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Resilience and Health Outcomes of Sexual Minority Middle-Aged and Older Adults

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Resilience and Health Outcomes of

Sexual Minority Middle-Aged and Older Adults

by

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ABSTRACT

While research on lesbian, gay, and bisexual (hereafter referred to as sexual minority) middle-aged and older adults has increased over the past decade, there is still a critical need for more research on the health and resilience in this growing subpopulation. Research has provided evidence that sexual minority adults have an increased risk of negative health outcomes when compared to heterosexual adults. Research has also demonstrated possible resilience in sexual minority middle-aged and older adults; however, few studies have measured resilience in middle-aged and older adults. Gaining a better understanding of resilience in sexual minority adults may help identify modifiable factors that can be targeted to potentially improve the health of sexual minority older adults as well as to prevent or delay negative health outcomes in younger sexual minority individuals. It may also help identify sexual minority individuals who are more at risk of negative health outcomes.

The overarching goal of the three studies in this dissertation was to examine the relationship between resilience and health disparities and whether the relationship is different for sexual minority middle-aged and older adults compared to their heterosexual counterparts. Study 1 used data from MIDUS 2 and MIDUS Refresher to identify personality profiles, including a resilient personality profile, and examined differences in health risk/promoting behaviors among the personality profiles in a sample of sexual minority (n=159) and propensity matched heterosexual (n=318) middle-aged and older adults. The results found that participants with a Resilient personality were not less likely to engage in health risk behaviors but were significantly

more likely to report engaging in more moderate physical activity than the other personality groups, regardless of sexual orientation. The results indicated that having a resilient personality was not more beneficial for the sexual minority group than it was for the heterosexual group.

Study 2 used data from MIDUS 1, MIDUS 2, and MIDUS 3 to examine the moderating effect of emotion-focused and problem-focused coping on the association between perceived daily discrimination and health outcomes over approximately 20 years in a sample of sexual minority (n=162) and propensity matched heterosexual (n=324) middle-aged and older adults. Results found that, for sexual minority participants, reporting higher perceived discrimination was associated with a greater number of chronic conditions at baseline, but was also associated with a significant decrease in the number of chronic conditions over time. For the heterosexual participants, both high and low perceived daily discrimination was associated with an increase in the number of chronic conditions over time. For both sexual minority and heterosexual participants, mental health decreased over time, regardless of perceived daily discrimination. The results of this study also found significant moderating effects of problem-focused and emotion-focused coping on the number of chronic conditions and self-rated mental health over time.

Study 3 used data from MIDUS 2 and MIDUS Refresher to examine the integrative effect of three conceptual dimensions of resilience (optimism, perceived control, and social support) on physical and mental health outcomes in a sample of sexual minority (n=164) and propensity matched heterosexual (n=238) middle-aged and older adults. The results found different results by sexual orientation. For sexual minority participants, perceived control had a significant negative association with the number of chronic conditions; optimism had a significant negative association with depressed affect plus anhedonia. For heterosexual participants, perceived control had a significant negative relationship with both the number of chronic conditions and

depressed affect plus anhedonia. The results also found different results by sexual minority subgroup. These results suggest that factors of resilience may differ by sexual orientation.

Overall, this dissertation provides insight into the association between resilience and the health of sexual minority middle-aged and older adults as well as differences compared to their heterosexual counterparts. The results of this dissertation provide evidence that potential adversity faced by sexual minority adults does not always result in negative health outcomes. Future research should further examine the strengths of sexual minority individuals as well as the health promoting pathways used to build resilience and age successfully.

CHAPTER ONE:
INTRODUCTION

The health of lesbian, gay, and bisexual (hereafter referred to as sexual minority) individuals was first identified as a public health priority in the United States by Healthy People 2020, a science-based report of national objectives aiming to improve the health of Americans (US Department of Health and Human Services, 2011). As a result, more research was conducted that documented sexual minority health disparities as well as potential protective and risk factors influencing the health of sexual minority people. Research assessing the health of sexual minority older adults have found results that suggest that sexual minority individuals may become resilient to negative influences (e.g., discrimination and stigma) affecting their health over time (Fredriksen-Goldsen, Kim, Bryan, et al., 2017; Nelson & Andel, 2020a, 2020b). However, very limited research has been conducted on resilience in sexual minority middle-aged and older adults, especially longitudinal research. Gaining a better understanding of resilience in sexual minority adults may help identify modifiable factors that can be targeted to potentially improve the health of sexual minority older adults as well as to prevent or delay negative health outcomes in younger sexual minority individuals. It may also help identify sexual minority individuals who are more at risk of negative health outcomes.

Defining and Measuring Resilience

In research, resilience is typically conceptualized as either an individual trait or as a dynamic process of adaptation to adversity (Chmitorz et al., 2018). Trait resilience is defined as a personality characteristic that promotes adaptation when facing hardships (Wagnild & Young,

1993). Individual characteristics such as hope or optimism are common examples of protective psychological factors that promote adaptation. Resilience as a trait suggests that it is a stable and enduring characteristic that can be used to identify at-risk individuals.

Resilience as a dynamic process is characterized by the utilization of resources and assets available to the individual to overcome adversities (Fergus & Zimmerman, 2005). Assets are individual internal factors like coping skills and self-efficacy; resources are external factors like social support. Resilience is often defined as the ability to bounce back. If an individual has adaptive coping skills or a support system to use when facing adversity, they will likely be able to bounce back or recover quickly from any adverse effects of hardships. Resilience as a process suggests that it is something that can be modified or taught to individuals.

Recent conceptualizations of resilience suggest that exposure to adversity is a prerequisite for developing resilience (Chmitorz et al., 2018). Exposure to stress or adversity can develop a resistance to the negative physical and mental health effects of future hardships. This is sometimes referred to as a "steeling effect" (Rutter, 2006). Sexual minority individuals may experience additional adversity or stressors due to individual and societal level stigma and discrimination based on their sexual orientation (Meyer, 2003). Due to the additional stress faced by sexual minority individuals, sexual minority individuals may experience a steeling effect and build resistance over time to the negative effects of minority stressors. Therefore, sexual minority individuals may experience an improvement in health as they age and build resilience.

In research on sexual minority middle-aged and older adults, there is limited research that has used some measure of resilience. Some studies have suggested possible resilience based on their results but did not include a resilience measure in the study (Fredriksen-Goldsen, Kim, Bryan, et al., 2017; Nelson & Andel, 2020a, 2020b). The studies that measured resilience either

used an established resilience scale (Downing Jr. et al., 2016; King & Orel, 2012; King & Richardson, 2016; Lassiter et al., 2019) or used a proxy variable for resilience such as psychological distress, compassion, or hardiness (Mereish & Poteat, 2015; Skinta et al., 2019; Winiker et al., 2019). Some qualitative studies identified factors of resilience such as community connectedness, self-acceptance, and effective coping strategies (Drabble et al., 2018; Levitt et al., 2016). The type of coping, whether it is maladaptive or adaptive, will likely influence whether a sexual minority individual is resilient. Individuals with higher resilience tend to adopt adaptive coping strategies such as positive reinterpretation, active coping, and planning (Sagone & De Caroli, 2014).

Resilience and Health in Sexual Minority Older Adults

Fredriksen-Goldsen (2014) found that most sexual minority older adults are aging well, despite having higher rates of poor physical and mental health than heterosexual older adults. Results from Caring and Aging with Pride, a national study of 2,560 sexual and gender minority adults, aged 50 to 95, found approximately 90 percent of the study's older adults had moderate levels of social support and were involved in leisure activities, and 80 percent engaged in physical activities. Most participants reported feeling satisfied with their lives despite the adversity they may encounter, suggesting that sexual minority older adults are resilient (Fredriksen-Goldsen, 2014).

Higher resilience has been found to be associated with better physical health in sexual minority adults. Downing Jr. et al. (2016) found that higher resilience was associated with better sleep quality among gay and bisexual men with HIV. Resilience has also been found to be associated with better mental health in sexual minority individuals. Resilience was found to be negatively associated with depression and mental distress, and positively related to psychological

health-related quality of life (Emlet et al., 2017; King & Orel, 2012; Winiker et al., 2019).

Minority stressors (i.e., internalized homophobia, discrimination, stigma) were also found to be

negatively associated with resilience or resilience proxy measures (King & Orel, 2012; King &

Richardson, 2016; Levitt et al., 2016; Mereish & Poteat, 2015).

Very few studies have examined sexual minority health and resilience longitudinally.

One study that examined the health of sexual minority and heterosexual adults over time (mean

age= 42.83) found that sexual minority participants had one more chronic condition, on average,

at baseline than heterosexual participants. However, the number of chronic conditions for sexual

minority participants increased less over time than compared to the change in the number of

chronic conditions for heterosexual participants (Nelson & Andel, 2020a). One possible

explanation for these results could be that sexual minority adults become more resilient to the

negative health effects of minority stressors over time. However, more research is necessary to

better understand the relationship between resilience and health over time.

Theoretical Framework: The Health Equity Promotion Model

The three studies in this dissertation are guided by the health equity promotion model, a

conceptual framework for research on sexual and gender minority health disparities meant to

promote health equity and not focus on health deficits (Fredriksen-Goldsen, Simoni, et al., 2014).

The model incorporates social positions (e.g., race, age, socioeconomic status, gender),

multilevel context (individual/ structural and environmental), and health-promoting and adverse

pathways as intersecting influences on sexual and gender minority health outcomes across the

life course.

The health equity promotion model addresses some of the limitations of minority stress

models like the minority stress theory (Meyer, 2003) and the psychological mediation framework

(Hatzenbuehler, 2009). Both minority stress models limit our ability to understand sexual minority health disparities. These models are deficit-focused and mainly aim to document the existence of health disparities caused by minority stress. We know that health disparities exist, but we lack an understanding of the mechanisms or factors that influence these health disparities. The results of several studies have pointed to possible resilience mechanisms that may prevent or reduce health disparities in sexual minority individuals (e.g., Fredriksen-Goldsen, Emlet, et al., 2012; Fredriksen-Goldsen, Kim, Bryan, et al., 2017), mechanisms that the minority stress models do not address. These models also do not address individual differences that are important for identifying individuals within the sexual minority community that are at higher risk of health disparities. These models also do not consider any positive health outcomes or benefits specific to the sexual minority community.

One strength of the health equity promotion model is that it allows health outcomes to be positive or negative. It does not assume that minority stress will result in negative health outcomes. It includes risk and health-promoting factors that may mediate and/or moderate the relationship between minority stressors and physical and mental health outcomes (Fredriksen-Goldsen, Simoni, et al., 2014). The inclusion of positive health outcomes in the health equity promotion model is important for research on sexual minority adults as it allows researchers to examine the resilience in this community, rather than just examining the risks.

Another strength of the health equity promotion model is that it considers the influence of experiences over the life course. A life course perspective highlights the influence of individual life experiences as well as the shared experiences of cohorts on the health outcomes of older adults. Considering the shifting social and historical context of different generational cohorts is essential to fully understand health disparities and resilience in sexual minority older adults. This

dissertation focuses on the health and resilience of sexual minority middle-aged and older adults from four cohorts: Invisible Generation, Silent Generation, Pride Generation, and Generation X. The next two paragraphs will summarize the social and historical contexts of these four cohorts.

Sexual minority individuals born in 1934 or earlier, the Invisible Generation, matured during a time when sexual orientation was not discussed as a political/societal issue, likely due to the hardships experienced during the Great Depression (1929-1939) and WWII (1939-1945). Sexual minority adults born between 1935 and 1949, the Silent Generation, were shaped by a historical time when homosexual conduct was illegal and considered a severe mental disorder (Foglia & Fredriksen-Goldsen, 2014; Fredriksen-Goldsen, 2016). During the 1950s, homosexual people were considered a risk to the security of the United States and were purged from government jobs (Cain, 1993; Faderman, 2015). This led to witch hunts within government jobs as well as in the military (Faderman, 2015). Individuals accused of sodomy, which was illegal in all states at the time, were forced to give up other individuals engaged in homosexual illegal activities (Faderman, 2015).

Sexual minority individuals of the Pride generation, born between 1950 and 1964, matured during a time when the movement for sexual minority rights started to gain traction (Foglia & Fredriksen-Goldsen, 2014). During this time, police would regularly raid gay bars, penalizing or shutting them down. In 1969, police raided the Stonewall Inn, a gay bar; this spurred the angry patrons to riot and throw objects at the police. Protests in the area continued for several days after the raid (Haber, 2009). Many people consider the Stonewall riots to be the start of the gay civil rights movement as two gay rights organizations were formed soon after the riots (Haber, 2009). Finally, Generation Xers, individuals born between 1965 and 1980, matured during the HIV/AIDS epidemic in the 1980s (Haber, 2009). Sexual minority people were

strongly stigmatized during this time with a common belief that the HIV/AIDS epidemic was a punishment for sexual minority people (Johnston, 2017).

Research on sexual minority older adults has found cohort differences among the Invisible, Silent, and Pride generations. Fredriksen-Goldsen (2016) reported that older sexual minority adults from the Invisible and Silent generations reported experiencing less lifetime discrimination than adults from the Pride Generation. Sexual minority older adults in the Invisible and Silent Generations were also found to be more likely to conceal their sexual identity which may have contributed to the sexual minority older adults experiencing less discrimination (Fredriksen-Goldsen, 2016). Moreover, Fredriksen-Goldsen (2016) reported higher loneliness and social isolation in the Pride Generation cohort.

Many cross-sectional studies have failed to consider age group/ cohort differences in the health disparities of sexual minority people. However, there is evidence of age-group differences between younger and older sexual minority cohorts. Bränström et al. (2016) found that the largest health disparities in physical health between sexual minority and heterosexual individuals were in the younger age groups (adolescents and young adults) and the smallest was among the oldest age groups (46 to 84 years). Additionally, other studies have found that substance use is higher in younger age groups than the older age groups (Cortes et al., 2019; Fredriksen-Goldsen, Kim, et al., 2014; Schuler et al., 2019). However, it is unclear whether these differences are due to age or cohort differences.

Overview and Contribution of Three Dissertation Studies

This doctoral dissertation is organized into three studies that address the overarching goal of examining the relationship between resilience and health outcomes in sexual minority middle-aged and older adults, guided by the health equity promotion model. Figure 1.1 displays the three

studies in this dissertation modeled within the health equity promotion framework. Study 1 examines the associations between having a resilient personality and engaging in health risk and health-promoting behaviors, categorized as *behavioral, health-promoting and adverse pathways* listed in the theoretical model. Study 2 examines coping as the measure of resilience. Specifically, the study examines whether coping, a *psychological, health-promoting pathway*, moderates the association between perceived daily discrimination (i.e., *individual level context*) and changes in *physical and mental health* over time for both sexual minority and heterosexual participants. Study 3 examines the integrative effect of three conceptual dimensions of resilience on physical and mental health outcomes. The study examines trait resilience as assessed by optimism and resilience as a process as assessed by perceived control; optimism and perceived control can be categorized as *psychological, health-promoting pathways* in the health equity promotion model. Relational resilience as assessed by social support can also be found in the *health-promoting and adverse pathways* box but under the *social and community* subsection of the theoretical model.

Although research on sexual minority middle-aged and older adults has increased over the past decade, there is still a critical need for more research on the health and resilience in this growing subpopulation. Research has provided evidence that sexual minority individuals have an increased risk of negative health outcomes when compared to heterosexual adults (Blosnich et al., 2014; Fredriksen-Goldsen, Kim, et al., 2012; Fredriksen-Goldsen, Kim, Bryan, et al., 2017; Hoy-Ellis & Fredriksen-Goldsen, 2016). Research has also demonstrated possible resilience in sexual minority middle-aged and older adults; however, few studies on sexual minority adults have included a measure of resilience. The studies that have measured resilience have had methodological limitations that this dissertation improves upon by 1) examining multiple

components of resilience such as personality (study 1), coping (study 2), as well as optimism, perceived control, and social support (study 3), 2) using population-based, propensity-matched samples, and 3) examining resilience and its effect on health cross-sectionally (study 1, study 3) as well as longitudinally over three time points, spanning approximately 20 years (study 2).

Multi-level Context

Individual Level
Study #2: Perceived discrimination

Study #1: Resilient Personality

Health-Promoting and Adverse Pathways

Behavioral
Study #1: Physical Activity, Routine Physical Exam, Smoking, Problematic Drinking, Substance Use

Psychological
Study #2: Coping
Study #3: Optimism, Perceived Control

Social and Community
Study #3: Social Support

Health

Physical
Study #2: Number of Chronic Conditions
Study #3: Number of Chronic Conditions

Mental

Study #2: Self-Rated Mental Health
Study #3: Depressed Affect + Anhedonia

Life Course
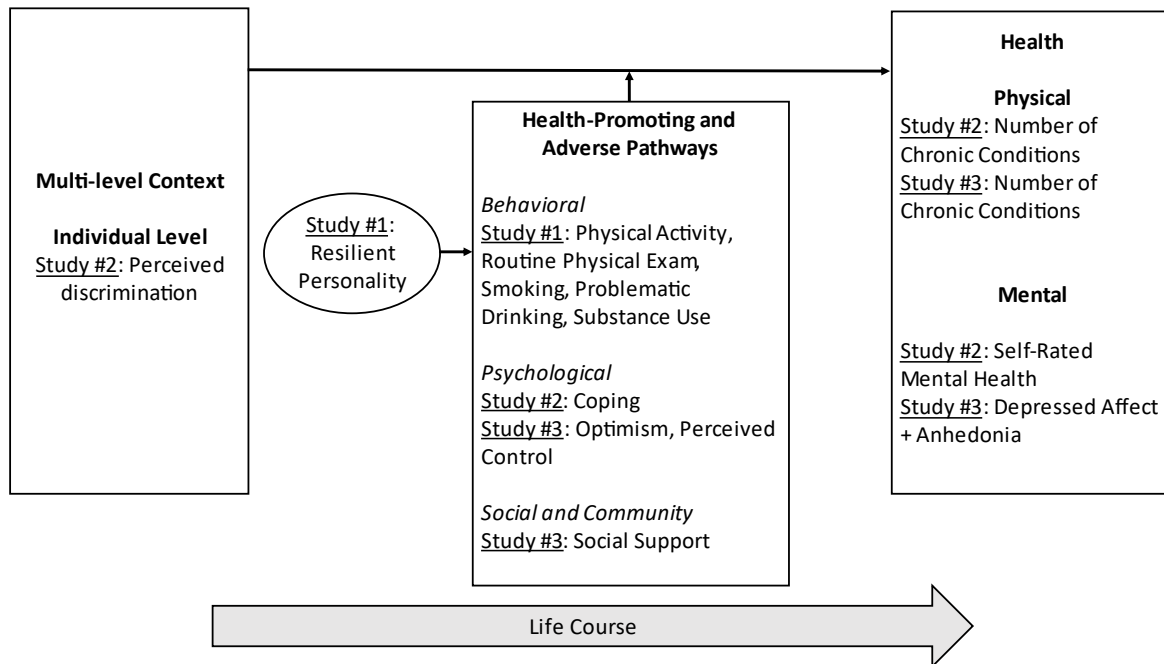
Figure 1.1. Dissertation Studies Modeled Within the Health Equity Promotion Model

Note. Only Study 2 incorporates all parts of the model. Study 1 adds resilient personality as a latent variable as it will be created by using latent profile analysis and it does not fit neatly into the model. Study 1 examines the association between having a resilient personality profile and the odds of engaging in health risk/promoting behaviors. Study 3 includes optimism and perceived control which are not mentioned in the examples provided in the health equity promotion model. However, optimism and perceived control can be considered to be psychological health-promoting pathways.

CHAPTER TWO:
STUDY 1: RESILIENT PERSONALITY AND HEALTH IN SEXUAL MINORITY
MIDDLE-AGED AND OLDER ADULTS

Introduction

Compared to heterosexual older adults, sexual minority older adults are more likely to

engage in health risk behaviors like smoking (Blosnich et al., 2014; Boehmer et al., 2012;

Conron et al., 2010; Dilley et al., 2010; Fredriksen-Goldsen, Emlet, et al., 2012; Fredriksen-

Goldsen, Kim, et al., 2012; Fredriksen-Goldsen et al., 2013), excessive drinking (Fredriksen-

Goldsen et al., 2013; Fredriksen-Goldsen, Kim, Shui, et al., 2017), and illicit drug use (Conron et

al., 2010). Some studies have also found that younger sexual minority adults are more likely to

engage in moderate physical activity and strength training than their heterosexual counterparts

(Boehmer et al., 2012); however, sexual minority older adults had increased odds of insufficient

exercise (Dilley et al., 2010) or were not significantly different in physical activity compared to

heterosexual older adults (Boehmer et al., 2012).

Studies have also found significant differences in the prevalence of healthcare utilization

by sexual orientation (Blosnich et al., 2014; Boehmer et al., 2012; Fredriksen-Goldsen, Emlet, et

al., 2012). However, these studies have found conflicting results. Boehmer et al. (2012) found

that older gay and bisexual men were more likely to utilize healthcare services in the past year

compared to heterosexual men. Older sexual minority women did not significantly differ in

health care utilization compared to older heterosexual women (Boehmer et al., 2012). However,

Blosnich et al. (2014) found that, compared to their heterosexual counterparts, sexual minority

women had significantly lower odds of having a routine physical exam in the past year, but men did not significantly differ in healthcare utilization.

While research has found poorer health in sexual minority older adults, there is also evidence of resilience in this subpopulation (Fredriksen-Goldsen, Kim, Shui, et al., 2017; Nelson & Andel, 2020a, 2020b; Wardecker et al., 2019). The sexual minority community is diverse and will, therefore, experience diversity in health and aging. Resilience is an understudied topic in research, especially in research on sexual minority middle-aged and older adults. By understanding more about resilience as a trait that influences behavior, we may be able to identify individuals who are more at risk of negative health outcomes.

Resilience, being associated with mental health, is likely to influence substance use, including tobacco use, excessive drinking, and illicit drug use. Winiker et al. (2019) found that higher grit, a construct related to resilience, was associated with lower odds of alcohol use in men who have sex with men. Fredriksen-Goldsen, Kim, Bryan, et al. (2017), while not measuring resilience, identified resilient pathways from good mental health to good physical health. Good mental health was not directly associated with good physical health but was indirectly related through higher health-promoting behaviors (physical activity, leisure, and wellness activities) and lower health risk behaviors (smoking and insufficient food intake).

Personality Traits and Resilience

Studies have found that resilience mediates the association between personality traits and mental health (Gong et al., 2020; Kocjan et al., 2021). Personality is defined as a stable set of individual traits that result in relatively stable patterns of thinking, feeling, and behaving (Roberts et al., 2008). Research has found associations between the Big Five personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism) and health risk

behaviors, mental health, physical health, mortality. Lower conscientiousness and higher

neuroticism are associated with an increased risk of mortality (Graham et al., 2017; Jokela et al.,

2013) and a greater likelihood of engaging in health risk behaviors like smoking or substance use

(Terracciano & Costa Jr, 2004; Turiano et al., 2012). However, studies have found different

results when examining interactions of personality traits such as high conscientiousness with

high neuroticism (Weston & Jackson, 2015). Therefore, it may be beneficial to examine the

associations between different combinations of personality traits, or personality profiles, and

health outcomes.

Latent Profile Analysis

While the previously cited research has found associations between personality traits and

health outcomes, they examined isolated traits. However, personality traits do not occur in

isolation; they occur simultaneously with the other personality traits. Latent profile analysis

(LPA) allows us to identify common personality profiles or combinations of personality traits.

LPA empirically defines profiles or subgroups based on common characteristics such as

personality traits. Studies using LPA to identify personality profiles have typically identified

three to five-class models as having the best fit for their data. The number of profiles identified

depends on the data. The next section will discuss commonly identified personality profiles and

their association to health outcomes.

Personality Profiles

In non-sexual minority focused studies, the results of latent profile analyses have found

3-class to 5-class solutions to have the best fit. The three most common personality profiles that

have been replicated in many normal and clinical populations are the Resilient, Undercontrolled,

and Overcontrolled personality profiles (Bohane et al., 2017). This section will discuss the more

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commonly identified personality profiles, including an ordinary/average personality profile, and their associations to health.

Theoretical Framework for Identifying Personality Profiles. The Blocks' model can be used to help interpret the Resilient, Overcontrolled, and Undercontrolled personality profiles (Block & Block, 1980). The Blocks' model is a theoretical framework comprised of ego-control and ego-resiliency. Ego-control is a person's tendency to control impulses which ranges from Overcontrolled to Undercontrolled. Overcontrolled individuals would be more likely to suppress impulses, delay gratification, and suppress emotions and actions to an excessive degree. Undercontrolled individuals would be more likely to have difficulty controlling impulses, delaying gratification, and suppressing emotions and actions (Yin et al., 2021).

Ego-resiliency is an individual's dynamic ability to adapt when facing hardships (Block & Block, 1980) and is also considered to be a personality characteristic. A person with high ego-resiliency will be more flexible in their response to a stressful situation and will be able to recover more quickly. A person with low ego-resiliency will respond more rigidly to stressful situations and will have more difficulty recovering from the stressful situation (Block & Block, 1980). A person with a resilient personality would have a high level of ego-resiliency. Individuals with Overcontrolled and Undercontrolled personality profiles would have low ego-resiliency (Yin et al., 2021).

Resilient Personality Profile. Resilient personality profiles were identified by low neuroticism and high extraversion, openness, agreeableness, and conscientiousness (Ferguson & Hull, 2018; Kinnunen et al., 2012; Morgan et al., 2017; Zhang et al., 2015). This Resilient personality profile is consistently identified in studies using latent profile analysis to identify personality profiles using the Big Five traits. However, some studies have used other names for

this personality profile, including protective, well-adjusted, and highly adaptive (Yin et al., 2021). This combination of personality traits being indicative of a resilient personality is supported by a recent meta-analysis that found that neuroticism was negatively correlated with resilience and the other four factors were positively correlated with resilience (Oshio et al., 2018).

Resilient profile was found to be associated with better physical (Kinnunen et al., 2012) and mental health (Morgan et al., 2017). Additional research points to similar results with various components of the Resilient profile. For example, lower neuroticism and higher conscientiousness have been found to be associated with a higher likelihood of smoking cessation or smoking abstinence (Hakulinen, Hintsanen, et al., 2015). Higher openness and conscientiousness and lower neuroticism have been found to be associated with higher levels of physical activity (Wilson & Dishman, 2015). Conversely, Zhang et al. (2015) found that Resilient profile membership was associated with an increased risk of frequent heavy drinking in young adults. Though, that may be due to the coding of frequent binge drinking as drinking five or more drinks in a day on a weekly basis compared to less than a weekly basis. Resilient individuals being higher in extraversion may be more likely to socially drink, which may not necessarily indicate problematic drinking behavior. In addition, Resilient personality profiles are also high in agreeableness which has been found to be associated with a higher probability of not drinking as well as with transitioning from moderate alcohol use to abstinence (Hakulinen, Elovainio, et al., 2015).

To the best of my knowledge, no studies have examined the differences in the associations between Resilient personality profile membership and health behaviors between sexual minority and heterosexual middle-aged and older adults. However, one study examined

the associations between at-risk and adaptive personality profiles and suicide risk in sexual minority young adults (Livingston et al., 2015). The at-risk profile and the adaptive were identified using latent profile analysis. The adaptive profile was identified by the same combination of personality traits as the Resilient personality profile: lower neuroticism and higher scores on the other four traits. The adaptive personality profile had decreased risk of suicide (Livingston et al., 2015).

Overcontrolled Personality Profile. The Overcontrolled personality profile has varied more between studies than the Resilient personality profile (Yin et al., 2021). An Overcontrolled personality profile is typically identified as being high in neuroticism and low in the other four traits (Herzberg & Roth, 2006; Zhang et al., 2015). This same combination of traits has also been labeled as distressed or brittle. A systematic review found that the Overcontrolled personality tended to score the highest level of neuroticism, and the lowest levels in extraversion and openness (Yin et al., 2021). Though there is some variation across studies, high neuroticism is a key characteristic in the Overcontrolled personality profile. Concerning health, neuroticism has been found to be associated with poorer mental and physical health. In a study of middle-aged and older adults, high neuroticism was found in individuals with mood and anxiety disorders as well as with various chronic conditions. Additionally, higher neuroticism has been found to be associated with health risk behaviors like smoking and excessive drinking (Hakulinen, Elovainio, et al., 2015; Hakulinen, Hintsanen, et al., 2015; Terracciano & Costa Jr, 2004; Turiano et al., 2012) as well as physical inactivity (Sutin et al., 2016). One longitudinal study found the adults with an Overcontrolled personality profile had the poorest health across eight years (Kinnunen et al., 2012).

Furthermore, a more extreme version of the Overcontrolled personality profile has been identified in studies as an "anti-resilient" personality profile (Yin et al., 2021). An anti-resilient personality profile has been identified as having the highest levels of neuroticism and lowest levels in the other four personality traits (Yin et al., 2021). This is a similar pattern as the Overcontrolled profile, but the difference is that the anti-resilient profile scores were higher in neuroticism and lower in the other four traits than the Overcontrolled profile or any other profile. Therefore, compared to a Resilient personality profile, it is likely that an Overcontrolled personality profile will be associated with lower odds of engaging in health promoting behaviors and higher odds of engaging in health risk behaviors.

Undercontrolled Personality Profile. The Undercontrolled personality profile has also varied more between studies than the Resilient personality profile (Yin et al., 2021). The Undercontrolled profile is typically identified by high openness and extraversion (Herzberg & Roth, 2006; Kinnunen et al., 2012) and low conscientiousness and agreeableness (Herzberg & Roth, 2006; Kinnunen et al., 2012; Yin et al., 2021). This combination of personality traits may result in mixed findings associated with health risk/promoting behaviors. Lower conscientiousness and higher extraversion have been found to be associated with heavy drinking (Hakulinen, Elovainio, et al., 2015), current smoking (Hakulinen, Hintsanen, et al., 2015), but higher levels of physical inactivity (Sutin et al., 2016). Higher agreeableness was found to be associated with smoking cessation, but also with smoking relapse over time (Hakulinen, Hintsanen, et al., 2015). Higher agreeableness was also found to be associated with reduced odds of alcohol consumption (Hakulinen, Elovainio, et al., 2015) and physical inactivity (Sutin et al., 2016). Due to these mixed findings, the Undercontrolled personality may have average odds of engaging in health risk/promoting behaviors compared to the other personality profiles.

Kinnunen et al. (2012) found that the Undercontrolled personality profile was associated with average health.

Ordinary Personality Profile. Another common personality profile is the Ordinary profile which is identified by having all personality traits closest to the average score of each trait in the study sample (Kinnunen et al., 2012; Zhang et al., 2015). Similarly, one study identified a "normative" personality profile that was identified by having average scores in all traits except openness (Morgan et al., 2017). The normative personality group had better health outcomes than a distressed group (same combination of traits as Overcontrolled), but worse health than the Resilient group. The Ordinary/normative personality profile is typically the largest class with approximately half of participants having this personality type (Kinnunen et al., 2012; Morgan et al., 2017; Zhang et al., 2015).

Research Aims and Hypotheses

This study had the following three aims: 1) to conduct latent profile analysis using the Big Five personality traits to identify distinct personality profiles, including a Resilient personality profile, 2) to examine the associations between sexual minority adults with a Resilient personality and the odds of engaging in health risk and health-promoting behaviors, compared to sexual minority adults with other personality profiles, and 3) to compare the associations between personality profile membership and the health behaviors for sexual minority participants to the associations found for propensity score matched heterosexual participants.

Based on existing findings, I predicted that 1) a Resilient, Undercontrolled, Overcontrolled, and Ordinary personality profile would be identified by the latent profile

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analysis. Based on previous research (Ferguson & Hull, 2018; Livingston et al., 2015), it was also expected that there would not be significant differences in the demographic characteristics between the identified personality profiles. I hypothesized that 2) compared to sexual minority participants with a Resilient personality profile, sexual minority participants with another personality profile (i.e., Ordinary, Undercontrolled, or Overcontrolled) would be more likely to engage in health risk behaviors and less likely to engage in health-promoting behaviors. Lastly, based on previous research that found that sexual minority adults are more likely to engage in health-risk behaviors compared to heterosexual adults, I hypothesized that 3) having a Resilient personality would be associated with less participation in health risk behaviors, especially in sexual minority participants and less so in heterosexual participants.

Method

Data

Data for this study comes from the main survey of the second wave of Midlife in the United States (MIDUS) and from the MIDUS Refresher. MIDUS is a nationally representative, multidisciplinary study of middle-aged and older adults. Participants were chosen via random telephone digit dialing procedures. Participants gave verbal consent and completed a 45-minute telephone interview. After the telephone interview, participants were mailed two self-administered questionnaires. MIDUS 2, the second wave of the MIDUS, was conducted between 2004 and 2006 with 4,963 of the original 7,108 participants completing the assessments. The MIDUS Refresher was designed to replenish the original MIDUS cohort; therefore, the same procedures and surveys were used. Data for the MIDUS Refresher study was collected from 2011-2014, resulting in a nationally representative sample of 3,577 adults, ranging in age from 25 to 74.

Sample

The sample for this study combined participants from MIDUS 2 and MIDUS Refresher (n=8,540). MIDUS participants are English-speaking adults living in the United States. Participants were excluded if they were missing data on sexual orientation (n=2,146), demographics (n=40), or personality traits (n=62). The sample was further restricted to participants aged 40 and older. Of the 5,365 participants remaining, 95 identified as homosexual (gay/lesbian), 64 as bisexual, and 5,206 as heterosexual. Homosexual and bisexual participants were combined into a sexual minority group. A 1:2 matched heterosexual group was identified using propensity score matching (Parsons, 2004) as described in the analysis section. The final analytical sample (n=477) included 159 sexual minority participants and 318 heterosexual participants. See Figure 2.1 for details on the inclusion/exclusion criteria for Study 1.

Measures

Dependent Variables. The dependent variables for this study include three health risk behaviors (smoking, problematic drinking, and substance abuse) and two health-promoting behaviors (routine physical exam and moderate physical activity). For substance use, participants were asked whether they used various substances in the past 12 months. Substance use was coded as (1) yes if participants used any substance in the past 12 months or (0) no if they did not use any substances in the past 12 months. Smoking was assessed using a variable that asked participants if they regularly smoke cigarettes now and coded as (1) yes if they smoke regularly now and (0) no if they do not smoke regularly now.

For problematic drinking, a dichotomous variable was constructed to indicate whether the participant experienced any problematic drinking in the past 12 months. If participants responded

yes to any of the following questions they were coded as 1 (yes, experienced problematic

drinking): (a) did you have any emotional or psychological problems from using alcohol, such as

feeling depressed, being suspicious of people, or having strange ides?, (b) did you have such a

strong desire or urge to use alcohol that you could not resist it or could not think of anything

else?, and (c) did you find that you had to use more alcohol than usual to get the same effect or

that the same amount had less effect on you than before?. Participants that did not respond yes to

any of the questions were coded as 0 (no problematic drinking in the past 12 months).

Participants were asked how often they engaged in moderate physical activity during

their leisure or free time during the summer and during the winter. Moderate physical activity

was defined as activity that "causes your heart rate to increase slightly and you typically work up

a sweat." Examples of moderate physical activity include leisurely sports like tennis, low-impact

aerobics, and brisk walking. Responses range from 1- Several times a week to 6 -Never. Values

were reverse coded so higher scores indicated more frequent moderate physical activity. The

summer and winter variables were combined and averaged. The physical activity composite

measure was treated as a continuous variable.

For routine physical exam, participants were asked how many times they saw a doctor

for a routine physical check-up or gynecological exam in the past 12 months. Responses were

coded as 1 (had at least one routine physical health check-up) or 0 (did not see a doctor in the

past 12 months for a routine physical exam).

Independent Variables. The independent variables for this study include sexual

orientation and personality profile membership. For sexual orientation, participants were asked

whether they would describe their sexual orientation as "heterosexual (sexually attracted to only

one sex), homosexual (sexually attracted only to your own sex), or bisexual (sexually attracted to

both men and women)". For this study, homosexual (i.e., lesbian, gay) and bisexual participants were combined into the sexual minority group. Propensity score matching was conducted to create a propensity matched heterosexual group.

For personality profile membership, latent profile analysis was used to identify personality profiles using the big five personality traits. The five personality traits were assessed via a self-administered measure that asked participants how much 30 adjectives described themselves on a scale from 1 (a lot) to 4 (not at all). The means of the reverse coded items were calculated for each trait with higher values indicating higher levels of each trait. The six personality traits include Openness (imaginative, creative, sophisticated, broadminded, curious, adventurous, intelligent), Conscientiousness (organized, responsible, hardworking, careless), Extraversion (outgoing, friendly, lively, talkative, active), Agreeableness (helpful, warm, caring, softhearted, sympathetic), and Neuroticism (moody, worrying, nervous, calm).

Covariates. The covariates for this study included age (in years), sex (male or female), education (highest achieved), marital status (married, separated/divorced, widowed, never married), employment status (employed, retired, other), race (White or non-White), and cohort. Cohort was categorized according to birth year and historical context as described in Chapter 1: Invisible Generation (1934 or earlier), Silent Generation (1935-1949), Pride Generation (1950-1964), and Generation X (1965-1980).

Statistical Analyses

First, propensity score matching (Parsons, 2004) was conducted to matched two heterosexual participants to each sexual minority participant using SAS, version 9.4 (SAS Institute, Cary, NC). Propensity scores were estimated using a logistic regression adjusted for

baseline age, sex, education, race, and employment status. After obtaining propensity scores, a greedy propensity matching add-on macro in SAS was used to match two heterosexual participants to each sexual minority participant. In greedy matching, matches are first made based on eight digits of the propensity score. The algorithm then matches based on seven digits, then six digits, and so on until all sexual minority participants have two heterosexual matches. Any sexual minority participants that did not match with two heterosexual participants were excluded from analyses. Chi-square and t-test were conducted to confirm successful matching.

Next, latent profile analysis (LPA) was conducted using Mplus 7.4 (Muthén & Muthén, 2017). LPA empirically defines profiles or subgroups based on common characteristics such as personality traits. This study used the Big Five personality traits as indicators to identify personality profiles. Models were estimated starting with a 1-profile solution and continued step by step to estimate models with a 2-profile solution, 3-profile solution, and so on until the optimal number of profiles was determined. To determine the optimal number of profile solutions, fit indices such as Akaike information criteria (AIC) and sample-size adjusted Bayesian information criteria (ssBIC) were used to compare the models. The profile solution with the lowest AIC and ssBIC was considered optimal. Additionally, the entropy value was examined to assess the precision of the classification; a value greater than .80 would indicate good fit. Chi-square and ANOVA analyses were conducted to assess differences in demographic characteristics between the personality profiles.

Using SAS, version 9.4 (SAS Institute, Cary, NC), logistic and linear regression analyses were conducted to assess the likelihood of sexual minority participants with a Resilient personality engaging in the health risk/promoting behaviors compared to the likelihood of sexual minority participants with other identified personality profiles engaging in the health behaviors.

Next logistic and linear regression analyses were conducted to assess the likelihood of the matched heterosexual participants with a Resilient personality engaging in the health behaviors compared to the likelihood of heterosexual participants with another identified personality profile engaging in the health behaviors. This study indirectly compared the results of the analyses for the heterosexual group to the results of the analyses for the sexual minority group. All regression analyses were adjusted for age, sex, education, race, marital status, employment status, and cohort.

Results

Sample Characteristics

Table 2.1 displays the descriptive characteristics of the study sample. On average, the 477 participants were 57.3 years of age (SD= 10.9 years, range= 40-83 years). Approximately 12% of participants were part of the Invisible Generation cohort (born in 1934 or earlier), 33% were part of the Silent Generation cohort (born 1935 to 1949), 48% were part of the Pride Generation cohort (born 1950 to 1964), and 7% were part of the Generation X cohort (born 1965 to 1972). The sample was comprised of primarily White (90%) participants. The sample was approximately evenly divided among male and female participants (males n=244, females n=233). The sample was well educated with roughly three-quarters having at least some college education with one-third having some graduate school education or more (i.e., has a graduate degree). More than half of the sample was married (52%), 20% were separated or divorced, 6% were widowed, and 22% were never married. Sixty-four percent of the sample was currently employed, 26% were retired, and 10% fell into another category (e.g., unemployed, student, maternity or sick leave, permanently disabled). Of the 159 participants that identified as a sexual minority, 55 identified as gay, 40 as lesbian, 29 as bisexual male, and 35 as bisexual female.

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Table 2.1 also displays the descriptive comparisons between the sexual minority and propensity matched heterosexual groups. Sexual minority participants (n=159) and propensity matched heterosexual participants (n=318) did not significantly differ on any of the matching covariates (age, sex, education, race, and employment status); the matched groups also did not significantly differ in cohort membership. However, the two groups did significantly differ in marital status (p<.01) with heterosexual participants being more likely to be married than sexual minority participants (67% vs 21%, respectively). Sexual minority participants were more likely to have never been married than heterosexual participants (52% vs 8%, respectively). Sexual minority and heterosexual participants were not matched on marital status due to laws restricting same sex marriage until 2015.

Latent Profile Analysis

LPA was conducted as described above to identify personality profiles. Models with one to six profile solutions were conducted and compared using fit indices. The 4-profile solution was deemed to be superior to the 3-profile solution based on the entropy values (.68 vs .78). A 5-profile solution appeared to be the optimal solution based on the AIC, ssBIC, and LMRT. However, after examining the interpretability of the 5-profile solution, it was determined that a 4-profile solution was conceptually superior and more intuitive to interpret. In addition, the entropy value was higher for the 4-profile solution than the 5-profile solution (.78 vs .75), indicating that the 4-profile solution was a better fit. The main issue with the 5-profile solution was that two profiles were too similar to determine which profile was more resilient based on the averages for the personality traits. There was a similar issue with two other profiles that both could have been interpreted as the Overcontrolled personality profile. Furthermore, the five-

profile solution yielded a small profile size for one of the profiles (13 individuals, 2,7% of the sample).

Table 2.3 displays the overall sample means for the personality traits, the means for the personality traits for each identified profile in the 4-profile solution as well as the classification probabilities for each profile. Figure 2.2 shows the mean scores of personality traits for each personality profile. Profile 1 was identified as the *Ordinary* personality profile as the means for each personality trait were relatively close to the sample means. The Ordinary profile consisted of 168 participants (35.2% of the sample). Profile 2 was identified as the *Resilient* personality profile as it had the lowest mean for neuroticism and the highest means for the other four personality traits. The Resilient profile consisted of 224 participants or 47% of the sample. Profile 3 was identified as the Overcontrolled profile as it had the highest mean for neuroticism and the lowest means for the other four personality traits; this profile consisted of 35 participants or 7.3% of the sample. Profile 4 was identified as the Undercontrolled profile and was high in neuroticism and agreeableness, low in extraversion and openness, and average in conscientiousness. Profile 4 consisted of 50 participants or 10.5% of the sample.

Chi-square and ANOVA Analyses

Table 2.4 displays the comparisons in the characteristics between the personality profile groups. The personality profiles did not significantly differ in any demographic characteristic, except for sex. The Undercontrolled profile group was more likely to be female (72%). The Overcontrolled and Ordinary profile groups were less likely to be female (29% vs 39%, respectively). The Resilient profile group was approximately even in sex (54% female). The personality profiles also did not differ significantly in most of the health behavior variables. The

groups did significantly differ in moderate physical activity with the Overcontrolled and Undercontrolled groups having higher scores than the Ordinary or Resilient groups (p=.01).

Table 2.5 displays differences in the health behaviors between sexual minority and heterosexual participants for each of the personality profiles. For the Resilient group, sexual minority participants were significantly more likely to engage in problematic drinking than heterosexual participants (12.5% vs 1.3%, p<.01). However, Resilient sexual minority participants were significantly more likely to have a routine physical exam than Resilient heterosexual participants (88.9% vs 82.9%, p=.03). There were no significant differences between sexual minority and heterosexual participants in the Ordinary profile group. For substance use, the difference between the Ordinary sexual minority group and the Ordinary heterosexual group trended toward significance (26.2% vs 13.1%, p=.08). For the Overcontrolled group, heterosexual participants were significantly more likely to engage in substance use than the sexual minority participants (29.2% vs 0%, p<05). In the Undercontrolled group, sexual minority participants were more likely than heterosexual participants to engage in moderate physical activity (M=4.3, SD=1.8 vs M=3.0, SD=1.8, p=.03).

Logistic and Linear Regression Analyses

Table 2.6 shows the differences between the Resilient personality profile and the other personality profiles for the sexual minority and heterosexual groups. Due to small sample sizes, the Ordinary, Overcontrolled, and Undercontrolled groups were combined for comparison with the Resilient group. For the sexual minority group, there were no significant differences in the health behaviors between the Resilient group and the other personality group. However, linear regression analysis controlling for covariates for moderate physical activity was trending toward

significance (B= .59, SE=.30, p=.05). This indicates that the Resilient personality group engaged in more moderate physical activity than the other personality group.

For the matched heterosexual group, the linear regression analysis assessing the association between personality profile group and moderate physical activity was significant after controlling for covariates (B= .47, SE=.20, p<.01). Again, the results found that the Resilient group engaged in moderate physical activity more than the other personality group.

Discussion

This study sought to identify personality profiles based on scores on five personality traits and to examine differences among the identified personality profiles. Consistent with previous research and the first hypothesis, four personality profiles were identified: Ordinary, Resilient, Undercontrolled, and Overcontrolled. The Resilient profile was consistent with previous research that identified the resilient personality profile as having the lowest neuroticism and the highest means in the other four personality traits (Ferguson & Hull, 2018; Kinnunen et al., 2012; Morgan et al., 2017; Zhang et al., 2015). The Undercontrolled profile was the most difficult to interpret. As mentioned in the introduction to this study, the Overcontrolled and Undercontrolled profiles had more variability across studies. The interpretation of the Undercontrolled profile in this study was based on a systematic review that found that some studies have identified the Undercontrolled profile as being high in neuroticism and agreeableness (Yin et al., 2021).

There were almost no significant differences in demographic characteristics between the profiles; however, there were significant differences found for sex. The results of this study did partially support hypothesis 2. Participants with a Resilient personality were not significantly less likely to engage in the health risk behaviors; however, participants with a Resilient

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personality reported engaging in more moderate physical activity than the other personality groups. Hypothesis 3 was not supported by the results of this study. Having a resilient personality was not more beneficial for the health of sexual minority participants than it was for the health of heterosexual participants.

Moderate Physical Activity

Both the Resilient sexual minority participants and the Resilient heterosexual participants engaged in more moderate physical activity than their counterparts with other personality profiles. The resilient sexual minority and heterosexual adults in this study engaged in moderate physical activity several times a month to once a week on average. Regular moderate physical activity consisting of aerobic and muscle-strengthening activities is recommended for older adults to improve psychological well-being, improve balance, prevent falls, and manage or prevent some chronic conditions (World Health Organization, 2020). The results of this study suggest that individuals with a personality combination consisting of high neuroticism, low extraversion, low conscientiousness, and low openness (i.e., undercontrolled and overcontrolled personality profiles) should be targeted in physical activity interventions. This is supported by previous research examining the associations between individual personality traits and physical activity that have found lower neuroticism, higher conscientiousness, and higher extraversion were associated with increased physical activity (Wilson & Dishman, 2015).

Interventions to increase physical activity in sexual minority middle-aged and older adults may be especially beneficial. Sexual minority older adults have an increased risk of poor physical and mental health compared to heterosexual adults (Fredriksen-Goldsen et al., 2013; Fredriksen-Goldsen, Kim, et al., 2014; Fredriksen-Goldsen, Kim, Shui, et al., 2017). There is a large body of research on the health benefits of physical activity in older adults. Research has

found that physical activity can reduce the prevalence of chronic conditions such as cardiovascular disease and diabetes (Lacey et al., 2015) as well as improve mental health in older adults (Callow et al., 2020). Research has also found that physical activity can reduce the risk of cognitive decline (Brini et al., 2018; Sofi et al., 2011) and reduce mortality rates (Shaked et al., 2021).

Some research has found that sexual minority men are less likely to be obese or overweight (Blosnich et al., 2014; Dilley et al., 2010; Fredriksen-Goldsen, Kim, et al., 2012; Fredriksen-Goldsen et al., 2013; Fredriksen-Goldsen, Kim, Shui, et al., 2017) and more physically active than their heterosexual counterparts (Boehmer et al., 2012). However, a scoping review found mixed findings on physical activity in gay older men with some studies finding that gay older men engaged in physical activity less than their heterosexual counterparts (Kendrick et al., 2021). However, other studies in this review found either little difference between gay and heterosexual older men or found that gay men engaged in more physical activity (Herrick & Duncan, 2018; Kendrick et al., 2021).

Research has found gender differences in being overweight or obese among sexual minority adults. Several studies have found that sexual minority men were less likely than heterosexual men to be obese or overweight while sexual minority women had greater odds of being obese or overweight compared to their heterosexual counterparts (Blosnich et al., 2014; Conron et al., 2010; Dilley et al., 2010; Fredriksen-Goldsen, Kim, et al., 2012; Fredriksen-Goldsen et al., 2013). A systematic scoping review of physical activity in sexual minority adults found that sexual minority men may be more likely to engage in physical activity as a result of being motivated by perceiving a thin and/or muscular body type to be ideal (Herrick & Duncan, 2018). That same review found evidence that sexual minority women are less likely to engage in

physical activity because of a social norm among sexual minority women of being accepting of diverse body types (Herrick & Duncan, 2018).

Routine Physical Exam

When examining differences between sexual minority participants and heterosexual participants in each personality profile, it was found that only the Resilient sexual minority participants were significantly more likely to get a routine physical exam than the Resilient heterosexual participants. There were no significant differences in having a routine physical exam between sexual minority and heterosexual participants in the other personality profiles. Previous research has found mixed results when examining differences in having a routine annual exam between sexual minority and heterosexual adults. Sexual minority men were twice as likely to get a routine physical exam than heterosexual men (Boehmer et al., 2012) while women were found to have lower odds of having a routine exam than heterosexual women (Blosnich et al., 2014).

These gender differences may have stemmed from barriers to accessing healthcare. Changes in policies such as the implementation of the Affordable Care Act and same-sex marriage being declared legal in all 50 states in 2015 have increased access to health insurance for sexual minority adults. Earlier research found lower odds of having health insurance for sexual minority adults (Conron et al., 2010; Dilley et al., 2010; Fredriksen-Goldsen et al., 2013), while more recent research has found no significant differences between sexual minority and heterosexual men and greater likelihood of having health insurance for sexual minority women (Fredriksen-Goldsen, Kim, Shui, et al., 2017). The increased access to health insurance coverage may explain why resilient sexual minority participants were significantly more likely to get a routine physical exam than resilient heterosexual participants. However, it is important to note

that sexual minority older adults still face barriers to accessing health care including financial difficulties, discrimination, and lack of culturally competent care (Cahill, 2017; Ezhova et al., 2020; Fredriksen-Goldsen et al., 2013).

Problematic Drinking

Similar to previous research, this study found that sexual minority adults were more likely to engage in problematic drinking than heterosexual adults (Blosnich et al., 2014; Boehmer et al., 2012; Dilley et al., 2010; Fredriksen-Goldsen, Emlet, et al., 2012; Fredriksen-Goldsen et al., 2013; Fredriksen-Goldsen, Kim, Shui, et al., 2017). However, when comparing sexual minority and heterosexual adults in each personality profile, only the sexual minority participants in the Resilient profile engaged in problematic drinking significantly more than their heterosexual counterparts in the Resilient profile. There was no significant difference in problematic drinking between the resilient sexual minority participants and sexual minority participants in other personality profiles. Previous research found that the Resilient profile was at an increased risk of frequent heavy drinking than other personality profiles in a sample of young adults (Zhang et al., 2015).

Strengths, Limitations, and Suggestions for Future Studies

To the best of my knowledge, this is the first study to use latent profile analysis to identify personality profiles, including a resilient profile, and examine differences in health behaviors between resilient sexual minority and heterosexual middle-aged and older adults. This study extends to research that conducts latent profile analysis to create personality profiles by identifying common personality profiles (Resilient, Undercontrolled, Overcontrolled, and Ordinary) in a sample containing both sexual minority and heterosexual adults. The majority of previous research using latent profile analysis to identify personality profiles has not included

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data on sexual orientation. As mentioned in the introduction to this study, one study examined differences in suicide risk between adaptive personality (lower neuroticism, higher means in other four traits) and at-risk personality (higher neuroticism, lower means in other four traits) sexual minority individuals (Livingston et al., 2015). However, that study did not use latent profile analysis.

This study also contributes new knowledge to our understanding of health and resilience in sexual minority middle-aged and older adults. Specifically, this study found that sexual minority adults with a resilient personality engaged in more moderate physical activity than sexual minority adults with personalities containing higher neuroticism (Overcontrolled and Undercontrolled). This study also found evidence that resilient sexual minority middle-aged and older adults may be more likely to get a routine physical exam than their resilient heterosexual counterparts.

Despite the strengths and contributions of this study, there are limitations to consider. The first limitation is the sample size. Due to small sample sizes in the personality profile groups, I was unable to conduct logistic regression analyses to compare the Resilient personality group with each of the other three personality profiles. Another limitation of this study was the small percentages of participants that engage in the health risk behaviors. Only approximately 19% of participants reported engaging in substance use, 16% reported currently smoking, and only 7% reported engaging in problematic drinking. Future studies with larger samples should examine the differences in health behaviors between resilient sexual minority adults and resilient heterosexual adults as well as differences between resilient sexual minority adults and sexual minority adults with another personality profile.

This study was also not able to examine differences in health behaviors between the personality profiles by the sexual minority subgroup. Research has found evidence that bisexual individuals may be at greater risk of health disparities than gay or lesbian individuals. Relevant to the results of this study, previous research has found that bisexual men and women were less likely to engage in sufficient physical activity (Dilley et al., 2010; Fredriksen-Goldsen, Emlet, et al., 2012). Research has also found differences in health behaviors between sexual minority women and sexual minority men; for example, lesbian and bisexual women have been found to be less likely to have a routine physical exam than gay and bisexual men (Fredriksen-Goldsen, Emlet, et al., 2012). Future research should examine differences in health behaviors between the sexual minority subgroups.

While it was beyond the scope of the current aims, this study did not examine differences in health outcomes between personality profiles in sexual minority adults as well as between resilient sexual minority and heterosexual adults. Future research should examine differences in physical and mental health outcomes between sexual minority older adults with different personality combinations. Future research should also investigate if having a resilient personality mediates/moderates that association between individual or structural level contexts (e.g., discrimination, social stigma, victimization) and health outcomes. Gaining a better understanding of resilient and other personality profiles will help interventions target sexual minority adults who are more at risk of engaging in negative health behaviors as well as poorer health outcomes.

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                    ┌─────────────┐  ┌─────────────┐
                    │ MIDUS 2 Main│  │   MIDUS     │
                    │   Sample    │  │Refresher Main│
                    │  n=4,963    │  │Sample: n=3,577│
                    └─────────────┘  └─────────────┘
                          │                │
                          ▼                ▼
          ┌───────────────────────────────────────────┐
          │ Potential participants in Study 1 N = 8,540│
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                                  │
  ┌─────────────────────┐         ▼
  │      Missing:       │◄──┌───────────────────────────────┐
  │ Sexual orientation: │   │Participants with complete data │
  │      n=2146         │   │on main study variables in      │
  │ Demographics: n=40  │   │Study 1 N = 6,292               │
  │Personality Traits: n=62│ └───────────────────────────────┘
  └─────────────────────┘                │
                                          ▼
                    ┌───────────────────────────────────┐
                    │Excluded participants <40 years = n=927│
                    │            N=5365                  │
                    └───────────────────────────────────┘
                                          │
                                          ▼
        ┌─────────────────────────────────────────────────┐
        │ "How would you describe your sexual orientation?"│
        └─────────────────────────────────────────────────┘
              │              │                         │
              ▼              ▼                         │
    ┌──────────────┐  ┌──────────┐                     │
    │  Homosexual  │  │ Bisexual │                     │
    │(gay/lesbian) │  │   n=64   │                     │
    │    n=95      │  │          │                     │
    └──────────────┘  └──────────┘                     │
           │              │                            │
           └──────┬───────┘                            ▼
                  ▼                           ┌──────────────┐
           ┌──────────────┐                   │ Heterosexual │
           │   Sexual     │                   │  n=5,206     │
           │   Minority   │                   └──────────────┘
           │   n=159      │                          │
           └──────────────┘                          │
                  │                                   │
                  └──────────────┬────────────────────┘
                                 ▼
                    ┌───────────────────────────┐
                    │ 2:1 Propensity score matching│
                    │ (matched on age, sex,      │
                    │ education, race, work status)│
                    └───────────────────────────┘
                         │              │
                         ▼              ▼
              ┌──────────────┐  ┌────────────────────┐
              │   Sexual     │  │      Matched       │
              │   Minority   │  │Heterosexual Participants│
              │ Participants │  │       n=318        │
              │   n=159      │  │                    │
              └──────────────┘  └────────────────────┘
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Figure 2.1. Flowchart of Study 1 Eligibility and Inclusion

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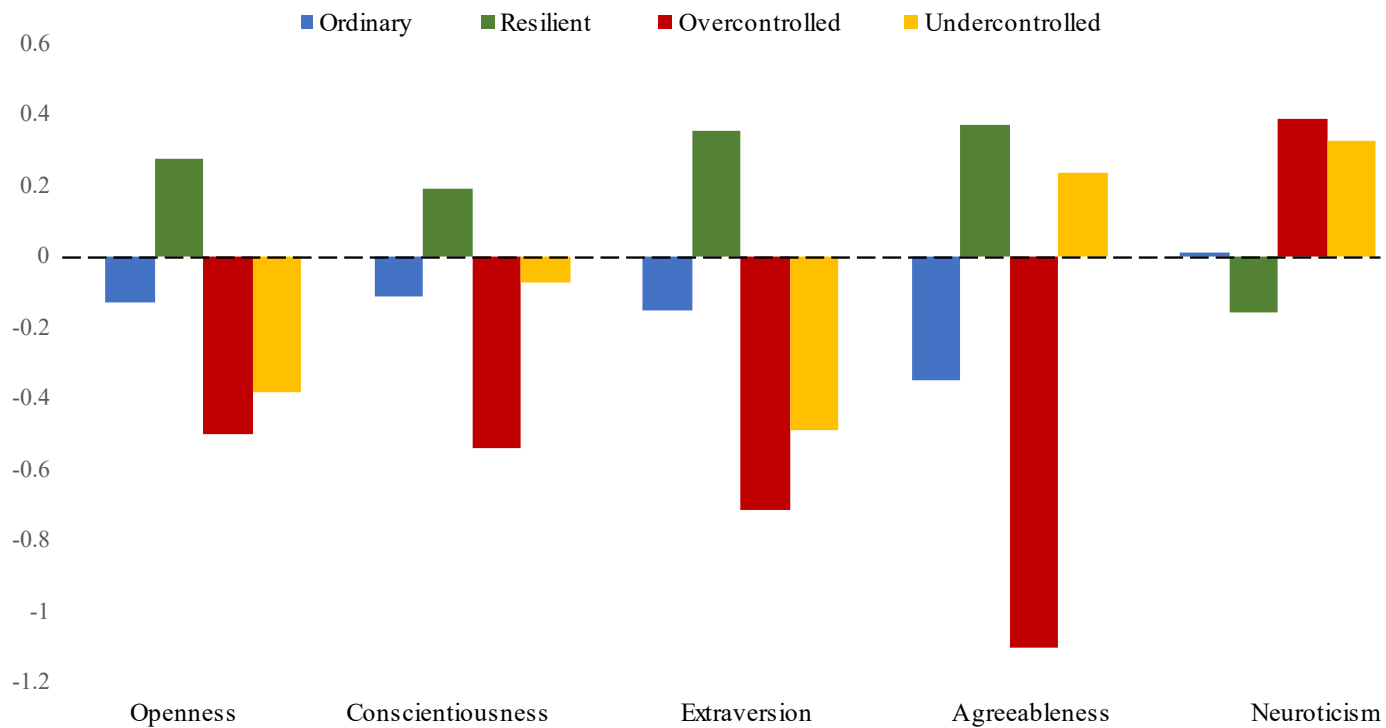
Figure 2.2. Centered Means of Personality Factor Scores for each of the Four Identified Personality Profiles

Note. Mean personality factor scores for each identified personality profile. Personality scores were mean-centered for this figure to easily see the distance from the mean for each personality factor for each identified profile.

Table 2.1. Characteristics of Sexual Minority and Propensity Matched Heterosexual Participants in Study 1

	All (n=477)	Sexual Minority Participants (n=159)	Heterosexual Participants (n=318)	p
	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	
Age	57.3(10.9)	56.5(10.8)	57.8(11.0)	.22
Cohort				.44
Invisible	11.7(56)	10.1(16)	12.6(40)	
Silent	33.5(160)	32.1(51)	34.3(109)	
Pride	48.2(230)	49.0(78)	47.8(152)	
Generation X	6.5(31)	8.8(14)	5.3(17)	
Sex (female)	48.9(233)	47.2(75)	49.7(158)	.60
Education				
High School Graduate or Less	22.6(108)	22.6(36)	22.6(72)	.99
Some College	18.2(87)	18.2(29)	18.2(58)	
College Graduate	27.0(129)	27.0(43)	27.0(86)	
Graduate School	32.1(153)	32.1(51)	32.1(102)	
Race (White)	90.4(431)	91.8(146)	89.6(285)	.42
Marital Status				<.01
Married	52.2(245)	20.5(31)	67.3(214)	
Divorced/ Separated	20.3(95)	22.5(34)	19.2(61)	
Widowed	5.8(27)	5.3(8)	6.0(19)	
Never Married	21.7(102)	51.7(78)	7.5(24)	
Employment Status				.13
Employed	64.4(298)	67.2(97)	65.5(201)	
Retired	25.5(118)	23.7(37)	26.4(81)	
Other	10.1(47)	14.1(22)	8.1(25)	
Substance Use	18.5(88)	23.3(37)	16.0(51)	.16
Current Smoker	16.4(78)	18.9(30)	15.1(48)	.13
Problematic Drinking	6.5(31)	12.6(20)	3.5(11)	<.01
Moderate Physical Activity	4.2(1.8)	4.1(1.8)	4.2(1.8)	.29
Routine Physical Exam	83.4(398)	86.8(138)	81.8(260)	.04

Table 2.2. Model Fit Indices

Number of Profiles	Loglikelihood	AIC	ssBIC	LMR (k-1)	p	Entropy	BLRT	p
1	-1944.30	3908.61	3918.54	-	-	-	-	-
2	-1800.87	3633.75	3649.64	279.31	.00	.70	286.86	.00
3	-1759.41	3562.83	3584.69	80.74	.47	.68	82.92	.00
4	-1728.80	3513.59	3541.41	59.56	.41	.78	61.15	.00
5	-1708.69	3485.38	3519.16	39.16	.02	.75	40.22	.00
6	-1701.23	3482.45	3522.20	14.54	.38	.75	14.93	.25

Note. AIC= Akaike Information Criterion, ssBIC=sample size-adjusted Bayesian Information Criterion, LMR= Lo-Mendell-Rubin, BLRT= Bootstrapped Likelihood Ratio Test.

Table 2.3. Overall Sample Means, the Means for the Four Identified Profiles and Classification Probabilities.

	Overall (n=477)	Profile 1 *Ordinary* (n=168)	Profile 2 *Resilient* (n=224)	Profile 3 *Overcontrolled* (n=35)	Profile 4 *Undercontrolled* (n=50)
	M(SD)	M(SE)	M(SE)	M(SE)	M(SE)
Openness	3.00(.53)	2.86(.05)	3.27(.12)	2.43(.10)	2.61(.41)
Conscientiousness	3.40(.48)	3.22(.05)	3.53(.07)	2.80(.11)	3.27(.11)
Extraversion	3.08(.57)	2.90(.05)	3.41(.13)	2.34(.08)	2.57(.58)
Agreeableness	3.45(.49)	3.09(.08)	3.81(.03)	2.34(.12)	3.68(.08)
Neuroticism	2.09(.62)	2.13(.05)	1.96(.07)	2.51(.15)	2.44(.50)
Profile 1	35.2%	.903	.052	.020	.025
Profile 2	47.0%	.038	.927	.000	.035
Profile 3	7.3%	.086	.000	.914	.000
Profile 4	10.5%	.157	.194	.000	.649

Note. Class probabilities and percentages of the overall sample are below the bold line.

Table 2.4. Characteristics of the Personality Profiles

	Overall (n=477)	Profile 1 Ordinary (n=168)	Profile 2 Resilient (n=224)	Profile 3 Overcontrolled (n=35)	Profile 4 Undercontrolled (n=50)	p
	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	
Age	57.3(10.9)	57.1(10.6)	57.5(11.3)	57.1(9.9)	57.3(10.9)	.98
Cohort						.57
Invisible	11.7(56)	11.3(19)	13.4(30)	2.9(1)	12.0(6)	
Silent	33.5(160)	28.6(48)	34.4(77)	42.9(15)	40.0(20)	
Pride	48.2(230)	52.4(88)	46.0(103)	48.6(17)	44.0(22)	
Gen X	6.5(31)	7.7(13)	6.3(14)	5.7(2)	4.0(2)	
Sex (female)	48.9(233)	39.3(66)	54.0(121)	28.6(10)	72.0(36)	<.01
Sexual Orientation						.77
Sexual Minority	33.3(159)	36.3(61)	32.1(72)	31.4(11)	30.0(15)	
Heterosexual	66.7(318)	63.7(107)	67.9(152)	68.6(24)	70.0(35)	
Education						.21
High School Graduate or Less	22.6(108)	20.2(24)	21.0(47)	28.6(10)	34.0(17)	
Some College	18.2(87)	14.9(25)	22.8(51)	11.4(4)	14.0(7)	
College Graduate	27.0(129)	27.4(46)	27.7(62)	25.7(9)	24.0(12)	
Graduate School	32.1(153)	37.5(63)	28.6(64)	34.3(12)	28.0(14)	
Race (White)	90.4(431)	90.5(152)	91.1(204)	94.3(33)	84.0(42)	.51
Marital Status						.83
Married	52.2(245)	50.6(83)	53.2(114)	48.6(17)	56.0(28)	
Divorced/ Separated	20.3(95)	24.4(40)	18.6(41)	22.9(8)	12.0(6)	
Widowed	5.8(27)	6.1(3)	5.5(12)	5.7(2)	6.0(3)	
Never Married	21.7(102)	18.9(31)	22.7(50)	22.9(8)	26.0(13)	
Employment Status						.44
Employed	64.4(298)	66.5(109)	65.9(143)	48.5(16)	61.2(30)	
Retired	25.5(118)	25.6(42)	23.5(51)	33.3(11)	28.6(14)	
Other	10.1(47)	7.69(13)	10.6(23)	18.2(6)	10.2(5)	
Substance Use	18.5(88)	17.9(30)	18.3(41)	20.0(7)	20.0(10)	.98
Current Smoker	16.4(78)	16.1(27)	15.6(35)	25.7(9)	14.0(7)	.29
Problematic Drinking	6.5(31)	7.1(12)	4.9(11)	14.3(5)	6.0(3)	.37
Moderate Physical Activity	4.2(1.8)	4.2(1.7)	4.4(1.7)	3.7(1.8)	3.6(1.9)	<.01
Routine Physical Exam	83.4(398)	82.1(138)	84.8(190)	77.1(27)	86.0(43)	.19

Table 2.5 Differences in Health Behaviors between Sexual Minority and Heterosexual Groups for Each Personality Profile

	Resilient			Ordinary			Overcontrolled			Undercontrolled		
Dependent variables	Sexual Minority (n=72)	Hetero-sexual (n=152)		Sexual Minority (n=61)	Hetero-sexual (n=107)		Sexual Minority (n=11)	Hetero-sexual (n=24)		Sexual Minority (n=15)	Hetero-sexual (n=35)	
	%(n)/ M(SD)	%(n)/ M(SD)	p	%(n)/ M(SD)	%(n)/ M(SD)	p	%(n)/ M(SD)	%(n)/ M(SD)	p	%(n)/ M(SD)	%(n)/ M(SD)	p
Substance Use	23.6(17)	15.8(24)	.31	26.2(16)	13.1(14)	.08	0.0(0)	29.2(7)	<.05	26.7(4)	17.1(6)	.44
Regularly Smoke Now	15.3(11)	15.8(24)	.26	18.0(11)	15.0(16)	.82	57.1(4)	20.8(5)	.46	36.4(4)	8.6(3)	.16
Problematic Drinking	12.5(9)	1.3(2)	<.01	11.5(7)	4.7(5)	.25	27.3(3)	8.3(2)	.31	6.7(1)	5.7(2)	.51
Moderate Physical Activity	4.4(1.7)	4.5(1.8)	.72	4.3(1.6)	4.1(1.7)	.55	3.0(1.8)	4.1(1.8)	.11	2.7(1.8)	4.0(1.8)	.03
Routine Physical Exam	88.9(64)	82.9(126)	.03	85.3(52)	80.4(86)	.53	81.8(9)	75.0(18)	.66	86.7(13)	85.7(30)	.73

Table 2.6. Differences between Resilient and Other Personality Profiles for Sexual Minority and Heterosexual Groups

Dependent variables	Resilient Sexual Minority (n=72)	Other Sexual Minority (n=87)	p	Resilient Heterosexual (n=152)	Other Heterosexual (n=166)	p
	%(n)/ M(SD)	%(n)/ M(SD)		%(n)/ M(SD)	%(n)/ M(SD)	
Substance Use	23.6(17)	23.0(20)	.54	15.8(24)	16.3(27)	.99
Regularly Smoke Now	15.3(11)	21.8(19)	.44	15.8(24)	14.5(24)	.95
Problematic Drinking	12.5(9)	12.6(11)	.88	1.3(2)	5.4(9)	.05
Routine Physical Exam	88.9(64)	85.1(74)	.75	82.9(126)	80.7(134)	.10
Moderate Physical Activity	4.4(1.7)	3.8(1.8)	.06	4.5(1.8)	4.1(1.8)	.06

Dependent variables	Resilient Sexual Minority (reference= other sexual minority)	Resilient Heterosexual (reference= other heterosexual)
	OR(95% CI) /B(SE)	OR/B (95% CI)/ B(SE)
Substance Use	1.07(.46, 2.47)	1.01(.53, 1.93)
Regularly Smoke Now	.70(.26, 1.89)	1.30(.61, 2.75)
Problematic Drinking	1.51(.41, 3.44)	.28(.05, 1.48)
Routine Physical Exam	1.74(.51, 5.91)	.80(.42, 1.50)
Moderate Physical Activity	B=.59, SE=.30, p=.05	**B= .47, SE=.20, p<.01**

Note. A linear regression analysis was conducted for moderate physical activity. Logistic regression analyses were conducted for the other dependent variables. Logistic and linear regression analyses controlled for age, sex, education, race, marital status, employment status, and cohort. The other group is comprised of participants with an Ordinary, Overcontrolled, or Undercontrolled personality profile. Bolded values indicate significant association.

CHAPTER THREE:
STUDY 2: THE ROLE OF COPING IN THE ASSOCIATION BETWEEN
DISCRIMINATION AND HEALTH IN SEXUAL MINORITY ADULTS

Introduction

Resilience is often defined as the process of adapting to adversities. This definition of resilience suggests that it is a learned process that is developed over time through life experiences, rather than being an innate personal characteristic. Underlying mechanisms related to resilience as a process include adaptive coping strategies like positive reinterpretation. Coping has been identified as a factor of resilience (Drabble et al., 2018; Levitt et al., 2016). The type of coping, whether it is maladaptive or adaptive, will likely influence whether a sexual minority individual is resilient.

Individuals with higher resilience tend to adopt adaptive coping strategies (Sagone & De Caroli, 2014). A commonly occurring factor in resilience scales is the ability to cope effectively with hardships. For example, in the Connor-Davidson Resilience Scale (Davidson, 2015), items like "I am able to handle unpleasant or painful feelings like sadness, fear, and anger", "Having to cope with stress can make me stronger", "I can deal with whatever comes my way", and "I am not easily discouraged by failure" imply that effective coping is an important factor of resilience. Similarly, in the Wagnild and Young Resilience Scale (Wagnild & Young, 1993), the item "I can get through difficult times because I've experienced difficulty before" implies that the person has learned to effectively cope with hardships through experience.

In a study of university students in Italy (study without consideration of sexual orientation), adaptive coping strategy predicted higher psychological well-being, while avoidant coping (maladaptive coping) predicted lower well-being (Sagone & De Caroli, 2014). Avoidant coping includes the use of substances such as alcohol or illicit drugs. Sexual minority individuals are more likely to use illegal drugs (Conron et al., 2010), smoke tobacco (Dilley et al., 2010; Fredriksen-Goldsen, Emlet, et al., 2012; Fredriksen-Goldsen, Kim, et al., 2012; Fredriksen-Goldsen, Kim, Shui, et al., 2017), and drink excessively (Blosnich et al., 2014; Dilley et al., 2010; Fredriksen-Goldsen et al., 2013; Fredriksen-Goldsen, Kim, Shui, et al., 2017). Increasing resilience by improving coping strategies could reduce health disparities in sexual minority people.

One key factor of coping is the perceived experience of having control over the stressor (Maier, 2015). People who have experienced adverse situations, adapt and recover, learn to successfully cope with future stressors. Individuals who can successfully adapt and recover from adversity are often described as resilient. The increase in the ability to cope with stressors has been labeled "steeling" or "behavioral immunization" (Hill & Gunderson, 2015). For sexual minority adults, behavioral immunization is the process of building a tolerance to the harmful effects of minority stressors such as discrimination over time. Those who do not cope effectively become sensitized to stressful situations and more vulnerable to harmful effects (Hill & Gunderson, 2015). Research has found evidence that a higher number of stressors in early life was related to higher resilience in adulthood (Harris et al., 2016). This supports the concept of a steeling effect that is developed through exposure to adversities over time in resilient individuals.

Sexual minority individuals face additional stressors that heterosexual individuals do not have to deal with. According to the health equity promotion model, these stressors are associated

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with health outcomes in sexual minority individuals. However, the model also shows that coping can moderate the association between the minority stressors and the health outcomes. A recent study using MIDUS data found that sexual minority participants reported more perceived daily and lifetime discrimination than heterosexual participants and that both types of discrimination mediated the association between sexual orientation and health outcomes (Wardecker et al., 2021). However, this study was cross-sectional and did not look at the moderating effects of coping on the association between perceived discrimination and health outcomes over time.

Very few studies have examined the health and resilience of sexual minority adults longitudinally. One study that examined the health of sexual minority and heterosexual adults over time found that sexual minority participants had one more chronic condition, on average, at baseline than heterosexual participants (Nelson & Andel, 2020a). However, the number of chronic conditions for sexual minority participants increased less over time than compared to the change in the number of chronic conditions for heterosexual participants (Nelson & Andel, 2020a). One possible explanation for these results could be that sexual minority adults become more resilient to the negative health effects of minority stressors over time. However, more research is necessary to better understand the relationship between resilience and health over time.

Research Aims and Hypotheses

This study had two aims: 1) to examine differences in the associations between perceived daily discrimination and the health outcomes over time for sexual minority and heterosexual adults, and 2) to assess the moderating effects of problem-focused and emotion-focused coping on the association between perceived daily discrimination and health over time for sexual minority and heterosexual adults. For the first aim, it was hypothesized that (1a) sexual minority

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participants would report significantly more perceived daily discrimination compared to heterosexual participants. It was also predicted that (1b) higher perceived daily discrimination would be associated with declines in physical and mental health over time. For the second aim, it was hypothesized that (2) problem-focused and emotion-focused coping would significantly moderate the association between perceived daily discrimination and changes in health over time for both sexual minority and heterosexual participants.

Methods

Data

Data for this study were from the main survey of waves 1, 2, and 3 of the Midlife in the United States (MIDUS) study, a nationally representative, multidisciplinary study of middle-aged and older adults. For the first wave of the MIDUS study (1995-1996), participants were chosen via random telephone digit dialing procedures, resulting in 7,108 adults. Participants gave verbal consent and completed a 45-minute telephone interview. After the telephone interview, participants were mailed two self-administered questionnaires. The second wave of the MIDUS study took place from 2004-2006. Of the 7,108 adults that participated in the first wave, 4,963 (approximately 70%) continued to participate in the second wave (MIDUS 2), completing both assessments again. The third wave MIDUS 3, following the same procedures as previous waves, was conducted between 2013 and 2015 with 3,294 participants completing the assessments.

Sample

MIDUS participants are English-speaking adults living in the United States. For this study, only participants who responded to the sexual orientation question during MIDUS 1 were included in the cross-sectional and longitudinal analyses (n=6,314). At baseline (MIDUS 1), 94 participants identified as homosexual (gay/lesbian), 74 as bisexual, and 5,958 as heterosexual.

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Homosexual and bisexual participants were grouped into a sexual minority group. Participants that were missing data on the variables of interest at MIDUS 1 (baseline) were excluded (n=387). In total, 162 participants identified as a sexual minority during MIDUS 1. A 1:2 propensity-score matched heterosexual group was identified using propensity score matching as described in the statistical analyses section. The final analytical sample (n=486) included 162 sexual minority participants and 324 heterosexual participants at baseline (MIDUS 1). See Figure 3.1 for details on Study 2 inclusion/exclusion criteria.

Measures

Dependent Variables. The dependent variables for this study included the number of chronic conditions and a self-reported measure of current mental health. The number of chronic conditions variable is the sum of chronic conditions that participants reported having experienced or been treated for in the past 12 months. In each wave, participants were asked about 30 chronic conditions including headache, stroke, diabetes, AIDS/ HIV, hay fever, and incontinence. For a full list of chronic conditions, see Table 3.1. The number of chronic conditions ranged from 0 to 30. However, to make this a measure of physical health only, the two chronic conditions related to mental health were removed: "anxiety, depression, or some other emotional disorder" and "alcohol or drug problems". Therefore, the total sum of chronic conditions ranged from 0 to 28. For the self-reported measure of current mental health, participants were asked to rate their current mental health on a sale of 1 (poor) to 5 (excellent). Self-rated mental health was treated as a continuous variable for this study.

Independent variables. The independent variables for this study were sexual orientation and perceived daily discrimination. For sexual orientation, participants were asked whether they would describe their sexual orientation as "heterosexual (sexually attracted to only one sex),

homosexual (sexually attracted only to your own sex), or bisexual (sexually attracted to both men and women)". For this study, homosexual (i.e., lesbian, gay) and bisexual participants were combined into the sexual minority group. Propensity score matching was conducted to create a propensity matched heterosexual group.

For perceived daily discrimination, participants were asked about how often they experience nine different types of discrimination on a day-to-day basis. Types of discrimination include being treated with less courtesy than other people, treated with less respect than other people, received poorer service, were called names or insulted, or were threatened or harassed. Responses ranged from 1 (never) to 4 (often). The scores were summed to create the perceived daily discrimination variable with scores ranging from 9 to 36. Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the median perceived daily discrimination score were categorized as low perceived daily discrimination (coded as 0). Scores greater than the median were categorized as high perceived daily discrimination (coded as 1).

Moderator Variables. The moderator variables for this study were emotion-focused and problem-focused coping. Coping was used to assess resilience in this study. In MIDUS, coping was measured using 26 items from six subscales of the COPE (Carver et al., 1989). Three subscales measured problem-focused coping (positive reinterpretation, active coping, planning), and three subscales measured emotion-focused coping (venting of emotion, denial, behavioral disengagement). Participants were asked about what they generally do and feel when they experience various stressful situations. Each item ranged from 1 (not a lot) to 4 (a lot). Coping was not assessed in MIDUS 1; therefore, this study used coping data from MIDUS 2.

Covariates. The covariates for this study included age (in years), sex (male or female), education (highest achieved), marital status (married, separated/divorced, widowed, never married), employment status (employed, retired, other), race (White or non-White), and cohort. Cohort was categorized according to birth year and historical context as described in Chapter 1: Invisible Generation (1934 or earlier), Silent Generation (1935-1949), Pride Generation (1950-1964), and Generation X (1965-1980).

Statistical Analyses

All analyses were conducted using SAS, version 9.4 (SAS Institute Inc., Cary, NC). First, propensity score matching was conducted as described in chapter two to create the matched heterosexual group. Chi-square and t-tests were conducted to confirm successful matching and to examine differences in the measures being used for this study between the sexual minority and matched heterosexual groups.

Next, generalized estimating equation (GEE) analyses with zero-inflated negative binomial distribution were conducted to assess the association between perceived daily discrimination and the number of chronic conditions over approximately 20 years. Using PROC GENMOD in SAS, separate GEE analyses were conducted for sexual minority and heterosexual participants. GEE analyses are often used with count variables that are usually skewed due to many responses at the lower end such as having a large number of participants with zero chronic conditions at baseline. Since the regression coefficients for the negative binomial GEE models were log-transformed, the coefficients were exponentiated to create interpretable values in the form of odds ratios. Mixed effects models, using the PROC MIXED procedure in SAS, were conducted to examine the association between perceived daily discrimination and the self-rated mental health outcome as a

continuous dependent variable. Again, separate analyses were conducted for the sexual minority and the matched heterosexual groups.

To test for the potential moderating effects of problem-focused coping and emotion-focused coping, interaction terms (Time x moderator x independent variable) were added to the models. If the interaction term was found to be significant, further analyses were conducted to examine the moderating effect. Specifically, the moderators were be stratified above and below its median.

Results

Sample Characteristics

Compared to participants with data in all three waves, dropouts after the first wave of MIDUS (i.e., missing data in at least one of the other two waves) were more likely to be a member of the Invisible Generation (19% vs 9%, p<.01), less educated (p<.01), more likely to have been retired at wave 1 (15% vs 6%, p<.01), less likely to be white (96% vs 99%, p=.04), but there were no significant differences in the number of chronic conditions or self-rated mental health at baseline.

Table 3.2 displays the overall sample characteristics at MIDUS 1 (baseline), as well as comparisons between the sexual minority and propensity matched heterosexual groups. Participants in this study were 43.0 years old (SD=12.5) at baseline. Approximately 15% of participants were part of the Invisible Generation cohort (born in 1934 or earlier), 22% were part of the Silent Generation cohort (born 1935 to 1949), 48% were part of the Pride Generation cohort (born 1950 to 1964), and 16% were part of the Generation X cohort (born 1965 to 1972). More than half of the sample had some college education or more. The sample was 98% white,

47% female, and a little more than half of the sample was married at baseline. Approximately three-quarters of the sample were employed at baseline.

There were no significant differences between sexual minority and heterosexual participants in any of the matching covariates (age, sex, race, education, employment status). The two groups significantly differed in marital status (p<.01) with heterosexual participants being more likely to be married than sexual minority participants (69% vs 25%, respectively). Sexual minority participants were more likely to have never been married than heterosexual participants (54% vs 11%, respectively, p<.01). Sexual minority and heterosexual participants were not matched on marital status due to laws restricting same sex marriage until 2015. The two groups also significantly differed in the number of chronic conditions, current self-rated mental health, perceived daily discrimination, and emotion-focused coping; sexual minority participants scored higher in emotion-focused coping than heterosexual participants. There were no significant differences in problem-focused coping between the two groups.

Longitudinal Analyses: Sexual Minority Participants

Table 3.3 displays the results of the GEE analyses that examined the associations between perceived daily discrimination and the number of chronic conditions for the sexual minority group. The results revealed that sexual minority participants with high perceived daily discrimination (i.e., scores greater than the median, median=12) reported a higher number of chronic conditions than sexual minority participants with low perceived daily discrimination (b=.55, SE=.14, p<.01). The calculated odds ratio (OR) indicated that sexual minority participants who reported high perceived daily discrimination had 73% greater odds of reporting one more chronic condition at baseline than the sexual minority participants who reported low

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perceived daily discrimination (OR=1.73, 95% CI=1.32-2.28). The odds increased to 87% after controlling for covariates (OR=1.87, 95% CI=1.43-2.44).

There was a significant increase in the number of chronic conditions over time for sexual minority participants with low perceived discrimination (b=.24, SE=.08, p<.01); the exponentiated coefficient indicated a 16% increase in the number of chronic conditions on average after 10 years (OR=1.16, 95% CI=1.09-1.49). However, this finding was no longer significant after controlling for the covariates. There was also a significant interaction between time and perceived daily discrimination. After controlling for covariates, the results indicate that the number of chronic conditions increased less over time for sexual minority participants who reported high perceived daily discrimination compared to sexual minority participants who report low perceived daily discrimination (B=-.24, SE=.10, p=.03). Specifically, the number of chronic conditions increased 21% less over time for sexual minority participants with high perceived daily discrimination than their counterparts who reported low perceived daily discrimination (OR=.79, 95% CI=.64-.96). Figure 3.2 shows the association between the number of chronic conditions and perceived daily discrimination over time for the sexual minority and heterosexual groups.

Table 3.3 also displays the results of the mixed effect analyses that examined the association between perceived daily discrimination and self-rated mental health for sexual minority participants. The results revealed no significant changes in mental health over time (B=-57, SE=1.64, p=.74). The results also revealed no significant effect of perceived daily discrimination on mental health in the sexual minority group (B= -.18, SE=.16, p=.26). The interaction between time and perceived daily discrimination was also not significant (B=.05,

SE=.14, p=.71). Figure 3.3 displays the association between perceived daily discrimination and self-rated mental health over time for the sexual minority and heterosexual groups.

Longitudinal Analyses: Heterosexual Participants

Table 3.4 displays the results of the GEE analyses that examined the association between perceived daily discrimination and the number of chronic conditions for heterosexual participants. The results of the GEE analysis revealed a significant effect of perceived daily discrimination (B=.37, SE=.12, p<.01). The calculated odds ratio (OR) indicated that heterosexual participants who reported high perceived daily discrimination had 45% greater odds of reporting one more chronic condition at baseline than the heterosexual participants who reported low perceived daily discrimination (OR=1.45, 95% CI=1.15-1.83). There was a significant increase in the number of chronic conditions over time for heterosexual participants (B=.19, SE=.06, p<.01); however, this finding was no longer significant after controlling for covariates. There was no significant interaction between time and perceived daily discrimination for heterosexual participants (B= -.04, SE=.09, p=.63). Figure 3.2 displays the association between perceived daily discrimination and the number of chronic conditions over time for heterosexual participants.

Table 3.4 also displays the results of the mixed effects analyses that examined the association between perceived daily discrimination and self-reported mental health for the matched heterosexual group. The results found a significant decrease over time in self-rated mental health (B=-.17, SE=.05, p<.01); however, this finding was no longer significant after controlling for covariates (B= -1.08, SE=.73, p=.14). The results also found an effect of perceived daily discrimination on self-rated mental health for the heterosexual group. Specifically, the results found that heterosexual participants who reported high perceived daily

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discrimination rated their mental health .22 lower than the heterosexual participants who reported low perceived daily discrimination (B= -.22, SE=.10, p=.03).

Moderation Analyses

Table 3.5 shows the results of the stratified GEE and mixed effects analyses for each significant moderation effect in the sexual minority and heterosexual groups. The table shows the p-value for the time*perceived daily discrimination*moderator interactions. Figure 3.4 shows the association between perceived daily discrimination and the number of chronic conditions over time for heterosexual participants, significantly moderated by emotion-focused coping (p<.01). The number of chronic conditions for heterosexual participants with high emotion-focused coping increased more over time than the number of chronic conditions for the heterosexual participants with low emotion-focused coping. Specifically, calculated odds ratios show the number of chronic conditions for participants with high emotion-focused coping increased 23% after 10 years (OR=1.23, 95% CI=1.02-1.48) and the number of chronic conditions for the participants with low-emotion focused coping increased 20% after 10 years (OR=1.20, 95% CI=1.05-1.36). For heterosexual participants with low emotion-focused coping, calculated odds ratios indicated that reporting high perceived daily discrimination increased the odds of having one more chronic condition at baseline by 62% (OR=1.62, 95% CI= 1.29-1.88).

Both problem-focused and emotion-focused coping moderated the association between perceived daily discrimination and self-rated mental health for the heterosexual group. Figure 3.5 shows the moderation effect of emotion-focused coping. Heterosexual participants with low emotion-focused coping reported higher mental health at baseline (B=4.24, SE=1.03, p<.01) than heterosexual participants with high emotion-focused coping (B=3.01, SE=1.53, p<.05). For heterosexual participants with high emotion-focused coping, reporting high perceived

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discrimination decreased mental health by .60 at baseline (B= -.60, SE=.18, p<.01). However, mental health decreased less over time having high perceived discrimination and high emotion-focused coping (B=.29, SE=.11, p<.05). For heterosexual participants with low emotion-focused coping, mental health decreased by .55 after 10 years (B=-.55, SE=.24, p<.05). There was no significant effect of perceived daily discrimination for heterosexual participants with low emotion-focused coping.

Figure 3.6 shows the association between perceived daily discrimination and self-rated mental health for the heterosexual participants, moderated by problem-focused coping. Heterosexual participants with high problem-focused coping reported higher mental health (B=4.24, SE=.11, p<.01) than heterosexual participants with low problem-focused coping (B=3.92, SE=.08, p<.01). For heterosexual participants with high perceived daily discrimination, individuals with low problem-focused coping experienced a decline in mental health over time, whereas heterosexual participants with high problem-focused coping experienced an increase in mental health over time.

For the sexual minority participants, there were no moderating effects of emotion-focused coping or problem-focused coping on the association between perceived daily discrimination and the number of chronic conditions over time. Therefore, the results were not reported. However, the time*perceived daily discrimination*problem-focused coping interaction term was significant when added to the mixed effects model examining the association between perceived daily discrimination and self-reported mental health over time for sexual minority participants. Figure 3.7 displays the moderation effect. The sexual minority participants with high perceived daily discrimination and high problem-focused coping reported the highest mental health across 20 years than any other sexual minority participants. However, the results of the mixed effect

analyses stratified by high and low problem-focused coping do not show any significant effect of time or perceived daily discrimination for sexual minority participants with high or low problem-focused coping.

Discussion

The purpose of this study was to examine the moderating effect of emotion-focused and problem-focused coping on the association between perceived daily discrimination and health outcomes over approximately 20 years. This study is one of the few studies to examine the health and resilience of sexual minority middle-aged and older adults longitudinally (over approximately 20 years). The results of the longitudinal analyses found that sexual minority participants reported more chronic conditions at baseline than heterosexual participants. Sexual minority participants with higher perceived daily discrimination had the highest number of chronic conditions at baseline; however, the longitudinal results show that reporting higher perceived discrimination at baseline was associated with a decrease in the number of chronic conditions over time for the sexual minority participants. Sexual minority participants with low perceived discrimination increased in the number of chronic conditions over time. For the heterosexual participants, both high and low perceived daily discrimination was associated with an increase in the number of chronic conditions over time. For both sexual minority and heterosexual participants, mental health decreased over time, regardless of perceived daily discrimination. The results of this study also found significant moderating effects of problem-focused and emotion-focused coping on the number of chronic conditions and self-rated mental health over time.

Effect of Perceived Daily Discrimination on the Health Outcomes

By the third wave of MIDUS, the number of chronic conditions for sexual minority participants was less than or similar to the number of chronic conditions for heterosexual participants. As can be seen in Figure 3.1, the line for the number of chronic conditions for the sexual minority participants with high perceived daily discrimination declined and surpassed the line for the number of chronic conditions for heterosexual participants with high perceived daily discrimination. Moreover, the line for sexual minority participants with higher perceived daily discrimination nearly converged with the line for the number of chronic conditions for heterosexual participants with low perceived daily discrimination. This finding supports the notion of a "steeling" effect or a resistance to stress achieved through exposures to adversity. This steeling effect was unique to sexual minority adults in this sample as the heterosexual participants who reported high perceived daily discrimination in this study did not experience a similar decline in chronic conditions.

There was a significant negative effect of perceived daily discrimination on mental health for heterosexual participants but not for sexual minority participants. There was also a significant decrease in mental health over time for the heterosexual group, but not for the sexual minority group, before controlling for covariates. Sexual minority participants with high and low perceived daily discrimination rated their mental health as higher across the three time points than their heterosexual counterparts. This suggests that the mental health of sexual minority middle-aged and older adults is not significantly affected by perceived daily discrimination.

There was not a significant effect of perceived daily discrimination on the mental health of sexual minority participants. However, there was a significant effect of perceived daily discrimination on the mental health of heterosexual participants. Heterosexual participants

reported less daily discrimination than sexual minority participants. One explanation for these results could be related to discrimination based on age. The sample in this study consisted of middle-aged and older adults; therefore, the discrimination experienced by heterosexual participants may be based on their age. Heterosexual participants in this study, being predominantly white, were probably not exposed to minority stressors throughout their lives. Therefore, they were not able to build up resilience to the negative effects of discrimination on their physical and mental health like the sexual minority middle-aged and older adults who were more likely to experience discrimination throughout their lives based on their sexual orientation.

Approximately half of the sexual minority adults in this study were part of the Pride Generation cohort, meaning they matured during the gay rights movement. Previous research found that sexual minority adults in the Pride Generation were less likely to conceal their identity and more likely to experience higher discrimination than older Generations (Fredriksen-Goldsen, 2016). Therefore, they were more likely to build resilience against the negative effects of discrimination. This is supported by the results of this study that suggest sexual minority participants experienced a "steeling" effect against the harmful effects of discrimination on their mental health. The findings in this study are supported by previous research on other disadvantaged groups. For example, one study found that high levels of childhood adversity were associated with lower rates of illegal drug use during midlife in a sample of African American adults. Conversely, experiencing low levels of childhood adversity was associated with higher illegal drug use (Doherty et al., 2018).

The Moderating Effect of Problem-Focused and Emotion-Focused Coping

Problem-focused coping significantly moderated the association between perceived daily discrimination and self-rated mental health for sexual minority participants. Specifically, mental

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health declined less over time, suggesting that problem-focused coping is an effective process promoting mental health resilience for sexual minority middle-aged and older adults experiencing daily discrimination. Problem-focused coping also significantly moderated the association between perceived daily discrimination and self-rated mental health for the heterosexual group. Heterosexual participants who reported high perceived daily discrimination and had high problem-focused coping reported an increase in mental health over.

Emotion-focused coping was not a significant moderator for the association between perceived daily discrimination and the health outcomes for sexual minority participants. However, for heterosexual participants, emotion-focused coping significantly moderated the association between discrimination and the number of chronic conditions as well as the association between discrimination and self-rated mental health. Specifically, higher scores in emotion-focused coping were associated with a higher number of chronic conditions and lower mental health for heterosexual participants. However, for heterosexual participants with high perceived daily discrimination, scoring higher in emotion-focused coping was associated with nearly stable self-rated mental health over time. Though the heterosexual participants with high perceived daily discrimination and high focused coping had lower self-rated mental health at baseline, they experienced very little decline over time. Emotion-focused coping consists of venting of emotions, denial, and behavioral disengagement and has been referred to as maladaptive coping (Sagone & De Caroli, 2014).

Strengths, Limitations, and Suggestions for Future Studies

This study is one of the few longitudinal studies that has examined the health of sexual minority adults over time. To the best of our knowledge, no study has examined the moderating effects of emotion-focused and problem-focused coping on the association between

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discrimination and sexual minority health over time with comparisons to heterosexual adults. One of the most important findings of this study was that higher perceived daily discrimination was associated with an improvement in health over time in sexual minority middle-aged and older adults, but not for heterosexual participants who reported high discrimination. Another important finding is that higher problem-focused coping is associated with higher self-rated mental health and less decline over time in sexual minority participants.

Despite the strengths of this study, some limitations should be considered. As is common in longitudinal studies, there were missing data and attrition in this study. With GEE and mixed effects analyses, all observations can be used if data are missing at random. However, in combination with the small sample size at baseline, attrition across the three waves of MIDUS may have resulted in insufficient power to detect significant associations between perceived discrimination and changes in the health outcomes over time. Another limitation of this study is that coping was not examined as a mediator of the association between perceived discrimination and health outcomes over time. It is possible that emotion-focused and problem-focused coping explain the association between perceived discrimination and changes in physical and mental health over time. For example, sexual minority participants with high perceived daily discrimination may have experienced a decrease in the number of chronic conditions over time because they use more adaptive coping strategies, thus making them more resilient to the perceived discrimination. Future research should examine resilience factors like coping as mediators between minority stressors and changes in health outcomes over time in sexual minority adults.
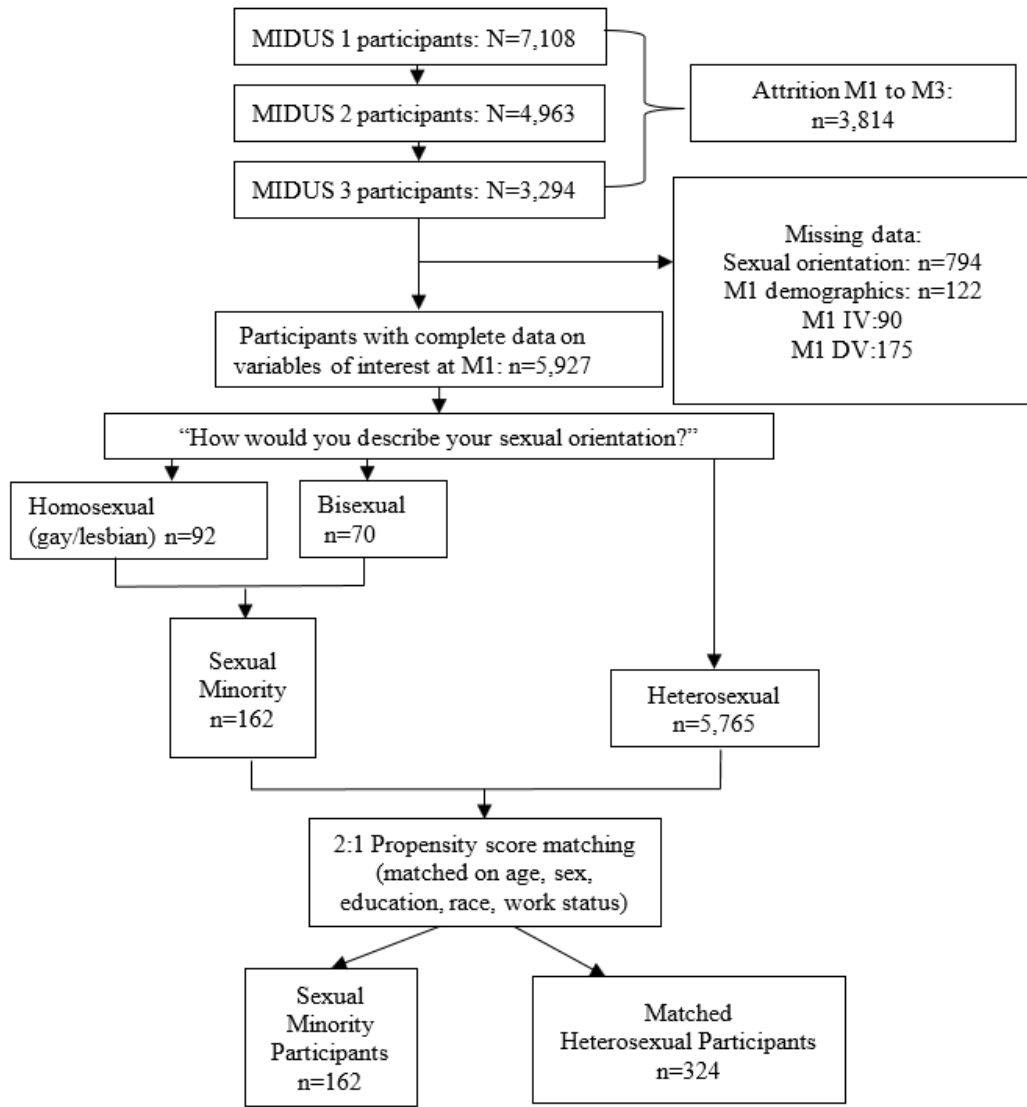
Figure 3.1. Flowchart of Study 2 Eligibility and Inclusion

Table 3.1. List of Chronic Conditions

Asthma, bronchitis, or emphysema
Tuberculosis
Other lung problems
Arthritis, rheumatism, or other bone or joint diseases
Sciatica, lumbago, or reoccurring backache
Persistent skin trouble
Thyroid disease
Hay fever
Recurrent stomach trouble
Urinary or Bladder problems
Constipated all or most of the time
Gall bladder trouble
Persistent foot trouble
Trouble with varicose veins requiring medical treatment
AIDS or HIV infection
Lupus or other autoimmune disease
Persistent trouble with gums or mouth
Persistent trouble with teeth
High blood pressure or hypertension
*Anxiety, depression, or some other emotional disorder
*Alcohol or drug problems
Migraine headaches
Chronic sleeping problems
Diabetes or high blood sugar
Multiple sclerosis, epilepsy, or other neurological disorders
Stroke
Ulcer
Hernia or rupture
Piles or hemorrhoids
Swallowing problems

Note. *chronic health conditions related to mental health that were removed from the sum of chronic conditions to make the measure a physical health measure only.

Table 3.2. Characteristics of Sexual Minority and Propensity Matched Heterosexual Participants in Study 2 at MIDUS 1

	All (n=486)	Sexual Minority Participants (n=162)	Heterosexual Participants (n=324)	p
	%(n)/M(SD)	*%(n)/M(SD)*	*%(n)/M(SD)*	
Age	43.0(12.5)	43.0(12.5)	43.0(12.5)	.99
Cohort				.98
Invisible	14.6(71)	14.2(23)	14.8(48)	
Silent	22.0(107)	22.8(37)	21.6(70)	
Pride	47.7(232)	46.9(76)	48.2(156)	
Gen X	15.6(76)	16.1(26)	15.4(50)	
Sex (female)	46.7(227)	45.7(74)	47.2(153)	.75
Education				.99
High School Graduate or Less	31.5(153)	31.5(51)	31.5(102)	
Some College	19.1(93)	19.1(31)	19.1(62)	
College Graduate	27.8(135)	27.8(45)	27.8(90)	
Graduate School	21.6(105)	21.6(35)	21.6(70)	
Race (White)	97.5(474)	97.5(158)	97.5(316)	.99
Marital Status				<.01
Married	53.1(258)	23.5(38)	67.9(220)	
Divorced/ Separated	16.7(81)	14.8(24)	17.6(57)	
Widowed	2.1(10)	3.7(6)	1.2(4)	
Never Married	28.2(137)	58.0(94)	13.3(43)	
Employment Status				.46
Employed	78.0(377)	76.4(123)	78.9(254)	
Retired	10.8(52)	9.9(16)	11.2(36)	
Other	11.2(54)	13.7(22)	9.9(32)	
Number of Chronic Conditions	2.3(2.3)	2.6(2.3)	2.1(2.2)	.01
Current Mental Health	3.8(1.0)	3.6(1.0)	3.9(0.9)	<.01
Perceived Daily Discrimination	13.3(4.9)	14.6(5.3)	12.7(4.6)	<.01
Emotion-Focused Coping (MIDUS 2)	22.2(5.6)	23.4(5.5)	21.7(5.5)	.01
Problem-Focused Coping (MIDUS 2)	38.4(5.9)	38.6(6.0)	38.3(5.8)	.64

Table 3.3. Results of the Longitudinal Analyses for the Sexual Minority Group.

Parameter	Number of Chronic Conditions			Self-Rated Mental Health	
	B(SE)	*p*	*OR(95% CI)*	*B* (SE)	p
Unconditional					
Intercept	.90 (.07)	<.01	2.47(2.14-2.84)	3.65(.08)	<.01
Slope (Time)	.11 (.06)	.05	1.11(1.00-1.24)	-.11(.06)	.08
Conditional, Unadjusted					
Intercept	.60 (.11)	<.01	1.81(1.47-2.24)	3.73(.11)	<.01
Slope (Time)	.24 (.08)	<.01	1.16 (1.09-1.49)	-.15(.09)	.10
Perceived Daily Discrimination	.55 (.14)	<.01	1.73(1.32-2.28)	-.16(.16)	.32
Time*Perceived Daily Discrimination	-.22 (.11)	.04	0.80(0.65-0.99)	.08(.13)	.52
Conditional, Adjusted					
Intercept	.18 (1.30)	.89	1.81(1.47-2.24)	4.63(1.63)	<.01
Slope (Time)	.15 (1.10)	.89	1.16 (1.09-1.49)	-.57(1.64)	.73
Perceived Daily Discrimination	.63 (.14)	<.01	1.87(1.43-2.44)	-.18(.16)	.26
Time*Perceived Daily Discrimination	-.24 (.10)	0.03	0.79(0.64-0.96)	.05(.14)	.71

Notes. Perceived Daily Discrimination (PDD) was categorized into a high and low group. Scores equal to or below the median PDD score was categorized as low PDD. Scores greater than the median were categorized as High PDD. The Low PDD group was used as the reference group Due to the negative binomial distribution of the GEE analyses, the beta (*b*) coefficients are the expected change in the log of the mean of the dependent variable for each change in the parameter. To make the coefficient interpretable, the coefficients needed to be exponentiated, creating odds ratios. The conditional models controlled for age, sex, education, race, marital status, cohort, and employment status. CI= confidence interval. SE=standard error. OR= odds ratio.

Table 3.4. Results of the Longitudinal Analyses for the Matched Heterosexual Group

Parameter	Number of Chronic Conditions			Self-Rated Mental Health	
	B(SE)	p	OR(95% CI)	*B*(SE)	p
Unconditional					
Intercept	.68 (.06)	<.01	1.97(1.75-2.22)	3.89	<.01
Slope (Time)	.17 (.04)	<.01	1.19(1.11-1.28)	-12	<.01
Conditional, Unadjusted					
Intercept	.48(.08)	<.01	1.62(1.38-1.89)	4.03(.07)	<.01
Slope (Time)	19(.06)	<.01	1.22(1.09-1.36)	-.17(.05)	<.01
Perceived Daily Discrimination	.40(.12)	<.01	1.49(1.18-1.87)	-.29(.10)	<.01
Time*Perceived Daily Discrimination	-.04(.08)	.64	0.97(0.83-1.12)	.12(.07)	.10
Conditional, Adjusted					
Intercept	-.75(1.13)	.08	0.47(0.21-1.08)	4.91(.98)	<.01
Slope (Time)	.40(.38)	.29	1.50(0.41-14.82)	-1.08(.73)	.14
Perceived Daily Discrimination	.37(.12)	<.01	1.45(1.15-1.83)	-.22(.10)	.03
Time*Perceived Daily Discrimination	-.04(.09)	.63	0.96(0.82-1.13)	.10(.07)	.16

Notes. Perceived Daily Discrimination (PDD) was categorized into a high and a low group. Scores equal to or below the median PDD score were categorized as low PDD. Scores greater than the median were categorized as High PDD. The Low PDD group was used as the reference group. Due to the negative binomial distribution of the GEE analyses, the beta (*b*) coefficients are the expected change in the log of the mean of the dependent variable for each change in the parameter. To make the coefficient interpretable, the coefficients needed to be exponentiated, creating odds ratios. The conditional models controlled for age, sex, education, race, marital status, cohort, and employment status. CI= confidence interval. SE=standard error. OR= odds ratio.

Table 3.5. Results of Longitudinal Analyses with Moderator Interaction Terms Added.

	Heterosexual			
	Emotion-Focused Coping		Problem-Focused Coping	
Number of Chronic Conditions	High	Low	High	Low
Parameter	*B* (SE)	*B* (SE)	*B* (SE)	*B(*SE)
Intercept	.56(.14)*	.44(.10)**	-	-
Slope (Time)	.21(.10)*	.18(.07)**	-	-
PDD	.21(.20)	.48(.14)**	-	-
Time*PDD	.09(.12)	-.13(.10)	-	-
Time*PDD*Emotion-Focused Coping	p<.01		p=.29	
	Emotion-Focused Coping		Problem-Focused Coping	
Mental Health	High	Low	High	Low
Intercept	3.01(1.53)*	4.24(1.03)**	4.24(.11)**	3.92(.08)**
Slope (Time)	-.39(.34)	-.55(.24)*	-.19(.07)**	-.18(.06)**
PDD	-.60(.18)**	-.03(.12)	-.44 (.18)	-.19(.12)
Time*PDD	.29(.11)*	-.0002(.09)	.25(.12)	.04(.08)
Time*PDD*Problem-Focused Coping	p=.03		p<.01	
	Sexual Minority			
	Emotion-Focused Coping		Problem-Focused Coping	
Mental Health	High	Low	High	Low
Intercept	-	-	3.92(.17)	3.64(.14)**
Slope (Time)	-	-	-.21(.12)	-.12(.11)
PDD	-	-	.19(.25)	-.29(.19)
Time*PDD	-	-	.13(.17)	-.001(.15)
Time*PDD*Emotion-Focused Coping	p=.28		p<.01	

Note. For problem=focused and emotion-focused coping, values greater than their respective medians are referred to as high and values less than or equal to the median are referred to as low. PDD=perceived daily discrimination. B=beta coefficient. SE=standard deviation. *<.05 **<.01

Figure 3.2: Perceived Daily Discrimination and the Number of Chronic Conditions Over Time for Sexual Minority and Heterosexual Participants

Note. Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the perceived daily discrimination score were categorized as low perceived daily discrimination. Scores greater than the median were categorized as High perceived daily discrimination. The median for perceived daily discrimination was 12.

Figure 3.3. Perceived Daily Discrimination and Self-Rated Mental Health for Sexual Minority and Heterosexual Participants

Note. Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the median perceived daily discrimination score were categorized as low perceived daily discrimination. Scores greater than the median were categorized as High perceived daily discrimination. The median for perceived daily discrimination was 12.
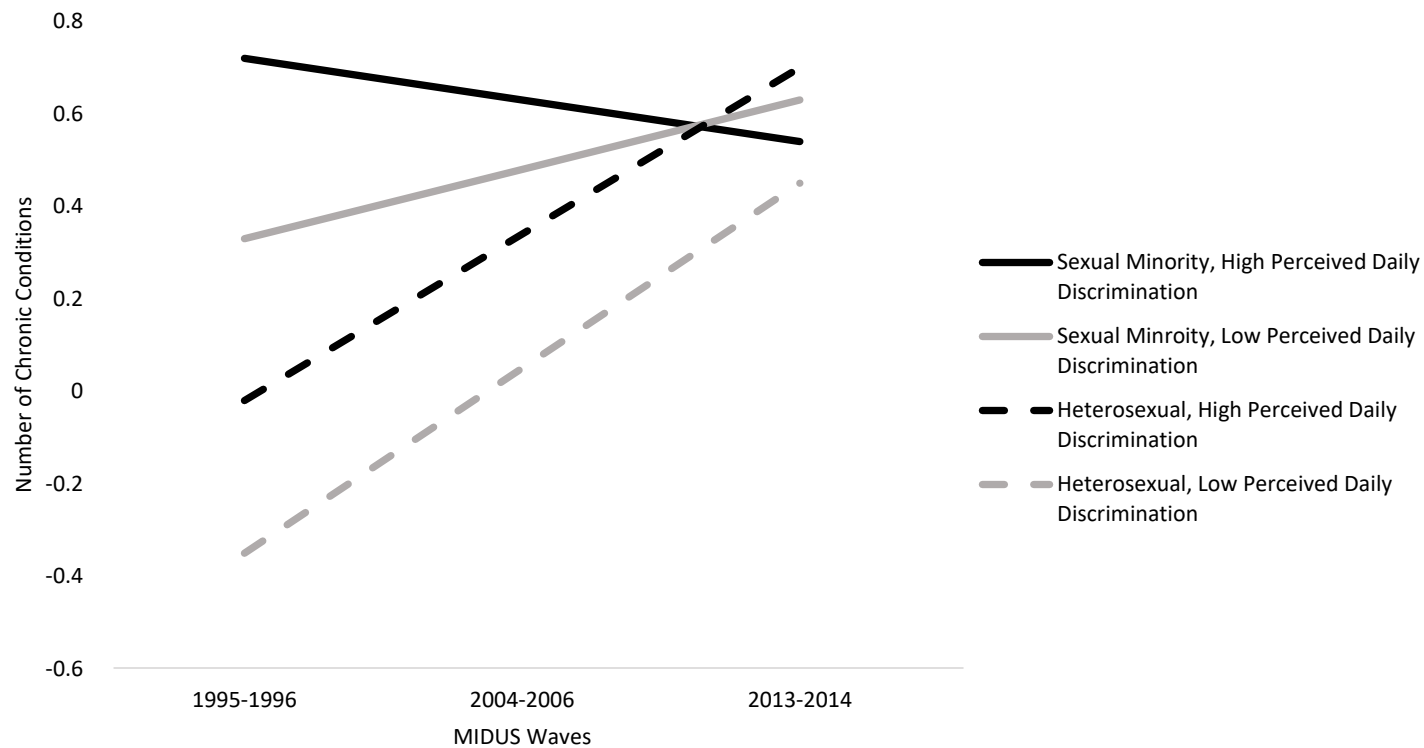
Figure 3.4. Perceived Daily Discrimination and the Number of Chronic Conditions Over Time for Heterosexual Participants, Moderated by Emotion-Focused Coping

Note. Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the median perceived daily discrimination score were categorized as low perceived daily discrimination. Scores greater than the median were categorized as High perceived daily discrimination. The median fo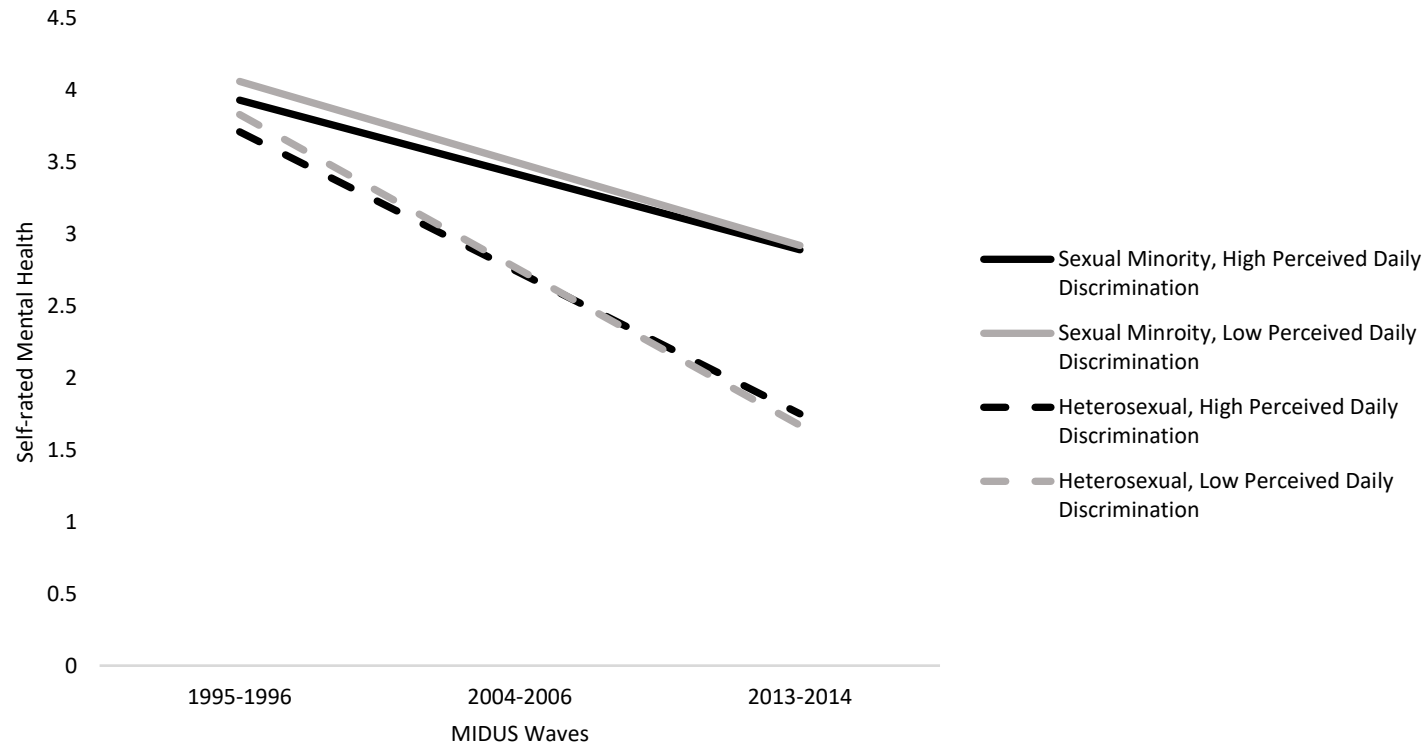r perceived daily discrimination was 12. For emotion-focused coping, values greater than the median are referred to as high and values less than or equal to the median are referred to as low. The median for emotion-focused coping was 22.

Figure 3.5. Perceived Daily Discrimination and Self-Rated Mental Health Over Time for Heterosexual Participants, Moderated by Emotion-Focused Coping

Note. Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the median perceived daily discrimination score were categorized as low perceived daily discrimination. Scores greater than the median were categorized as High perceived daily discrimination. The median for percei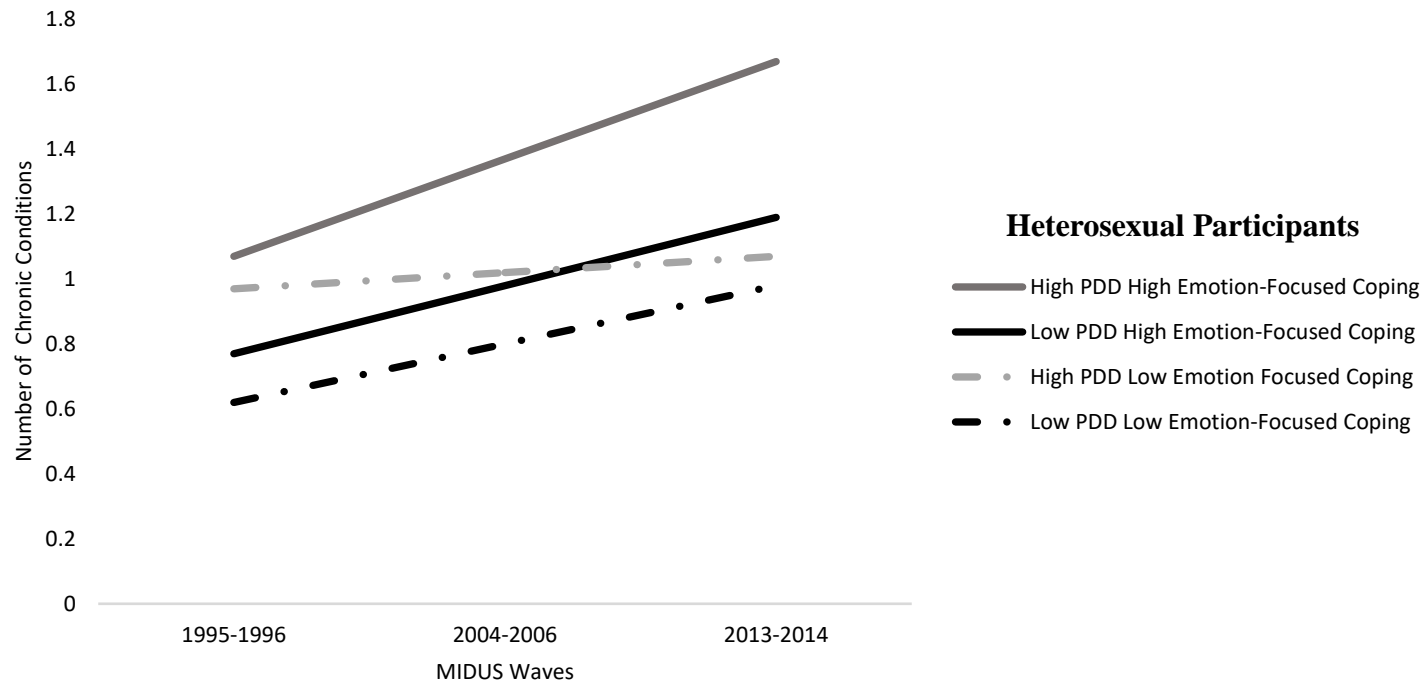ved daily discrimination was 12. For emotion-focused coping, values greater than the median are referred to as high and values less than or equal to the median are referred to as low. The median for emotion-focused coping was 22.
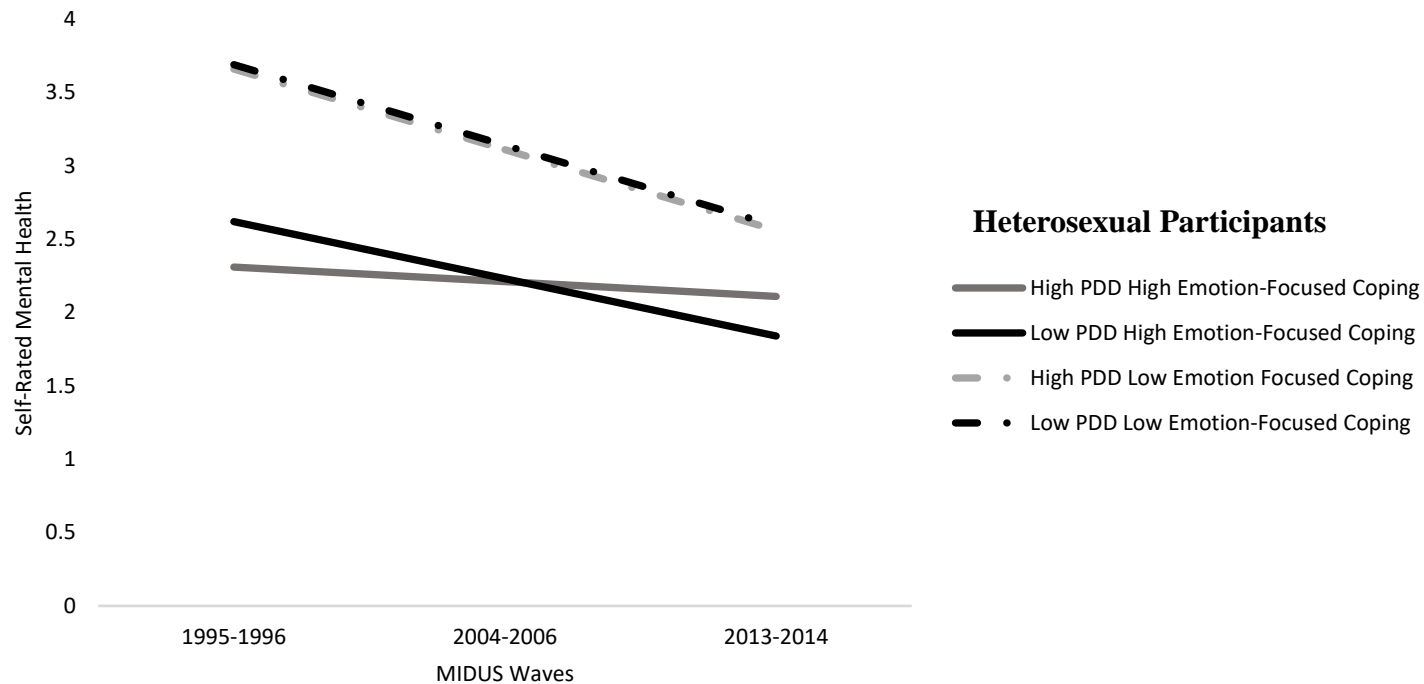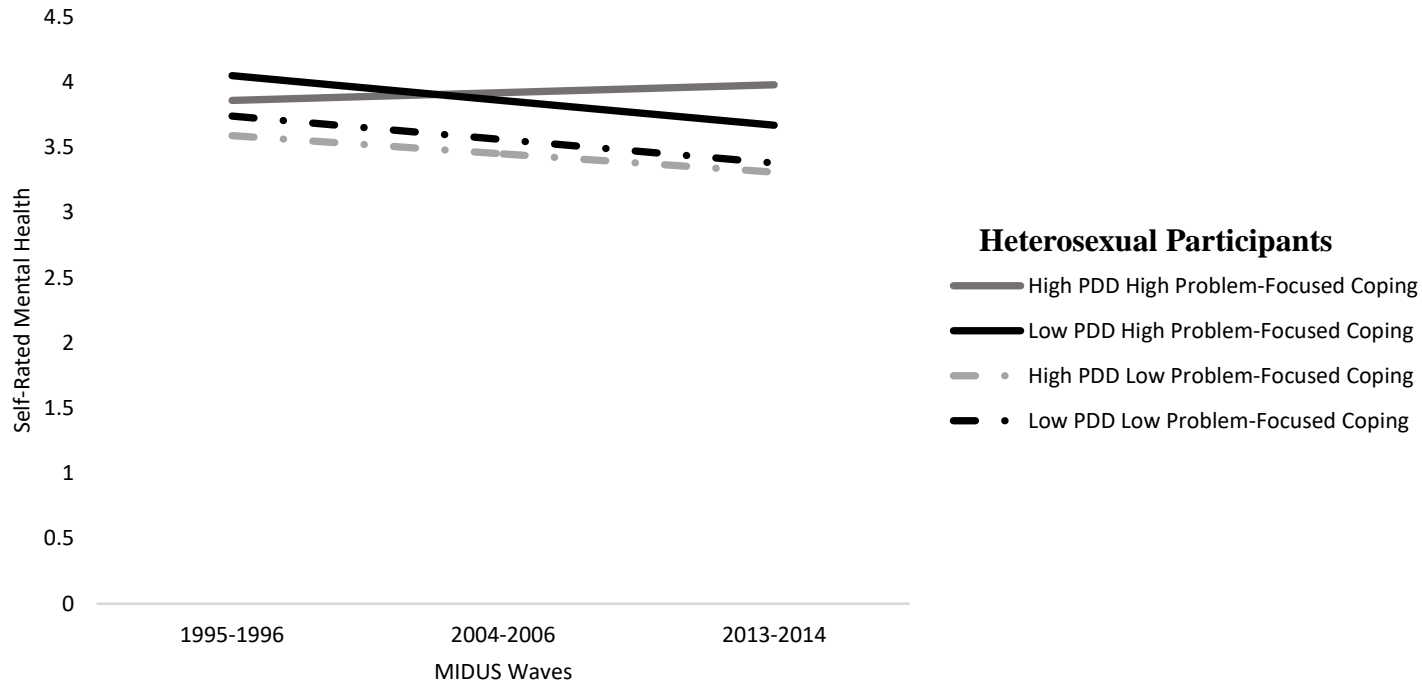
Figure 3.6. Perceived Daily Discrimination and Self-Rated Mental Health Over Time for Heterosexual Participants, Moderated by Problem-Focused Coping

Note: Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the median perceived daily discrimination score were categorized as low perceived daily discrimination. Scores greater than the median were categorized as High perceived daily discrimination. The median for perceived daily discrimination was 12. For problem-focused coping, values greater than the median are referred to as high and values less than or equal to the median are referred to as low. The median for problem-focused coping was 39.

Figure 3.7. Perceived Daily Discrimination and Self-Rated Mental Health Over Time for Sexual Minority Participants, Moderated by Problem-Focused Coping

Note. Perceived daily discrimination was categorized into a high and a low group. Scores equal to or below the median perceived daily discrimination score were categorized as low perceived daily discrimination. Scores greater than the median were categorized as High perceived daily discrimination. The median for perceived daily discrimination was 12. For problem-focused coping, values greater than the median are referred to as high and values less than or equal to the median are referred to as low. The median for problem-focused coping was 39.
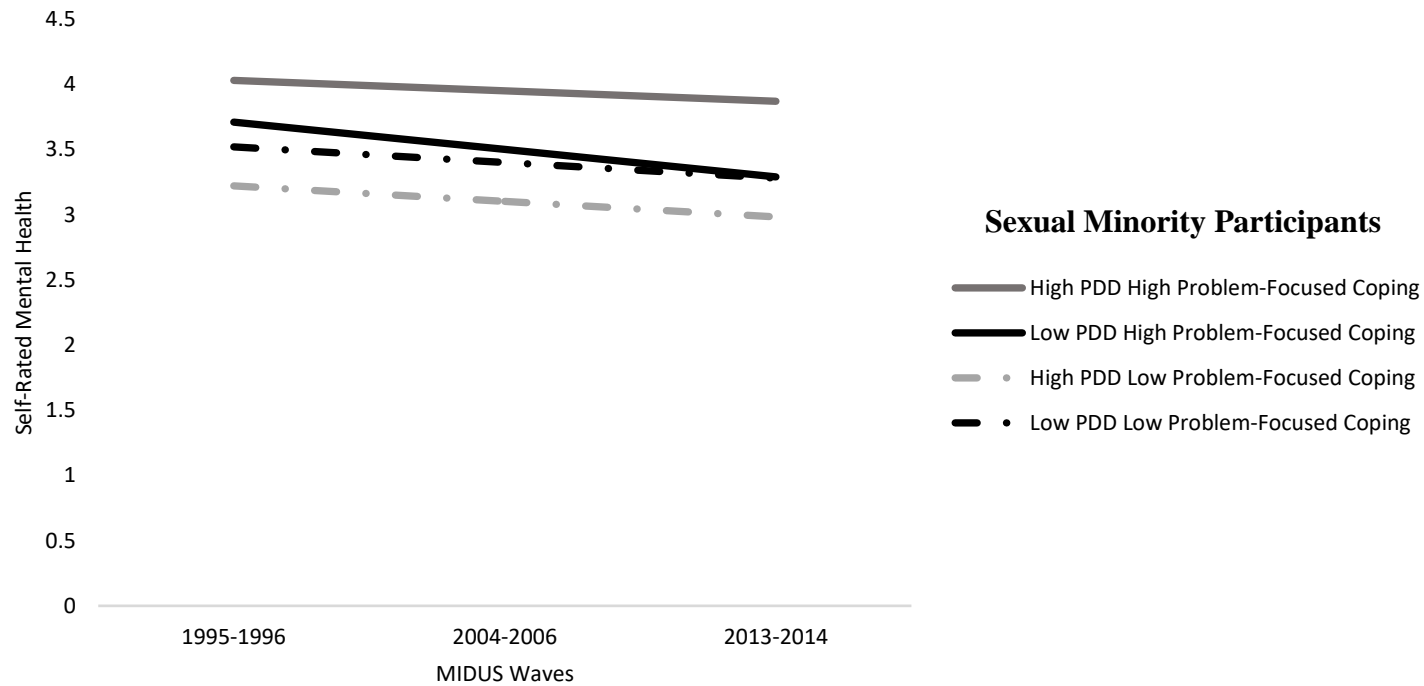
CHAPTER FOUR:
STUDY 3: THE INTEGRATIVE EFFECT OF THREE CONCEPTUAL DIMENSIONS OF RESILIENCE ON THE HEALTH OF SEXUAL MINORITY ADULTS

Introduction

Previous research on resilience in sexual minority adults has primarily examined resilience as either a trait or a dynamic process. Study 1 and Study 2 of this dissertation examined resilience as a trait and as a dynamic process, respectively. A third dimension of resilience not yet examined in this dissertation is relational resilience, which is defined as finding strength through family, friends, or community support during hardships. These common definitions or conceptualizations of resilience are interrelated. An individual that has a resilient personality will likely learn resilience processes such as coping skills through life experiences or will seek support from members of their social support networks during times of adversity. However, few studies have investigated multiple conceptual dimensions of resilience simultaneously (de Lira & de Morais, 2018). Examining resilience as an individual trait, as a dynamic process, and as a relational phenomenon simultaneously can provide a less fragmented understanding of resilience. Therefore, this study intended to examine the integrative effect of these three dimensions of resilience on the mental and physical health of sexual minority middle-aged and older adults.

As mentioned in Chapter 2, trait resilience is defined as a personality characteristic that promotes adaptation when facing hardships (Wagnild & Young, 1993). This third study examines dispositional optimism as the individual trait that promotes adaptation during times of adversity. For this study, optimism was measured using the Life Orientation Optimism Test-

Revised (LOT-R) which examines pessimism and optimism as two ends of a spectrum with higher scores indicating more optimism. In a study of middle-aged and older sexual minority men, having more pessimistic expectations for the future was found to predict loneliness (Jacobs & Kane, 2012). For older adults, loneliness has been found to be associated with adverse physical and mental health outcomes (Park et al., 2020) and increased mortality risk (Rico-Uribe et al., 2018). A theoretical framework of resilience in sexual minority individuals proposed by Kwon (2013) included hope and optimism as a source of resilience, specifically as characteristics that allow sexual minority individuals to overcome stress relate to prejudice.

In non-sexual minority focused research (i.e., research on the general population), optimism has been found to predict resilience as well as physical and mental health outcomes. In a study of repatriated prisoners of war, optimism was found to be the strongest predictor of resilience (Segovia et al., 2012). Segovia and colleagues also found that optimism was a strong predictor of good physical and mental health in repatriated prisoners of war (Segovia et al., 2015). One meta-analytic review of 84 studies found that optimism was significantly associated with positive health outcomes (Rasmussen et al., 2009). In a study of adults with disadvantaged childhoods, higher optimism has also been found to be associated with being a nonsmoker and having a healthy diet and BMI (Non et al., 2020).

Chapter 3 discussed the examination of resilience as a dynamic process characterized by the utilization of assets available to the individual to overcome adversities such as coping mechanisms (Fergus & Zimmerman, 2005). Study 3 examines perceived control as the proxy for resilience as a process. Perceived control is defined as an individual's belief that they have the ability to influence situations and achieve their goals. Perceived control, also referred to as self-efficacy and locus of control, consists of a combination of personal mastery and perceived

constraints. In studies of the general population (i.e., not sexual minority-focused), there is a growing amount of evidence that higher perceived control is associated with better physical and mental health outcomes (Hong et al., 2021; Toyama & Fuller, 2021) and may protect against increased inflammation and mortality risk associated with exposure to traumatic experiences (Elliot et al., 2017; Elliot et al., 2018). A longitudinal study found an association between perceived control and change in the number of chronic health conditions over time, specifically that higher perceived control was associated with less decline in physical health over time (Toyama & Fuller, 2021).

Studies examining perceived control in sexual minority samples are less abundant. In a study of HIV-positive gay and bisexual men, personal mastery and resilience independently contributed to psychological well-being (Emlet et al., 2017). However, when entered into the model together, both factors were reduced in strength in their association to psychological well-being, suggesting that resilience and personal mastery are related constructs (Emlet et al., 2017). Higher personal mastery was found to be associated with lower rates of depression and higher quality of life in a sample of sexual and gender minority older adults (Fredriksen-Goldsen et al., 2019). A study examining the moderating effect of locus of control on the association between workplace-based prejudice and psychological distress found that sexual minority participants with a high external locus of control (i.e., less perceived control) experienced higher psychological distress from prejudice experienced in the workplace (Carter et al., 2014).

Relational resilience is the third conceptual dimension of resilience examined in this study. It is defined as finding strength in family, friends, and communities as well as political movements (Bartoş & Langdridge, 2019). There is evidence that suggests relational resilience may be especially important for the health of sexual minority adults. A recent meta-synthesis on

qualitative articles examining resilience in sexual minorities found that almost all stories told by participants in these studies were of other people rather than the sexual minority individual themselves (Bartoș & Langdridge, 2019). This suggests that social support and other social resources are important for resilience in sexual minorities. Similarly, social support and community connectedness were found to be factors of resilience in two qualitative studies (Drabble et al., 2018; Levitt et al., 2016). In quantitative studies, social support (Emlet et al., 2017; King & Richardson, 2016) and higher levels of relationship fostering (Mereish & Poteat, 2015) were associated with resilience. Another study found that sexual minority adults, except for lesbian women, were less likely to be resilient if they had lower social support (Krueger & Upchurch, 2020).

Research Aims and Hypotheses

This study had two aims: 1) to examine the integrative effect of the three types of resilience on the physical and mental health outcomes in sexual minority middle-aged and older adults, and 2) to examine if there are differences in the results between the sexual minority and heterosexual groups which may indicate whether one type of resilience is more important for one group compared to the other. For the first aim, it was hypothesized that all three types of resilience would significantly contribute to the prediction of the health outcomes for both groups. For the second aim, it was hypothesized that relational resilience would contribute more to the prediction of the health outcomes than the other types of resilience for the sexual minority group, but not for the heterosexual group.

Methods

    Data

Data for this study comes from the main survey of MIDUS 2 and the MIDUS Refresher

the Midlife in the United States (MIDUS) study, a nationally representative, multidisciplinary

study of middle-aged and older adults. Participants were chosen via random telephone digit

dialing procedures. Participants gave verbal consent and completed a 45-minute telephone

interview. After the telephone interview, participants were mailed two self-administered

questionnaires. MIDUS 2, the second wave of the MIDUS, was conducted between 2004 and

2006 with 4,963 of the original 7,108 participants completing the assessments. The MIDUS

Refresher was designed to replenish the original MIDUS cohort; therefore, the same procedures

and surveys were used. Data for the MIDUS Refresher study was collected from 2011-2014,

resulting in a nationally representative sample of 3,577 adults, ranging in age from 25 to 74.

    Sample

The sample for this study combined participants from MIDUS 2 and MIDUS Refresher

(n=8,540). MIDUS participants are English-speaking adults living in the United States.

Participants were excluded if they were missing data on sexual orientation (n=2,146),

demographics (n=219), the dependent variables (n=49), or the independent variables (n=95). The

sample was further restricted to participants aged 40 and older. Of the 5,171 participants

remaining, 96 identified as homosexual (gay/lesbian), 68 as bisexual, and 5,007 as heterosexual.

Homosexual and bisexual participants were combined into a sexual minority group. A 1:2

matched heterosexual group was identified using propensity score matching (Parsons, 2004) as

described in the analysis section. The final analytical sample (n=492) included 164 sexual

minority participants and 328 heterosexual participants. See Figure 2.1 for details on the inclusion/exclusion criteria for Study 1.

Measures

Dependent Variables. The dependent variables for this study include a measure of physical health and a measure of mental health. A continuous measure of depressed affect plus anhedonia will be used to assess mental health. This continuous measure ranges from 0 to 7 with higher scores indicating higher depression. The number of chronic conditions will be used to assess physical health and is also a continuous variable. The number of chronic conditions variable is the sum of chronic conditions that participants reported having experienced or been treated for in the past 12 months. In each wave, participants were asked about 30 chronic conditions including headache, stroke, diabetes, AIDS/ HIV, hay fever, and incontinence. The number of chronic conditions ranged from 0 to 30. However, to make this a measure of physical health only, the two chronic conditions related to mental health were removed: "anxiety, depression, or some other emotional disorder" and "alcohol or drug problems". Therefore, the total sum of chronic conditions ranged from 0 to 28.

Independent Variables. The independent variables for this study include sexual orientation and three resilience measures. For sexual orientation, participants were asked whether they would describe their sexual orientation as "heterosexual (sexually attracted to only one sex), homosexual (sexually attracted only to your own sex), or bisexual (sexually attracted to both men and women)". For this study, homosexual (i.e., lesbian, gay) and bisexual participants were combined into the sexual minority group. Propensity score matching was conducted to create a propensity matched heterosexual group.

Three types of resilience were assessed as predictors of health: relational resilience, trait resilience, and process resilience. Relational resilience was assessed by social support from friends and social support from family. Participants were asked about how much their friends and family understand the way they feel, really care about them, whether they can rely on them for help with problems, and whether they feel they can open up to them about their worries. Responses for each item ranged from 1 (not at all) to 4 (a lot). The items for both family and friend social support were summed and averaged to create the relational resilience variable.

Trait resilience was assessed using a measure of optimism. Optimism and pessimism were measured using the Life Orientation Test-Revised (LOT-R; Scheier et al., 1994). The six-item scale assesses the tendency to expect positive outcomes (3 items for pessimism, 3 items for optimism). The items were assessed on a scale of 1 (agree a lot) to 5 (disagree a lot). The optimism items were reverse coded so higher scores represent higher optimism. Scores ranged from 6 to 30.

Process resilience was assessed by a composite measure of personal mastery and constraints, or perceived control (Lachman & Weaver, 1998). Perceived control was assessed by combining a 4-item personal mastery scale and an 8-item perceived constraints scale. Responses for the items ranged from 1 (strongly agree) to 7 (strongly disagree). The items from personal mastery were reverse coded so higher scores would indicate higher perceived control.

Covariates. The covariates for this study included age (in years), sex (male or female), education (highest achieved), marital status (married, separated/divorced, widowed, never married), employment status (employed, retired, other), race (White or non-White), and cohort. Cohort was categorized according to birth year and historical context as described in Chapter 1:

Invisible Generation (1934 or earlier), Silent Generation (1935-1949), Pride Generation (1950-1964), and Generation X (1965-1980).

Statistical Analyses

First, propensity score matching was conducted as described in chapter two to create a matching heterosexual group for comparison. Chi-square and t-test analyses were conducted to compare the demographic characteristics between the two groups and to confirm successful matching. Next, linear regression analyses were conducted to assess the associations between the resilience measures and the two health outcomes. In step 1, the covariates were entered into the model. In step 2, optimism, perceived control, and social support were added to the model. All resilience variables were entered simultaneously to assess their integrative contribution to the prediction of health outcomes. Regression analyses were conducted separately for sexual minority and heterosexual adults.

Exploratory analyses comparing the sexual minority subgroups were conducted to examine the differences in demographic characteristics and the resilience measures as predictors of the two health outcomes. Chi-square and ANOVA analyses were conducted to assess differences in demographic characteristics between the sexual minority subgroups (i.e., gay, lesbian, bisexual men, bisexual women). Regression analyses were conducted as described above for each subgroup.

Results

Sample Characteristics

Table 4.1 displays the descriptive characteristics of the study sample. On average, the 492 participants were 57.8 years of age (SD= 10.9 years, range= 40-83 years). Approximately 12%

of participants were part of the Invisible Generation cohort (born in 1934 or earlier), 39% were

part of the Silent Generation cohort (born 1935 to 1949), 43% were part of the Pride Generation

cohort (born 1950 to 1964), and 6% were part of the Generation X cohort (born 1965 to 1972).

The sample was comprised of primarily White (91%) participants and was almost evenly divided

among male and female participants (males n=241, females n=251). The sample was well

educated with three-quarters having at least some college education and approximately a third

having some graduate school education or more. More than half of the sample was married

(53%), 18% were separated or divorced, 7% were widowed, and 22% were never married. Sixty-

three percent of the sample was currently employed, 26% were retired, and 11% fell into another

category (e.g., unemployed, student, maternity or sick leave, permanently disabled). Of the 164

participants that identified as a sexual minority, 56 identified as gay, 40 as lesbian, 32 as bisexual

male, and 36 as bisexual female.

Table 4.1 also displays the descriptive comparisons between the sexual minority and

propensity matched heterosexual groups. Sexual minority participants (n=164) and propensity

matched heterosexual participants (n=328) did not significantly differ on any of the matching

covariates (age, sex, education, race, and employment status) and they were also not significantly

different in cohort membership. However, the two groups did significantly differ in marital status

(p<.01) with heterosexual participants being more likely to be married than sexual minority

participants (69% vs 21%, respectively). Sexual minority participants were more likely to have

never been married than heterosexual participants (51% vs 8%, respectively). Sexual minority

and heterosexual participants were not matched on marital status due to laws restricting same sex

marriage until 2015. Sexual minority participants scored significantly lower, on average, than the

matched heterosexual participants on the three resilience measures. Sexual minority participants

reported nearly one more chronic condition, on average, than the matched heterosexual group (2.9 vs. 2.1, respectively). There were no significant differences in depressed affect scores between the two groups.

Regression Analyses for Sexual Minority Group

Table 4.2 shows the results of the regression of the three resilience variables of the number of chronic conditions for sexual minority participants. For the sexual minority group, results of the regression analyses indicated that the three resilience variables (optimism, social support, and perceived control) explained 4% of the variance in the number of chronic conditions after controlling for the covariates in step 1 (R^2=.19, ΔR^2=.04, $F(10,139)$= 3.35, p<.01). However, only perceived control significantly was significantly related to the number of chronic conditions (B= -.61, standard error (SE)=.25, p=.02) This indicates that for each unit increase in perceived control, the number of chronic conditions decreased by .61 units. Social support and optimism were not significant predictors of the number of chronic conditions for the sexual minority group.

Table 4.2 also shows the results of the regression of the three resilience variables on depressed affect for sexual minority and heterosexual participants. For the sexual minority group, the results indicated that the three resilience variables explained 8% of the total variance for depressed affect after controlling for the covariates in step 1 (R^2=.19, ΔR^2=.08, $F(10,140)$= 3.35, p<.01). Only optimism was significantly associated with depressed affect in the sexual minority group (B= -.15, SE=.04, p<.01). Therefore, for each unit increase in optimism, depressed affect decreased by .15 units for the sexual minority participants. Social support and optimism were not significant predictors of depressed affect for the sexual minority group.

Regression Analyses for Heterosexual Group

The results of the regression analyses for the heterosexual group were similar to the results for the sexual minority group (see Table 4.3). The results indicated that the three resilience variables explained 5% of the variance in the number of chronic conditions after controlling for covariates in step 1 (R^2=.22, ΔR^2=.05 F(3,309)= 8.37, p<.01). Again, perceived control was the only resilience variable to significantly predict the number of chronic conditions (B= -.41, SE= .13, p<.01) Social support and optimism were not significant predictors of the number of chronic conditions.

The results of the regression analysis for mental health indicated that the three resilience variables explained 10% of the variance in depressed affect after controlling for covariates in step 1 (R^2=.17, ΔR^2=.10, F(10,314)= 6.25, p<.01). Only perceived control was a significant predictor of depressed affect for the heterosexual group (B= -.42, SE= .13 p<.01). Social support and optimism were not significant predictors of depressed affect for the heterosexual group.

Exploratory Analyses by Sexual Minority Subgroup

Table 4.4 shows the results of the differences in demographic characteristics and main study variables by sexual minority subgroup (gay men, bisexual men, lesbian women, and bisexual women). There were significant differences in age, marital status, education, employment status, and the number of chronic conditions. Bisexual men were older with an average age of 61.4 years (SD=11.1) and were most likely to be retired. Lesbian and bisexual women were more likely to have less education than the sexual minority men; 30% of lesbian women and 42% of bisexual women reported have a high school diploma or less education compared to only 16% of gay men and 13% of bisexual men. Gay men were more likely to be

married (73%) than the other subgroups (47% or less). Lesbian participants reported more chronic conditions on average (4.0) compared to the other sexual minority group (2.9 or less).

Table 4.5 shows the results of the regression analyses by subgroup. When analyzing the associations between the resilience variables and the health outcomes by subgroup, it was found that three resilience variables explained more of the variance in the number of chronic conditions and depressed affect for lesbian and bisexual women. The three resilience variables explained 16% of the variance for the number of chronic conditions for lesbian participants, but the model was not significant (R^2=.36, ΔR^2=.16, $F(9,27)$= 1.66, p=.15) and 38% of the variance for the number of chronic conditions for bisexual women (R^2=.47, ΔR^2=.38, $F(9,23)$= 2.35, p=.06), but the models were not significant when controlling for the covariates in step 1. Optimism was found to be a significant predictor of the number of chronic conditions for lesbian (B= -.39, SE=.17, p=.03) and bisexual women (B=.24, SE=.10, p=.02). These results indicate that when optimism score is higher by one unit, the number of chronic conditions decreases by .39 units for lesbian women but increases by .24 units for bisexual women. Perceived control was found to be a significant predictor of the number of chronic conditions for bisexual women (B= -1.65, SE= .48, p<.01), but not for lesbian women. Therefore, every one unit increase in perceived control is related to a 1.65-unit decrease in the number of chronic conditions for bisexual women.

The three resilience measures explained 31% of the variance in depressed affect for bisexual women (R^2=.59, ΔR^2=.31, $F(9,23)$= 3.64, p<.01), but only 5% of the variance for lesbian women (R^2=.48, ΔR^2=.05, $F(9,28)$= 2.88, p=.02). For lesbian women, none of the resilience measures were significant predictors of depressed affect. For bisexual women, optimism was a significant predictor of depressed affect after controlling for the covariates in

step 1 (B= -.29, SE=.08, p<.01). This indicates that for each unit increase in optimism, depressed affect decreased by .28 units.

The three resilience measures did not significantly predict either health outcome for gay or bisexual men. For gay men, the regression models were not significant; the resilience measures explained 6% of the variance for the number of chronic conditions (R^2=.23, ΔR^2=.06, $F(9,38)$= 1.25, p=.30) and 6% of the variance for depressed affect (R^2=.12, ΔR^2=.06, $F(9,38)$= .56, p=.82). Similarly, for bisexual men, the resilience measures explained 11% of the variance for the number of chronic conditions (R^2=.32, ΔR^2=.11, $F(9,22)$= 1.15, p=.37) and 3% of the variance for depressed affect (R^2=.08, ΔR^2=.03, $F(9,22)$= .90, p=.99).

Discussion

This study examined the integrative effect of three conceptual dimensions of resilience on physical and mental health outcomes for sexual minority and heterosexual middle-aged and older adults. The results of this study failed to support the two hypotheses for this study. Contrary to the first hypothesis, not all of the resilience measures were significantly associated with the health outcomes for sexual minority and heterosexual participants. Perceived control was significantly related to both the number of chronic conditions and depressed affect for heterosexual adults. However, for sexual minority participants, perceived control only was only significantly associated with the number of chronic conditions. Optimism was significantly associated with depressed affect for the sexual minority group, but not for the heterosexual group. Contrary to the second hypothesis, social support (relational resilience) was not significantly associated with the health outcomes for the sexual minority group. Finally, this study found different results by sexual minority subgroup. These results suggest that factors of resilience may differ by sexual orientation.

Differences in Resilience between Sexual Minority and Heterosexual Adults

For sexual minority middle-aged and older adults in this study, perceived control only was significantly associated with the physical health outcome, but not the mental health outcome. This may suggest the sexual minority adults in older cohorts perceive having the ability to control their physical health, but not the ability to control their mental health. One possible contributing factor could be historical events that the older generations of sexual minorities experienced as they matured. Specifically, older sexual minority adults were largely shaped by a historical time when homosexual conduct was illegal and considered a severe mental disorder (Foglia & Fredriksen-Goldsen, 2014; Fredriksen-Goldsen, 2016). In 1952, homosexuality was listed in the American Psychiatric Association's Diagnostic and Statistical Manual (DSM) as a sociopathic personality disturbance (Haber, 2009) and was not removed from the DSM until 1973. Sexual minority individuals may also not feel like they have control over other stressors like discrimination and victimization that have been found to be associated with negative mental health outcomes (Feinstein et al., 2012; Lee et al., 2016; Lehavot & Simoni, 2011). Furthermore, sexual minority individuals may internalize negative societal attitudes related to homosexuality. This internalized homonegativity has been found to be associated with mental health problems (Feinstein et al., 2012; Lehavot & Simoni, 2011; Newcomb & Mustanski, 2010). Conversely, for the heterosexual group, perceived control was a significant predictor of both physical and mental health. Since perceived control is comprised of mastery and constraints, these results may suggest that additional constraints perceived by sexual minority individuals such as discrimination and victimization may be an area to target in interventions aiming to improve mental health in sexual minority individuals.

The results of this study also found that optimism was related to depressed affect for sexual minority adults, but not heterosexual adults. Optimism may also be affected by a lifetime of experiencing discrimination, victimization, and internalized homonegativity. However, those who are optimistic as a personal characteristic may be able to overcome the negative effects of the minority stressors on their mental health. Therefore, sexual minority individuals who are more pessimistic may be less resilient and more at risk of poor mental health.

Contrary to what was predicted, social support was not significantly related to physical or mental health for sexual minority middle-aged and older adults. Social support scores were significantly different between sexual minority and heterosexual participants. On average, heterosexual participants reported higher social support. One possible explanation for these results could be the difference in composition of social networks between sexual minority and heterosexual individuals. The social support measure used in this study was a composite variable combining social support from friends and social support from family. It has been found that sexual minority individuals typically have fewer family members, but more friends in their support networks compared to heterosexual individuals (Hawthorne et al., 2020). In the absence of family support, sexual minority adults will turn to their "family of choice" or friends who provide emotional support that is lacking from biological family (Dewaele et al., 2011). The results found in this study may have been affected by the limitations of the social support measure as it may not accurately measure relational resilience, which is strength from friends, family, community, and political movements used during times of adversity.

Differences in Resilience by Sexual Minority Subgroup

The results found differences in the results of the regression analyses when conducted separately for each subgroup. Gay and bisexual men reported fewer chronic conditions, on

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average, than lesbian and bisexual women. However, for gay and bisexual men, optimism, perceived control, and social support were not significant predictors of the health outcomes; these three resilience variables explained very little of the variance in the two health outcomes for the sexual minority men.

Some research suggests that there are gender differences in resilience. The results of a meta-analysis found that gender moderated the association between trait resilience and mental health, specifically that there was a weaker effect for male participants as the sample size of male participants increased (Hu et al., 2015). Males and females are socialized differently which may create differences in resilience factors. Fredriksen-Goldsen, Emlet, et al. (2012) found that gay and bisexual men had less social support and smaller social networks than lesbian and bisexual women.

This study found that for lesbian and bisexual women, optimism was significantly associated with the number of chronic conditions. However, the results suggest that optimism is beneficial for the physical health of lesbian women, but detrimental to the health of bisexual women. Previous research has found that there could be detrimental effects of unrealistic optimism on health outcomes. Unrealistic optimism is defined as expecting better future outcomes than what is realistic based on some quantitative objective standard. People with unrealistic optimism have a bias that other people are more likely to have negative outcomes than themselves (Weinstein, 1980). It could be that bisexual women do not take adequate precautions against chronic physical conditions due to their unrealistic optimism. Research has found that bisexual individuals may have a higher risk of health disparities than gay/lesbian individuals (Fredriksen-Goldsen, 2016; Fredriksen-Goldsen, Shiu, et al., 2017). More research is

necessary to further understand the possibility of unrealistic optimism negatively influencing physical health outcomes in bisexual women.

Furthermore, perceived control was also a significant predictor of the number of chronic conditions for bisexual women. The results indicated that as perceived control increased, the number of chronic conditions decreased by 1.65. One can speculate that there may be an interaction effect of optimism and perceived control on the number of chronic conditions as it seems that having high perceived control would negate the effect of high optimism.

Strengths, Limitations, and Suggestions for Future Studies

This study has some limitations that should be considered. First, the sample for this study was primarily white and well-educated; therefore, the results may not be generalizable. Furthermore, the participants in this sample were primarily born between 1935 and 1964; therefore, the results of this study may not be generalizable to younger cohorts. Another limitation was the sample size in the sexual minority group and subgroups. The analyses, especially the subgroup analyses, may have been underpowered. The mental health measure used in this study only assessed depressed affect plus anhedonia. Future studies should examine the associations between the three conceptual dimensions of resilience and mental health with mental health measures designed to assess mental health in older adult populations, such as the Geriatric Depression Scale (Brink et al., 1982).

Despite the limitations, this study contributes new knowledge to our understanding of resilience in sexual minority middle-aged and older adults. To the best of my knowledge, this is the first study to examine the integrative effect of multiple conceptual dimensions of resilience in a sample of sexual minority middle-aged and older adults. This study also compared sexual minority and heterosexual adults and found evidence that raises a question about whether sexual

minority adults use different psychological pathways to achieve good physical and mental health than their heterosexual counterparts. This study also found evidence that important factors related to resilience may differ by sexual minority subgroup. Future studies should investigate differences in health-promoting pathways between the sexual minority subgroups as the results of this study suggest that, compared to sexual minority women, sexual minority men may utilize different psychological pathways to promote physical and mental health as they age.
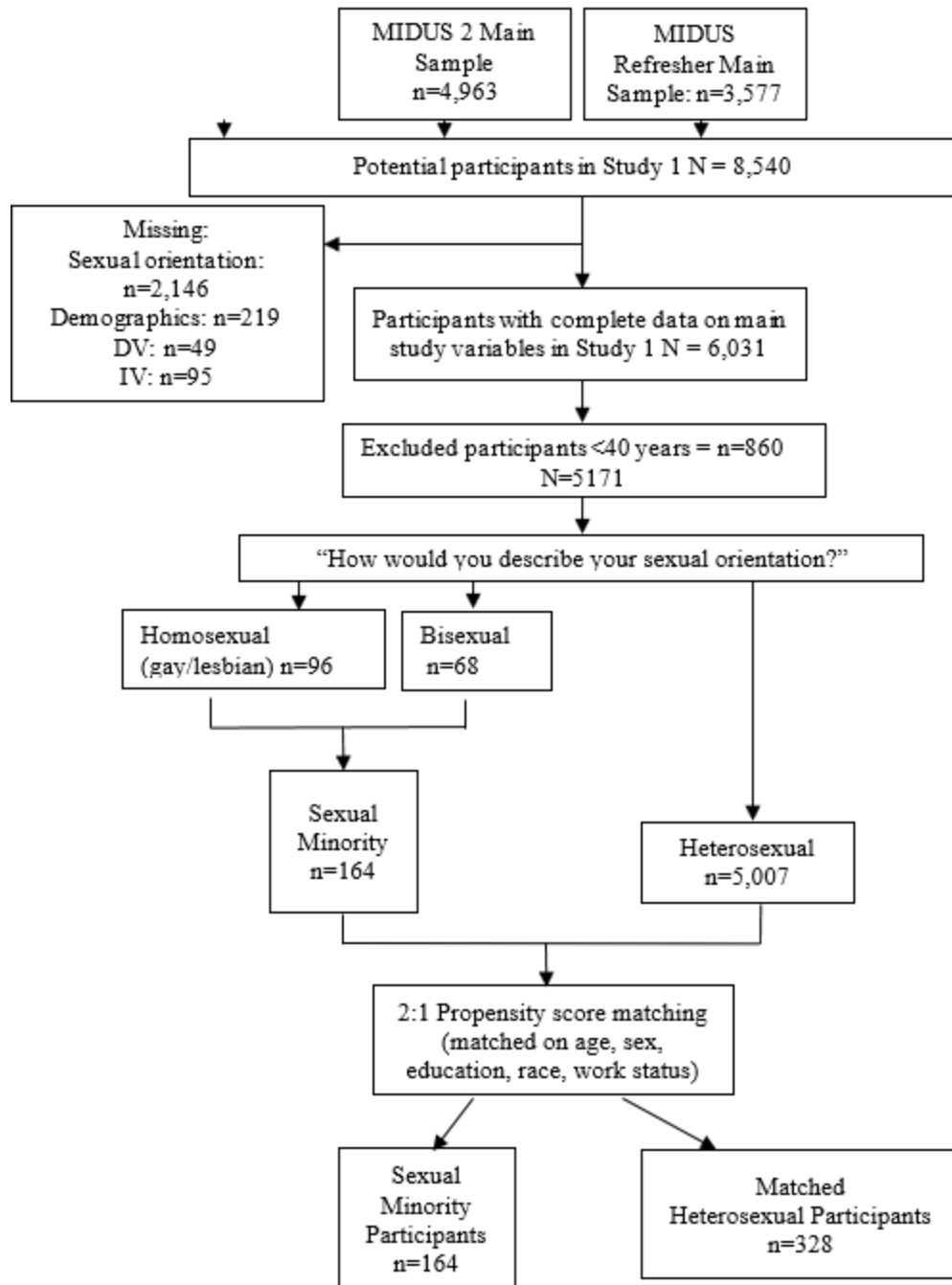
Figure 4.1. Flowchart of Study 3 Eligibility and Inclusion

Table 4.1. Characteristics of Sexual Minority and Propensity Matched Heterosexual Participants in Study 3

	All (n=492)	Sexual Minority Participants (n=164)	Heterosexual Participants (n=328)	p
	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	
Age	57.8 (10.9)	56.7(11.1)	58.3(10.8)	.12
Cohort				.17
Invisible	11.6(57)	11.0 (18)	11.9(39)	
Silent	38.6(190)	32.9(54)	41.4(136)	
Pride	43.5(214)	47.6(78)	41.4(136)	
Gen X	6.3(31)	8.5(14)	5.2(17)	
Sex (female)	51.0(251)	46.3(76)	53.3(175)	.14
Education				.99
High School Graduate or Less	24.4(120)	24.4(40)	24.4(80)	
Some College	17.7 (87)	17.7(29)	17.7(58)	
College Graduate	26.8(132)	26.8(44)	26.8(88)	
Graduate School	31.1(153)	31.1(51)	31.1(102)	
Race White)	91.5(450)	91.5(150)	91.5(300)	.83
Marital Status				< .001
Married	53.4(258)	21.2(33)	68.8(225)	
Divorced/ Separated	18.2(88)	21.8(34)	16.5(54)	
Widowed	6.8(33)	6.4(10)	7.0(23)	
Never Married	21.5(104)	50.6(79)	7.7(25)	
Employment Status				.22
Employed	63.3(304)	60.9(98)	64.6(206)	
Retired	25.8(124)	24.8(40)	26.3(84)	
Other	10.8(52)	14.3(23)	9.1(29)	
Optimism	23.2(4.9)	22.2(5.0)	23.7(4.8)	< .01
Perceived Control	5.5(1.0)	5.4(1.1)	5.6(1.0)	.01
Social Support	3.4(0.6)	3.2(0.6)	3.4(0.5)	< .001
Number of Chronic Conditions	2.4(2.2)	2.9(2.5)	2.1(2.1)	< .001
Depressed affect	0.7(1.9)	0.9(2.1)	0.7(1.8)	.25

Table 4.2. Linear Regressions Predicting the Health Outcomes for the Sexual Minority Participants (n=164)

Dependent Variable	Model	Independent Variable	Coefficient (B)	Standard Error	p
Number of Chronic Conditions	$R^2=.15$ Adjusted $R^2=.11$ F(7,142)=3.72 p=<.01	Step 1			
		Age	.02	.03	.60
		Sex	1.29	.41	<.01
		Education	-.09	.07	.62
		Race	-.26	.20	.20
		Employment Status	.70	.31	.02
		Marital Status	.26	.16	.12
		Cohort	.17	.44	.71
	$R^2=.19$ Adjusted $R^2=.14$ $\Delta R^2=.04$ F(10,139)=3.35 p=<.01	Step 2			
		Perceived Control	-.61	.25	.02
		Optimism	.03	.05	.59
		Social Support	.04	.38	.92
Depressed affect plus Anhedonia	$R^2=.11$ Adjusted $R^2=.06$ F(7,146)=2.47 p=.02	Step 1			
		Age	-.05	.03	.08
		Sex	.39	.33	.24
		Education	.02	.06	.44
		Race	-.20	.16	.35
		Employment Status	.20	.07	.02
		Marital Status	.01	.03	.92
		Cohort	-.25	.13	.48
	$R^2=.19$ Adjusted $R^2=.13$ $\Delta R^2=.08$ F(10,140)=3.35 p=<.01	Step 2			
		Perceived Control	.10	.20	.63
		Optimism	-.15	.04	<.01
		Social Support	.22	.31	.49

Note. All models controlled for age, education, race, marital status, employment status, and cohort. Step 1 entered the covariates; step 2 entered the resilience measures.

Table 4.3. Linear Regressions Predicting the Health Outcomes for the Heterosexual Participants (n=328)

Dependent Variable	Model	Independent Variable	Coefficient (B)	Standard Error	p
Number of Chronic Conditions	R^2=.16 Adjusted R^2= .14 $F(7,303)$=8.54 p=<.01	Step 1			
		Age	.01	.02	.69
		Sex	.27	.20	.19
		Education	-.04	.04	.32
		Race	.21	.10	.05
		Employment Status	.20	.05	<.01
		Marital Status	.23	.11	.04
		Cohort	-.22	.25	.65
	R^2=.22 Adjusted R^2= .19 ΔR^2=.05 $F(10,309)$=8.37 p=<.01	Step 2			
		Perceived Control	-.41	.13	<.01
		Optimism	.01	.03	.73
		Social Support	-.28	.22	.21
Depressed affect plus Anhedonia	R^2=.06 Adjusted R^2= .04 $F(7,317)$=3.04 p=<.01	Step 1			
		Age	-.01	.02	.67
		Sex	.42	.19	<.01
		Education	-.01	.04	.82
		Race	-.16	.10	.12
		Employment Status	.02	.05	.71
		Marital Status	.05	.10	.68
		Cohort	.27	.24	.26
	R^2=.17 Adjusted R^2=.14 ΔR^2=.10 $F(10,314)$=6.25 p=<.01	Step 2			
		Perceived Control	-.42	.13	<.01
		Optimism	-.04	.03	.09
		Social Support	-.11	.21	.58

Note. All models controlled for age, education, race, marital status, employment status, and cohort. Step 1 entered the covariates; step 2 entered the resilience measures.

Table 4.4. Characteristics of Sexual Minority Subgroups in Study 3

	Gay (n=56)	Bisexual Men (n=32)	Lesbian (n=40)	Bisexual Women (n=36)	p
	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	%(n)/M(SD)	
Age	54.6(9.4)	61.4(11.1)	55.6(11.0)	57.1(12.5)	.04
Cohort					.14
Invisible	3.6(2)	21.9(7)	12.5(5)	11.1(4)	
Silent	30.4(17)	37.5(12)	25.0(10)	41.(25)	
Pride	53.6(30)	40.6(13)	52.5(21)	38.9(24)	
Gen X	12.5(7)	0(0)	10.0(4)	8.3(3)	
Education					.05
High School Graduate or Less	16.1(9)	12.5(4)	30.0(12)	41.7(15)	
Some College	30.4(17)	25.0(8)	17.5(7)	22.2(8)	
College graduate	23.2(13)	15.6(5)	27.5(11)	11.1(4)	
Graduate school	30.4(17)	46.9(15)	25.0(10)	25.0(9)	
Race (White)	89.3	93.8	92.5	91.7	.31
Marital Status					<.01
Married	7.8(4)	28.1(9)	28.9(11)	25.7(9)	
Divorced/ Separated	19.6(10)	25.0(8)	18.4(7)	25.7(9)	
Widowed	0(0)	6.3(2)	5.3(2)	17.1(6)	
Never Married	72.6(37)	40.6(13)	47.4(18)	31.4(11)	
Employment Status					<.01
Employed	69.6(39)	43.7(14)	60.0(24)	63.9(23)	
Retired	14.3(8)	50.0(16)	17.5(7)	25.0(9)	
Other	16.1(9)	6.3(2)	22.5(9)	11.1 (4)	
Optimism	22.1(5.0)	21.5(4.2)	22.5(5.1)	22.2(5.0)	.82
Perceived Control	5.3(1.1)	5.0(1.1)	5.4(1.0)	5.6(1.2)	.19
Social Support	3.1(0.7)	3.1(0.5)	3.3(0.6)	3.3(0.7)	.20
Number of Chronic Conditions	2.4(2.4)	2.3(1.8)	4.0(2.8)	2.8(2.1)	.02
Depressed affect	0.7(1.8)	0.7(1.6)	1.1(2.4)	1.1(2.4)	.69

Table 4.5. Linear Regressions Predicting the Health Outcomes for each Sexual Minority Subgroup

Dependent Variable	Model	Independent Variable	Coefficient (B)	Standard Error	p
Gay Men (n=56)					
Number of Chronic Conditions	R^2=.23, Adjusted R^2= .05, ΔR^2=.06, $F_{(9,38)}$=1.25, p=.30	Perceived Control	-.72	.49	.15
		Optimism	.03	.11	.75
		Social Support	-.17	.81	.83
Depressed affect plus Anhedonia	R^2=.12, Adjusted R^2= -.09, ΔR^2=.06, $F_{(9,38)}$=0.56, p=.82	Perceived Control	-.08	.36	.82
		Optimism	-.03	.08	.75
		Social Support	-.59	.59	.32
Bisexual Men (n=32)					
Number of Chronic Conditions	R^2=.32, Adjusted R^2=.04, ΔR^2=.11, $F_{(9,22)}$=1.15, p=.37	Perceived Control	-.24	.50	.63
		Optimism	.12	.13	.38
		Social Support	1.30	.89	.16
Depressed affect plus Anhedonia	R^2=.08, Adjusted R^2=-.30, ΔR^2=.03, $F_{(9,22)}$=0.21, p=.99	Perceived Control	-.09	.53	.87
		Optimism	-.04	.14	.76
		Social Support	.65	.94	.50
Lesbian Women (n=40)					
Number of Chronic Conditions	R^2=.36, Adjusted R^2=.14, ΔR^2=.16, $F_{(9,27)}$=1.66, p=.15	Perceived Control	.52	.82	.53
		Optimism	-.39	.17	.03
		Social Support	1.30	1.18	.28
Depressed affect plus Anhedonia	R^2=.48, Adjusted R^2=.31, ΔR^2=.05, $F_{(9,28)}$=2.88, p=.02	Perceived Control	-.49	.62	.43
		Optimism	-.20	.12	.12
		Social Support	.85	.90	.35
Bisexual Women (n=36)					
Number of Chronic Conditions	R^2=.47, Adjusted R^2=.26, ΔR^2=.38, $F_{(9,23)}$=2.35, p=.06	Perceived Control	-1.65	.48	<.01
		Optimism	.24	.10	.02
		Social Support	-1.05	.93	.27
Depressed affect plus Anhedonia	R^2=.59, Adjusted R^2=.43, ΔR^2=.31, $F_{(9,23)}$=3.64, p=<.01	Perceived Control	-.40	.42	.34
		Optimism	-.29	.08	<.01
		Social Support	.98	.80	.23

Note. All models controlled for age, education, race, marital status, employment status, and cohort. Step 1 entered the covariates (not shown in table); step 2 entered the resilience measures.

CHAPTER FIVE:
CONCLUDING REMARKS

The overarching goal of this dissertation was to examine the relationship between multiple conceptual definitions of resilience and health outcomes in sexual minority middle-aged and older adults. The studies in this dissertation improved upon methodological limitations of previous studies by 1) examining multiple components of resilience such as personality (study 1), coping (study 2), as well as optimism, perceived control, and social support (study 3), 2) using population-based, propensity-matched samples, and 3) examining resilience and its effect on health cross-sectionally (study 1, study 3) as well as longitudinally over three time points, spanning approximately 20 years (study 2). These studies also make important contributions to the literature, providing more insight into the health and resilience of sexual minority middle-aged and older adults. This concluding chapter will discuss the overall findings of this dissertation as well as the limitations, and suggestions for future research.

Discussion of Findings

The first study found that resilient sexual minority and resilient heterosexual middle-aged and older adults reported engaging in more moderator physical activity than their counterparts in with other personality profiles. This finding is important for sexual minority adults as research finds that sexual minority adults are at higher risk of health disparities. Engaging in the recommended amount of moderate physical activity has been found to have many health benefits. Therefore, sexual minority adults who engage in more moderate physical activity may be able to combat the negative effects of minority stressors like discrimination and victimization.

The findings of this study suggest that sexual minority adults who do not have resilient personalities should be targeted in interventions that aim to improve sexual minority health.

The second study provided insights into the health and resilience of sexual minority middle-aged and older adults over time. One important finding in study 2 found that sexual minority participants who reported high perceived daily discrimination experienced a decrease in the number of chronic conditions over time. However, heterosexual participants that reported high perceived daily discrimination experienced an increase in chronic conditions over time. These results provide support for a steeling effect of discrimination in sexual minority adults. However, this study also found evidence that problem-focused coping moderates the association between perceived daily discrimination and self-rated mental health over time. This is important because, unlike resilience, coping skills can be developed without exposure to adversity (Emlet et al., 2017).

The third study found results that suggest that factors of resilience may differ by sexual orientation and gender. This study found differences between sexual minority and heterosexual participants as well as between the sexual minority subgroups. For the sexual minority subgroups, perceived control, optimism, and social support explained very little of the variance in the physical and mental health outcomes for sexual minority men but explained approximately 20-40% of the variance in the health outcomes for sexual minority women.

Collectively, all three studies provide insight into the association between resilience and the health of sexual minority middle-aged and older adults. While each study targeted different aspects of the health equity promotion model, the results of this dissertation provide evidence that minority stress does not always result in negative health outcomes. By using the health equity promotion model to guide the studies in this dissertation, I was able to examine

psychological health-promoting pathways that positively influenced health outcomes. However, the results of these three studies highlight the need for more research on resilience in sexual minority adults.

Limitations

Large nationally representative studies that collect data on sexual orientation are limited. Moreover, longitudinal research that includes sexual orientation data is even more limited. Healthy People 2020 set a national objective to increase the number of nationally representative health surveys that collect sexual orientation and gender identity data (US Department of Health and Human Services, 2011). At the beginning of the decade, there were only six data systems that collected sexual orientation and gender identity data and by the end of the decade, only two more national surveys started collecting data on sexual orientation (Office of Disease Prevention and Health Promotion, 2021). While the data used from MIDUS has limitations, MIDUS is one of the only publicly available data systems that has included data collection on sexual orientation for over 20 years.

Sample Size

Most studies examining the health of sexual minority adults, including the studies in this dissertation, have had small sample sizes. Even the studies with large sample sizes have disproportionately larger numbers of heterosexual participants. For example, MIDUS had 168 participants that self-identified as lesbian, gay, or bisexual and 5,958 participants that self-identified as heterosexual at Wave 1 (Nelson & Andel, 2020b). That means only approximately three percent of participants that responded to the sexual orientation question were sexual minorities.

Comparing the smaller group with the larger group is likely to lead to some bias due to confounding factors. In the three studies in this dissertation, to make the sexual minority and heterosexual groups more comparable, propensity score matching was conducted. Propensity score matching is a statistical procedure that reduces bias by balancing confounding factors between the two groups (Morgan, 2018). To balance the two groups, propensity scores were estimated using a logistic regression adjusted for the confounding covariates (e.g., age, sex, education, and race) (Parsons, 2004); the dependent variable, in this case, was sexual orientation. The propensity scores (probability of being in the sexual minority group) were used to match two heterosexual participants to each sexual minority participant, creating a more balanced sample.

Despite creating a more balanced sample with propensity score matching, the small sample size in the three studies created limitations. In the first study, after dividing the sample into four personality profiles, the sample size in each group was not enough to achieve an acceptable level of statistical power to successfully conduct logistic and linear regression analyses. In the second study, attrition across the three waves of MIDUS may have resulted in insufficient power to detect significant associations between perceived discrimination and changes in the health outcomes over time. In the third study, due to the small sample size, the analyses examining the three conceptual dimensions of resilience on the health outcomes for each sexual minority subgroup were likely underpowered. Therefore, possible significant associations may have been missed.

Measures

Due to the limited availability of nationally representative data that include sexual orientation data, the measures used in the three studies in this dissertation were not ideal. First, MIDUS does not include a resilience scale but does contain psychosocial factors that promote

resilience. The studies in this dissertation used psychosocial factors such as optimism, coping, and perceived control as proxy measures for resilience. While these measures are correlated with resilience, they are conceptually different. However, psychosocial factors such as the ones used in this dissertation are modifiable and can be used in interventions to build resilience and reduce health disparities in sexual minority adults.

The measures used in the studies in this dissertation to define mental health have limitations. The measures used for mental health in the second and third studies were too broad to target specific mental health concerns. It would be beneficial for future studies to examine the association between sexual orientation, resilience, and mental health conditions in older adults using more in-depth assessments. For example, future studies examining the mental health of sexual minority older adults would benefit from using tested mental health scales designed for use with older adults (e.g., Geriatric Depression Scale, Geriatric Anxiety Scale).

The sexual orientation question used in this dissertation was also limited. Most large publicly available data sets with a sexual orientation measure were not specifically designed to assess sexual minority health issues. Therefore, researchers must use variables that are available in existing datasets which may not allow the researcher to answer their research questions accurately or completely. The sexual orientation question used in MIDUS only included three possible options: homosexual, bisexual, or heterosexual. Many studies also include a "something else" option (Miller & Ryan, 2011; Seelman, 2018); while there are limitations associated with this option (Ridolfo et al., 2012), it provides an alternative for individuals who identify as something other than the three options provided in MIDUS. Finally, while it is beyond the scope of this dissertation, MIDUS does not include data on gender identity. Therefore, it was not

possible to examine the health and resilience of gender minority (e.g., transgender, non-binary) middle-aged and older adults.

Suggestions for Future Directions

One component of the health equity promotion model that the studies in this dissertation were not able to address was the influence of intersecting social positions (e.g., race, age, socioeconomic status, gender). One important and much-needed avenue for future research examining the health and resilience of sexual minority adults is intersectional research. Most research on sexual minority older adults, including the research in this dissertation, is conducted using samples of primarily white well-educated participants. People have multiple social identities, and these social identities intersect (Bowleg, 2012). While identifying as a sexual minority may be an important aspect of a person's identity, it is not the only component. Other social identities such as one's race or gender are also important to consider concurrently with sexual orientation.

Incorporating social positions addresses the differences in health disparities by sexual orientation, race/ethnicity, gender, and SES which is one of the challenges in studying health disparities in sexual minority adults. It also acknowledges that individuals may be in multiple marginalized groups and the cumulative marginalization could affect health outcomes. One study (Calabrese et al., 2015) examined the differences in health disparities of black sexual minority women (three marginalized social positions) compared to white sexual minority women (two marginalized social positions) and black sexual minority men (two marginalized social positions). The study found that compared to the black sexual minority men and white sexual minority women, black sexual minority women reported poorer psychological and social well-

being (Calabrese et al., 2015). This study illustrates the importance of examining the intersecting influence of multiple social positions.

Future research should continue to investigate the strengths of sexual minority individuals and not solely focus on deficits. The results found in this dissertation provided more evidence that sexual minority adults become resilient over time. Furthermore, the results of Study 2 suggest that experiencing higher discrimination is associated with resilience as the sexual minority middle-aged and older adults who reported higher perceived daily discrimination experienced an improvement in their physical health over approximately 20 years. Examining how these individuals became resilient over time while experiencing higher perceived discrimination may provide insight on how interventions can build resilience in other sexual minority individuals who are more at risk of negative health outcomes.

Lastly, examining the health and resilience of sexual minority older adults can provide more insight into the heterogeneity in aging. Older adults are an increasingly diverse group of individuals. Marginalized and disadvantaged groups have increased exposure to risks (e.g., barriers to accessing healthcare, early-life stress) and decreased exposure to opportunities that can negatively influence life course trajectories (Ferraro & Shippee, 2009). The results of this dissertation and previous research provide evidence that despite inequalities, sexual minority individuals can age successfully. Future research should continue to investigate psychosocial resilience mechanisms that can promote successful aging in disadvantaged groups.

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