion, or more overt acts of bias, all of which communicate rejection and devaluation (Sue et al., 2007; Herek, 2009; Woodford et al., 2013). At the structural level, institutionalized stigma is embedded in laws, policies, and cultural norms that constrain opportunities and resources for SM individuals (Corrigan et al., 2005; Parker & Aggleton, 2003). These systemic barriers, such as limited availability of providers trained in LGBTQ+ health, financial constraints, and logistical challenges in accessing care, interact with interpersonal experiences to reduce timely and effective treatment, leaving many SM individuals with unmet mental health needs despite higher rates of service utilization (Dahlhamer et al., 2025; Roxo et al., 2025; Bränström, 2017).

Importantly, these stressors do not impact all SM individuals in the same way. To better understand the complexity of sexual minority mental health disparities, researchers have increasingly applied intersectionality theory, originally developed by Crenshaw (1991) to

examine legal inequalities, to the psychological domain, investigating how overlapping social identities, such as race, gender, sexual orientation, and socioeconomic status, interact to shape mental health outcomes (Bowleg, 2008). These intersecting identities give rise to distinct forms of oppression and privilege, resulting in unique patterns of exposure to discrimination and psychological stress (Purdie-Vaughns & Eibach, 2008; Williams & Fredrick, 2015). For instance, a Black lesbian woman may experience stressors from racism, sexism, and homophobia in a way that amplifies their impact beyond the sum of each individual factor, resulting in qualitatively and quantitatively different experiences compared with those of a white gay man. Consequently, research that treats SM populations as a homogenous group risks overlooking the complex and context-specific stress processes that influence mental health (Bowleg, 2012; McConnell et al., 2016).

1.3 Perceived Discrimination and Psychological Outcomes

Perceived discrimination, defined as the recognition or experience of being treated unfairly due to membership in a stigmatized social group, is a significant psychosocial stressor that contributes to elevated rates of psychological distress (Banks et al., 2006; Williams et al., 1999). Unlike externally measured discrimination, which can include objectively documented incidents such as biased hiring practices or wage disparities observed in field or audit studies (Daniel, 1968; Bertrand & Mullainathan, 2004), perceived discrimination reflects individuals' subjective interpretations of events, shaping emotional and behavioral responses (Fischer & Shaw, 1999; Williams & Mohammed, 2009). Within the minority stress framework, perceived discrimination functions as a primary external stressor that amplifies psychological vulnerability in SM individuals (Meyer, 2003). Despite notable societal advances, such as the legalization of

same-sex marriage and increased media visibility, SM individuals continue to encounter both overt and subtle forms of discrimination.

Perceived discrimination also initiates internal psychological processes that compound distress. For example, internalized stigma, also referred to as internalized homophobia, occurs when individuals adopt society's negative attitudes toward their group, leading to self-devaluation and shame (Williamson, 2000). Repeated discriminatory encounters can also heighten rejection sensitivity, in which individuals anticipate prejudice in ambiguous situations (Pachankis et al., 2008; Mendoza-Denton et al., 2002). Many SM individuals may respond by concealing their identities, a coping strategy that can offer temporary relief from anticipated judgment or social rejection but is linked to long-term mental health costs (Pachankis, 2007). These intrapersonal processes, self-stigma, rejection sensitivity, and concealment, have each been empirically associated with increased rates of depression, anxiety, and psychological distress across SM youth and adult populations (Cole et al., 1997; Meyer, 2003; Newcomb & Mustanski, 2010).

Perceived discrimination represents a chronic and cumulative threat to well-being. As Link and Phelan (2001) argue, perceived discrimination often represents a shared experience across minority groups that functions as an independent predictor of poor mental health, distinct from general socioeconomic disadvantage (Brown et al., 2010; Hatzenbuehler et al., 2013). Daily, routine forms of discrimination (e.g., microaggressions or subtle slights) may be especially insidious. Research suggests that chronic, low-level discrimination is more strongly associated with psychological distress than acute, overt episodes of discrimination (Lee & Turney, 2012). These experiences can dysregulate the stress response system over time,

increasing the risk for mental illness and even physical health problems through allostatic load (Stephoe et al., 2005; Sapolsky, 2004; Marmot, 2004).

Extensive empirical research supports the association between perceived discrimination and mental health difficulties in SM populations. National and community-based studies consistently document robust links between high levels of interpersonal and institutional discrimination among LGBQ+ individuals and increased depression, anxiety, substance use, and suicidality (Almeida et al., 2009; Coker et al., 2010; Feinstein et al., 2012; Hatzenbuehler et al., 2010; Huebner et al., 2004; Mays & Cochran, 2001; Tilcsik, 2011). These associations persist even when accounting for other social determinants of health, such as income, education, and healthcare access (Bostwick et al., 2015; Kim et al., 2017).

Additionally, in a nationally representative study, Mays and colleagues (2001) found that lesbian, gay, and bisexual adults were significantly more likely than their heterosexual counterparts to report both lifetime and day-to-day discrimination, with approximately 42% attributing such experiences to their sexual orientation. Perceived discrimination was directly linked to reduced quality of life and greater psychiatric morbidity. Notably, controlling for experiences of discrimination significantly weakened the association between sexual orientation and mental health outcomes, indicating that discrimination plays a key mediating role in these disparities.

Importantly, as the term perceived discrimination suggests, psychological outcomes are influenced not only by actual acts of discrimination but also by the anticipation or perception of unfair treatment, which can activate stress responses with similarly harmful effects (Pascoe & Smart-Richman, 2009; Korte et al., 2005). These subjective experiences are central to the minority stress model, which emphasizes that mental health outcomes depend as much on how

individuals interpret and internalize social events as on the events themselves. Related constructs, such as rejection sensitivity, the tendency to anxiously expect and readily perceive social rejection, and social identity threat, the perceived devaluation of one's social group, illustrate how anticipated evaluation and social scrutiny can exacerbate stress and contribute to adverse psychological outcomes (Downey & Feldman, 1996; Steele & Aronson, 1995; Schmader et al., 2008).

1.4 Loneliness as a Mediator of Discrimination and Psychological Distress

Among the various psychological consequences of minority stress, loneliness has emerged as a particularly salient yet understudied factor. Defined as the subjective experience of a gap between desired and actual social relationships, loneliness reflects a profound sense of social and emotional disconnection (de Jong Gierveld, 1987). Unlike objectively measured social isolation, which can include observable indicators such as a paucity of social contacts, minimal engagement with others, or a lack of belonging within a social network (Gardiner et al., 2018; Shvedko et al., 2018), loneliness reflects the individual's subjective perception of social disconnection and may persist even when surrounded by others. Researchers commonly distinguish among three dimensions of loneliness: social loneliness, characterized by the absence of a broader support network; emotional loneliness, referring to the lack of close, intimate bonds; and existential loneliness, a deeper sense of alienation or disconnection from the world and one's place in it (Weiss, 1973; Hawkey et al., 2005; McKenna-Plumley et al., 2021).

SM individuals are disproportionately vulnerable to loneliness due to both structural and interpersonal factors. Empirical evidence shows that SM individuals are more likely than their heterosexual peers to be single, childless, and estranged from their families of origin, conditions that increase risk for social isolation and loneliness (Eres et al., 2021; Fokkema & Kuyper, 2009;

Hsieh & Liu, 2021). Additionally, chronic exposure to minority stress, including perceived discrimination, rejection, and stigmatization, further compounds the experience of loneliness. Consistent with this, research indicates that SM individuals report higher levels of loneliness than heterosexual peers. Population and cross-sectional studies corroborate elevated prevalence estimates in specific samples. For example, roughly 13–24% of sexual minority men report loneliness “most or all of the time” in some Canadian samples (Salway et al., 2020), and other work has reported rates around 34.7% (Kneale et al., 2020). Also, a comparative meta-analysis reported a small-to-moderate effect size for greater loneliness among sexual minorities (Gorczynski & Fasoli, 2022). Loneliness among SM people is linked to poorer mental health across the lifespan, from adolescents and young adults to older adults (Yadegarfar et al., 2014; Mereish & Poteat, 2015; D’Augelli et al., 2001), and correlates with rejection and discrimination, internalized homonegativity, lower optimism and body satisfaction, and higher engagement in risk behaviors (Kuyper & Fokkema, 2010; Jacobs & Kane, 2012; Martin & Knox, 1997; Fish & Weis, 2019).

Minority stress theory (Meyer, 2003) and Hatzenbuehler’s (2009) Integrative Mediation Framework (IMF) explain how distal and proximal stressors converge to produce loneliness and, in turn, symptoms of depression and anxiety. Distal stressors, which are external to the individual, include experiences such as exclusion, interpersonal and institutional discrimination, and structural stigma. These stressors can reduce opportunities for connection and undermine trust in social environments. Proximal stressors, by contrast, operate within the individual and involve internal processes such as internalized stigma, heightened rejection sensitivity, identity concealment, and a compromised sense of safety, all of which can disrupt the formation and maintenance of authentic relationships (Ensel & Lin, 1996). For instance, identity concealment

and heightened rejection sensitivity can lead to social withdrawal or the misinterpretation of ambiguous social cues as rejection, setting in motion a self-reinforcing cycle of isolation (Pachankis et al., 2008; Feinstein, 2020; London et al., 2007; Watson & Nesdale, 2012). Experiences of loneliness have been associated with greater perceptions of social threat, negative self-appraisals, and difficulties in social functioning (Cacioppo & Hawkley, 2009; Qualter et al., 2015; Spithoven et al., 2017). Concurrently, internalized stigma erodes self-worth and confidence in relationships, deepening emotional isolation (Frost & Meyer, 2009; Downs, 2012). Collectively, these processes heighten vulnerability to psychological disorders, particularly depression and anxiety.

Meta-analytic and large-scale studies demonstrate that loneliness is consistently associated with elevated symptoms of depression and anxiety. Specifically, loneliness has been shown to predict depressive symptoms in general population samples (Erzen & Çikrikci, 2018) and anxiety symptoms across clinical and community samples (Wang et al., 2018). Recent research also indicates that disparities in loneliness between LGBTQ+ youth and their heterosexual peers emerge early in development (Charmaraman et al., 2024), and age-comparative studies suggest that older SM adults may report particularly high levels of loneliness, highlighting variation in risk across the lifespan (Hughes et al., 2024). Empirical research has consistently found that loneliness mediates the relationship between minority stressors and depression and anxiety symptoms. Specifically, loneliness has been shown to mediate the effects of discrimination, identity concealment, and internalized stigma on depression and anxiety across diverse SM samples, including Latino gay men, bisexual adults, LGBTQ+ youth, and older SM adults (Diaz et al., 2001; Mereish & Poteat, 2015; Ribeiro-Gonçalves et al., 2019; Kittiteerasack et al., 2021; Charmaraman et al., 2024).

Together, this growing body of research highlights loneliness as a key psychological mechanism by which minority stress contributes to adverse mental health outcomes in SM populations. By disrupting interpersonal relationships and deepening emotional isolation, loneliness not only compounds existing vulnerabilities but also reinforces the broader consequences of social marginalization.

1.5 The Protective Role of Social Support

While loneliness may intensify the negative psychological effects of minority stress, social support may serve as an important protective factor. Social support refers to the perception or experience of being valued, cared for, and connected within one's social network (Cohen, 2004; Uchino, 2009). For SM individuals, supportive relationships may be especially important because they can promote adaptive coping, affirm identity, and reduce the psychological consequences of social isolation and stigma-related stress (Bouris et al., 2010; Meyer, 2003; Ryan et al., 2010).

Social support encompasses both perceived support, the belief that help would be available if needed, and received support, the actual provision of assistance (Sarason & Pierce, 1990; Haber et al., 2007). In the present study, perceived support is the primary focus because it is particularly relevant to mental health outcomes and may buffer the effects of loneliness on depression and anxiety. Received support can improve well-being directly through the provision of tangible aid, emotional reassurance, and practical assistance during times of need (Lakey & Orehek, 2011; Uchino, 2009). These supportive functions may take several forms, including emotional support (care, empathy, and validation), instrumental support (tangible aid), informational support (advice and guidance), companionship (shared activities), and appraisal support (affirmation and validation of feelings or identity) (House, 1981; Cutrona & Russell,

1990; Malecki & Demaray, 2002; Kahn & Antonucci, 1980). Although these forms of support are often enacted through interpersonal interactions, perceived support reflects an individual's belief that such resources are available when needed. By fostering social connectedness and belonging, greater perceived support may be associated with lower loneliness while also helping to reduce its negative psychological consequences (Lee & Robbins, 1995; Hughes et al., 2024).

For SM individuals, support may come from several sources that contribute differently to psychological well-being. Family support can enhance life satisfaction and reduce distress, although these benefits may be limited when family relationships are hostile or rejecting (Factor & Rothblum, 2007; McConnell et al., 2015). Peer and community support may be especially important because relationships with heterosexual peers can provide a sense of social normalcy, whereas relationships with LGBTQ+ peers can foster belonging, shared understanding, identity validation, and access to informational and appraisal resources (Galupo et al., 2014; Munoz-Plaza et al., 2002; Craig et al., 2022). Openness about one's sexual identity may also facilitate connection with affirming communities, though greater visibility can increase exposure to discrimination (Pachankis, 2007; Russell & Fish, 2016). When in-person support is limited, online communities and social media may provide additional avenues for connection, affirmation, and identity development, complementing traditional support networks (Knowles & Danzi, 2025).

Consistent with the importance of these support systems, empirical research with SM populations demonstrates that higher perceived social support is associated with lower depression, anxiety, and psychological distress (Budge et al., 2013; Lehavot & Simoni, 2011; Heywood & Lyons, 2016; Ryan et al., 2010). This pattern suggests that perceived support may help weaken the association between loneliness and mental health symptoms by fostering

connection, belonging, and access to interpersonal resources. Broader research similarly indicates that social support can moderate associations between social disconnection and psychological distress, including links between burnout and distress, loneliness and well-being, and loneliness and depressive symptoms (Xiao et al., 2022; Tang et al., 2025; Sumerlin et al., 2025). Collectively, these findings suggest that perceived support may shape the extent to which loneliness contributes to depression and anxiety, highlighting its potential role as a buffer against loneliness-related distress (Donovan & Blazer, 2020).

Although much of the literature emphasizes social support as a buffer against loneliness-related distress, support may also reduce the psychological impact of stigma-related stressors more directly. For example, social support has been shown to attenuate the association between LGBTQ-related microaggressions and depressive symptoms (Matijczak et al., 2021). Similarly, lower support has been associated with stronger links between discrimination and suicidality among transgender individuals (Trujillo et al., 2016). Additional work suggests that social support may moderate associations between minority stressors and adverse mental health outcomes among LGBTQ populations more broadly (Li et al., 2024). Together, these findings suggest that perceived support may protect mental health not only by reducing the effects of loneliness but also by weakening the direct impact of discrimination and stigma-related stress.

Overall, perceived social support may protect SM individuals from both loneliness-related and discrimination-related distress. Supportive relationships can provide reassurance, validation, belonging, and practical resources, helping individuals feel less socially isolated and better able to cope with stigma-related stress. Accordingly, greater perceived support may be associated with lower loneliness while also weakening both the association between loneliness

and depressive and anxiety symptoms and the direct association between perceived discrimination and depressive and anxiety symptoms

1.6 Weight Discrimination as a Compounding Stressor

Weight-based mistreatment is a form of bias that is frequently overlooked or socially normalized, yet it carries significant consequences for both mental and physical health (Pearl & Puhl, 2018). Unlike other forms of discrimination that are widely recognized as unacceptable, weight stigma is often dismissed or minimized, allowing harmful attitudes and behaviors to persist. Yet weight stigma remains understudied, is not recognized as a legally protected category, and is rarely examined through an intersectional lens. Despite this, societal responses to higher weight, ranging from teasing and exclusion to reduced opportunities, are persistent, patterned, and impactful (Puhl & Brownell, 2001). Research consistently links weight stigma to diminished opportunities and well-being, although the exact social and structural mechanisms remain under discussion (Muennig, 2008).

Weight stigma encompasses socially shared negative stereotypes, such as assumptions that higher-weight individuals are lazy, unmotivated, or lack self-control (Puhl & Brownell, 2003). Prejudice reflects the negative attitudes underlying these beliefs, while discrimination refers to the behaviors that enact bias, from teasing and subtle slights to inequities in employment and healthcare (Diedrichs & Puhl, 2017). These forms of bias often overlap across personal and structural domains, including unfair hiring practices, substandard clinical care, and media portrayals that normalize the devaluation of larger bodies (Carels et al., 2022; Pearl, 2018; Puhl & Brownell, 2003). For SM individuals, weight stigma intersects with heterosexism and sexism in a multiplicative pattern, such that the presence of one form of discrimination intensifies the impact of the others, resulting in compounded stress and elevated risk for

loneliness, depressive and anxiety symptoms, and functional impairments (Balsam et al., 2011; Meyer, 2003).

Evidence highlights both the prevalence and impact of weight discrimination. National data suggest that 20–45% of women and 6–28% of men with obesity report experiencing discrimination, with risk increasing alongside obesity severity (Spahlholz et al., 2016). These experiences emerge early, as children consistently rate peers with obesity as less likable than those with other physical conditions (Latner & Stunkard, 2003). In adulthood, higher-weight women experience elevated rates of romantic rejection (Chen & Brown, 2005) and public harassment (Lewis et al., 2011), while higher-weight individuals face systematic disadvantages in employment, including lower likelihood of hiring, promotions, and wage penalties (Roehling et al., 2013; Rudolph et al., 2009; Vanhove & Gordon, 2014). In one study, human resource professionals were 4.5 times less likely to select candidates with obesity for supervisory positions compared with thinner peers (Giel et al., 2012). Observational research further indicates wage penalties of approximately 3.4% for men and 6.1% for women with obesity, even after controlling for sociodemographic factors, as well as higher unemployment and fewer years employed (Baum & Ford, 2004; Paraponaris et al., 2005).

Healthcare settings also reflect systemic bias. Providers across disciplines, including physicians, nurses, dietitians, psychologists, and trainees, often hold more negative attitudes toward higher weight patients and lower expectations for treatment adherence (Budd et al., 2011; Phelan et al., 2014; Tomiyama et al., 2018). These attitudes often result in shorter consultations, less patient-centered communication, reduced preventive care, and lower trust in healthcare, contributing to delayed or avoided treatment (Phelan et al., 2015; Carels et al., 2024). Patients report unsolicited weight loss advice, derogatory remarks, and physical cues of exclusion, such

as ill-fitting medical equipment (Amy et al., 2006; Kaminsky & Gadaleta, 2002; Puhl et al., 2008). Among higher-weight women, nearly 70% have delayed recommended gynecologic screening due to weight-related stigma (Amy et al., 2006). Structural policies, such as mandated coverage for obesity screening, have done little to nullify these persistent barriers (Wilson et al., 2017).

Cultural narratives and media further amplify weight stigma. Exposure to stigmatizing images increases implicit and explicit bias, social distancing, and endorsement of discriminatory policies (Carels et al., 2014, Hinman et al., 2015). Children exposed to weight-focused media content tend to hold more negative attitudes toward higher-weight peers (Latner et al., 2007). Experimental evidence shows that pairing policy proposals with stigmatizing imagery increases public support for weight-discriminatory health policies (Brochu et al., 2020). Together, these cultural mechanisms reinforce the perception of weight bias as socially acceptable, legitimizing both interpersonal and institutional discrimination (Pearl & Puhl, 2018).

The psychological and behavioral consequences of weight discrimination are substantial. Individuals who experience weight stigma exhibit higher rates of mood and anxiety disorders, perceived stress, and mental health service utilization (Hatzenbuehler et al., 2009). They also display greater engagement in maladaptive behaviors, including binge eating and unhealthy weight-control strategies (Carels & Latner, 2016; Ashmore et al., 2008; Puhl et al., 2007). The perceived controllability of weight, combined with stigmatization by close others, magnifies shame and self-blame, reinforcing chronic stress and depression and anxiety symptoms (Boyes & Latner, 2009; Brown & McClimens, 2012). Weight discrimination has also been linked to sleep disruption, problematic alcohol use, cigarette smoking, and reduced physical activity (Gerend et al., 2023).

Sexual minority populations experience these weight-related risks alongside preexisting minority stressors. SM women, who have disproportionately high rates of overweight and obesity (61–76%), are at elevated risk for compounded stigma (Austin et al., 2009, Boehmer et al., 2007; Bowen et al., 2008). Importantly, weight stigma also affects SM men, with research documenting both experiences of antifat bias and the heightened pressure to conform to appearance norms within the gay male community (Foster-Gimbel & Engeln, 2016). Among sexual minority youth, 50–55% report experiencing weight stigma from family and peers, with rates similar to those in the general population but occurring alongside sexual orientation–related stressors (Puhl et al., 2011). In adulthood, the lifetime prevalence of weight-stigma experiences among SM participants in weight management programs ranges from 69–79%, often overlapping with other forms of discrimination (Puhl et al., 2019). These experiences contribute to higher rates of disordered eating, body dissatisfaction, and depression and anxiety symptoms compared with heterosexual peers (Austin et al., 2013; Diemer et al., 2015; Hadland et al., 2014).

Research shows that weight discrimination affects mental health outcomes in SM populations. Among SM college students, experiences of weight stigma are linked to higher rates of self-reported eating disorders and depression, as well as academic challenges. For SM women reporting weight discrimination, depression prevalence exceeded 60%, highlighting how compounded stigmas increase psychological distress and functional difficulties (Simone et al., 2020). Weight-based mistreatment may also contribute to loneliness by increasing experiences of rejection and exclusion, reducing feelings of belonging, and promoting withdrawal from social situations. These patterns align with minority stress theory, which emphasizes how external stressors such as enacted stigma combine with internal stressors, including internalized weight

bias, to increase loneliness, social withdrawal, and vulnerability to mental health problems (Meyer, 2003; Hatzenbuehler, 2009).

Weight discrimination is a persistent social stressor with clear effects across interpersonal, structural, and cultural contexts. For SM individuals, it functions as a compounding form of stigma that intensifies social isolation, depression and anxiety symptoms, maladaptive coping, and functional challenges. Addressing weight discrimination alongside other forms of stigma is therefore essential for reducing psychological distress and supporting well-being in these populations.

1.7 Mechanisms Linking Weight Discrimination to Psychological Distress

Weight discrimination affects mental health through multiple intersecting mechanisms, mirroring the pathways in the minority stress model for SM populations. A central process is enacted stigma, which refers to the behavioral expression of societal devaluation. Repeated weight-based mistreatment, whether through teasing, exclusion, or barriers in institutions, can trigger psychological responses such as heightened sensitivity to rejection, shame, and self-blame (Earnshaw & Chaudoir, 2009; Boyes & Latner, 2009). For individuals in SM populations, these responses are compounded by additional stressors related to sexual orientation or gender, creating a cumulative social and psychological burden (Meyer, 2003; Balsam et al., 2011).

Weight discrimination may also contribute directly to loneliness. Higher-weight SM individuals may face fewer opportunities for meaningful social connections due to actual exclusion or the anticipation of stigma. These experiences can lead to social withdrawal, reduced trust in others, and emotional isolation, reflecting patterns seen across minority stress contexts (Hatzenbuehler, 2009; Puhl et al., 2014). Loneliness, in turn, increases vulnerability to disorders such as depression and anxiety by heightening sensitivity to social threats, promoting negative

self-evaluations, and reinforcing maladaptive coping behaviors (Cacioppo & Hawkley, 2009; Erzen & Çikrikci, 2018). Evidence indicates that SM adults who report weight-based mistreatment experience higher levels of social isolation, depressive symptoms, and disordered eating (Puhl et al., 2019; Simone et al., 2020; Carels & Latner, 2016).

Behavioral responses to experienced weight discrimination also affect mental health outcomes. Common coping strategies include disordered eating, social withdrawal, and reduced participation in physical activity, each of which can negatively impact physical health and reinforce a stigmatized identity (Carels et al., 2010; Ashmore et al., 2008; Gerend et al., 2023). These patterns create a feedback loop in which experiences of stigma contribute to maladaptive behaviors, which then provoke additional social devaluation, highlighting the persistent and self-reinforcing nature of weight-based stress.

Social support is expected to moderate these pathways by reducing the impact of intersecting stigmas on maladaptive behaviors, yet it may not fully offset the compounded effects. Even within supportive family, peer, or community networks, repeated or severe experiences of weight discrimination alongside sexual orientation or gender-based minority stress can overwhelm coping resources, maintaining cycles of loneliness, low self-esteem, and psychological distress (Hatzenbuehler et al., 2013; Puhl et al., 2016). Because higher-weight status often lacks a widely recognized or affirming social identity, individuals may have fewer protective factors, leaving them more vulnerable to social withdrawal and psychological strain (Mossakowski, 2003; Sellers et al., 2003).

Taken together, these mechanisms suggest that weight discrimination functions as both a distinct social stressor and a factor that may increase vulnerability to the psychological effects of broader discrimination. Through exclusion, anticipated rejection, and reduced belonging, weight-

based mistreatment may be associated with greater loneliness. At the same time, experiencing weight discrimination may intensify the direct association between broader discriminatory experiences and depressive and anxiety symptoms. These processes highlight the psychological burden of overlapping forms of marginalization among SM individuals.

1.8 Overview of the Current Study

Sexual minority (SM) individuals frequently encounter discrimination and stigma, both of which are associated with poorer mental health outcomes, including elevated depressive and anxiety symptoms. Although prior research has documented the harmful effects of minority stress, fewer studies have simultaneously examined the mechanisms through which discrimination contributes to psychological distress, as well as the contextual factors that may exacerbate or buffer these effects. Building on prior work identifying loneliness, social support, and weight-related discrimination as important psychosocial factors, the present study examined how these variables operate within a moderated mediation framework to better understand mental health outcomes among SM individuals.

Loneliness was conceptualized as a key mechanism linking perceived discrimination to depressive and anxiety symptoms, reflecting the social and emotional disconnection that may accompany stigmatizing experiences (Meyer, 2003; Hatzenbuehler, 2009). Greater exposure to perceived discrimination was expected to be associated with increased loneliness, which in turn would be associated with greater psychological distress. Social support was expected to function as a protective factor, weakening the association between loneliness and mental health symptoms, consistent with evidence suggesting that perceived support may buffer the negative psychological effects of stress through increased connectedness and access to emotional and practical resources (Haber et al., 2007; Lakey & Cohen, 2000). Social support was also examined

as a moderator of the direct association between perceived discrimination and psychological distress and was modeled as a predictor of loneliness given its established association with social connectedness (Lee & Robbins, 1995). Weight-related discrimination was conceptualized as an additional source of stigma that may intensify the direct psychological burden associated with broader discriminatory experiences. Given its association with social isolation and disconnection, weight-related discrimination was also modeled as a predictor of loneliness (Puhl et al., 2019).

Accordingly, the present study examined whether loneliness mediated the association between perceived discrimination and symptoms of depression and anxiety, whether perceived social support moderated both the association between loneliness and psychological symptoms and the direct association between perceived discrimination and psychological symptoms, and whether weight-related discrimination moderated the direct association between perceived discrimination and psychological symptoms. The model also included direct associations between social support and loneliness and between weight-related discrimination and loneliness to account for their established relationships with social connection and isolation. By simultaneously examining protective and risk factors, the study aimed to clarify the conditions under which perceived discrimination may be more strongly associated with psychological distress among sexual minority individuals. Figures 1 and 2 present the conceptual models for depressive and anxiety symptoms, respectively.

Together, these processes provide a more comprehensive account of how minority stress may be associated with mental health among SM populations. By examining loneliness as a mediator, social support as a protective moderator, and weight-related discrimination as an additional source of stigma, the present study highlights the interplay between social disconnection, supportive resources, and intersecting forms of discrimination.

1.9 Research Aims and Hypotheses

The current research aims are as follows. Conceptual models for each outcome are presented in Figure 1 (depressive symptoms) and Figure 2 (anxiety symptoms), illustrating the mediating role of loneliness and the moderating roles of perceived social support and weight discrimination.

Study Aim 1: To examine whether loneliness mediates the relationship between discrimination and symptoms of depression and anxiety among SM individuals.

Rationale: Discrimination has been linked to social isolation and loneliness, which in turn contribute to higher depression and anxiety symptoms. Investigating loneliness as a mediator clarifies how experiences of discrimination affect psychological well-being.

Hypothesis 1: Loneliness will mediate the relationship between perceived discrimination and depressive and anxiety symptoms, such that higher levels of perceived discrimination will be associated with greater loneliness (Path a_1 , Figures 1 and 2), which in turn will be associated with increased symptoms of depression and anxiety (Path b_1 , Figures 1 and 2).

Study Aim 2: To examine whether perceived social support moderates the effect of loneliness on depression and anxiety.

Rationale: Perceived social support can buffer the negative psychological effects of loneliness by fostering a sense of connection and access to emotional and practical resources. SM individuals with higher levels of perceived support are expected to show weaker associations between loneliness and depression and anxiety symptoms.

Hypothesis 2: Greater perceived social support will weaken the relationship between loneliness and depressive and anxiety symptoms, whereas lower perceived social support will strengthen this relationship (Path d_1 , Figures 1 and 2).

Study Aim 3: To examine whether perceived social support moderates the direct association between perceived discrimination and depressive and anxiety symptoms.

Rationale: Perceived social support may buffer the negative impact of discrimination on mental health by providing emotional and instrumental resources that help individuals cope with discriminatory experiences and reduce their psychological burden.

Hypothesis 3: Greater perceived social support will buffer the direct association between perceived discrimination and depressive and anxiety symptoms, such that the relationship between perceived discrimination and psychological distress will be weaker among individuals reporting higher levels of social support (Path d₂, Figures 1 and 2).

Study Aim 4: To investigate whether experiences of weight discrimination moderate the direct association between perceived discrimination and depressive and anxiety symptoms.

Rationale: Weight discrimination represents an additional source of stigma that may compound the psychological burden associated with broader experiences of discrimination. Individuals who experience weight discrimination may therefore demonstrate a stronger association between perceived discrimination and depressive and anxiety symptoms.

Hypothesis 4: The direct association between perceived discrimination and depressive and anxiety symptoms will be stronger among individuals reporting weight discrimination compared to those who do not (Path d₃, Figures 1 and 2).

Chapter 2: Methods

Participants and Procedure

Data for the present study were drawn from the All of Us Research Program, a nationwide U.S. initiative that collects comprehensive demographic, health, and survey information. The current analyses utilized Controlled Tier version 8 (CDRv8), which provides access to sexual and gender minority (SGM) status. Released on February 3, 2025, CDRv8 includes data collected between May 31, 2017, and October 1, 2023, with additional cognitive and mental health measures added on February 20, 2025. All participants provided informed consent, and the study protocol was approved and is actively monitored by the All of Us Institutional Review Board. As the dataset is fully de-identified, additional institutional review was not required.

The All of Us Research Program enrolls participants aged 18 and older from across the United States, with children eligible at select sites. Participation is open to all individuals, regardless of health status, insurance coverage, or access to digital devices. Study materials are provided in English and Spanish. Some participants attend partner sites for in-person assessments or biological sample collection, receiving a one-time \$25 compensation. Strong privacy protections, including data de-identification and Certificates of Confidentiality, are strictly enforced.

The present study focused on sexual minority participants (i.e., individuals not exclusively identifying as heterosexual) who completed all primary study measures. Inclusion criteria required participants to be at least 18 years old and have completed the Generalized Anxiety Disorder scale (GAD-7), the Patient Health Questionnaire (PHQ-9), the modified

Medical Outcomes Study Social Support Survey (mMOS-SS), the UCLA Loneliness Scale (ULS-8), and the Everyday Discrimination Scale (EDS).

The final analytic sample included 8,493 participants ($M_{age} = 46.90$, $SD = 16.18$; range = 20–96 years) with diverse demographic backgrounds (see Table 1). Participants represented a range of gender identities, racial and ethnic backgrounds, sexual orientations, educational levels, and income brackets. The sample was primarily composed of individuals identifying as female, White, and non-Hispanic, with bisexual identity being the most commonly reported sexual orientation. Participants also endorsed a range of attributed reasons for discriminatory experiences, with gender (56.5%), sexual orientation (39.6%), age (35.2%), and weight (27.1%) among the most commonly reported (see Table 2).

All data preparation and analyses were conducted using the cloud-based All of Us Researcher Workbench.

Measures

Demographics. Participants reported demographic information, including age, income, race, ethnicity, gender, and sexual orientation.

Everyday Discrimination. Discrimination experiences were measured using the 9-item Everyday Discrimination Scale (EDS; Williams et al., 1997). Participants reported how frequently they experienced unfair treatment in daily life on a 6-point scale from 1 (never) to 6 (almost every day). Items assessed a variety of experiences, including being treated with less courtesy or respect, receiving poorer service, being called names or insulted, being threatened or harassed, and being perceived as unintelligent, dishonest, or inferior. Participants also indicated the perceived reasons for these experiences, selecting all that applied from a list including ancestry or national origins, race, gender, age, religion, height, weight, other aspects of physical

appearance, sexual orientation, and education or income. Total scores were computed by summing responses across all items, with higher scores reflecting more frequent experiences of discrimination across multiple daily contexts. Reliability in the present sample was strong ($\alpha = 0.87$).

Social Support. Perceived social support was assessed using the 8-item modified Medical Outcomes Study Social Support Survey (mMOS-SS; Sherbourne & Stewart, 1993). This short form captures two dimensions, emotional support and instrumental support, with four items per subscale. Participants rated the availability of support on a 5-point scale from 1 (none of the time) to 5 (all of the time), with example items including “Someone to have a good time with” and “Someone to love and make you feel wanted.” Subscale and overall scores are calculated as means, with higher scores reflecting greater perceived support. The overall total score was used in primary analyses to represent general perceived social support. Reliability analysis using omega indicated excellent internal consistency ($\omega = 0.97$).

Loneliness. Loneliness was assessed using the 8-item UCLA Loneliness Scale short form (ULS-8; Hays & DiMatteo, 1987). Participants rated how often they experienced feelings of social disconnection and isolation over a 4-point scale from 1 (never) to 4 (often). Items included statements such as “I feel left out” and “I feel isolated from others.” Total scores, after reverse coding as appropriate, range from 8 to 32, with higher scores reflecting greater loneliness. Reliability analysis in the present sample indicated strong internal consistency ($\alpha = 0.86$).

Depressive Symptoms. Depressive symptoms were measured with the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), which assesses the frequency of common depressive experiences over the past two weeks. Participants responded to items such as “Little interest or pleasure in doing things” and “Feeling down, depressed, or hopeless” on a 4-point

scale from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 27, with higher scores reflecting greater depressive severity. Reliability in the current sample was excellent ($\alpha = 0.90$).

Anxiety Symptoms. Anxiety was assessed using the 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006). Participants indicated how often they experienced common anxiety symptoms over the previous two weeks on a 4-point scale ranging from 0 (not at all) to 3 (nearly every day). Items included statements such as “Feeling nervous, anxious, or on edge” and “Not being able to stop or control worrying.” Total scores range from 0 to 21, with higher scores reflecting greater symptom severity. Reliability analysis in the present sample indicated excellent internal consistency ($\alpha = 0.91$).

Data Analyses

Data were first assessed for missingness, outliers, and distributional assumptions (skewness and kurtosis) using RStudio within the All of Us Researcher Workbench. Descriptive statistics, including means, standard deviations, and frequencies, were calculated to summarize demographic characteristics (age, gender, income, ethnicity) and study measures (discrimination, loneliness, social support, depressive symptoms, and anxiety symptoms). Missing data were minimal and handled using full information maximum likelihood (FIML) estimation to maximize the use of available information.

Preliminary analyses included screening continuous variables for normality, linearity, and homoscedasticity. Because discrimination scores were positively skewed, a log transformation was applied to meet parametric assumptions. Categorical variables were summarized with counts and percentages. Covariate analyses examined associations between demographic variables (age,

gender, income, ethnicity) and primary outcomes (depressive and anxiety symptoms) to guide their inclusion in subsequent models.

Primary analyses were conducted using structural equation modeling (SEM) with the lavaan package in R (Rosseel, 2012) to test hypothesized mediation and moderation pathways. Two separate models were specified: Model 1 evaluated depressive symptoms as the outcome, and Model 2 evaluated anxiety symptoms as the outcome. In both models, loneliness was tested as a mediator of the relationship between experiences of discrimination and the outcome variables, while perceived social support and experiences of weight discrimination were tested as moderators. Covariates were included as fully saturated paths to account for all demographic influences on outcomes. Indirect effects were estimated using bootstrapped 95% confidence intervals, with effects considered statistically significant when confidence intervals did not include zero.

Continuous predictors and moderators were mean-centered to facilitate the interpretation of interaction effects. Interaction terms were created for moderation analyses, including loneliness $\times$ social support, discrimination $\times$ social support, and discrimination $\times$ weight-related discrimination. Additionally, social support and weight-related discrimination were categorized into quartiles to examine conditional effects at low (25th percentile), moderate (50th percentile), and high (75th percentile) levels, which improved the interpretability of both main and interaction effects and helped reduce potential multicollinearity among predictors.

Model fit was assessed using multiple standard SEM indices, including the Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI). RMSEA evaluates approximate fit per degree of freedom, SRMR reflects the standardized difference between observed and

predicted correlations, and CFI and TLI compare the specified model with a null model. Values of $RMSEA \leq 0.06$ and $SRMR \leq 0.08$ indicate good fit, while CFI and TLI ≥ 0.95 are considered good and ≥ 0.90 acceptable (Hu & Bentler, 1999; Kline, 2016).

Chapter 3: Results

Preliminary Analyses

Missing data were minimal (<2%). Continuous variables were screened for normality, linearity, and homoscedasticity. Discrimination scores were positively skewed ($M = 22.61$, $SD = 7.91$, skew = 1.08) and were log-transformed to meet normality assumptions (transformed $M = 3.11$, $SD = 0.32$; skew = 0.07, kurtosis = 0.53). No outliers were detected for depressive symptoms, anxiety, loneliness, or social support, and variance inflation factors for all predictors were below 2, indicating acceptable multicollinearity.

Descriptive statistics indicated that participants reported mild to moderate depressive symptoms (PHQ-9 $M = 8.43$, $SD = 6.49$) and anxiety symptoms (GAD-7 $M = 7.49$, $SD = 5.57$). Loneliness scores on the ULS-8 averaged 10.66 ($SD = 5.31$), and perceived social support on the mMOS-SS averaged 3.67 ($SD = 1.05$), indicating moderate levels of support. Participants also reported moderate levels of perceived everyday discrimination, with scores ranging from 9 to 54 ($M = 22.61$, $SD = 7.91$). As shown in Table 2, participants endorsed a range of attributed reasons for discriminatory experiences, with gender, sexual orientation, age, and weight (27.1%) among the most frequently reported. Because participants could endorse multiple attributions, most (72.1%) reported more than one attributed reason for discriminatory experiences.

Pearson correlations were consistent with theoretical expectations. Depressive and anxiety symptoms were strongly positively correlated ($r = 0.75$, $p < .001$). Loneliness was positively associated with depressive symptoms ($r = 0.46$, $p < .001$), anxiety symptoms ($r = 0.38$, $p < .001$), and discrimination experiences ($r = 0.35$, $p < .001$). Perceived social support was negatively associated with depressive symptoms ($r = -0.24$, $p < .001$), anxiety symptoms ($r = -0.15$, $p < .001$), and loneliness ($r = -0.61$, $p < .001$), and inversely correlated with discrimination

($r = -0.26, p < .001$). Discrimination experiences were moderately correlated with depressive ($r = 0.27, p < .001$) and anxiety symptoms ($r = 0.23, p < .001$).

Covariate analyses showed modest relationships between demographics and study outcomes. Age was negatively associated with depressive symptoms ($r = -0.12, p < .001$) and anxiety symptoms ($r = -0.08, p < .001$) and positively associated with social support ($r = 0.14, p < .001$). Income was negatively correlated with depressive symptoms ($r = -0.09, p < .001$), anxiety symptoms ($r = -0.06, p < .01$), and loneliness ($r = -0.11, p < .001$) and positively correlated with social support ($r = 0.10, p < .001$). Gender differences were minimal, with female participants reporting slightly higher anxiety ($M = 7.91, SD = 5.63$) than males ($M = 7.12, SD = 5.42; t = 3.21, p < .01$). Race and ethnicity were weakly and non-significantly associated with primary outcomes. For inclusion as covariates in the models, race was dichotomized as minority versus non-minority (minority: Black, Asian, MENA, AIAN, or Multiracial), and ethnicity was dichotomized as Hispanic/Other versus non-Hispanic.

Depression Symptoms Model

Figure 1, estimated via SEM, models the relationships among perceived discrimination, loneliness, social support, weight-related discrimination, and depressive symptoms (PHQ-9 total scores), controlling for age, gender, race, ethnicity, and income. Loneliness was specified as a mediator of the discrimination–depression relationship, with social support and weight-related discrimination included as moderators. Interaction terms tested moderated mediation effects, including loneliness $\times$ social support, discrimination $\times$ weight discrimination, and discrimination $\times$ social support.

The model demonstrated excellent fit. The robust (Yuan–Bentler scaled) chi-square test was non-significant, $\chi^2(3) = 3.20, p = .36$, indicating no significant discrepancy between the

observed and model-implied covariance matrices. Fit indices confirmed close fit: CFI = 1.00, TLI = 0.998, RMSEA = 0.009, 90% CI [0.00, 0.022], and SRMR = 0.002. The model explained 45% of the variance in loneliness ($R^2 = .45$, 95% CI [.43, .46]) and 31% of the variance in depressive symptoms ($R^2 = .31$, 95% CI [.29, .33]), indicating meaningful explanatory power.

Predictors of Loneliness: Several demographic covariates were significantly associated with loneliness. Age was negatively associated with loneliness ($b = -0.046$, $SE = 0.003$, $z = -15.37$, $p < .001$, $\beta = -.14$), suggesting younger individuals reported greater loneliness. Participants reporting a minoritized racial identity reported lower loneliness than those who did not ($b = -1.02$, $SE = 0.17$, $z = -6.18$, $p < .001$, $\beta = -.05$). Similarly, participants reporting a minoritized ethnicity reported lower loneliness than those who did not ($b = -0.94$, $SE = 0.14$, $z = -6.55$, $p < .001$, $\beta = -.06$). Higher income was also associated with lower loneliness ($b = -0.005$, $SE = 0.001$, $z = -7.12$, $p < .001$, $\beta = -.06$). Gender was not significantly associated with loneliness ($b = -0.17$, $SE = 0.11$, $z = -1.54$, $p = .13$).

Log-transformed perceived discrimination was positively associated with loneliness ($b = 2.72$, $SE = 0.16$, $z = 16.58$, $p < .001$, $\beta = .16$). Social support was strongly negatively associated with loneliness ($b = -2.87$, $SE = 0.05$, $z = -58.90$, $p < .001$, $\beta = -.57$), highlighting its protective role, and weight-related discrimination was positively associated with loneliness ($b = 0.79$, $SE = 0.10$, $z = 8.08$, $p < .001$, $\beta = .07$).

Predictors of Depressive Symptoms: Several demographic covariates were also significantly associated with depressive symptoms. Younger age ($b = -0.06$, $SE = 0.004$, $z = -15.21$, $p < .001$, $\beta = -.15$), male gender ($b = -0.41$, $SE = 0.14$, $z = -2.89$, $p = .004$, $\beta = -.03$), minoritized race ($b = -0.82$, $SE = 0.23$, $z = -3.63$, $p < .001$, $\beta = -.04$), and higher income ($b = -0.015$, $SE = 0.001$, $z = -14.18$, $p < .001$, $\beta = -.14$) were associated with lower depressive

symptoms. Minoritized ethnicity was not significantly associated with depressive symptoms ($b = -0.03$, $SE = 0.20$, $z = -0.14$, $p = .89$).

Loneliness was strongly positively associated with depressive symptoms ($b = 0.44$, $SE = 0.015$, $z = 28.66$, $p < .001$, $\beta = .36$). Perceived discrimination also significantly predicted higher depressive symptoms ($b = 3.03$, $SE = 0.22$, $z = 13.98$, $p < .001$, $\beta = .15$). Social support ($b = 0.34$, $SE = 0.08$, $z = 4.17$, $p < .001$, $\beta = .06$) and weight-related discrimination ($b = 0.91$, $SE = 0.14$, $z = 6.67$, $p < .001$, $\beta = .06$) were also significantly associated with depressive symptoms.

Moderation Effects: The interaction between loneliness and social support was significant and negative ($b = -0.044$, $SE = 0.012$, $z = -3.76$, $p < .001$, $\beta = -.04$), indicating that social support attenuates the effect of loneliness on depression. Simple-slope analyses indicated that the positive association between loneliness and depressive symptoms was strongest at low social support ($b = 0.47$, 95% CI [.44, .51]), weaker at moderate social support ($b = 0.43$, 95% CI [.40, .46]), and weakest at high social support ($b = 0.40$, 95% CI [.36, .44]) (Figure 3).

The direct association between perceived discrimination and depressive symptoms was moderated by weight-related discrimination and social support. The association was stronger among individuals reporting weight-related discrimination ($b = 0.97$, $SE = 0.45$, $z = 2.18$, $p = .03$, $\beta = .02$) and weaker among those with greater social support ($b = -0.45$, $SE = 0.21$, $z = -2.18$, $p = .03$, $\beta = -.03$) (Figure 4).

Conditional Indirect Effects: Conditional indirect effects of perceived discrimination on depressive symptoms through loneliness were significant across all levels of social support: 1.28 at low support, 95% CI [1.10, 1.47], 1.18 at moderate support, 95% CI [1.02, 1.33], and 1.09 at high support, 95% CI [0.94, 1.23]. These findings indicate that loneliness remained a significant pathway linking perceived discrimination to depressive symptoms across levels of social support,

although the magnitude of the indirect effect decreased as social support increased. Consistent with this pattern, the index of moderated mediation was significant, index = -0.12 , SE = 0.03 , $z = -3.69$, $p < .001$, 95% CI [-0.19 , -0.06], indicating that the indirect effect of perceived discrimination on depressive symptoms through loneliness became weaker as social support increased.

Conditional Direct and Total Effects: Perceived discrimination remained significantly associated with depressive symptoms after accounting for loneliness, indicating a direct association beyond the pathway through loneliness. The magnitude of this association varied across levels of social support and weight-related discrimination. As shown in Figure 5, the association between perceived discrimination and depressive symptoms was strongest among individuals with low social support who reported weight-related discrimination and weakest among individuals with high social support who did not report weight-related discrimination. Conditional total effects, representing the combined direct and indirect associations, ranged from 3.43 to 5.32 across combinations of social support and weight-related discrimination (Table 3).

Anxiety Symptoms Model

Figure 2, estimated via SEM, models the relationships among perceived discrimination, loneliness, social support, weight-related discrimination, and anxiety symptoms (GAD scores), controlling for age, gender, race, ethnicity, and income. Loneliness was specified as a mediator of the discrimination-anxiety relationship, with social support and weight-related discrimination included as moderators. Interaction terms tested moderated mediation effects, including loneliness $\times$ social support, discrimination $\times$ weight discrimination, and discrimination $\times$ social support.

The model demonstrated excellent fit. The robust (Yuan–Bentler scaled) chi-square test was non-significant, $\chi^2(3) = 3.20$, $p = .36$, indicating no meaningful discrepancy between the

observed and model-implied covariance matrices. Fit indices confirmed close fit: CFI = 1.00, TLI = 1.00, RMSEA = 0.00, and SRMR = 0.00. The baseline model's RMSEA was 0.21, showing substantial improvement over the null model. The model explained 45% of the variance in loneliness ($R^2 = .45$, 95% CI [.43, .46]) and 27% of the variance in anxiety symptoms ($R^2 = .27$, 95% CI [.26, .29]), indicating meaningful explanatory power.

Predictors of Loneliness: Several demographic covariates were significantly associated with loneliness. Age was negatively associated with loneliness ($b = -0.05$, $SE = 0.00$, $z = -15.38$, $p < .001$, $\beta = -.14$), indicating that younger individuals reported higher loneliness. Participants reporting a minoritized racial identity reported lower loneliness than those who did not ($b = -1.02$, $SE = 0.17$, $z = -6.18$, $p < .001$, $\beta = -.05$). Similarly, participants reporting a minoritized ethnicity reported lower loneliness than those who did not ($b = -0.94$, $SE = 0.14$, $z = -6.55$, $p < .001$, $\beta = -.06$). Higher income was also associated with lower loneliness ($b = -0.01$, $SE = 0.00$, $z = -7.10$, $p < .001$, $\beta = -.06$). Gender was not significantly associated with loneliness ($b = -0.17$, $SE = 0.11$, $z = -1.54$, $p = .12$).

Log-transformed perceived discrimination was positively associated with loneliness ($b = 2.72$, $SE = 0.16$, $z = 16.59$, $p < .001$, $\beta = .16$), suggesting that greater exposure to discrimination was linked to higher loneliness. Social support showed a strong negative association ($b = -2.87$, $SE = 0.05$, $z = -58.89$, $p < .001$, $\beta = -.57$), highlighting its protective role, while weight-related discrimination was also positively associated with loneliness ($b = 0.79$, $SE = 0.10$, $z = 8.09$, $p < .001$, $\beta = .07$).

Predictors of Anxiety Symptoms: Covariates followed expected trends, with younger age ($b = -0.08$, $SE = 0.00$, $z = -22.17$, $p < .001$, $\beta = -.22$), male gender ($b = -0.58$, $SE = 0.12$, $z = -4.64$, $p < .001$, $\beta = -.05$), minority race ($b = -0.90$, $SE = 0.20$, $z = -4.63$, $p < .001$, $\beta = -.05$), and

higher income ($b = -0.008$, $SE = 0.001$, $z = -8.64$, $p < .001$, $\beta = -.09$) associated with lower anxiety symptoms. Minority ethnicity was not significant ($b = 0.03$, $SE = 0.17$, $z = 0.21$, $p = .84$).

Loneliness was positively associated with anxiety symptoms ($b = 0.31$, $SE = 0.01$, $z = 22.45$, $p < .001$, $\beta = .29$). Perceived discrimination also significantly predicted higher anxiety symptoms ($b = 3.12$, $SE = 0.19$, $z = 16.23$, $p < .001$, $\beta = .18$). Weight-related discrimination was also associated with higher anxiety symptoms ($b = 0.34$, $SE = 0.12$, $z = 2.79$, $p = .005$, $\beta = .03$).

Moderation Effects: The interaction between loneliness and social support was significant and negative ($b = -0.02$, $SE = 0.01$, $z = -2.24$, $p = .03$, $\beta = -.02$), indicating that social support weakened the association between loneliness and anxiety. Simple-slope analyses indicated that the association was strongest at low social support ($b = 0.32$, 95% CI [.29, .35]), weaker at moderate social support ($b = 0.30$, 95% CI [.27, .33]), and weakest at high social support ($b = 0.29$, 95% CI [.25, .32]) (Figure 6).

The direct association between perceived discrimination and anxiety symptoms was moderated by weight-related discrimination and social support. This association was stronger among individuals reporting weight-related discrimination ($b = 1.12$, $SE = 0.38$, $z = 2.95$, $p = .003$, $\beta = .03$) and weaker among individuals reporting greater social support ($b = -0.50$, $SE = 0.18$, $z = -2.83$, $p = .005$, $\beta = -.03$) (Figure 7).

Conditional Indirect Effects: The indirect effect of discrimination on anxiety through loneliness was significant at all levels of social support. However, the magnitude of this indirect effect decreased as social support increased, from 0.87 at low support (95% CI [0.72, 1.04]) to 0.82 at moderate support (95% CI [0.69, 1.00]) and 0.77 at high support (95% CI [0.66, 0.98]). In other words, loneliness remained an important pathway linking discrimination to anxiety regardless of support level, but this pathway was weaker among individuals reporting greater

social support. Consistent with this pattern, the index of moderated mediation was significant (index = -0.06, SE = 0.03, $z = -2.23$, $p = .03$, 95% CI [-0.12, -0.01]), indicating that the indirect effect of discrimination on anxiety through loneliness became weaker as social support increased.

Conditional Direct and Total Effects: Perceived discrimination remained significantly associated with anxiety after accounting for loneliness, indicating a significant direct effect. This direct association varied as a function of both social support and weight-related discrimination, with stronger effects observed among individuals with lower social support and reported weight-related discrimination. As shown in Figure 8, the discrimination-anxiety association was strongest among individuals with low social support who reported weight-related discrimination and weakest among individuals with high social support who did not report weight-related discrimination. Across combinations of these moderators, conditional total effects ranged from 3.12 to 5.14 (Table 4).

Chapter 4: Discussion

Mental health disparities among sexual minority (SM) populations are well documented, with consistently elevated rates of depression, anxiety, and functional impairment relative to heterosexual populations (Plöderl & Tremblay, 2015; Miller et al., 2024). Minority stress theory provides a useful framework for understanding these disparities, conceptualizing them as the cumulative result of chronic exposure to stigma, discrimination, and social marginalization across interpersonal and structural contexts (Meyer, 2003; Hatzenbuehler, 2009; Sue et al., 2007; Herek, 2009). Although substantial research has established the harmful mental health effects of minority stress, less is known about the specific interpersonal and psychological mechanisms through which these experiences contribute to psychological well-being. Addressing this gap, the present study examined loneliness as a potential pathway linking perceived discrimination to depressive and anxiety symptoms among SM individuals. Perceived social support was examined as a protective interpersonal resource, while weight-related discrimination was considered an additional co-occurring stressor that may intensify the psychological burden of broader discriminatory experiences. Findings related to each hypothesis are discussed below.

Hypothesis 1

It was hypothesized that loneliness would mediate the association between perceived discrimination and depression and anxiety symptoms, such that perceived discrimination would be associated with poorer psychological well-being in part through greater loneliness. This hypothesis was supported across both the depressive and anxiety models. Individuals reporting more frequent experiences of discrimination also reported greater loneliness, and both greater perceived discrimination and greater loneliness were associated with higher levels of depressive

and anxiety symptoms. Significant indirect effects further suggested that loneliness partially accounted for the association between perceived discrimination and emotional distress.

Consistent with this pattern, these findings suggest that the psychological burden associated with discrimination may extend beyond the immediate distress linked to stigmatizing experiences. Although loneliness appears to represent an important pathway through which discriminatory experiences are associated with depressive and anxiety symptoms, the persistence of significant direct effects indicates that these associations are not fully explained by loneliness alone. Experiences of unfair treatment, rejection, or marginalization may therefore contribute to emotional distress through multiple pathways, including disruptions in social connection and belonging as well as other psychological, interpersonal, and stress-related processes.

These findings align with minority stress theory, which proposes that distal stressors, such as discrimination, may contribute to proximal stress processes that occur within the individual and are relevant to mental health outcomes (Meyer, 2003; Hatzenbuehler, 2009). Within this framework, repeated exposure to stigma and social rejection may contribute to heightened expectations of rejection, increased vigilance toward potential social threats, and reduced trust in others (Pachankis et al., 2008; Feinstein, 2020). These internal psychological processes may interfere with the development and maintenance of supportive social relationships and contribute to feelings of social isolation. As a result, loneliness may emerge as an important interpersonal correlate of minority stress and a pathway through which discriminatory experiences are associated with depressive and anxiety symptoms.

Existing literature further supports this perspective, with meta-analytic and longitudinal evidence consistently identifying loneliness as a strong predictor of both depression and anxiety across general and SM populations (Erzen & Çikrikci, 2018; Wang et al., 2018). Prior studies

have also shown that loneliness mediates the relationship between minority stressors, including discrimination, internalized stigma, and identity concealment, and depression and anxiety symptoms among bisexual adults, LGBTQ+ youth, Latino gay men, and older SM adults (Diaz et al., 2001; Mereish & Poteat, 2015; Mereish et al., 2017; Ribeiro-Gonçalves et al., 2019; Kittiteerasack et al., 2021; Charmaraman et al., 2024). Across this literature, loneliness consistently emerges as a meaningful pathway linking minority stress exposure to poorer mental health outcomes across diverse SM populations.

Building on this work, the present findings further support loneliness as an important interpersonal pathway through which discrimination may contribute to psychological distress among SM individuals. Rather than functioning solely as an outcome of poor mental health, loneliness may represent a meaningful mechanism through which discriminatory experiences contribute to depressive and anxiety symptoms. Future longitudinal research is needed to clarify whether loneliness prospectively explains associations between discriminatory experiences and later psychological distress.

Hypothesis 2

It was hypothesized that greater perceived social support would weaken the relationship between loneliness and depression and anxiety symptoms, whereas lower perceived social support would strengthen this relationship. This hypothesis was supported across both the depressive and anxiety models, with significant interaction effects indicating that perceived social support altered the strength of the association between loneliness and emotional distress.

Across both outcomes, loneliness was more strongly associated with depressive and anxiety symptoms among individuals reporting lower levels of perceived social support, whereas this association was weaker among those reporting greater support. Although loneliness

remained significantly associated with psychological distress across all levels of support, the strength of this relationship varied depending on perceived support, suggesting that social support may lessen, though not eliminate, the emotional impact of loneliness. This buffering pattern appeared somewhat stronger for depressive symptoms, although differences across outcomes were not directly tested.

This pattern is consistent with theoretical models of loneliness, which emphasize the perceived gap between desired and actual social relationships as central to loneliness-related distress (de Jong Gierveld, 1998; Peplau & Perlman, 1982). Within this framework, perceived social support may be especially relevant because it reflects individuals' beliefs that emotional and interpersonal resources are available when needed. This distinction is important given that the present study assessed perceived availability of emotional and instrumental support rather than objective network size or received support. By providing affirmation, reassurance, practical assistance, and a continued sense of relational connection, social support may help make experiences of loneliness feel less overwhelming (Cohen & Wills, 1985; Cohen, 2004). Supportive relationships may also shape how loneliness is interpreted, making experiences of disconnection feel less personally threatening or emotionally overwhelming (Downey & Feldman, 1996). In contrast, when perceived support is limited, loneliness may become more psychologically salient, with fewer relational resources available to challenge negative self-perceptions or foster a sense of belonging.

Prior research broadly supports this interpretation. Social support has been negatively associated with loneliness, with individuals reporting greater perceived support generally reporting lower levels of loneliness (Gul et al., 2018; Lee et al., 2020; Zhang & Dong, 2022). Perceived social support may be particularly important, as it captures individuals' subjective

sense that support is available and adequate, which has been strongly linked to well-being (Wills & Shinar, 2000). Studies have also shown that perceived social support can weaken the association between loneliness and depressive symptoms, as well as related indicators of distress such as burnout and reduced social connectedness (Donovan & Blazer, 2020; Sumerlin et al., 2025; Tang et al., 2025; Xiao et al., 2022).

Taken together, the present findings suggest that perceived social support may serve as an important interpersonal resource in the context of loneliness. While loneliness remained associated with poorer mental health across all levels of support, individuals reporting greater perceived support appeared less vulnerable to its emotional effects, underscoring the potential role of supportive relationships in mitigating loneliness-related depressive and anxiety symptoms among SM individuals.

Hypothesis 3

It was hypothesized that greater perceived social support would buffer the direct association between perceived discrimination and depressive and anxiety symptoms. This hypothesis was supported across both models. Although perceived discrimination remained significantly associated with poorer mental health after accounting for loneliness, the strength of this direct association was weaker among individuals reporting higher levels of perceived social support. Conversely, perceived discrimination was more strongly associated with depressive and anxiety symptoms among individuals reporting lower levels of support. These findings suggest that perceived social support may reduce the psychological impact of discriminatory experiences beyond its role in the loneliness pathway. This buffering pattern appeared somewhat stronger for anxiety symptoms than depressive symptoms, although differences across outcomes were not directly tested.

This pattern is consistent with the stress-buffering model, which proposes that social support can reduce the negative psychological impact of stressful experiences (Cohen & Wills, 1985; Cohen, 2004). Minority stress theory similarly emphasizes that coping and social resources shape how stigma-related stressors affect mental health (Meyer, 2003). In the present study, perceived social support reflected the perceived availability of emotional and instrumental resources, including reassurance, understanding, companionship, and practical assistance. In the context of discrimination, these forms of support may help individuals feel validated, cared for, and less alone when coping with stigmatizing experiences. Supportive relationships may also help individuals interpret discrimination as a reflection of external prejudice rather than personal inadequacy, reducing the likelihood that these experiences are internalized and associated with depressive or anxiety symptoms (Major & O'Brien, 2005; Meyer, 2003).

These findings also align with prior research among sexual and gender minority populations, where social support has been identified as an important protective factor in the context of minority stress. Higher perceived social support has been associated with lower levels of depression, anxiety, suicidality, and nonsuicidal self-injury across diverse SM samples (Bauer et al., 2015; Boza & Nicholson Perry, 2014; Budge et al., 2013; Pflum et al., 2015). Emerging evidence also suggests that social support may buffer the effects of stigma-related stress. For example, social support has been shown to attenuate associations between LGBTQ-related microaggressions and depressive symptoms (Matijczak et al., 2021), while lower support has been associated with stronger links between discrimination and suicidality among transgender individuals (Trujillo et al., 2016). Additional work similarly suggests that social support may moderate associations between minority stressors and adverse mental health outcomes among LGBTQ populations (Li et al., 2024).

Overall, these findings suggest that perceived social support may play an important protective role for SM individuals exposed to discrimination. Whereas Hypothesis 2 examined whether support weakened the association between loneliness and psychological distress, Hypothesis 3 suggests that support may also reduce the direct psychological impact of discrimination itself. Specifically, perceived discrimination was less strongly associated with depressive and anxiety symptoms among individuals with higher levels of support, highlighting the potential importance of supportive relationships in reducing vulnerability to stigma-related distress.

Hypothesis 4

It was hypothesized that the direct association between perceived discrimination and depressive and anxiety symptoms would be stronger among individuals who reported weight-related discrimination than among those who did not. This hypothesis was supported across both outcome models, suggesting that weight-related discrimination may intensify the psychological burden associated with broader discriminatory experiences. Although greater perceived discrimination was associated with poorer mental health across the full sample, its associations with depressive and anxiety symptoms were stronger among participants who also reported weight-related discrimination. This pattern suggests that exposure to weight-related discrimination may increase vulnerability to the psychological effects of discrimination more broadly. The moderating effect appeared somewhat stronger for anxiety symptoms than for depressive symptoms, although the magnitude of the effects across outcomes was not directly compared.

Again, these findings are consistent with minority stress and intersectionality-informed perspectives, which suggest that individuals exposed to multiple forms of stigma may experience

overlapping stressors that contribute to psychological burden (Crenshaw, 1991; Hatzenbuehler, 2009; Meyer, 2003). Minority stress theory proposes that marginalized individuals are exposed not only to external stressors, such as discrimination and prejudice, but also to internal psychological responses to these experiences, including heightened vigilance, expectations of rejection, and chronic anticipatory stress, all of which may contribute to poorer mental health outcomes (Meyer, 2003). Within this framework, weight-related discrimination may represent more than an additional source of stigma-related stress by shaping how broader discriminatory encounters are interpreted, emotionally experienced, and internalized.

Several stigma-related processes may help explain this moderating effect. Weight stigma has been linked to shame, internalized stigma, body dissatisfaction, self-criticism, and maladaptive coping responses, all of which are associated with poorer mental health (Pearl & Puhl, 2018; Simone et al., 2020). Repeated exposure to weight-based mistreatment may also increase vigilance, expectations of rejection, and sensitivity to social threat, leaving individuals more likely to anticipate negative evaluation or exclusion in future interactions (Major & O'Brien, 2005; Pinel, 1999). From a stress and coping perspective, these experiences may heighten the perceived threat of discriminatory encounters, reduce perceived coping capacity, or make subsequent discrimination feel more personally connected to prior stigmatizing experiences (Lazarus & Folkman, 1984). Thus, weight-related discrimination may not simply add another source of stress, but may also intensify the emotional and cognitive impact of discrimination more broadly.

This interpretation is consistent with the finding that weight-related discrimination strengthened the direct association between perceived discrimination and psychological distress. The observed interaction may reflect processes involving emotional distress, threat sensitivity,

shame, self-criticism, and anticipatory stress, which may increase vulnerability to the psychological effects of discriminatory experiences (Major & O'Brien, 2005; Meyer, 2003; Pearl & Puhl, 2018; Simone et al., 2020). These processes may help explain why perceived discrimination was more strongly associated with psychological distress among individuals who also reported weight-related discrimination, suggesting that weight-related discrimination may intensify the psychological burden associated with broader discriminatory experiences.

These findings may be especially relevant within SM populations, where body image, appearance, and weight-related concerns may carry heightened interpersonal and social salience, though these experiences likely vary across subgroups. Prior research has documented elevated body dissatisfaction, disordered eating behaviors, unhealthy weight-control practices, and appearance-related concerns across several SM populations relative to heterosexual peers (Austin et al., 2009; Austin et al., 2013; Diemer et al., 2015; Hadland et al., 2014; Meneguzzo et al., 2018; Panza et al., 2021). For some SM individuals, body size and appearance may be closely tied to perceived attractiveness, belonging, social acceptance, and interpersonal value. Within this context, weight-related discrimination may be particularly salient not only because it reflects another form of stigma, but also because it may target domains closely connected to social safety and self-worth.

Taken together, these findings suggest that weight-related discrimination may intensify the psychological burden of broader discriminatory experiences among SM individuals. By demonstrating that the association between perceived discrimination and depressive and anxiety symptoms was stronger among those who reported weight-related discrimination, the present results highlight the importance of considering intersecting forms of stigma when examining mental health risk in marginalized populations.

Strengths

The present study has several strengths. One important strength is its focus on SM individuals, a population that continues to experience significant mental health disparities while remaining underrepresented in large-scale health research. Another strength is the use of a large national sample drawn from the All of Us Research Program, which allowed for the examination of complex relationships, including mediation, moderation, and moderated mediation pathways, within a relatively diverse sample of SM adults. This study also contributes to a relatively understudied area within the All of Us dataset, as the mental health measures included in the present analyses were added more recently. As a result, this study is among the first to examine these psychosocial relationships within an SM sample using this dataset, offering a more integrated understanding of how loneliness, perceived social support, and weight-related discrimination relate to depressive and anxiety symptoms among SM individuals.

Limitations

Despite its contributions, the present study has several limitations. First, the cross-sectional design limits conclusions regarding causality and the temporal ordering of the observed relationships. Although the proposed model was informed by minority stress theory and prior research, the direction of these associations cannot be definitively established. For example, while discrimination was conceptualized as contributing to loneliness and internalizing distress, individuals experiencing elevated depressive or anxiety symptoms may also perceive, interpret, or recall social experiences differently. Also, loneliness itself may shape perceptions of discrimination or available social support. Future longitudinal research would help clarify how these relationships develop over time.

Several measurement-related limitations should also be acknowledged. All variables were assessed using self-report measures, which may have been influenced by recall bias, shared method variance, or other response-related factors. Discrimination was measured using the Everyday Discrimination Scale (EDS), which captures broad experiences of unfair treatment but does not isolate discrimination attributable to a single source. Since participants could endorse multiple perceived reasons for discriminatory experiences, distinguishing whether reported experiences were specifically related to sexual orientation, gender identity, weight, race, or other marginalized identities is challenging. Consequently, it is difficult to determine the extent to which observed associations reflect the influence of any single form of discrimination versus the combined effects of multiple stigmatized identities and experiences. Perceived social support was also assessed as a general construct, limiting the ability to determine whether different sources of support, such as family, peers, romantic partners, or LGBTQ+ community networks, may function differently in relation to mental health outcomes.

Sample-related limitations should also be considered. As this study relied on secondary data from the All of Us Research Program, inclusion was limited to participants who completed the relevant study measures. Since the PHQ-9 and GAD-7 were introduced later in the data collection process, some otherwise eligible participants were excluded from the final analytic sample. Although the sample included diversity across sexual orientation, gender identity, age, and socioeconomic background, it remained predominantly White, with some racial, ethnic, and gender-diverse groups represented in smaller numbers. Certain demographic variables were also simplified for analytic purposes, potentially reducing sensitivity to meaningful subgroup differences.

Similarly, combining diverse SM identities into a broader analytic category may have limited the ability to detect meaningful differences across specific subpopulations. Experiences of discrimination, loneliness, social support, weight-related stigma, and psychological distress may vary across sexual and gender minority identities, as well as across intersecting demographic contexts. As a result, the associations observed in the present study may differ across SM groups. Future research with larger and more diverse subgroup representation would help clarify whether these relationships differ across more specific sexual and gender minority populations.

Clinical Implications

The findings of the present study highlight several potential clinical implications. The observed associations among discrimination, loneliness, social support, and internalizing distress suggest that mental health concerns among SM individuals may be better understood when psychosocial stressors are considered alongside symptom presentation. In clinical settings, particularly primary care, behavioral health, and integrated healthcare environments, broader assessment of discrimination experiences, social isolation, and perceived social support may provide useful context for understanding depressive and anxiety symptoms. Given that primary care and other general healthcare settings often serve as common points of contact within the healthcare system, these settings may offer opportunities for earlier recognition of psychological distress and related psychosocial concerns.

The findings also suggest several potential intervention targets. Perceived social support emerged as a protective factor, suggesting that interventions aimed at strengthening affirming relationships, social connectedness, and community belonging may be beneficial for SM individuals experiencing loneliness or minority stress. Findings related to weight-related

discrimination further suggest that overlapping forms of stigma may contribute to greater emotional distress for some individuals, highlighting the importance of considering both minority stress and weight-based stigma in clinical care. More broadly, LGBTQ+ affirming and stigma-informed approaches may help foster clinical environments that support trust, engagement, and help-seeking while increasing provider awareness of social stressors that may shape emotional well-being

Future Directions

Considering the findings and limitations of the present study, future research should prioritize longitudinal designs to better understand how changes in discrimination, loneliness, social support, and other psychosocial stressors relate to changes in mental health outcomes over time. Future work may also benefit from examining additional mental health outcomes beyond depression and anxiety symptoms, such as suicidality-related outcomes, particularly given the elevated prevalence of suicidal ideation and suicide attempts documented among SM populations, to more comprehensively capture the breadth of psychological risk. More refined measurement of discrimination experiences is also needed to better distinguish between specific sources of stigma, such as sexual orientation, gender identity, weight, race, and other marginalized identities. More precise assessment of these experiences, including weight-related stigma, may help clarify how different forms of discrimination uniquely or jointly relate to mental health outcomes. Finally, future research should better capture diversity within SM populations by examining distinct subgroups and improving representation across gender, racial, and ethnic identities, which may help clarify how these factors relate to mental health across groups.

Conclusion

This study highlights the complex ways in which perceived discrimination, loneliness, social support, and weight-related discrimination are associated with depressive and anxiety symptoms among SM adults. Consistent with minority stress theory, findings suggest that discrimination is associated with poorer mental health both directly and indirectly through loneliness. Perceived social support appeared to buffer these associations, weakening both the loneliness-symptom link and the direct association between discrimination and psychological distress. Weight-related discrimination also intensified the association between perceived discrimination and mental health symptoms, underscoring the importance of considering overlapping forms of stigma when examining mental health among SM adults. Overall, this study contributes to the existing literature by providing a more integrated understanding of how stigma-related stressors and interpersonal resources may jointly shape mental health. Future longitudinal research with more diverse samples may help clarify these pathways and inform more tailored, stigma-sensitive interventions.

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Appendix A. Measures

Demographics Questions

Which categories describe you?

- American Indian or Alaska Native
- Asian
- Black, African American, or African
- Hispanic, Latino, or Spanish
- Middle Eastern or North African
- Native Hawaiian or Other Pacific Islander
- White
- None of these fully describe me
- Prefer not to answer

What terms best express how you describe your gender identity?

- Man
- Woman
- Non-binary
- Transgender
- None of these describe me, and I'd like to consider additional options
- Prefer not to answer

Branching Logic: when "nonbinary," "transgender," or "None of these describe me, and I'd like to consider additional options" selected, then:

Are any of these a closer description to your gender identity?

- Trans man/Transgender Man/FTM
- Trans woman/Transgender Woman/MTF
- Genderqueer
- Genderfluid
- Gender variant
- Two-spirit
- Questioning or unsure of your gender identity
- None of these describe me, and I want to specify

Which of the following best represents how you think of yourself?

- Gay
- Lesbian
- Straight that is, not gay or lesbian, etc.
- Bisexual
- None of these describe me, and I'd like to see additional options

Branching Logic: when “none of these describe me, and I'd like to see additional options” is selected, then:

Are any of these a closer description of how you think of yourself?

- Queer
- Polysexual, omnisexual, sapiosexual or pansexual
- Asexual
- Two-spirit
- Have not figured out or are in the process of figuring out your sexuality
- Mostly straight, but sometimes attracted to people of your own sex
- Do not think of yourself as having a sexuality
- Do not use labels to identify yourself
- Don't know the answer
- Prefer not to answer

Generalized Anxiety Disorder Scale (GAD-7)

Everyone worries from time to time. The next questions have to do with anxiety and feelings of worry. Your answers may help researchers better understand how anxiety affects physical and mental health. Sharing your experiences could also improve how to identify and treat anxiety for more people.

Over the last 2 weeks, how often have you been bothered by the following problems?

Feeling nervous, anxious, or on edge

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

Not being able to stop or control worrying

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

Worrying too much about different things

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

Trouble relaxing

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

Being so restless that it's hard to sit still

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

Becoming easily annoyed or irritable

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problems?

Feeling afraid as if something awful might happen

- Not at all
- Several days
- More than half the days
- Nearly every day

Patient Health Questionnaire (PHQ-9)

Everyone experiences sadness every now and then. When a person is sad for a long time, that may be a sign they need treatment. The next questions have to do with feelings of depression. The questions you answer today could lead to tomorrow's treatment.

Over the last 2 weeks, how often have you been bothered by the following problem:

Little interest or pleasure in doing things

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problem:

Feeling down, depressed, or hopeless

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problem:

Trouble falling or staying asleep, or sleeping too much

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problem:

Feeling tired or having little energy

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problem:

Poor appetite or overeating

- Not at all
- Several days
- More than half the days
- Nearly every day

Over the last 2 weeks, how often have you been bothered by the following problem:

Feeling bad about yourself or that you are a failure or have let yourself or your family down

- Not at all
- Several days
- More than half the days
- Nearly every day

**Over the last 2 weeks, how often have you been bothered by the following problem:
Trouble concentrating on things, such as reading the newspaper or watching television**

- Not at all
- Several days
- More than half the days
- Nearly every day

**Over the last 2 weeks, how often have you been bothered by the following problem:
Moving or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual**

- Not at all
- Several days
- More than half the days
- Nearly every day

**Over the last 2 weeks, how often have you been bothered by the following problem:
Thoughts that you would be better off dead or of hurting yourself in some way**

- Not at all
- Several days
- More than half the days
- Nearly every day

Modified Medical Outcomes Study Social Support Survey (mMOS-SS)

Supportive relationships may play a key role in helping people live healthy lives. Answering the following questions may help researchers learn more about the potential health benefits of supportive relationships.

People sometimes look to others for friendship, help, or other types of support. Choose the answer that best describes how often you can find support if you need it?

Someone to help you if you were confined to bed

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

Someone to take you to the doctor if you need it

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

Someone to prepare your meals if you were unable to do it yourself

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

Someone to help with daily chores if you were sick

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

Someone to have a good time with

- None of the time
- A little of the time
- Some of the time
- Most of the time

- All of the time

Someone to turn to for suggestions about how to deal with a personal problem

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

Someone who understands your problems

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

Someone to love and make you feel wanted

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

UCLA Loneliness Scale short form (ULS-8)

We would like to ask you some questions about your relationships with others. Choose the answer that is true for you.

I lack companionship

- Never
- Rarely
- Sometimes
- Often

There is no one I can turn to

- Never
- Rarely
- Sometimes
- Often

I am an outgoing person

- Never
- Rarely
- Sometimes
- Often

I feel left out

- Never
- Rarely
- Sometimes
- Often

I feel isolated from others

- Never
- Rarely
- Sometimes
- Often

I can find companionship when I want it

- Never
- Rarely
- Sometimes
- Often

I am unhappy being so withdrawn

- Never

- Rarely
- Sometimes
- Often

People are around me but not with me

- Never
- Rarely
- Sometimes
- Often

Everyday Discrimination Scale (EDS)

People who experience discrimination may be at higher risk of negative health outcomes.

Sharing your experiences with discrimination in everyday life and in healthcare settings may help researchers learn how to reduce negative health outcomes associated with discrimination.

The next statements describe how others may treat you. In your day-to-day life, how often do any of these happen to you?

You are treated with less courtesy than other people are.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

You are treated with less respect than other people are.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

You receive poorer service than other people at restaurants or stores.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

People act as if they think you are not smart.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

People act as if they are afraid of you.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

People act as if they think you are dishonest.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

People act as if they're better than you are.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

You are called names or insulted.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

You are threatened or harassed.

- Almost every day
- At least once a week
- A few times a month
- A few times a year
- Less than once a year
- Never

What do you think is the main reason for these experiences? Select all that apply.

- Your Ancestry or National Origins

- Your Gender
- Your Race
- Your Age
- Your Religion
- Your Height
- Your Weight
- Some Other Aspect of Your Physical Appearance
- Your Sexual Orientation
- Your Education or Income Level

Appendix B. Demographic Characteristics

Table 1

Means, Standard Deviations, and Percentages of Sample Demographic Variables

Variables	M (SD)	N (% of total sample)
Age	49.6 (16.2)	
Education Level		
High school/GED		738 (8.7)
Some college		2,415 (28.4)
Bachelor's degree		2,603 (30.6)
Graduate degree		2,483 (29.2)
Income		
< \$25,000		1,863 (22.0)
\$25,000–49,999		1,717 (20.2)
\$50,000–74,999		1,287 (15.2)
\$75,000–99,999		928 (10.9)
\$100,000–149,999		1,093 (12.9)
\$150,000–199,999		507 (6.0)
≥ \$200,000		547 (6.4)
Race		
American Indian/Alaskan Native		66 (0.8)
Asian/Asian American		211 (2.5)
Black/African American		403 (4.8)
Middle Eastern/North African		37 (0.4)
Pacific Islander/Native Hawaiian		1 (<0.1)
White/European American		6,406 (75.4)
Other/Mixed Racial Identity		1,276 (15.0)
Ethnicity		
Non-Hispanic/Latino		7,391 (87.0)
Hispanic/Latino		896 (10.5)
Other		113 (1.3)
Gender Identity		
Man		2,235 (26.3)
Woman		4,902 (57.7)
Non-binary		490 (5.8)
Transgender		138 (1.6)
Other		659 (7.8)
Sexual Identity		
Bisexual		3,490 (41.1)
Gay		1,589 (18.7)
Lesbian		976 (11.5)
Queer		386 (4.5)
Pansexual / Polysexual /		
Omnisexual / Sapiosexual		364 (4.3)
Asexual		291 (3.4)
Other / Self-Described		580 (6.8)

Appendix C. Reported Attributions for Perceived Discrimination

Table 2

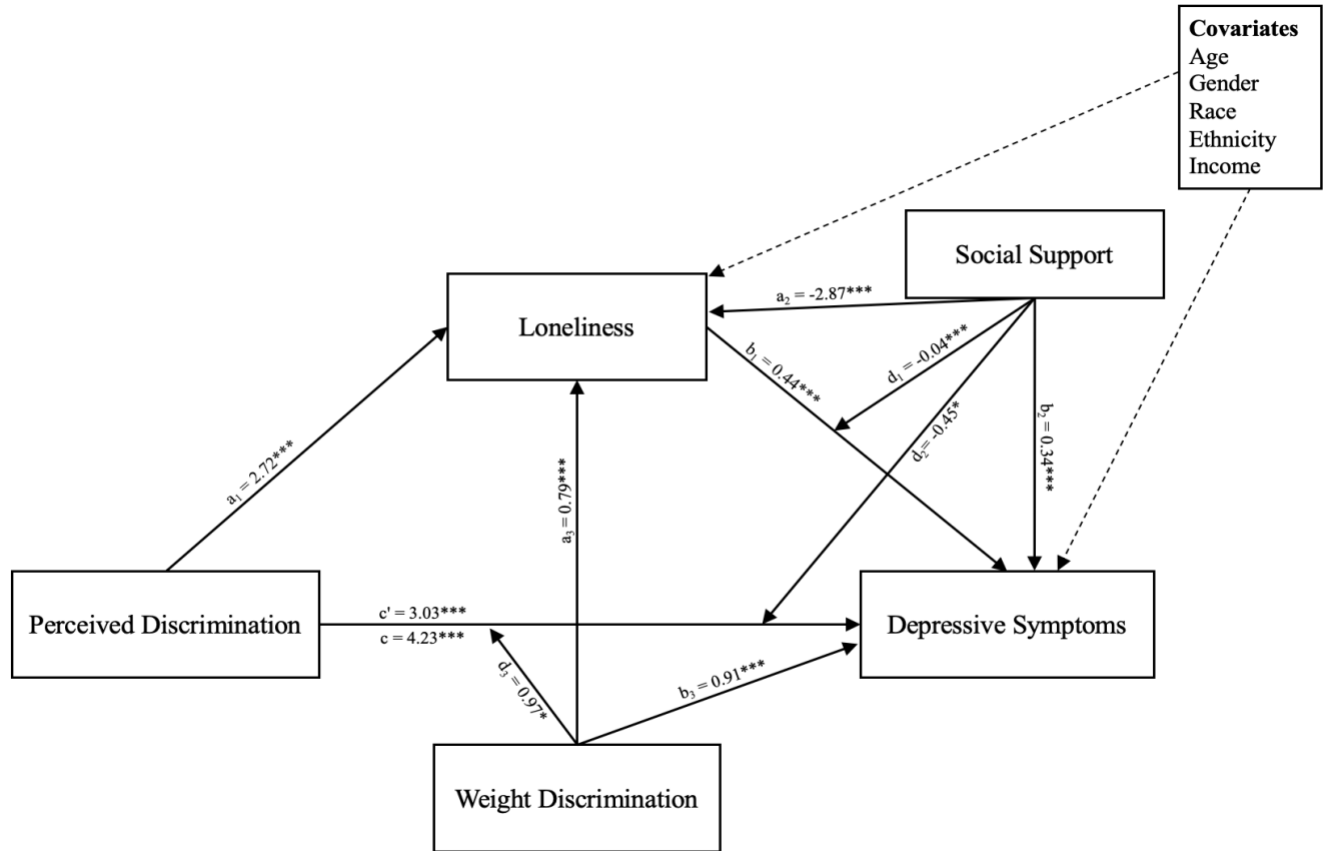
Reported Reasons for Discriminatory Experiences (N = 8,493)

Variables	N (% of total sample)
Gender	4,802 (56.5)
Sexual orientation	3,360 (39.6)
Age	2,986 (35.2)
Weight	2,303 (27.1)
Other physical appearance	1,970 (23.2)
Education or income level	1,659 (19.5)
Race	1,546 (18.2)
Other	1,502 (17.7)
Ancestry or national origins	1,020 (12.0)
Height	816 (9.6)
Religion	574 (6.8)

Appendix D. Structural Equation Model Figures

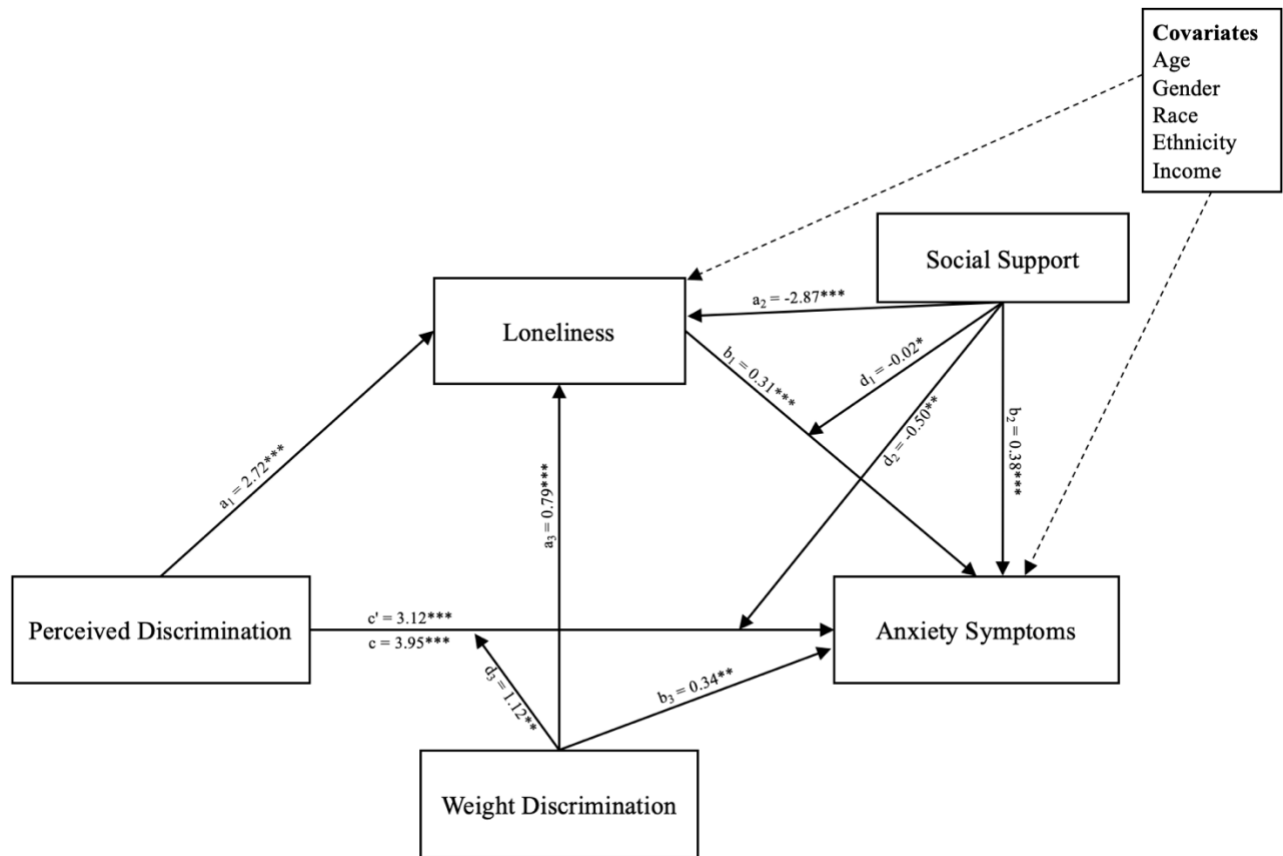
Figure 1

Moderated Mediation Model Predicting Depressive Symptoms



Note. Solid lines represent estimated structural paths, and dashed lines represent covariate effects included in the model. Paths labeled a represent the first stage of the mediational pathway, paths labeled b represent the second stage, paths labeled c represent direct effects, and paths labeled d represent moderation effects. $p < .05$ (*), $p < .001$ (***)

Figure 2
Moderated Mediation Model Predicting Anxiety Symptoms



Note. Solid lines represent estimated structural paths, and dashed lines represent covariate effects included in the model. Paths labeled a represent the first stage of the mediational pathway, paths labeled b represent the second stage, paths labeled c represent direct effects, and paths labeled d represent moderation effects. $p < .05$ (*), $p < .01$ (**), $p < .001$ (***)

Appendix E. Conditional Effects for Depression and Anxiety Models

Table 3

Conditional Direct, Indirect, and Total Effects of Perceived Discrimination on Depressive Symptoms Across Levels of Social Support and Weight-Related Discrimination

Social Support	Weight-Related Discrimination	Direct Effect, b [95% CI]	Indirect Effect, b [95% CI]	Total Effect, b
25th percentile	Not endorsed	3.07 [2.43, 3.64]	1.28 [1.10, 1.47]	4.35
25th percentile	Endorsed	4.04 [3.18, 4.73]	1.28 [1.10, 1.47]	5.32
50th percentile	Not endorsed	2.68 [2.19, 3.23]	1.18 [1.02, 1.33]	3.85
50th percentile	Endorsed	3.65 [2.76, 4.43]	1.18 [1.02, 1.33]	4.83
75th percentile	Not endorsed	2.34 [1.76, 3.00]	1.09 [0.94, 1.23]	3.43
75th percentile	Endorsed	3.31 [2.37, 4.23]	1.09 [0.94, 1.23]	4.40

Note. Conditional effects were estimated at the 25th, 50th, and 75th percentiles of perceived social support. Weight-related discrimination indicates whether participants endorsed weight as a reason for experiencing discrimination. Direct effects represent the conditional association between perceived discrimination and depressive symptoms after accounting for loneliness. Indirect effects represent the conditional pathway through loneliness. Total effects represent the sum of the corresponding direct and indirect effects. Confidence intervals for the direct and indirect effects are percentile bootstrap confidence intervals.

Table 4

Conditional Direct, Indirect, and Total Effects of Perceived Discrimination on Anxiety Symptoms Across Levels of Social Support and Weight-Related Discrimination

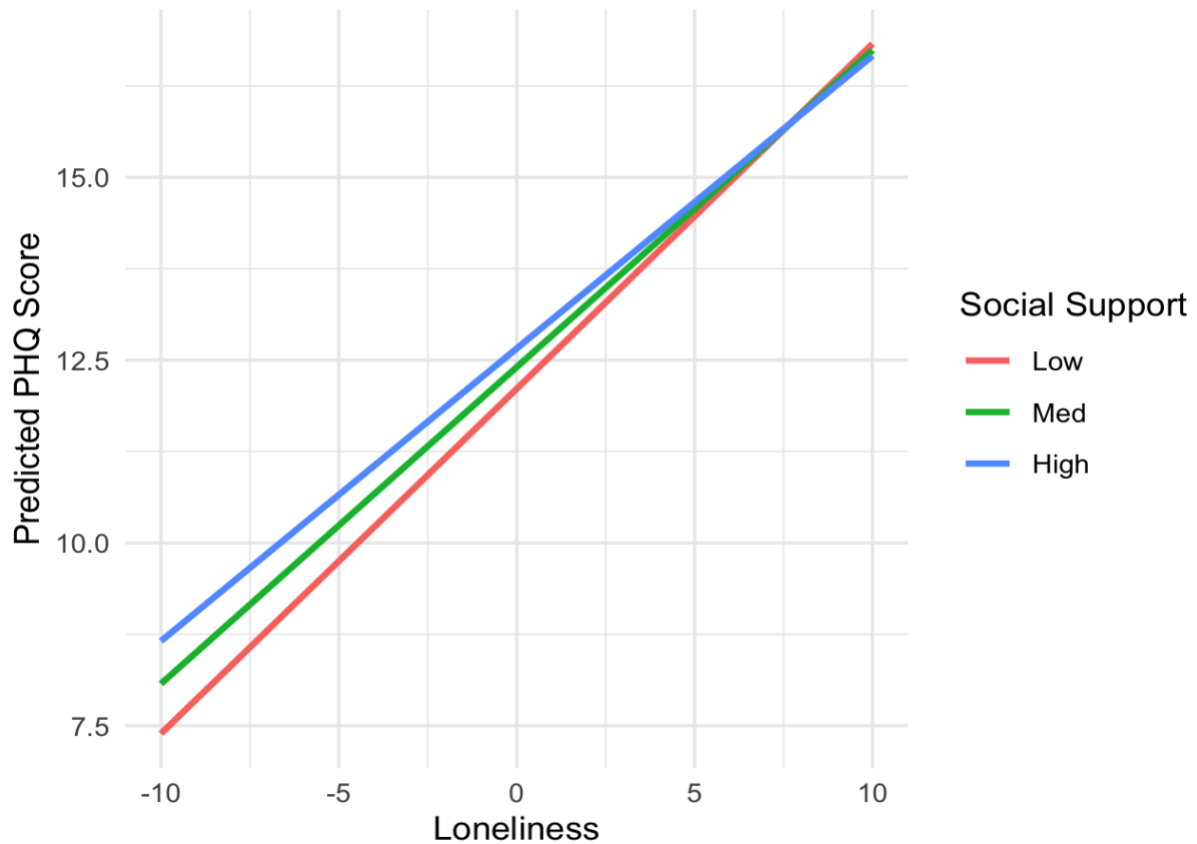
Social Support	Weight-Related Discrimination	Direct Effect, b [95% CI]	Indirect Effect, b [95% CI]	Total Effect, b
25th percentile	Not endorsed	3.15 [2.61, 3.67]	0.87 [0.72, 1.04]	4.03
25th percentile	Endorsed	4.27 [3.60, 4.96]	0.87 [0.72, 1.04]	5.14
50th percentile	Not endorsed	2.72 [2.26, 3.15]	0.82 [0.69, 1.00]	3.54
50th percentile	Endorsed	3.84 [2.95, 4.39]	0.82 [0.69, 1.00]	4.66
75th percentile	Not endorsed	2.35 [1.72, 2.84]	0.77 [0.66, 0.98]	3.12
75th percentile	Endorsed	3.47 [2.35, 4.08]	0.77 [0.66, 0.98]	4.24

Note. Conditional effects were estimated at the 25th, 50th, and 75th percentiles of perceived social support. Weight-related discrimination indicates whether participants endorsed weight as a reason for experiencing discrimination. Direct effects represent the conditional association between perceived discrimination and anxiety symptoms after accounting for loneliness. Indirect effects represent the conditional pathway through loneliness. Total effects represent the sum of the corresponding direct and indirect effects. Confidence intervals for the direct and indirect effects are percentile bootstrap confidence intervals.

Appendix F. Interaction Plots for Depression Models

Figure 3.

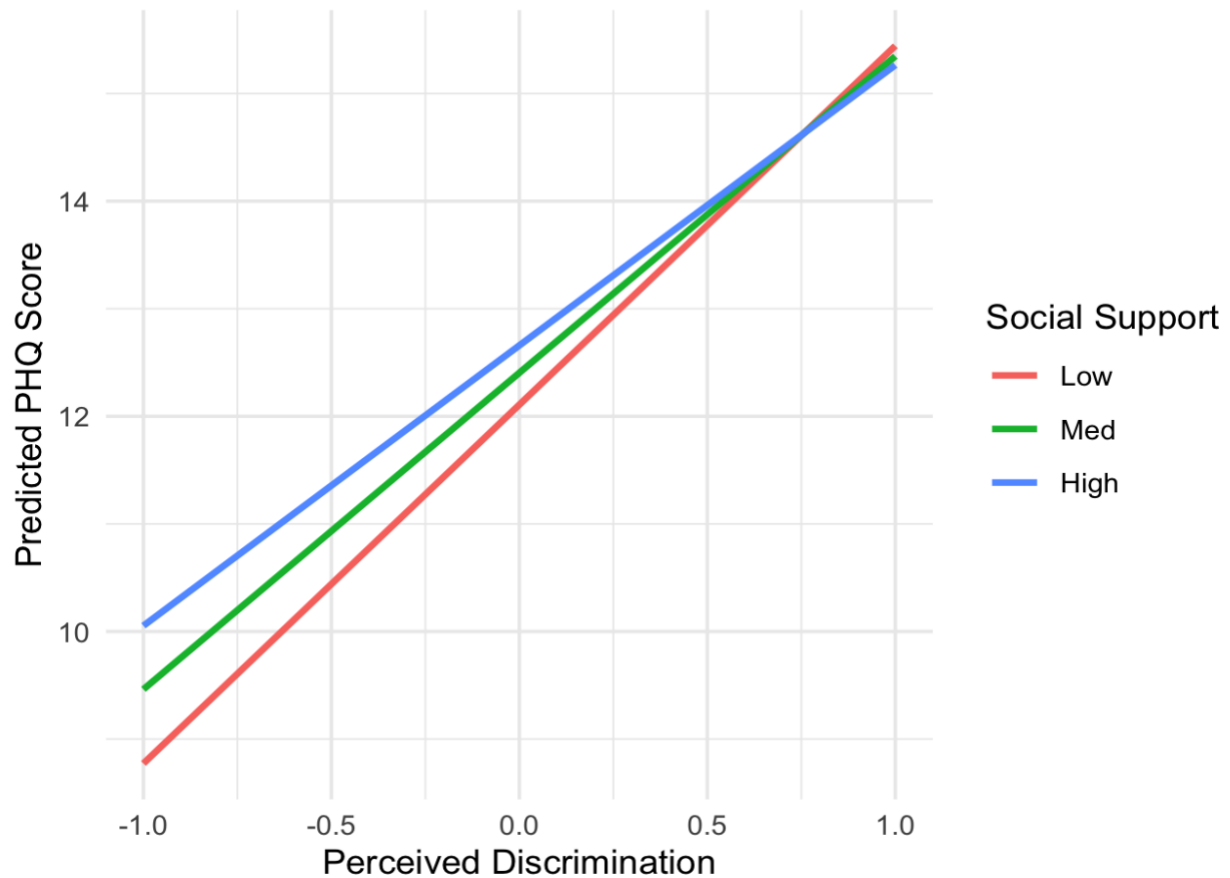
Interaction Between Loneliness and Social Support Predicting Depressive Symptoms



Note. Predicted PHQ-9 depressive symptom scores across low, moderate, and high levels of loneliness. Higher social support weakened the positive association between loneliness and depressive symptoms. Estimates are adjusted for age, gender, race, ethnicity, income, loneliness, and weight-related discrimination.

Figure 4.

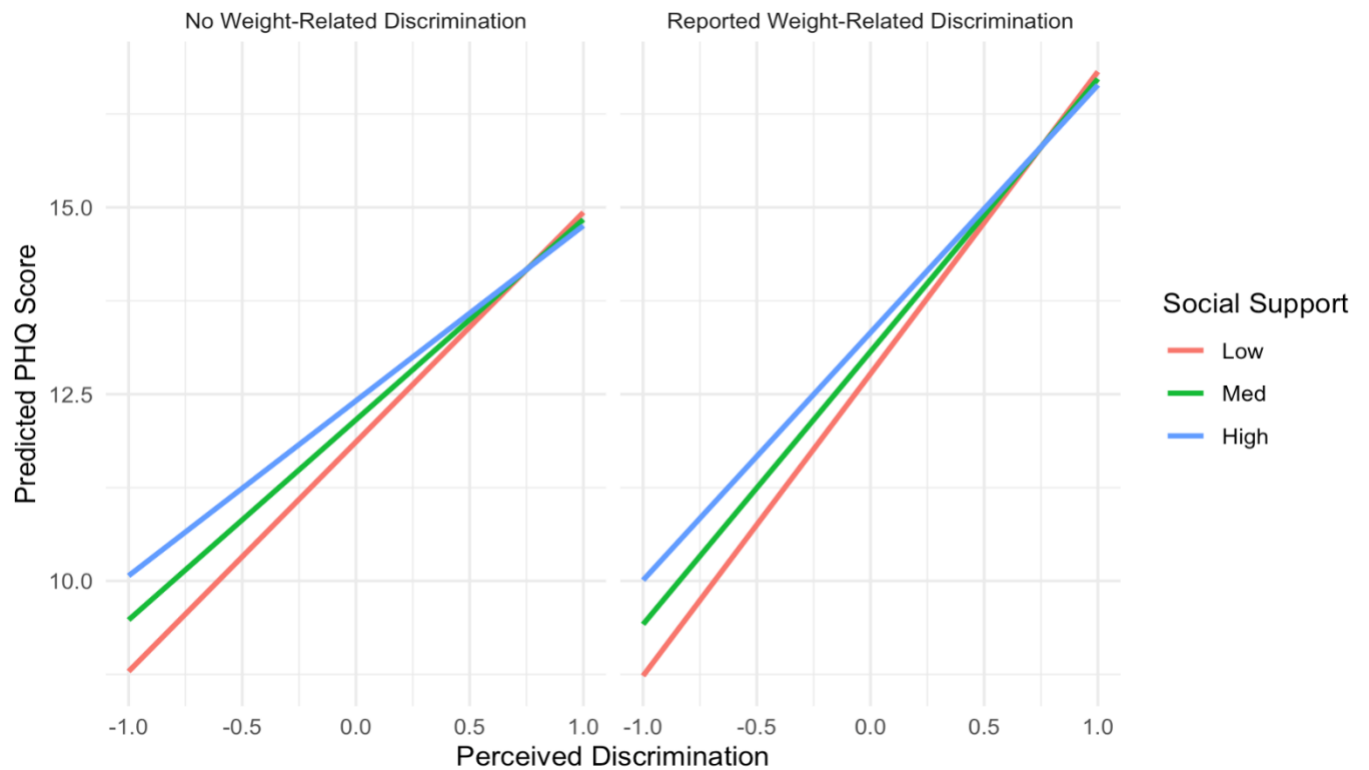
Interaction Between Perceived Discrimination and Social Support Predicting Depressive Symptoms



Note. Predicted PHQ-9 depressive symptom scores across low, moderate, and high levels of social support. Higher social support weakened the positive association between perceived discrimination and depressive symptoms. Estimates are adjusted for age, gender, race, ethnicity, income, loneliness, and weight-related discrimination.

Figure 5.

Conditional Associations Between Perceived Discrimination and Social Support Predicting Depressive Symptoms by Weight-Related Discrimination Status

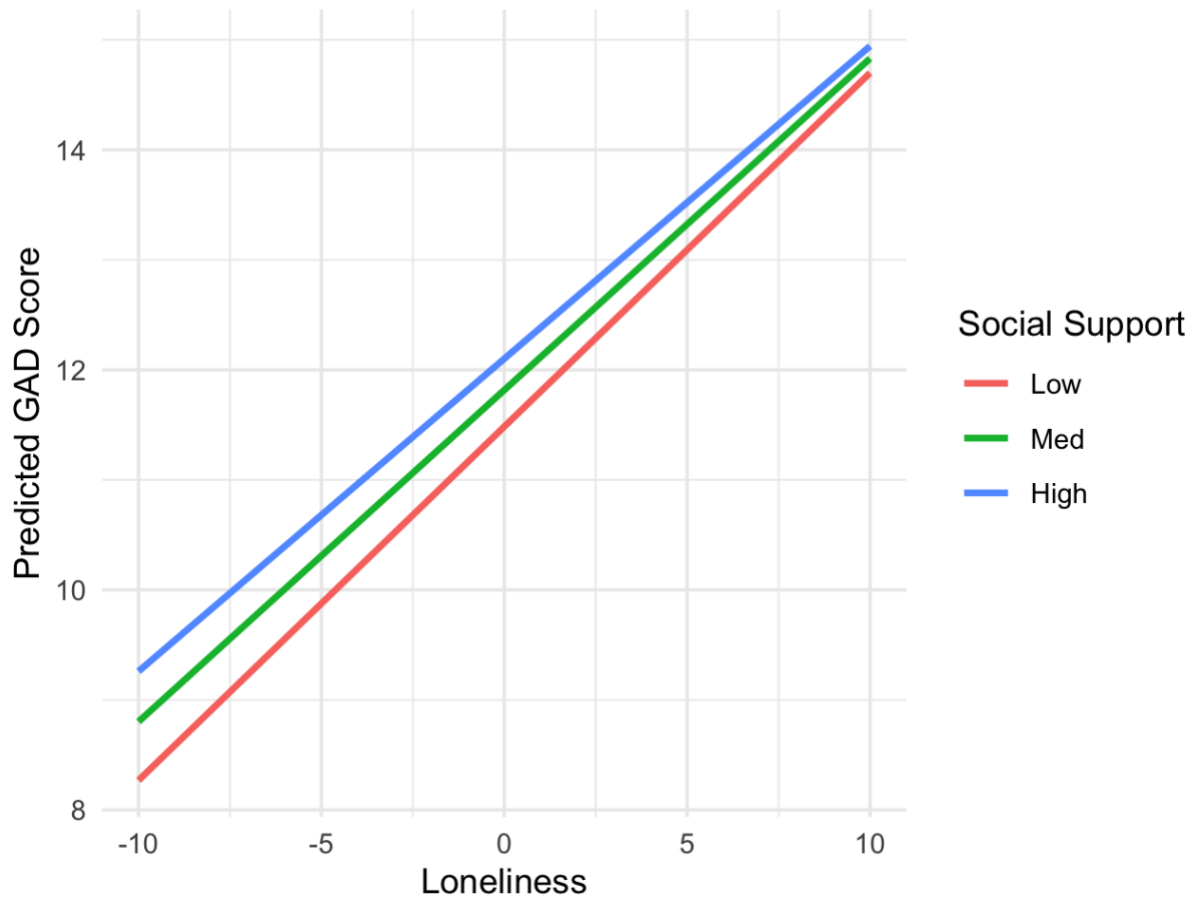


Note. Predicted PHQ-9 depressive symptom scores across low, moderate, and high levels of perceived social support, shown separately for participants who did and did not report weight-related discrimination. Higher social support weakened the positive association between perceived discrimination and depressive symptoms, whereas reported weight-related discrimination was associated with a stronger discrimination-depression association. Estimates are adjusted for age, gender, race, ethnicity, income, and loneliness.

Appendix G. Interaction Plots for Anxiety Models

Figure 6.

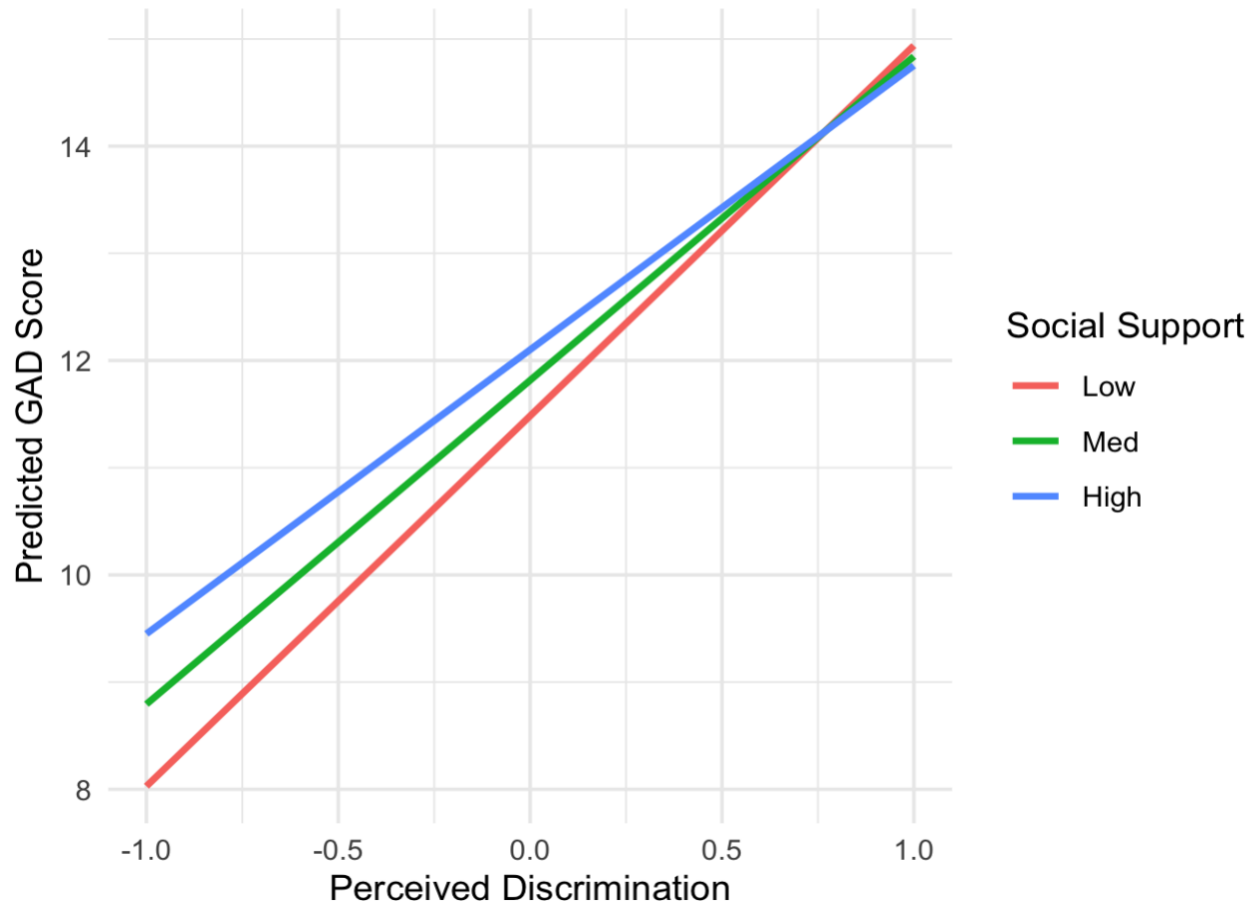
Interaction Between Loneliness and Social Support Predicting Anxiety Symptoms



Note. Predicted GAD-7 anxiety symptom scores across low, moderate, and high levels of loneliness. Higher social support weakened the positive association between loneliness and anxiety symptoms, controlling for age, gender, race, ethnicity, income, perceived discrimination, and weight-related discrimination.

Figure 7.

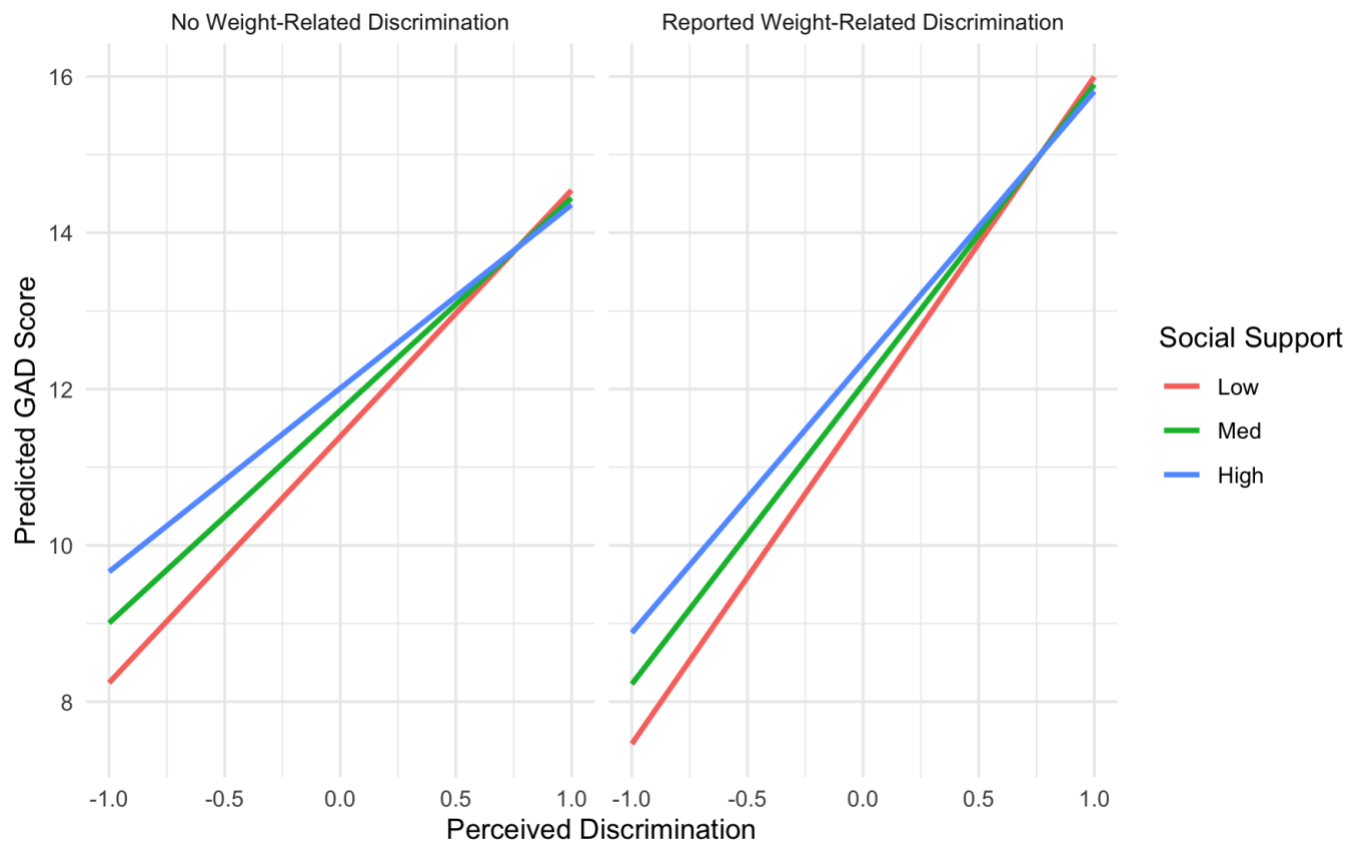
Interaction Between Perceived Discrimination and Social Support Predicting Anxiety Symptoms



Note. Predicted GAD-7 anxiety symptom scores across low, moderate, and high levels of social support. Higher social support weakened the positive association between perceived discrimination and anxiety symptoms, controlling for age, gender, race, ethnicity, income, loneliness, and weight-related discrimination.

Figure 8.

Conditional Associations Between Perceived Discrimination and Social Support Predicting Anxiety Symptoms by Weight-Related Discrimination Status



Note. Predicted GAD-7 anxiety symptom scores across low, moderate, and high levels of perceived social support, shown separately for participants who did and did not report weight-related discrimination. Higher social support weakened the positive association between perceived discrimination and anxiety symptoms, whereas reported weight-related discrimination was associated with a stronger discrimination-anxiety association. Estimates are adjusted for age, gender, race, ethnicity, income, and loneliness.