ABSTRACT

Title of Dissertation: PREDICTORS OF PHYSICAL HEALTH INDICATORS AND BEHAVIORS AMONG YOUNG SEXUAL MINORITY WOMEN: MINORITY AFFIRMATIVE AND STRESS PERSPECTIVES

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Research on the physical health of sexual minority groups has lagged behind research on their psychological health, and research on the physical health of sexual minority women (SMW) is particularly sparse. The current study used a combined cross-sectional and daily diary design to test propositions about the health of SMW drawn from both sexual minority affirmative and minority stress perspectives. Specifically, four health-related variables—physical health-related quality of life, body mass index (BMI), diet quality, and participation in physical activity—were examined in relation to heterosexist discrimination, internalized stigma, depressive symptoms, appearance norm internalization, gender nonconformity, and interactions with sexual minority others. Additionally, the study examined how these variables differ between lesbian and bisexual women. Results provided mixed support for both the minority stress and minority affirmative approaches to health, with more extensive support found for the

minority stress model. Discrimination, internalized stigma, depressive symptoms, and muscular ideal internalization emerged as the most robust predictors of health outcomes. As hypothesized, discrimination predicted poorer health-related quality of life and higher BMI at the between-person level. Surprisingly, discrimination also predicted higher levels of physical activity at the between-person level, suggesting that SMW may attempt to cope with discrimination through exercise. As expected, internalized stigma predicted poorer diet quality on the within- and between-person levels, and depressive symptoms predicted poorer diet quality on the within-person level and poorer health-related quality of life on the between- and within-person levels. Finally, muscular ideal internalization predicted better diet quality, more physical activity, and lower BMI on the between-person level. No differences were found between lesbian and bisexual women in terms of health outcomes. However, lesbian women reported higher levels of discrimination relative to bisexual women, which was associated with both negative (poorer health-related quality of life) and positive (increased participation in physical activity) health outcomes. These results highlight the value of research that examines identity-specific variables in relation to the physical health of sexual minority communities.

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by

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Dedication

To Anastasia – reaching this milestone without you is bittersweet.

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Chapter 1: Introduction

Research on the physical health of sexual minority groups has lagged behind research on their psychological health (Boehmer, 2002), particularly with respect to sexual minority women (SMW; Eliason, 2014). Recent research has begun to examine physical health outcomes among SMW; however, the pattern of results that has emerged from this work is unclear. For example, a great deal of research suggests that sexual minority women have higher body mass indices (BMIs) and higher rates of overweight and obesity than heterosexual women (Bowen et al., 2008; Eliason et al., 2015). Despite this disparity, research has not consistently found higher rates of chronic diseases thought to be associated with obesity, such as cardiovascular disease and diabetes, among SMW (Eliason, 2014; Meads et al., 2018; Simoni et al., 2017). Similarly, the results of research on SMW's physical health-related quality of life (PHRQoL) have been inconsistent. Some research has indicated that SMW report poorer PHRQoL than heterosexual women (Charlton et al., 2018; Potter & Patterson, 2019), while other research has demonstrated similar levels of PHRQoL among SMW and heterosexual women, particularly when controlling for demographic variables and mental health (Boehmer et al., 2012; Cochran & Mays, 2007).

Many health researchers have suggested that more attention should be paid to the behavioral determinants of health, such as physical activity and diet quality, given that these factors contribute substantially to preventable disease risk and are directly modifiable (Cawley & Ruhm, 2011; McGinnis et al., 2002). However, research on SMW's engagement in health behaviors is inconclusive. For instance, some studies have found that SMW engage in more physical activity than heterosexual women (Aaron et al., 2001; Austin & Irwin, 2010), while others have found that they engage in less physical activity (McElroy & Jordan, 2014; Zaritsky & Dibble, 2010) or have found no differences by sexual orientation (Blosnich et al., 2014;

Boehmer & Bowen, 2009). Very few studies have examined differences in diet quality between SMW and heterosexual women, but again, those that exist have drawn conflicting conclusions (Dilley et al., 2010; Roberts et al., 2003; Valanis et al., 2000; VanKim, et al., 2017).

While this body of research is valuable, it has several important limitations. First, most of the research has focused on comparing prevalence rates between SMW and heterosexual women. While comparative studies can be useful, they rarely examine the mechanisms that drive potential disparities (Canino et al., 2009). Relatedly, these studies have tended to be relatively atheoretical in nature, making it difficult to draw conclusions about the underlying processes that may be affecting SMW's health. Additionally, most of these studies have been cross-sectional, limiting researchers' ability to examine how variables impact one another over time. The cross-sectional nature of the literature is particularly problematic for the study of health behaviors, which tend to fluctuate significantly from day to day (Steptoe et al., 1998). The current study aimed to fill these gaps in the literature by undertaking a theory-driven examination of mechanisms that impact SMW's physical health and engagement in health behaviors using a combined cross-sectional and daily diary design. Health outcomes that tend to vary significantly over short periods of time were measured both at baseline and daily (i.e., diet quality, physical activity, PHRQoL), whereas BMI was measured at baseline only since it tends remain relatively stable over short intervals.

Another limitation of the existing research on SMW's physical health is that most studies have either included lesbians only (e.g., Dibble et al., 2002; Moore & Keel, 2003) or have lumped lesbian and bisexual women together into one group (e.g., Farmer et al., 2013; Hatzenbuehler et al., 2013), obscuring potential between-group differences. The results of the few studies that do compare lesbian and bisexual women to heterosexual women separately have

been equivocal. There is reason to believe that physical health processes may differ between lesbian and bisexual women. For instance, bisexual women report higher rates of poverty (Badgett et al., 2019), poorer access to healthcare (Diamant et al., 2000), and lower levels of identity disclosure to healthcare providers (Durso & Meyer, 2013) than lesbian women. Lesbian and bisexual women also differ on a host of identity-related variables, such as outness, identity centrality, and identity uncertainty (Dyar et al., 2015). Any of these factors could impact women's physical health status or their engagement in health behaviors. Thus, the current study examined differences between lesbian and bisexual women in terms of the health outcomes of interest.

Research Question 1: How will sexual orientation (i.e., lesbian versus bisexual identity) be related to diet quality, physical activity, BMI, and PHRQoL?

Perspectives on Physical Health Among SMW: Minority Stress

Research on the physical health of sexual minority populations has been influenced by several theoretical perspectives, each of which identifies potential mechanisms that may impact health indicators and behaviors among these groups. One of these perspectives focuses on the impact of minority stressors on sexual minority individuals' physical health. It suggests that distal stressors (i.e., stressors in external to the sexual minority person) and proximal stressors (i.e., stressors in internal to the sexual minority person) set off a cascade of psychological and physiological stress reactions, which in turn negatively influence the sexual minority person's engagement in health behaviors and their physical health status (Flentje et al., 2019; Lick et al., 2013; Mereish & Poteat, 2015).

One potential driver of health outcomes for SMW suggested by the minority stress perspective is sexual orientation-related discrimination. Indeed, previous studies with sexual

minority adults have shown that discrimination is related to poorer overall health status (Mereish & Poteat, 2015; Walch et al., 2016) and increased obesity risk (Coulter et al, 2015; Mereish, 2014). Currently, it appears that no studies have examined the impact of discrimination on diet quality or physical activity among sexual minority individuals. However, research with other marginalized groups (e.g., racial/ethnic minority individuals) has generally shown that discrimination is associated with poorer diet quality and lower levels of physical activity, perhaps because discrimination leads to self-regulatory depletion and coping attempts (Chen & Yang, 2014; Forsyth et al., 2014). To date, the majority of studies examining the impact of discrimination on physical health among sexual minority individuals have been cross-sectional in nature. Because experiences of discrimination are thought to vary substantially from day to day (Heron et al., 2018), discrimination was measured both at baseline and daily in the current study. This measurement approach allowed for the estimations of within- and between-person associations between discrimination and health outcomes. Furthermore, discrimination was examined as a potential mediator of links between sexual orientation and health outcomes, given that lesbian and bisexual women tend to report different levels of and experiences with sexual orientation-related discrimination (e.g., Balsam et al., 2013; Bostwick et al., 2014; Brewster & Moradi, 2010). See Figure 1.

Hypothesis 1a: Discrimination will be negatively related to diet quality, physical activity, and PHRQoL at baseline and in between- and within-person daily diary models.

Hypothesis 1b: Discrimination will be positively related to BMI at baseline.

Research Question 2: Will discrimination mediate the associations between sexual orientation and diet quality, physical activity, BMI, or PHRQoL at baseline or in between-person daily diary models?

The minority stress perspective also suggests that internalized sexual orientation stigma may serve as a proximal stressor that negatively impacts SMW's health behaviors and health status (Flentje et al., 2019; Lick et al., 2013). Research has demonstrated a negative association between internalized stigma and physical health status among sexual minority adults (Hoy-Ellis & Fredriksen-Goldsen, 2016; Mereish & Poteat, 2015), though the evidence for SMW specifically has been less conclusive (Molina et al., 2014). However, very few studies have examined the relationship between internalized stigma and physical health among SMW, especially as these processes occur from day to day. Research has demonstrated that bisexual women report higher levels of internalized stigma than lesbian women (Pistella et al., 2016), suggesting that internalized stigma may mediate the associations between sexual orientation and health outcomes. Again, internalized stigma was measured both at baseline and daily given evidence suggesting that it can vary substantially over short time periods (Mohr & Sarno, 2016).

Hypothesis 2a: Internalized stigma will be negatively related to diet quality, physical activity, and PHRQoL at baseline and in between- and within-person daily diary models.

Hypothesis 2b: Internalized stigma will be positively related to BMI at baseline.

Research Question 3: Will internalized stigma mediate the associations between sexual orientation and diet quality, physical activity, BMI, or PHRQoL at baseline or in between-person daily diary models?

Finally, proponents of the minority stress perspective have suggested that distal and proximal minority stressors may result in heightened psychological distress and elevated levels of depression among sexual minority individuals. Distress and depression, in turn, may inhibit sexual minority individuals' participation in health behaviors, promote participation in unhealthy behaviors, and directly contribute to poorer overall physical health (Lick et al., 2013). Indeed,

research with SMW has demonstrated that depressive symptoms are associated with poorer physical health and functioning (Cochran & Mays, 2007; Fredriksen-Goldsen et al., 2010). Given that rates of depression are higher among SMW than heterosexual women (Cochran et al., 2017), is it is important to examine the impact of depressive symptoms on health behaviors and outcomes among SMW. Because depressive symptoms tend to fluctuate over short time periods (Hankin et al., 2005), they were measured both at baseline and daily in the present study. Depressive symptoms were also examined as a potential mediator of links between sexual orientation and health outcomes, given evidence that rates of depression are especially high among bisexual women (Ross et al., 2018).

Hypothesis 3a: Depressive symptoms will be negatively related to diet quality, physical activity, and PHRQoL at baseline and in between- and within-person daily diary models.

Hypothesis 3b: Depressive symptoms will be positively related to BMI at baseline.

Research Question 4: Will depressive symptoms mediate the associations between sexual orientation and diet quality, physical activity, BMI, or PHRQoL at baseline or in between-person daily diary models?

Perspectives on Physical Health Among SMW: Minority Affirmation

Another theoretical perspective on sexual minority health seeks to affirm the positive aspects of sexual minority individuals' identities and communities (Eliason, 2014; Fredriksen-Goldsen et al., 2014; Meyer, 2015; Riggle et al., 2008). For instance, Fredriksen-Goldsen and colleagues' (2014) Health Equity Promotion Model explicitly integrates a sexual minority-affirmative approach. The authors state, "Previous LGBT health disparity studies have mainly utilized deficit-focused models to understand poor health outcomes … Investigating sexual and gender identity-specific strengths and resources are equally important in the effort to understand

LGBT health" (pp. 658-659). Importantly, most researchers see the affirmative perspective as complementary to the minority stress perspective, rather than in opposition to it (Meyer, 2015). However, unlike the minority stress perspective, it is possible that the mechanisms identified by the affirmative perspective may have both health-promoting and health-harming effects, as described below (Fredriksen-Goldsen et al., 2014).

Proponents of the affirmative approach have identified SMW's rejection of restrictive mainstream appearance norms as a strength of this community (Rothblum, 2002). In particular, research has suggested that SMW may not internalize gendered appearance norms (e.g., the importance of thinness) to the same extent as their heterosexual peers (Share & Mintz, 2002). Some researchers have suggested that, as a result of their relatively low levels of appearance norm internalization, SMW may engage in health promotion behaviors such as healthy eating and physical activity with the goal of improving their overall health, rather than losing weight (Eliason et al., 2015). Indeed, qualitative research with SMW has supported this notion (Bowen et al., 2006). Thus, SMW's elevated body weights compared to heterosexual women may not be indicative of poorer health, but rather, a different set of health-related priorities. Rejecting weight-based appearance norms may also enhance SMW's health directly by reducing psychological distress associated with body dissatisfaction (Lick et al., 2013).

However, other researchers have argued that lower levels of appearance norm internalization may damage SMW's health, since SMW may be less motivated engage in healthy behaviors in order to maintain a low body weight (Mason & Lewis, 2014; Thayer, 2010). It is possible that appearance norm internalization may even have health-promoting promoting effects on some physical health outcomes (e.g., physical activity) and health-harming effects on others (e.g., PHRQoL) simultaneously. Research suggests that lesbian women, as compared to bisexual

women, may exhibit especially low levels of appearance norm internalization (Hazzard et al., 2019). Thus, if norm internalization is associated with health outcomes, it may serve as a mediator of the links between sexual orientation and health. Appearance norm internalization is thought to be relatively stable over time (Schaefer et al., 2015); thus, it was measured at baseline only.

> *Research Question 5:* How will appearance norm internalization be related to diet quality, physical activity, BMI, and PHRQoL at baseline and in between-person daily diary models?
>
> *Research Question 6:* Will appearance norm internalization mediate the associations between sexual orientation and diet quality, physical activity, BMI, or PHRQoL at baseline or in between-person daily diary models?

Research has also demonstrated that SMW's gender expressions vary more widely than heterosexual women's, a characteristic that has been identified as strength of SMW's communities (Levitt, 2019). Some researchers have suggested that gender nonconformity may encourage SMW to participate in more vigorous physical activity, given gender-based stereotypes about athleticism (Eliason et al., 2015). Furthermore, since there is a strong cultural expectation of thinness for women (Wiseman et al., 1992), gender nonconforming SMW may be less preoccupied with their weight and more focused on their overall health than other women (Eliason et al., 2015). Again, however, it is also possible that gender nonconformity could encourage unhealthy habits among SMW by decreasing the perceived need to maintain a low body weight (Thayer, 2010). More research on the impact of gender nonconformity on SMW's health is needed. Research has shown that lesbian women report higher levels of gender nonconformity than bisexual women, suggesting that gender nonconformity may mediate the

links between sexual orientation and health outcomes (Kachel et al., 2016). Given that gender nonconformity is thought to be relatively stable over time (Kachel et al., 2016), it was measured at baseline only.

Research Question 7: How will gender nonconformity be related to diet quality, physical activity, BMI, and PHRQoL at baseline and in between-person daily diary models?

Research Question 8: Will gender nonconformity mediate the associations between sexual orientation and diet quality, physical activity, BMI, or PHRQoL at baseline or in between-person daily diary models?

Finally, both the minority stress and affirmative perspectives suggest that interactions with other sexual minority individuals may impact SMW's health, but in different ways. According to some minority stress theorists, contact between sexual minority peers can transmit the impact of minority stress beyond the individual who immediately experienced the stressor. Through these interactions, sexual minority individuals who have not directly experienced a minority stressor may be exposed to their peers' unhealthy attempts to cope with minority stress (e.g., increased alcohol use, poor nutrition) and come to view these behaviors as normative (Lick et al., 2013). Thus, sexual minority individuals' health may suffer as a result of interactions with sexual minority others. On the other hand, the affirmative perspective suggests that support from other members of the sexual minority community may improve SMW's engagement in health behaviors (Eliason et al., 2015; Eliason & Fogel, 2015). Indeed, SMW in a qualitative study reported that community support encouraged them to engage in physical activity (Bowen et al., 2006). Furthermore, community support may improve SMW's health by enhancing their ability to cope with minority stressors, thereby decreasing physiological distress (Fredriksen-Goldsen et al., 2014; Meyer, 2015). Interactions with other sexual minority individuals are an important

driver of perceived community support (Lin & Israel, 2012); thus, the affirmative perspective would suggest that interactions with sexual minority peers should enhance SMW's health. Given these conflicting perspectives, more research on the impact of interactions with sexual minority others on SMW's health is needed. Research suggests that lesbian women tend to be more connected to the sexual minority community (Rothblum, 2010); thus, this variable may mediate the associations between sexual orientation and health outcomes.

Research Question 9a: How will interactions with sexual minority others be related to diet quality, physical activity, and PHRQoL at baseline and in between- and within-person daily diary models?

Research Question 9b: How will interactions with sexual minority others be related to BMI at baseline?

Research Question 10: Will interactions with sexual minority others mediate the associations between sexual orientation and diet quality, physical activity, BMI, or PHRQoL at baseline or in between-person daily diary models?

A final factor that may influence bisexual women's health is the gender of their current romantic partner. Research has suggested that bisexual women in monogamous relationships with men report higher levels of depression and discrimination and lower levels of community support than bisexual women in same-gender relationships (Dyar et al., 2014; McLean, 2008; Molina et al., 2015). Qualitative research has also indicated that bisexual women may express their gender more traditionally and be more attuned to sociocultural appearance norms when they are partnered with men (Huxley et al., 2011; Pennington, 2009). Thus, among bisexual women, partner gender may predict health outcomes through mediating factors such as discrimination

and appearance norm internalization. However, the impact of partner gender on bisexual women's health is highly understudied.

Research Question 11: Among bisexual women, how will partner gender be related to diet quality, physical activity, BMI, and PHRQoL?

Research Question 12: Among bisexual women, will partner gender predict diet quality, physical activity, BMI, or PHRQoL through the mediators of discrimination, internalized stigma, depressive symptoms, appearance norm internalization, gender nonconformity, or interactions with sexual minority others at baseline or in between-person daily diary models?

Present Study

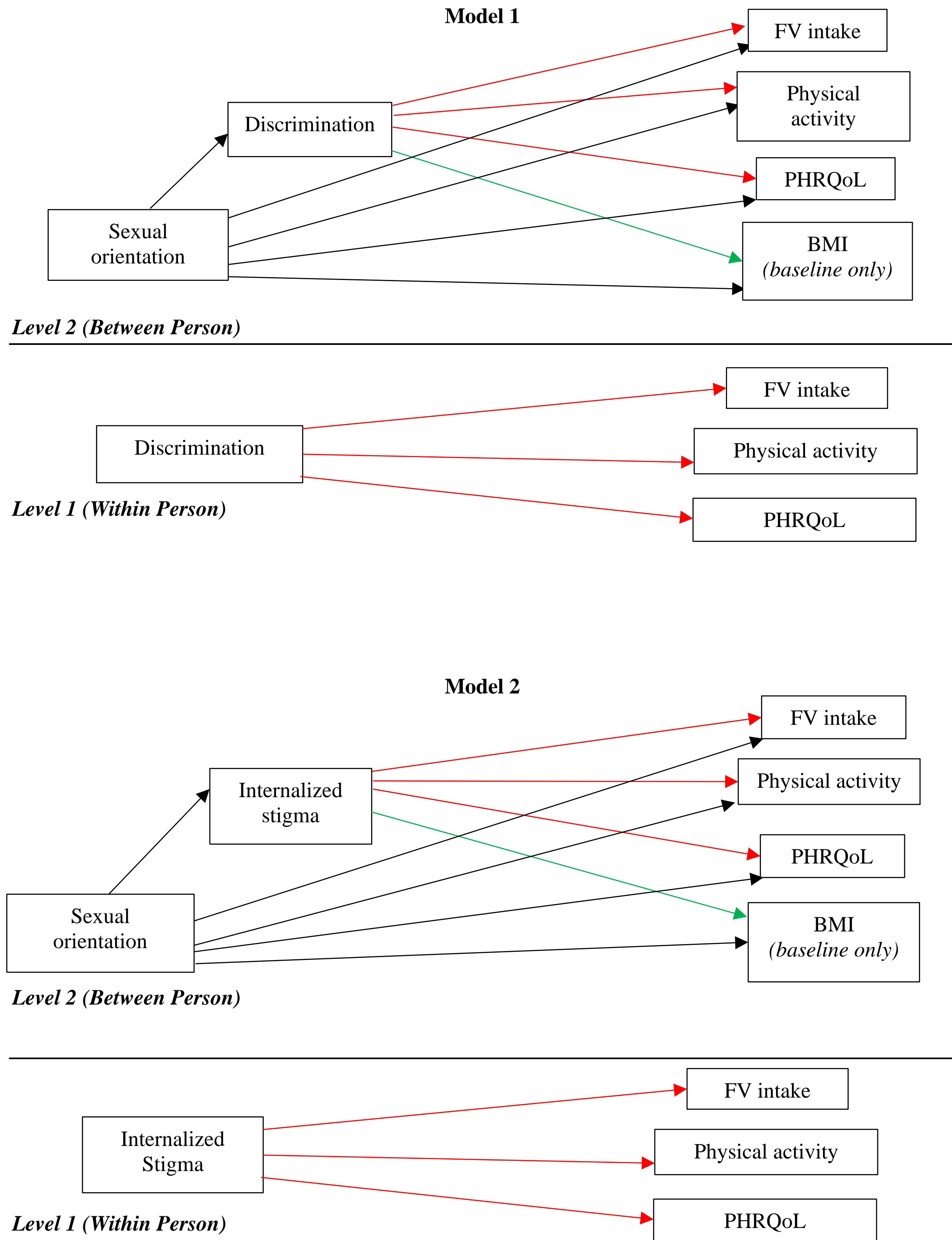
Table 1 provides an overview of primary study variables and hypotheses. The current study is among the first to quantitatively examine potential mechanisms driving health indicators and behaviors among SMW, particularly as these processes occur from day to day. It is also among the first to investigate how these processes differ between lesbian and bisexual women. Furthermore, this study collected daily measures of diet quality and physical activity, which are difficult to measure accurately using retrospective report (Dishman et al, 2001; Garden et al., 2018). The results of this study have the potential to provide significant insight into the physical health and wellbeing of SMW.

Following the example of several studies in this domain (e.g., Heron et al., 2019; Mason et al., 2017), the present study examined the physical health of young SMW between the ages 18 to 30. Research suggests that young adulthood is the developmental stage when people are most at risk for developing poor physical health habits, the effects of which compound over the life course (Rovniak et al., 2002; Winpenny et al., 2018). Thus, it is crucial to improve the field's

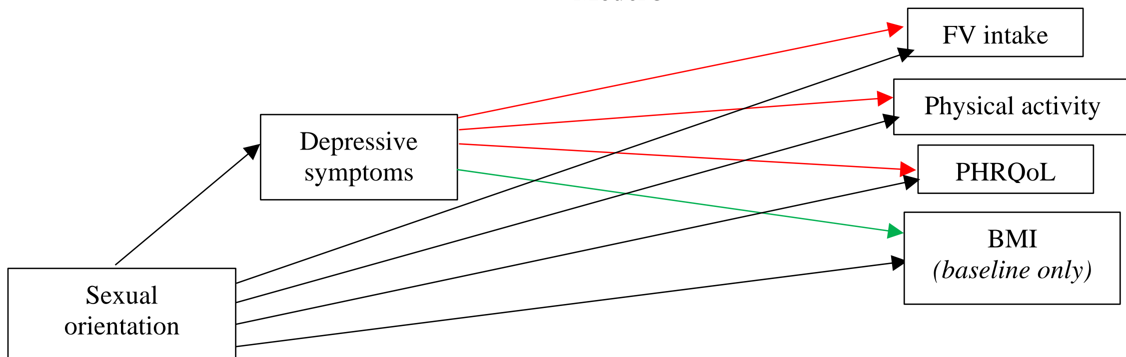
understanding of the factors driving physical health behaviors among young adults, so that effective, targeted interventions can be developed. Additionally, for sexual minority individuals, young adulthood is often a period of significant sexual orientation identity exploration (Bishop et al., 2020; Kaestle, 2018; Katz-Wise et al., 2017). As a result, young sexual minority adults may be more affected by both minority stress and minority affirmative processes than older sexual minority adults, who may be more established in their identities and communities.

Figure 1

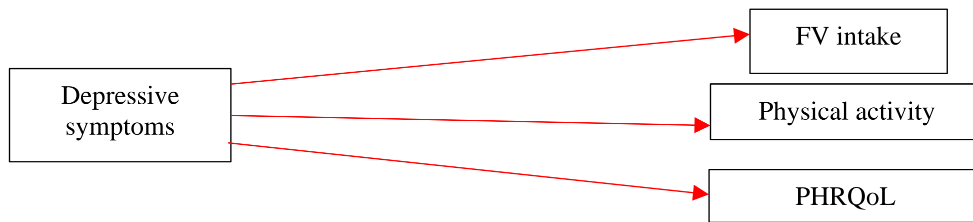
Hypothesized Multilevel Models



Model 3

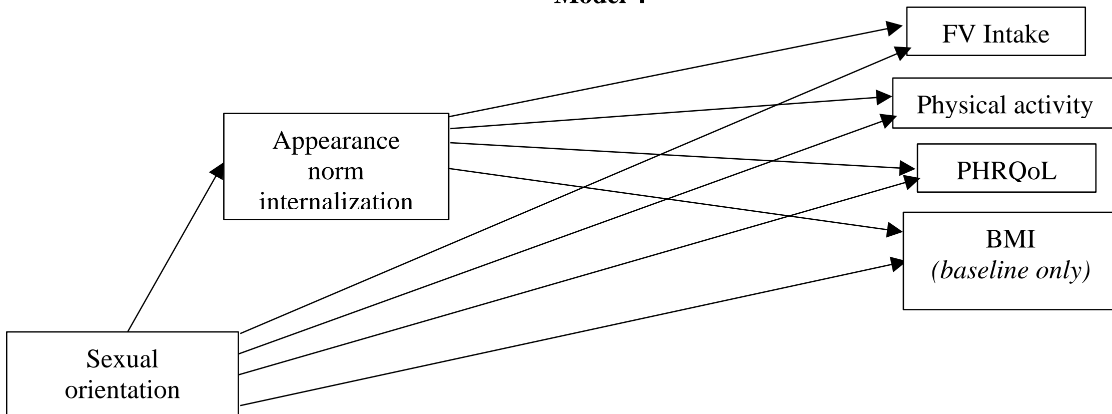


Level 2 (Between Person)



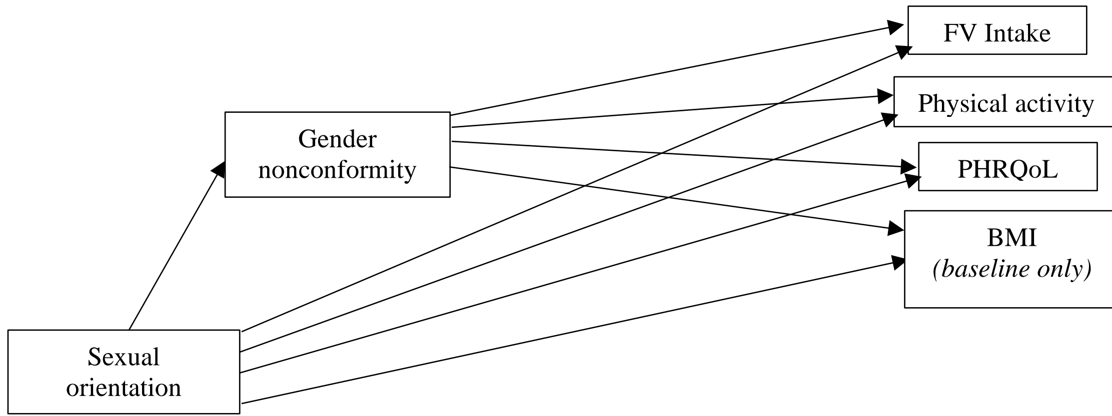
Level 1 (Within Person)

Model 4



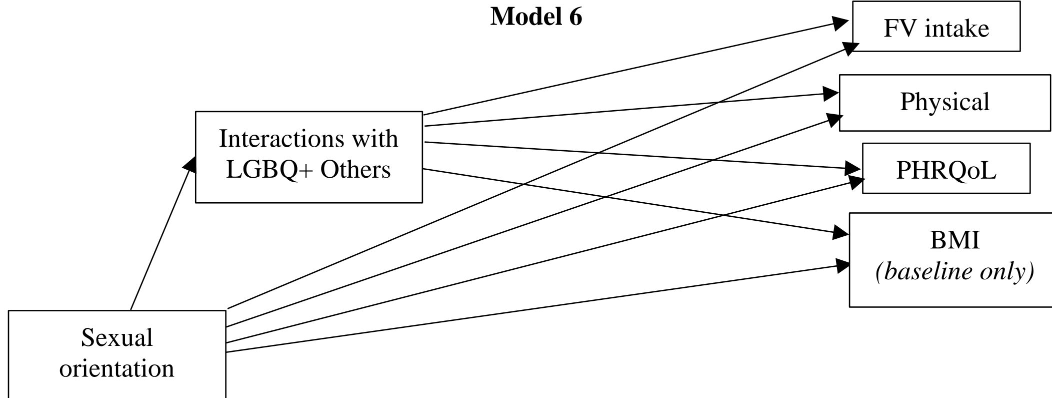
Between Person Only

Model 5

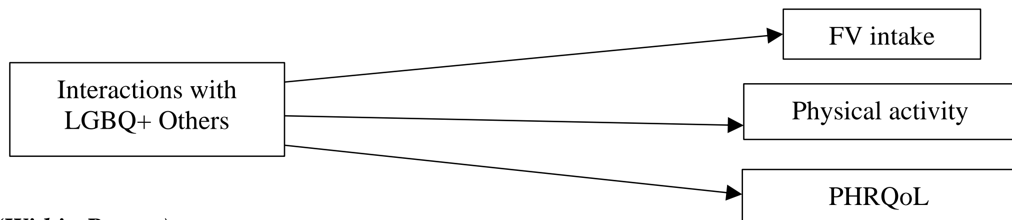


Between Person Only

Model 6



Level 2 (Between Person)



Level 1 (Within Person)

Note. For clarity, associations between outcome variables are not shown. Green lines represent hypothesized positive relations; red lines represent hypothesized negative relations; black lines represent associations for which the direction has not been specified. BMI = body mass index; PHRoL = physical health-related quality of life; FV intake = fruit and vegetable intake.

Table 1

Summary of Primary Study Variables and Hypotheses

Predictor	Measurement	Included in Models			Hypothesized Association with Outcome			
		Baseline	Daily Diary (between person)	Daily Diary (within person)	Diet Quality	Physical Activity	BMI	PHRQoL
Sexual orientation	Baseline	X	X		?	?	?	?
Partner gender (bisexual only)	Baseline	X	X		?	?	?	?
Discrimination	Baseline & daily	X	X	X	Negative	Negative	Positive	Negative
Internalized stigma	Baseline & daily	X	X	X	Negative	Negative	Positive	Negative
Depression	Baseline & daily	X	X	X	Negative	Negative	Positive	Negative
Appearance norm internalization	Baseline	X	X		?	?	?	?
Gender nonconformity	Baseline	X	X		?	?	?	?
Interactions with SM others	Daily		X	X	?	?	?	?

Note. BMI = body mass index; PHRQoL = physical health-related quality of life; SM = sexual minority.
X = included in the relevant model.
? = research question.

Chapter 2: Methods

Participants

Participants in the baseline study were 277 SMW between the ages of 18 and 30 (*M* = 22.61; *SD* = 3.22). Slightly less than half of the sample (*n* = 126; 45.5%) identified as lesbian; slightly more than half (*n* = 151; 54.5%) identified as b; isexual. Baseline participants were from the following regions: Mid-Atlantic (*n* = 82; 29.6%), Midwest (*n* = 61; 22.0%), Southeast (*n* = 48; 17.3%), Pacific Coast (*n* = 30; 10.8%), New England (*n* = 24; 8.7%), Southwest (*n* =18; 6.5%), and Rocky Mountain (*n* = 14; 5.1%). Of the baseline participants, 233 women participated in the daily diary portion of the study. The daily diary sample included 124 (53.2%) bisexual women and 109 (46.8%) lesbian women. In terms of age, the daily diary sample ranged from 18 to 30 (*M* = 22.61; *SD* = 3.20). Demographic information for both samples can be found in Table 2. Participants who engaged in the daily diary portion of the study completed a total of 1,830 daily diary surveys (*M* = 7.85 per participant, *SD* = 1.38, range = 1 – 9). There were no significant differences between the baseline and daily diary samples in terms of age, sexual orientation, race/ethnicity, income, education level, or romantic partner status. Data were collected between October and December 2020.

Table 2

Demographics of Participants

Demographic Factor	Baseline Sample *n* (%)	Daily Diary Sample *n* (%)
Sexual Orientation		
Bisexual	151 (54.5%)	124 (53.2%)
Lesbian	126 (45.5%)	109 (46.8%)
Race/Ethnicity†		
American Indian or Alaska Native	5 (1.8%)	5 (2.1%)
Asian or Asian American	38 (13.7%)	33 (14.2%)
Black or African American	20 (7.2%)	16 (6.9%)
Hispanic or Latina	28 (10.1%)	25 (10.7%)
Middle Eastern or North African	5 (1.8%)	5 (2.1%)
White	221 (79.8%)	185 (79.4%)
Other	5 (1.8%)	2 (0.9%)
Income		
Under $10,000	40 (14.4%)	29 (12.4%)
$10,000-$29,999	65 (23.5%)	52 (22.3%)
$30,000-$49,999	56 (20.2%)	49 (21.0%)
$50,000-$69,999	37 (13.4%)	31 (13.3%)
$70,000-89,999	18 (6.5%)	16 (6.9%)
$90,000 and above	55 (19.9%)	51 (21.9%)
Education		
Less than high school	3 (1.1%)	2 (0.9%)
High school diploma or equivalent	16 (5.8%)	14 (6.0%)
Some college	105 (37.9%)	86 (36.8%)
Associate degree	14 (5.1%)	11 (4.7%)
Bachelor’s degree	103 (37.2%)	91 (39.1%)
Master’s degree or more	36 (13.0%)	29 (12.4%)
Romantic Relationship Status		
Single	126 (45.5%)	113 (48.5%)
Multiple partners	7 (2.5%)	6 (2.6%)
One partner, man	58 (20.9%)	46 (19.7%)
One partner, woman	72 (26%)	58 (24.9%)
One partner, nonbinary or genderqueer	7 (2.5%)	5 (2.1%)

Note. Baseline sample size = 277; daily diary sample size = 233.
†Response options were not exclusive; percentages add up to greater than 100%.

Procedures

Recruitment and Eligibility Survey

Advertisements (see Appendix B) included a link to the study's online landing page, which explained the study's requirements and purpose. Individuals interested in participating in the study completed the online eligibility survey (see Appendix C). The eligibility survey assessed whether participants met study inclusion criteria (i.e., identifying as a cisgender woman, identifying as lesbian or bisexual, being between the ages of 18 and 30, living in the US, being fluent in English, and not currently being pregnant or planning to become pregnant within the next six months). The eligibility survey also collected basic demographic information. Respondents were selected to participate in the baseline survey based on eligibility, recruitment targets (i.e., approximately 50% bisexual-identified participants and 50% lesbian-identified participants, at least 33% participants of color), and the successful completion of several survey elements designed to screen out careless or fraudulent responders. These elements included (a) having a unique IP address located within the United States, (b) correctly answering two attention check items, and (c) providing reasonable responses to two free response items (e.g., "Why are you interested in participating in [this study]?"). Respondents who were selected to participate based on these criteria received an email invitation to the baseline survey.

Baseline Survey

The baseline survey (see Appendices D and E) obtained informed consent and assessed demographic factors, BMI, PHRQoL, diet quality, physical activity, discrimination, internalized stigma, depressive symptoms, internalization of appearance

norms, and gender nonconformity. After completing all measures, participants read a brief description of the daily diary phase of the study and indicated their scheduling preferences for the daily diary phase. In total, the baseline survey took participants approximately 35 minutes to complete. Baseline participants were selected to engage in the daily diary phase of the study based on recruitment targets (i.e., approximately 50% bisexual-identified participants and 50% lesbian-identified participants, at least 33% participants of color), self-report of some physical activity over the past two weeks (to ensure variability in the daily diary data; accounting for approximately 94% of the baseline sample), and the successful completion of survey elements designed to screen out careless or fraudulent responders. These elements included a CAPTCHA task, the Infrequency subscale of the Attentive Responding Scale (Maniaci & Rogge, 2014), several directed response questions, and several free response items (Berinsky, Margolis, & Sances, 2014). Participants received $5.00 for their participation in the baseline survey.

Baseline data were cleaned using a multi-step process. First, I searched for duplicate surveys by examining the date, time, and IP address for all submissions. No evidence of duplicate submissions was found. Next, I removed 32 entries from participants who exited the survey shortly after completing the informed consent process. Additionally, I removed two entries in which the participant had incorrectly answered more than two directed questions or items from the Attentive Responding Scale (Maniaci & Rogge, 2014). Finally, I removed one entry from a participant who did not meet study eligibility criteria. The final sample includes the 277 participants remaining after these steps.

Daily Diary Surveys

Participants engaged in the daily diary phase of the study for nine days, including two weekends. Each evening during this phase, they received a link to an online survey assessing diet quality, physical activity, PHRQoL, discrimination, internalized stigma, depressive symptoms, and contact with sexual minority others over the past 24 hours (see Appendix F). Participants received the link to the daily survey by email each evening at 6PM, as well as a reminder email if they had not completed the survey by 10PM. Participants were instructed to complete the daily survey within two hours of going to sleep each night. The daily survey took participants approximately 10 minutes to complete. Participants received $1.50 for each of their first seven completed nightly surveys and $2.25 for each their last two completed nightly surveys. This structure was designed to encourage maximal daily participation.

During data cleaning, six daily diary surveys were removed because they were completed by a participant who did not meet study eligibility criteria. Five entries were removed because the participant exited the survey on the first webpage. The final sample includes the 1,830 entries remaining after these steps.

Measures

Baseline Survey

Demographics. Participants completed a demographic survey assessing their sexual orientation, age, race/ethnicity, height, weight, education, income, location, and relationship status. Sexual orientation was assessed by asking participants to select one sexual orientation label from a list of six options, including an “other” option. Only participants who self-identified as lesbian or bisexual were included in the study.

Physical Health-Related Quality of Life. Participants completed the physical component of the SF-36 HRQoL measure (Ware, Kosinski, & Keller, 1994). Participants completed 10 items related to physical activity limitations by indicating whether their health limits their ability to participate in various activities, such as "climbing several flights of stairs." The response scale for these items includes three options: 1 (*yes, limited a lot*), 2 (*yes, limited a little*), or 3 (*no, not limited at all*). They also completed four items related to role limitations by indicating whether their physical health has interfered with daily activities, such as work. Responses options for these items are 0 (*no*) or 1 (*yes*). They also completed two items related to experiences of physical pain (e.g., "How much bodily pain have you had during the past 4 weeks?"), which they will answer on a scale from 1 (*none*) to 6 (*very severe*). Finally, they rated five items assessing their overall health (e.g., "I am as healthy as anybody I know") on a scale from 1 (*definitely true*) to 5 (*definitely false*). All 21 items were rescored from so that high scores represented better health, then combined into a single summary score ranging from 0 to 100 as described by Hayes and Morales (2001). Research has demonstrated that scores on this measure are significantly lower among adults with chronic medical conditions (McHorney, Ware, & Raczek, 1993). Internal consistency reliability of scores in the current study was indicated by a McDonald's omega of .93.

Diet Quality. Diet quality was measured with the PrimeScreen (Rifas-Shiman et al., 2001). The PrimeScreen is a brief dietary questionnaire that assesses participants' typical consumption of various food groups over the past year. For example, participants are asked to rate how often they consume "dark green leafy vegetables (e.g., spinach, kale, collard greens, arugula)" on a scale from 1 (*less than once per week*) to 5 (*twice or*

more per day). All six fruit and vegetable groups were combined into a single fruit and vegetable intake score, which was used as a proxy for diet quality. In previous research, reported fruit and vegetable intake on the PrimeScreen was associated with intake measured by a validated food frequency questionnaire (Rifas-Shiman et al., 2001). In the current study, McDonald's omega was .78.

Physical Activity. Participants also completed the International Physical Activity Questionnaire (IPAQ; Craig et al., 2003) as a measure of physical activity. The IPAQ instructs participants to provide the number of instances and the duration of vigorous and moderate physical activity over the past seven days, as well as the number of instances and the duration of walking. Using an established scoring protocol, these responses can be combined to represent 3total minutes of moderate-to-vigorous physical activity. Among general samples of adults, the IPAQ has evidenced good test-retest reliability (Brown, Trost, Bauman, Mummery, & Owen, 2004) and validity (Craig et al., 2003).

Discrimination. Participants completed the six-item discrimination and harassment subscale of The Daily Heterosexist Experiences Questionnaire (Balsam et al., 2013). This measure was developed to measure sexual minority individuals' experiences with sexual orientation-related stress over the past 12 months. Participants rated on a scale from 1 (*did not happen*) to 6 (*it happened, and it bothered me extremely*) the extent to which they were bothered by a particular form of discrimination (e.g., "Being verbally harassed by people you know because you are LGBT"), with higher scores indicating a higher level of discrimination. Among a sample of sexual minority adults, the subscale demonstrated acceptable reliability ($\alpha = 0.85$) and scores were related to perceived stress (Balsam et al., 2013). In the current study, McDonald's omega was .71.

Internalized Stigma. Participants also completed the private esteem subscale of the Collective Self-Esteem scale (Luhtanen & Crocker, 1992). This scale was developed to be modified by researchers to refer to the social group of interest; in the current study, items were modified to refer to sexual orientation (see Gray & Desmarais, 2014). Participants rated on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*) the extent to endorse each of four statements (e.g., "I often regret that I belong to my sexual orientation group"). Higher scores indicate a higher level of internalized stigma. In a previous study with sexual minority adults, the modified scale demonstrated acceptable reliability ($\alpha = 0.80$; Gray & Desmarais, 2014). In another study, scores on the private esteem subscale were negatively associated with depression among sexual minority adults (Longares, Escartin, & Rodriguez-Carballeira, 2016). In the current study, McDonald's omega was .85.

Depressive Symptoms. Depressive symptoms were assessed using the Patient Health Questionnaire (PHQ-9), a nine-item measure of depressive symptoms (Kroenke et al., 2001). Participants rate on a scale from 1 (*not at all*) to 4 (*nearly every day*) the frequency with which they have experienced symptoms of depression (e.g., "Feeling down, depressed, or hopeless") over the past two weeks. This measure has demonstrated good reliability with adult primary care patients (Cronbach's $\alpha = .86$), and scores were associated with functional status (Kroenke et al., 2001). Additionally, the PHQ-9 has demonstrated good reliability with LGBQ adults (Cronbach's $\alpha = .89$; Borgogna et al., 2019). In the current study, McDonald's omega was .89.

Appearance Norm Internalization. Participants completed the Sociocultural Attitudes towards Appearance Questionnaire-4 (SATAQ-4; Schaefer et al., 2015) as a

measure of the degree to which they have internalized cultural norms related to body weight and shape. Participants completed two subscales (i.e., thin ideal internalization and muscular ideal internalization), each of which consists of five items. Items (e.g., "It want my body to look very thin") are rated on a scale from 1 (*definitely disagree*) to 5 (*definitely agree*), with higher scores indicating greater internalization. Among a sample of sexual minority women, both subscales demonstrated good reliability (α > .80) and scores on both subscales were associated with dietary restraint (Hazzard et al., 2019). In the current study, McDonald's omega was .86 for the thin ideal subscale and .87 for the muscular ideal subscale.

Gender Nonconformity. Gender nonconformity was assessed with the Traditional Masculinity-Femininity scale (TMF; Kachel et al., 2016). This scale instructs participants to rate on a scale of 1 (*very feminine*) to 7 (*very masculine*) how they view themselves in six different domains (e.g., "Traditionally, my outer appearance would be considered as …"). Higher scores indicate greater gender nonconformity. Among a sample of adults with diverse sexual orientations, the scale demonstrated excellent reliability (α = 0.94) and scores on the measure were associated with implicit gender-related attitudes (Kachel et al., 2016). In the current study, McDonald's omega was .77.

Impact of COVID-19. To gather descriptive information about the impact of the COVID-19 pandemic on study results, participants were asked to rate how much seven aspects of their lives had changed since the beginning of the pandemic in March 2020. These aspects included physical health, body weight, diet quality, physical activity, depression, discrimination, and connection to the LGBQ+ community. Participants rated these items on a scale from 1 (e.g., *a lot less depressed*) to 5 (*a lot more depressed*).

Daily Diary Surveys

For each daily diary survey, participants completed the IPAQ as a measure of physical activity and the PHQ-9 as a measure of depression (Level 1 $\Omega = .76$; Level 2 $\Omega = .95$). In addition, participants completed the following measures. Measures were modified as needed to refer to participants' experiences over the past 24 hours.

Diet Quality. As a measure of diet quality, participants were asked to report on the servings of fruits and vegetables they consumed over the past 24 hours. Participants were provided with guidance on serving sizes (e.g., "One serving of vegetables is equal to one handful of cut raw, frozen, cooked, or canned vegetables or one glass of 100% vegetable juice; O'Connor et al., 2008). Fruit and vegetable servings were combined to produce a total score. In previous daily diary research, this measurement approach demonstrated acceptable test-retest validity, and scores were higher in a group of participants who had received a self-regulation intervention (Stadler et al., 2010).

Physical Health-Related Quality of Life. As a measure of daily PHRQoL, participants completed a single-item self-rated health measure (Idler & Benyamini, 1997). Participants rated their "health today" on a scale from 1 (*poor*) to 5 (*excellent*). Previous research has demonstrated that this measure is a reliable predictor of morbidity and mortality (Idler & Benyamini, 1997). In previous daily diary research, self-rated health was associated with saliva cortisol levels (Dahlgren et al., 2009).

Discrimination. Experiences of discrimination were assessed using the Sexual Minority Stressors measure (Heron et al., 2018). This measure was designed to be used in daily diary research with lesbian women. Items were modified slightly to be applicable to bisexual women. Participants rated eight items (e.g., "I was told I was overreacting or

being oversensitive regarding sexual minority issues") on a scale from 1 (*not at all*) to 7 (*a lot*). In previous research, the measure demonstrated good reliability (α = 0.85). In the current study, Level 1 Ω = .77 and Level 2 Ω =.91.

Internalized Stigma. Internalized stigma was assessed with the three-item Internalized Homonegativity subscale of Mohr and Kendra's (2011) Lesbian, Gay, and Bisexual Identity Scale (LGBIS). Participants rated their agreement with statements such as "I wish I were heterosexual" on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*). This subscale has demonstrated acceptable reliability with LGBQ university students (α = .77), and scores on the measure were strongly associated with an established internalized homophobia scale (Mohr & Kendra, 2011). In the current study, Level 1 Ω = .79 and Level 2 Ω =.97.

Interactions with Sexual Minority Others. Participants also completed the Rochester Interaction Record for social interactions over the previous 24 hours that lasted more than 10 minutes (Reis & Wheeler, 1991; Schaafsma et al., 2010). Given the context of the COVID-19 pandemic, reportable interactions included those that occurred via the telephone or the internet. If participants interacted with more than five people on a given day, they were instructed to choose the five interactions with the longest duration. Participants indicated their relationship to each interaction partner (including partner/spouse, family member, friend, co-worker or classmate, boss or professor, acquaintance, stranger, or other), the sexual orientation of each interaction partner (including heterosexual, gay, lesbian, bisexual, pansexual, queer, other, or unsure), and the length of each the interaction. To my knowledge, the Rochester Interaction Record has not been used with sexual minority populations. However, previous research has

suggested that quantity of social interactions is related to depressive symptoms among the general population (Nezlek et al., 1994). In the current study, the total number of sexual minority others that a participant interacted with on a given day was used as a measure of contact with sexual minority others.

Data Analytic Plan

Baseline Data

Path analysis was used to analyze the baseline data. Maximum likelihood estimation with robust statistics was employed to account for missing data and non-normal variable distributions. Age, income, and race/ethnicity were included as control variables in all analyses, given evidence that these variables are associated with the health outcomes of interest in this study (Armstrong et al., 2018; Corder et al., 2017; Hales et al., 2017; Hiza et al., 2013; Ogden et al., 2017; Zimmerman & Anderson, 2019). First, health outcomes (i.e., diet quality, physical activity, BMI, PHRQoL) were regressed on sexual orientation and partner gender (among bisexual participants only) to examine between-group differences. Next, each predictor (i.e., discrimination, internalized stigma, depression, appearance norm internalization, gender nonconformity) was analyzed in a separate model. In each model, the predictor of interest predicted all health outcomes, which were allowed to covary. The reverse models (i.e., all predictors predicting a single health outcome) were also tested to examine the relative importance of hypothesized predictors.

To test sexual orientation-related mediation hypotheses, sexual orientation was entered as an exogenous variable into the single predictor models. Sexual orientation predicted the focal predictor (e.g., discrimination) and all health outcomes. Indirect

effects and confidence intervals were estimated using the Monte Carlo method; a significant indirect effect was inferred from a 95% confidence interval for the indirect effect that did not include 0. An identical approach was used to examine partner gender-related mediation hypotheses among bisexual participants. In these models, bisexual participants partnered with men were compared to bisexual participants partnered with women and nonbinary individuals.

Daily Diary Data

Multilevel structural equation modeling (MSEM) was used to analyze the daily diary data to account for the dependency of observations due to the nested data structure (i.e., daily diary surveys nested within participants). MSEM offers greater power to detect effects and better methods for handing missing data than traditional multilevel regression (Preacher et al., 2010). Maximum likelihood estimation with robust statistics was employed to account for missing data and non-normal variable distributions. Age, income, and race/ethnicity were included as control variables in all between-person analyses. First, health outcomes (i.e., diet quality, physical activity, PHRQoL) were regressed on sexual orientation and partner gender (among bisexual participants only) to examine differences between participants at the between-person level. Next, each predictor (i.e., discrimination, internalized stigma, depression, interactions with sexual minority others) was analyzed in a separate model. In each model, the predictor of interest predicted all outcomes (i.e., diet quality, physical activity, and PHRQoL), which were allowed to covary. The reverse models (i.e., all predictors predicting a single outcome) were also tested to examine the relative importance of hypothesized predictors. These models were estimated on the between- and within-person levels. Additionally,

appearance norm internalization and gender nonconformity, which were measured at baseline, were included as predictors in between-person daily diary models as specified by the hypotheses. In order to determine which slopes in the Level 1 models should be allowed vary randomly, the variance of the slope for each direct effect was tested individually. When the variance of the slope was significant, this slope was allowed to vary randomly in the final model. Mediation models were also tested at Level 2, using an identical approach to the one described above.

Chapter 3: Results

Baseline Data

Preliminary Analyses

In total, 0.38% of data points were missing due to participant error. Missing data was accounted for using maximum likelihood estimation. Descriptive statistics and bivariate correlations among primary study variables are presented in Table 3. In general, correlations were in the expected directions. One exception is the significant positive correlation between minutes of moderate-to-vigorous physical activity and experiences of discrimination.

On average, participants reported eating the six measured fruit and vegetable groups between once per week and several times per week. Reported frequencies for each category ranged from never to twice per day. Participants also reported engaging in approximately 70 minutes of moderate-to-vigorous physical activity per week (range: 0 – 900 minutes). Although these averages are below recommended targets, they are relatively typical for adults in the US (Blackwell & Clarke, 2018; Lee-Kwan et al., 2017). Participants reported an average BMI of 26.78, which corresponds with the "overweight" category according to national guidelines. The mean BMI among the sample was somewhat lower than the national average for adult women (29.60), likely because of the sample's age restrictions (Fryar et al., 2018). Participants ranged from 17.17 (underweight category) to 54.23 (Class III obese category). Finally, the sample reported being in good to very good health, on average (Hayes & Morales, 2001). On a scale of 0 to 100, participants' PHRQoL scores ranged from 18.13 to 85.00. Frequencies for COVID-19-related variables are presented in Table 4. The majority of participants

reported poorer physical health, poorer diet quality, less physical activity, and more depressive symptoms since the beginning of the pandemic.

Main Effects

There were no significant differences between lesbian- and bisexual-identified participants in terms of fruit and vegetable intake, physical activity, BMI, or PHRQoL. There were also no differences between bisexual participants partnered with men and bisexual participants partnered with women or nonbinary individuals in terms of health outcomes. Results for the hypothesized path models are displayed in Table 5. Results for the simple regression models with a single predictor predicting all health outcomes are displayed in the first row of each cell. Surprisingly, discrimination was positively associated with physical activity. Discrimination was also negatively associated with PHRQoL and positively associated with BMI. Depression and thin ideal internalization were both negatively associated with PHRQoL. Muscular ideal internalization was positively associated with fruit and vegetable intake and physical activity and negatively associated with BMI. Internalized stigma and gender nonconformity were unrelated to all outcomes. The results for the models with all predictors predicting a single health outcome are displayed in the second row of each cell in Table 5. Results revealed that diet quality was predicted by muscular ideal internalization only; physical activity and BMI were both predicted by discrimination and muscular ideal internalization; and PHRQoL was predicted by depression and muscular ideal internalization. In sum, it appears that discrimination, muscular ideal internalization, and depression had the most robust effects on the health outcomes at baseline, whereas internalized stigma, thin ideal internalization, and gender nonconformity were less predictive of health outcomes.

Mediation

Indirect effects for the baseline mediation models are displayed in Table 6. Results for the sexual orientation mediation models revealed two direct effects of sexual orientation. Sexual orientation had a direct effect on discrimination, with lesbians reporting higher levels of discrimination (B = -0.33, SE = 0.10, p = .001). Sexual orientation also had a direct effect on internalized stigma, with bisexuals reporting higher levels of stigma (B = 0.32, SE = 0.12, p = .01). Only one significant indirect effect of sexual orientation emerged. Sexual orientation indirectly predicted physical activity through the mediator of discrimination. Lesbians reported higher levels of discrimination, which in turn led to more physical activity.

Results for the partner gender mediation models (performed with bisexual participants only) revealed two direct effects of partner gender. Partner gender had a direct effect on discrimination (B = 0.96, SE = 0.28, $p < .001$) and gender nonconformity (B = 0.40, SE = 0.20, p = .04). In both cases, the outcome was higher among participants partnered with women and nonbinary individuals than women partnered with men. There were no significant indirect effects of partner gender.

Table 3

Descriptive Statistics and Zero-Order Correlations for Baseline Variables

Variables	*M*	*SD*	Range	1	2	3	4	5	6	7	8	9	10
1. FV Frequency	5.05	1.49	2.00 – 8.50	--									
2. MVPA	138.52	165.09	0.00 – 900.00	.28*	--								
3. BMI	26.78	6.91	17.16 – 54.23	-.18*	.02	--							
4. PHRQoL	64.67	15.80	18.13 – 85.00	.15*	.09	-.17*	--						
5. Discrimination	1.57	0.77	1.00 – 5.00	.07	.28*	.16*	-.16*	--					
6. Internalized Stigma	1.95	1.00	1.00 – 6.00	-.03	.02	-.06	-.06	-.01	--				
7. Depression	2.22	0.70	1.00 – 4.00	.02	.01	.09	-.49*	.21*	.11	--			
8. Thin Ideal Internalization	3.30	0.98	1.00 – 5.00	.04	.05	-.11	-.14*	.10	.19*	.20*	--		
9. Muscular Ideal Internalization	2.42	0.97	1.00 – 5.00	.27*	.29*	-.22*	.08	.16*	.21*	.08	.38*	--	
10. Gender Nonconformity	3.29	0.89	1.00 – 5.83	.04	.02	.05	.02	.04	-.02	.01	-.09	.18*	--

Note. Means, standard deviations, and ranges for all variables provided in original scales. FV Frequency = frequency of fruit and vegetable intake; MVPA = minutes of moderate-to-vigorous physical activity; BMI = body mass index; PHRQoL = physical health-related quality of life.
*$p < .05$.

Table 4

Impact of the COVID-19 Pandemic on Study Variables

Variable	Response *n* (%)				
	Much worse	**A little worse**	**About the same**	**A little better**	**Much better**
Physical health	13 (4.7%)	126 (45.5%)	108 (39.0%)	25 (9.0%)	5 (1.8%)
Diet quality	31 (11.2%)	111 (40.1%)	77 (27.8%)	48 (17.3%)	10 (3.6%)
	Much less	**A little less**	**About the same**	**A little more**	**Much more**
Physical activity	115 (41.5%)	69 (24.9%)	35 (12.6%)	41 (14.8%)	16 (5.8%)
Body weight	17 (6.1%)	58 (20.9%)	64 (23.1%)	115 (41.5%)	23 (8.3%)
Depression	4 (1.4%)	14 (5.1%)	61 (22.0%)	138 (49.8%)	60 (21.7%)
Discrimination	11 (4.0%)	26 (9.4%)	206 (74.4%)	31 (11.2%)	2 (0.7%)
Connection to the LGBQ+ Community	21 (7.6%)	68 (24.5%)	97 (35.0)	64 (23.1%)	27 (9.7%)

Table 5

Baseline Main Effects

Predictors	Outcomes			
	FV Frequency *B* (*SE*)	MVPA *B* (*SE*)	BMI *B* (*SE*)	PHRQoL *B* (*SE*)
Discrimination	0.10 (0.12) 0.03 (0.11)	56.08* (18.99) 50.94* (20.42)	1.47* (0.65) 1.66* (0.61)	-2.87* (1.39) -1.31 (1.24)
Internalized Stigma	-0.08 (0.09) -0.14 (0.09)	1.02 (9.77) -4.85 (9.04)	-0.48 (0.40) -0.06 (0.41)	-0.59 (1.00) -0.24 (0.89)
Depression	-0.01 (0.13) -0.00 (0.13)	0.70 (14.11) -7.41 (13.54)	0.84 (0.58) 0.72 (0.59)	-11.11* (1.23) -10.59* (1.30)
Thin Ideal Internalization	0.01 (0.10) -0.16 (0.10)	4.51 (9.25) -16.73 (10.86)	-0.85 (0.48) -0.25 (0.51)	-2.15* (1.08) -1.70 (1.30)
Muscular Ideal Internalization	0.41* (0.09) 0.51* (0.10)	49.72* (10.28) 52.54* (13.35)	-1.81* (0.42) -2.01* (0.48)	1.63 (0.99) 2.95* (0.98)
Gender Nonconformity	0.03 (0.10) -0.09 (0.10)	3.77 (11.05) -9.48 (11.78)	0.34 (0.49) 0.62 (0.45)	0.34 (0.76) -0.45 (0.93)

Note. First set of coefficients in each cell represent simple regression models with one predictor; second set of coefficients represent multiple regression models with all predictors. All analyses controlled for age, income, and race/ethnicity. FV Frequency = frequency of fruit and vegetable intake; MVPA = minutes of moderate-to-vigorous physical activity; BMI = body mass index; PHRQoL = physical health-related quality of life.
$^*p < .05$.

Table 6

Baseline Indirect Effects

Predictor	Mediator	Outcomes: FV Frequency *B* (*SE*) [95% CI]	MVPA *B* (*SE*) [95% CI]	BMI *B* (*SE*) [95% CI]	PHRQoL *B* (*SE*) [95% CI]
Sexual Orientation	Discrimination	-0.03 (0.04) [-0.11, 0.04]	-18.17* (9.00) [-35.80, -3.37]	-0.48 (0.29) [-1.04, -0.00]	0.95 (0.58) [-0.18, 1.91]
Sexual Orientation	Internalized Stigma	-0.03 (0.03) [-0.09, 0.04]	0.70 (3.14) [-5.45, 5.87]	-0.15 (0.14) [-0.43, 0.09]	-0.20 (0.34) [-0.86, 0.35]
Sexual Orientation	Depression	0.00 (0.01) [-0.02, 0.02]	-0.01 (0.94) [-1.85, 1.83]	-0.06 (0.08) [-0.21, 0.10]	0.74 (0.97) [-1.16, 2.65]
Sexual Orientation	Thin Ideal Internalization	0.00 (0.01) [-0.03, 0.03]	0.76 (1.59) [-2.35, 3.87]	-0.13 (0.13) [-0.37, 0.08]	-0.33 (0.30) [-1.10, 0.17]
Sexual Orientation	Muscular Ideal Internalization	-0.01 (0.05) [-0.10, 0.09]	-0.98 (5.84) [-12.43, 10.47]	0.04 (0.22) [-0.39, 0.46]	-0.03 (0.19) [-0.41, 0.35]
Sexual Orientation	Gender Nonconformity	-0.01 (0.02) [-0.04, 0.03]	-0.49 (1.94) [-4.29, 3.32]	-0.05 (0.09) [-0.23, 0.13]	-0.06 (0.19) [-0.44, 0.32]
Partner Gender	Discrimination	0.11 (0.20) [-0.28, 0.50]	27.63 (27.970 [-27.19, 82.44]	1.63 (1.11) [-0.54, 3.81]	-2.08 (2.30) [-7.99, 1.70]
Partner Gender	Internalized Stigma	-0.01 (0.04) [-0.08, 0.07]	-1.04 (6.77) [-14.30, 12.23]	0.03 (0.19) [-0.34, 0.39]	0.04 (0.24) [-0.44, 0.52]
Partner Gender	Depression	0.03 (0.05) [-0.08, 0.14]	1.07 (3.88) [-6.53, 8.68]	0.11 (0.22) [-0.32, 0.55]	-1.96 (2.43) [-6.72, 3.79]
Partner Gender	Thin Ideal Internalization	0.00 (0.01) [-0.01, 0.01]	0.03 (0.64) [-1.23, 1.28]	-0.00 (0.04) [-0.83, 6.59]	-0.04 (0.78) [-1.57, 1.50]
Partner Gender	Muscular Ideal Internalization	0.21 (0.12) [-0.02, 0.45]	31.25 (18.91) [-5.81, 68.31]	-0.72 (0.42) [-1.56, 0.11]	1.16 (0.84) [-0.48, 2.79]
Partner Gender	Gender Nonconformity	-0.01 (0.09) [-0.19, 0.16]	-3.91 (7.33) [-18.29, 10.46]	-0.14 (0.40) [-0.92, 0.51]	-0.14 (0.40) [-2.34, 1.23]

Note. FV Frequency = frequency of fruit and vegetable intake; MVPA = minutes of moderate-to-vigorous physical activity; BMI = body mass index; PHRQoL = physical health-related quality of life. Asterisk denotes a statistically significant indirect effect ($p < .05$) as indicated by the confidence interval.

Daily Diary Data

Preliminary Analyses

In total, 0.16% of data points were missing due to participant error. Missing data was accounted for using maximum likelihood estimation. Descriptive statistics and within- and between-person bivariate correlations among daily diary variables are presented in Table 7. In general, within- and between-person correlations were in the expected directions.

On average, participants reported consuming approximately 2.5 servings of fruits and vegetables (range: 0 – 11.50) and engaging in 14 minutes of physical activity (range: 0 – 120.00) per day. Again, these averages fall below public health recommendations but are fairly typical for adults in the US (Blackwell & Clarke, 2018; Lee-Kwan et al., 2017). They also reported being in good daily health and experiencing mild depressive symptoms, on average (Hayes & Morales, 2001; Kroenke et al., 2001). Participants generally reported low levels of daily discrimination and internalized stigma, evidenced by low sample means. Finally, participants reported interacting with approximately one other sexual minority person per day. Sample intraclass correlation coefficients (ICCs) are also presented in Table 7. ICCs represent the proportion of variance that is consistent within persons; (1 - ICC) represents the proportion of variance that varies within persons from day to day (plus error). The low to moderate ICCs associated with fruit and vegetable intake, physical activity, PHRQoL, discrimination, and number of interactions with sexual minority others (.27 - .60) indicate that these variables vary substantially from day to day. On the other hand, the high ICCs associated with depressive symptoms

and internalized stigma (.74 - .85) indicate that these variables are more consistent within persons.

Main Effects

Level 1. Results for the hypothesized MSEM models are presented in Table 8. Results for the models with one predictor and three correlated outcomes (i.e., daily servings of fruits and vegetables, daily minutes of moderate-to-vigorous physical activity, and daily PHRQoL) are displayed in the first row of each cell. Level 1 results revealed that discrimination and number of interactions with sexual minority others were unrelated to the health outcomes. However, internalized stigma was negatively associated with diet quality, and depression was negatively associated with diet quality and PHRQoL. Only one slope met criteria to be included in the model as a random coefficient: the effect of depression on PHRQoL. This finding indicates that the association between depressive symptoms and PHRQoL differs significantly from participant to participant. Results for the models including all predictors and a single health outcome are displayed in the second row of each cell in Table 8. Results revealed that diet quality was predicted by discrimination, internalized stigma, and depression. PHRQoL was predicted by depression. Physical activity was not predicted by any variables in this model. No slopes met criteria to be included as random coefficients in the multi-predictor models. In sum, these results suggest that depression and internalized stigma had the most substantial effects on health outcomes at the within-persons level.

Level 2. Results revealed no significant differences between lesbian- and bisexual-identified participants in terms of diet quality, physical activity, or PHRQoL. There were also no differences between bisexual participants partnered with men and

bisexual participants partnered with women or nonbinary individuals in terms of health outcomes. When examining the models with a single predictor and multiple outcomes, discrimination was negatively associated with PHRQoL at the between-person level. Internalized stigma was negatively associated with diet quality. Muscular ideal internalization and gender nonconformity were positively associated with physical activity. Depression, thin ideal internalization, and number of interactions with sexual minority others did not predict any health outcomes in these models. When examining the models with multiple predictors and a single outcome, diet quality was predicted by internalized stigma and muscular ideal internalization. Surprisingly, physical activity was positively associated with discrimination. Physical activity was also predicted by depression and muscular ideal internalization. Finally, PHRQoL was negatively associated with depression. Thus, at the between-person level, several predictors (including discrimination, internalized stigma, depression, and muscular ideal internalization) were robustly associated with health outcomes.

See Table 9 for a summary of all main effects from the baseline and daily diary phases of the study.

Mediation

Indirect effects for Level 2 mediation models are displayed in Table 10. Results revealed two direct effects of sexual orientation. Sexual orientation had a direct effect on discrimination, with lesbians reporting higher levels of discrimination (B = -0.12, SE = 0.05, p = .01). Sexual orientation also had a direct effect on the average number of interactions with sexual minority others, with lesbians reporting more interactions (B = -0.26, SE = 0.12, p = .03). One significant indirect effect was found. Sexual orientation

had an indirect effect on PHRQoL through the mediator of discrimination. Lesbians reported higher levels of discrimination, which in turn predicted poorer PHRQoL.

Partner gender mediation models were also estimated at Level 2. Results revealed that partner gender had a direct effect on gender nonconformity ($B = 0.53$, $SE = 0.24$, $p = .03$). Bisexual participants partnered with women or nonbinary individuals reported higher levels of gender nonconformity than bisexual women partnered with men. Additionally, one significant indirect effect was found. Partner gender had an indirect effect on PHRQoL through the mediator of number of interactions with sexual minority others. Participants partnered with women or nonbinary individuals reported more interactions with sexual minority others, which in turn was associated with better PHRQoL at the between-person level.

Table 7

Descriptive Statistics and Zero-Order Correlations for Daily Diary Variables

Variables	*M*	*SD*	Range	1	2	3	4	5	6	7
1. FV Intake	2.53	1.59	0.00 – 11.50	.57	-.00	.15*	.03	-.08*	-.12*	-.04
2. MVPA	13.65	20.01	0.00 – 120.00	.33*	.27	.11*	.02	-.01	-.05*	.03
3. PHRQoL	3.06	0.71	1.20 – 5.00	.19*	.25*	.55	-.03	-.05	-.29*	.00
4. Discrimination	1.19	0.31	1.00 – 3.15	.01	.18	-.31*	.34	.11*	.06*	.04
5. Internalized Stigma	1.62	0.88	1.00 – 5.24	-.15*	-.04	-.10	.09	.85	.11*	0.01
6. Depression	1.89	0.63	1.00 – 3.63	.00	-.08	-.49*	.38*	.17*	.74	-.01
7. Number of LGBQ+ Contacts	0.97	0.83	0.00 – 4.75	.03	.03	.05	.10	-.18*	.05	.60

Note. Means and standard deviations for all variables provided in original scales and based on data aggregated to the person level. ICCs shown on the diagonal. Within-person correlations located above diagonal; between-person correlations located below diagonal. FV Intake = servings of fruit and vegetables; MVPA = minutes of moderate-to-vigorous physical activity; PHRQoL = physical health-related quality of life.
*$p < .05$.

Table 8

Daily Diary Main Effects

Predictor	Outcomes		
	FV Intake *B* (*SE*)	MVPA *B* (*SE*)	PHRQoL *B* (*SE*)
	Within-Person Effects		
Discrimination	0.12 (0.07) 0.18* (0.08)	1.42 (2.02) 1.51 (2.06)	-0.05 (0.05) -0.02 (0.05)
Internalized Stigma	-0.28* (0.11) -0.25* (0.12)	-0.68 (1.67) -0.53 (1.78)	-0.08 (0.05) -0.02 (0.04)
Depression	-0.43* (0.09) -0.43* (0.09)	-3.31 (1.73) -3.32 (1.73)	-0.46* (0.05)† -0.47* (0.05)
Number of LGBQ+ Contacts	-0.09 (0.05) -0.09 (0.05)	1.58 (1.12) 1.55 (1.12)	-0.00 (0.02) -0.01 (0.02)
	Between-Person Effects		
Discrimination	0.24 (0.35) 0.30 (0.42)	10.95 (0.21) 18.70* (9.16)	-0.72* (0.18) -0.28 (0.20)
Internalized Stigma	-0.26* (0.12) -0.31* (0.12)	-0.79 (1.76) -1.38 (1.80)	-0.06 (0.06) -0.03 (0.05)
Depression	-0.02 (0.16) -0.06 (0.17)	-2.19 (2.28) -5.58* (2.05)	0.05 (0.10) -0.51* (0.08)
Thin Ideal Internalization	-0.02 (0.10) -0.08 (0.10)	-0.78 (1.49) -2.10 (1.55)	-0.02 (0.05) 0.04 (0.05)
Muscular Ideal Internalization	0.19 (0.11) 0.29* (0.11)	4.57* (1.39) 5.58* (1.31)	0.04 (0.05) 0.08 (0.05)
Gender Nonconformity	-0.01 (0.10) -0.07 (0.10)	2.95* (1.43) 2.75 (1.55)	0.03 (0.05) 0.00 (0.05)
Number of LGBQ+ Contacts	0.14 (0.13) -0.06 (0.12)	0.40 (1.43) -0.54 (1.36)	-0.02 (0.06) -0.00 (0.05)

Note. First set of coefficients in each cell represent simple regression models with one predictor; second set of coefficients represent multiple regression models with all predictors.. All between-person analyses controlled for age, income, and race/ethnicity. All predictors mean centered. FV Intake = servings of fruit and vegetables; MVPA = minutes of moderate-to-vigorous physical activity; PHRQoL = physical health-related quality of life.
† = random slope.
*$p < .05$.

Table 9

Summary of Main Effects

	Outcomes									
	Baseline	Daily Diary		Baseline	Daily Diary		Baseline	Daily Diary		Baseline
Predictors	FV	FV (within)	FV (between)	MVPA	MVPA (within)	MVPA (between)	PHRQoL	PHRQoL (within)	PHRQoL (between)	BMI
Discrimination	*ns*	*ns*	*ns*	+	*ns*	*ns*	-	*ns*	-	+
Internalized Stigma	*ns*	-	-	*ns*	*ns*	*ns*	*ns*	*ns*	*ns*	*ns*
Depression	*ns*	-	*ns*	*ns*	*ns*	*ns*	-	-	*ns*	*ns*
Thin Ideal Internalization	*ns*	N/A	*ns*	*ns*	N/A	*ns*	-	N/A	*ns*	*ns*
Muscular Ideal Internalization	+	N/A	*ns*	+	N/A	+	*ns*	N/A	*ns*	-
Gender Nonconformity	*ns*	N/A	*ns*	*ns*	N/A	+	*ns*	N/A	*ns*	*ns*
Number of LGBQ+ Contacts	N/A	*ns*	*ns*	N/A	*ns*	*ns*	N/A	ns	*ns*	N/A

Note. Effects represent simple models with a single predictor. FV = fruit and vegetable intake; MVPA = moderate-to-vigorous physical activity; PHRQoL = physical health-related quality of life; BMI = body mass index.
ns = nonsignificant.
N/A = not included in the relevant model.
+ = significant positive effect.
- = significant negative effect.

Table 10

Daily Diary Indirect Effects

Predictor	Mediator	Outcomes		
		FV Intake *B* (*SE*) [95% CI]	**MVPA** *B* (*SE*) [95% CI]	**PHRQoL** *B* (*SE*) [95% CI]
Sexual Orientation	Discrimination	-0.05 (0.05) [-0.14, 0.05]	-1.28 (1.09) [-3.42, 0.87]	0.10* (0.04) [0.02, 0.17]
Sexual Orientation	Internalized Stigma	-0.01 (0.03) [-0.07, 0.06]	-0.02 (0.10) [-0.22, 0.18]	-0.00 (0.01) [-0.02, 0.01]
Sexual Orientation	Depression	0.00 (0.02) [-0.04, 0.04]	0.35 (0.43) [-0.49, 1.20]	0.07 (0.05) [-0.02, 0.17]
Sexual Orientation	Thin Ideal Internalization	-0.00 (0.01) [-0.03, 0.02]	-0.08 (0.20) [-0.47, 0.30]	-0.00 (0.01) [-0.02, 0.01]
Sexual Orientation	Muscular Ideal Internalization	0.00 (0.03) [-0.05, 0.05]	-0.01 (0.59) [-1.16, 1.14]	0.00 (0.01) [-0.01, 0.01]
Sexual Orientation	Gender Nonconformity	-0.00 (0.02) [-0.03, 0.03]	0.43 (0.40) [-1.22, 0.37]	0.00 (0.01) [-0.02, 0.01]
Sexual Orientation	Number of LGBQ+ Contacts	-0.04 (0.04) [-0.12, 0.03]	-0.05 (0.36) [-0.76, 0.66]	0.01 (0.02) [-0.03, 0.04]
Partner Gender	Discrimination	0.03 (0.13) [-0.22, 0.28]	-0.14 (0.61) [-1.33, 1.05]	-0.04 (0.14) [-0.31, 0.24]
Partner Gender	Internalized Stigma	0.09 (0.09) [-0.09, 0.27]	-1.68 (1.91) [-5.43, 2.07]	0.01 (0.04) [-0.08, 0.09]
Partner Gender	Depression	-0.05 (0.17) [-0.39, 0.30]	-1.68 (1.60) [-4.81, 1.45]	-0.24 (0.14) [-0.52, 0.05]
Partner Gender	Thin Ideal Internalization	0.07 (0.09) [-0.11, 0.25]	0.28 (0.86) [-1.21, 2.17]	0.05 (0.05) [-0.06, 0.15]
Partner Gender	Muscular Ideal Internalization	0.08 (0.09) [-0.10, 0.26]	2.49 (1.84) [-1.12, 6.10]	0.04 (0.05) [-0.07, 0.14]
Partner Gender	Gender Nonconformity	0.06 (0.14) [-0.32, 0.21]	-1.51 (1.42) [-1.28, 4.30]	-0.06 (0.08) [-0.09, 0.20]
Partner Gender	Number of LGBQ+ Contacts	0.69 (0.52) [-0.33, 1.70]	8.01 (5.59) [-2.95, 18.97]	0.59* (0.24) [0.12, 1.06]

Note. FV Intake = servings of fruit and vegetables; MVPA = minutes of moderate-to-vigorous physical activity; PHRQoL = physical health-related quality of life. Asterisk denotes a statistically significant indirect effect ($p < .05$) as indicated by the confidence interval.

Chapter 4: Discussion

A nascent body of research has begun to examine the effect of identity-related processes on the physical health of sexual minority individuals. Previous findings suggest that both minority stress and minority affirmative processes may impact the health of SMW. The present study adds to this literature by examining how multiple theoretically grounded mechanisms that are relevant to SMW's identities and communities influence their health, including both within- and between-person relations. Furthermore, this study is attentive to variability among SMW, investigating potential differences in these associations between young lesbian and bisexual women and between bisexual women partnered with men, women, and nonbinary individuals. Generally, results provided mixed support for both the minority stress and minority affirmative approaches to health, with stronger support found for the minority stress model. Results also revealed few differences between lesbian and bisexual women or based on partner gender, suggesting that physical health processes among SMW may be more similar than different.

Minority Stress Perspective

Experiences of heterosexist discrimination emerged as a key predictor of health outcomes. Discrimination was negatively related to PHRQoL at baseline and in between-person daily diary models, suggesting that women who experienced more heterosexist discrimination reported poorer physical health overall. These findings replicate previous cross-sectional research with LGBQ+ populations (Mereish & Poteat, 2015; Walch et al., 2016). However, discrimination was not associated with PHRQoL on the within-person level. Although discrimination level varied considerably from day-to-day within participants, these changes were not associated with fluctuations in daily reports of PHRQoL. Rather, my findings are consistent

with the view that the PHRQoL of SMW is impacted by stable patterns of daily discrimination. For instance, some SMW may experience persistently high levels of discrimination (e.g., as a result of an oppressive family system or social climate; Hasenbush et al., 2014), which are associated with ongoing poor physical health. To my knowledge, this is the first study to examine between- and within-person associations between discrimination and PHRQoL among SMW using a daily diary approach. The results provide support for a central claim of the minority stress model: distal stressors "get under the skin" and influence the physical health of marginalized populations. Future research should examine the precise mechanisms through which discrimination impacts sexual minority individuals' health status.

Additionally, experiences of discrimination were positively associated with BMI at baseline. It is likely at this association is bidirectional. Previous longitudinal research with diverse populations has demonstrated that discrimination predicts future weight gain (e.g., among Black women; Cozier et al., 2009), perhaps through the mechanism of increased cortisol levels (Jackson et al., 2014). However, higher BMI may also confer greater risk for heterosexist discrimination. For instance, heavier SMW may be targeted for heterosexist discrimination more frequently due to a perception that they are violating mainstream, heteronormative beauty standards (McPhail & Bombak, 2015). Larger body size may also render women's queer identities more visible, resulting in more frequent discrimination (Taylor, 2018).

Contrary to my hypotheses, discrimination was positively associated with physical activity at baseline, as well as in the multi-predictor between-person daily diary model. To my knowledge, this is the first study to examine the impact of discrimination on exercise behavior among sexual minority individuals. However, this finding diverges from some previous literature on the effect of racist discrimination on exercise among racial minority groups, which suggests

that discrimination depletes self-regulatory resources, thereby discouraging participation in physical activity (Chen & Yang, 2014). On the other hand, other studies of racist discrimination have found a positive between-person effect of discrimination on physical activity, suggesting that vigorous exercise may be used as an adaptive coping strategy (Corral & Landrine, 2012). My findings extend this line of inquiry to the domain of heterosexist discrimination and suggest that some SMW may attempt to cope with experiences of discrimination through physical activity. Notably, discrimination did not facilitate exercise on a day-to-day basis; rather, women who experienced more discrimination also reported more physical activity overall.

Whereas discrimination impacted PHRQoL, BMI, and physical activity, but not diet quality, internalized stigma impacted diet quality only. Interestingly, internalized stigma was negatively associated with fruit and vegetable intake in both the within- and between-person daily dairy models, but not at baseline. Given the difficulties associated with prolonged retrospective recall in dietary assessment, the daily dairy measure of this outcome is likely more accurate than the baseline measure (Bailey, 2021). In line with previous research, SMW women reporting high levels of internalized stigma may experience emotional dysregulation and attempt to cope by eating highly appetitive, nutrient-poor foods (Richard et al., 2015; Szymanski & Henrichs-Beck, 2014). This effect appears to operate both daily and over time.

Finally, depression was also associated with diet quality on the within-person level, meaning that participants reported consuming fewer serving of fruits and vegetables on days when they experienced more depressive symptoms. It is notable that diet quality was primarily related to proximal (i.e., internalized stigma and depressive symptoms), rather than distal (i.e., discrimination), stressors, at least in the current study. This finding reflects the fact that eating habits are highly vulnerable to negative internal states (Bourdier et al., 2018). Internalized stigma

and depressive symptoms represent inherently negative internal states, whereas discriminatory experiences can be internalized differently by different individuals, perhaps attenuating their impact on eating behaviors.

In addition, depressive symptoms were also negatively associated with PHRQoL at baseline and at the within-person level, in line with previous research (Cochran & Mays, 2007; Ruo et al., 2003). The daily impact of depression on physical health may reflect a somatization effect (Niles & O'Donovan, 2019). Conversely, symptoms of poor health (e.g., pain, role limitation) may induce depressive symptoms (Gayman et al., 2008). Future research should examine whether interventions that improve SMW's mental health have a positive downstream effect on their self-rated physical health, particularly since SMW are at elevated risk for depression and other mental health concerns.

Minority Affirmative Perspective

Previous literature has suggested that appearance norm internalization plays a substantial role in women's health. Mirroring previous findings with heterosexual women, thin ideal internalization was negatively associated with PHRQoL at baseline in the current study. Thin ideal internalization may facilitate the development and maintenance of eating disorders (Schaefer et al., 2019) and intensify psychological distress (Dittmar et al., 2009), both of which can harm women's health. However, thin ideal internalization was associated with no other health outcomes in the current sample. Instead, muscular ideal internalization was highly influential across several facets of health. To date, there has been relatively little research on the effects of muscular ideal internalization among women. The relative importance of muscularity over thinness in this study may be unique to SMW. Some studies have indicated that, compared to heterosexual women's norms, SMW's community norms emphasize muscularity and overall

fitness and de-emphasize thinness (Meneguzzo et al., 2018; Yean et al., 2013). Alternatively, the substantial impact of muscular ideal internalization in the current study may be the result of an increasing desire for muscularity among women of all sexual orientations over the past decade (Boszik et al., 2018). In either case, it appears that muscular ideal internalization is a key between-person predictor of physical health indicators and behaviors among young SMW.

In general, muscular ideal internalization appeared to be associated with beneficial health outcomes. It was positively related to diet quality at baseline, negatively related to BMI at baseline, and positively related to physical activity in both the baseline and between-person daily diary models. It was also positively associated with PHRQoL in the multi-predictor baseline model. It is perhaps unsurprising that the desire for a muscular body would encourage healthy eating and participation in vigorous exercise, which in turn support better physical health status and lower BMI. In this sense, muscular ideal internalization may be considered a stregnth of SMW's communities, especially if SMW are accepting of a wide diversity of body types (including, but not limited to, muscular body types, which are often considered masculine and unattractive according to mainstream beauty standards for women; Grossbard et al., 2011). However, there may also be downsides to high levels of muscular ideal internalization among SMW. Some research has demonstrated that muscular ideal internalization is associated with higher levels of eating pathology and body dissatisfaction (Girard et al., 2018; Hazzard et al., 2019), though evidence is mixed. Thus, while this study suggests that there may be benefits to muscular ideal internalization with regards to certain aspects of SMW's physical health, more research should examine its impact on diverse health outcomes.

The second hypothesized affirmative factor, gender nonconformity, was positively associated with physical activity in the daily diary between-person model. This finding supports

previous theorizing, which suggested that gender stereotypes about athleticism might discourage women with traditionally feminine gender presentations from participating in some vigorous physical activities, such as weightlifting (Eliason et al., 2015; Plaza et al., 2017). Conversely, gender nonconforming women may be more comfortable participating in such counter-stereotypic activities. Thus, the high levels of gender nonconformity present in SMW's communities may be health-promoting (Levitt, 2019). However, gender nonconformity was not associated with any other outcomes. It may be that the present study's choice of gender nonconformity measure (i.e., a measure designed for people of all sexual orientations; measured on a bipolar masculine-feminine scale) was not a good fit for the current sample. For example, this measure may not have captured non-traditional gender expressions that are more common among SMW (e.g., nonbinary and queer gender expressions; Levitt, 2019). Future research should examine whether the diversity of gender identities and expressions present in SMW's communities are associated with health outcomes.

The final affirmative factor of interest, interactions with sexual minority others, was unrelated to all health outcomes. It is possible that the measure utilized in this study (i.e., the number of sexual minority others that a participant interacted with on a given day) was too blunt to capture the complexities of SMWs' interactions. For instance, it may be that the quality, intimacy, or supportiveness of interactions is more predictive of health outcomes than the quantity. Alternatively, the context of the COVID-19 pandemic may have obscured the impact of interactions with sexual minority others on health. Participants' social lives were undoubtedly affected by the COVID-19 pandemic and social distancing requirements. As a result, participants' typical in-person interactions with sexual minority others may have been curtailed or transferred to other mediums (e.g., telephone, texting, video), which may have been less

impactful. Future research should investigate the hypothesized association between contact with sexual minority others and physical health after the conclusion of the pandemic.

In sum, the current study found mixed support for the minority stress and minority affirmative perspectives on physical health among SMW. All four health outcomes of interest – diet quality, physical activity, PHRQoL, and BMI – were predicted by multiple mechanisms, demonstrating that it is valuable to consider the impact of identity-relevant processes on sexual minority groups' physical health status and participation in health behaviors. Based on the current study, it appears that experiences of discrimination, internalized stigma, depressive symptoms, and muscular ideal internalization are particularly relevant to SMW's health.

Sexual Orientation and Partner Gender

Contrary to my hypotheses, there were no differences between lesbian- and bisexual-identified women in terms of the health outcomes of interest. Previous research on differences between lesbian and bisexual women's health has produced mixed findings. The current study suggests that health behaviors and health status are similar between these groups. However, it is also possible that certain characteristics of the present sample (e.g., the inclusion of self-identified lesbian and bisexual women only; the sample's relatively high proportion of White, educated women; age restrictions) or my recruitment strategy (i.e., explicitly recruiting participants for a study on sexual minority identity, rather than selecting SMW from a random sample of young adults) may have obscured real differences in physical health between subgroups of SMW. Similarly, there were no differences between bisexual women partnered with men and bisexual women partnered with women or nonbinary individuals in terms of the study's four health outcomes. Again, this may reflect true similarity between these groups or limitations to the present study and sample. Future research should investigate between-group

variability in health outcomes among SMW, including variation related to sexual orientation, relationship status, age, race/ethnicity, and education level.

Given the lack of differences between subgroups, it is unsurprising that few significant mediation effects were found. However, the mediation effects that did emerge are intriguing. With regard to sexual orientation, lesbians reported more discrimination at baseline, which was in turn related to higher levels of physical activity. Lesbians also reported more discrimination in the daily diary phase of the study, which in turn predicted poorer PHRQoL. These findings suggest that lesbian women are at higher risk for overtly heterosexist discrimination than bisexual women, perhaps because their identities are more visible to others (Huxley, 2013). This finding highlights the potential value of assessing the perceived concealability of participants' sexual orientation identities, rather than identity label only, in future research. Further, some lesbians may attempt to cope with discrimination through physical activity. Unfortunately, they also appear to suffer negative downstream health effects from elevated levels of minority stress. Interventions designed to reduce heterosexist discrimination and bolster lesbians' adaptive coping responses in the face of minority stress are needed.

Regarding partner gender, results revealed that bisexual women partnered with women and non-binary individuals reported more frequent interactions with sexual minority others in the daily diary portion of the study, which in turn predicted better PHRQoL. The higher number of LGBQ+ interactions among bisexual women partnered with women and nonbinary individuals includes contact with their own romantic partners (who are likely to be sexual minority-identified themselves), but may also include greater contact with LGBQ+ friends and acquaintances (McLean, 2008).This finding supports the potential health-promoting effects of engagement in the LGBQ+ community. Women who interact more frequently with sexual

minority others may cope more effectively with minority stress, reducing physiological distress and improving their global physical health status (Fredriksen-Goldsen et al., 2014). Additionally, for bisexual women specifically, interacting with sexual minority others (including, but not limited to, their own romantic partners) may help render their sexual minority identity visible to others, which has positive psychological consequences (Dyar et al., 2014). Future research should explore contact with sexual minority others as a potential health intervention, especially for bisexual women, who may be more isolated from the LGBQ+ community (McLean, 2008).

Limitations

Though this study provides important insights into the mechanisms linked to SMW's physical health, the results should be interpreted in light of several limitations. First, the sample was limited to SMW between the ages of 18 and 30. Research indicates that young adulthood is an important developmental stage for the formation of health habits and for sexual orientation identity exploration (Kaestle, 2018; Rovniak et al., 2002; Winpenny et al., 2018). It is therefore important to understand the factors influencing young adult SMW's health behaviors and physical health status. However, the results of this study cannot be generalized to older SMW, for whom general contextual factors (e.g., marital and parenting status, income) may be more influential than sexual minority-specific factors. Additionally, the current sample was limited to SMW who self-identify as lesbian or bisexual. Research suggests that SMW who prefer other labels (e.g., pansexual, queer) differ from lesbian- and bisexual-identified women in potentially relevant ways (for example, in terms of demographic characteristics, mental health, and sexual identity milestones; Bishop et al., 2020; Morandini et al., 2017; Wadsworth & Hayes-Skelton, 2015). Finally, the sample was limited to SMW who volunteered for a study explicitly related to sexual minority identity. As a result, the present sample may be more out about their sexual

orientation identities than SMW as a whole. Thus, caution should be exercised when attempting to generalize the findings of the current study to other groups of SMW.

Additionally, despite my efforts to recruit a diverse sample, the participants in the study were relatively White (67.5% of the baseline sample identified as exclusively as non-Hispanic White versus 60.1% of the United States population; United States Census Bureau, 2020) and educated (93.1% of the baseline sample reported some college experience versus 61.1% of adults in the United States; United States Census Bureau, 2020). A robust body of research has documented associations between race/ethnicity, education level, and health status (Zimmerman & Anderson, 2019; Cutler & Lleras-Muney, 2007); however, the current study did not examine differences between participants based on these sociodemographic characteristics. The results of this study may not generalize to SMW of color or SMW with lower levels of educational attainment. Additionally, descriptive results revealed that the sample was in relatively good physical health compared to the overall population of adults in the US. Because this study was advertised as pertaining to "physical health outcomes," it is possible that SMW who are more interested in health and fitness may have volunteered for the study, resulting in an unusually healthy sample. While this finding illustrates the resilience of participants in the current study, caution should be exercised when attempting to generalize findings to other groups of young adult SMW, who may experience poorer health.

There are several additional limitations related to study design. First, all study data was collected through self-report. Though I used survey directions and data cleaning protocols designed to minimize inaccurate responding, there may have been intentional or unintentional misreporting. Variables that are considered private (e.g., body weight) or that are difficult to report accurately (e.g., servings of fruits and vegetables) may have been particularly vulnerable

to misreporting. Future research on the physical health of SMW should include more direct measures (e.g., in-person measurement of weight and health variables, dietitian-led recalls of food intake). Additionally, all baseline and daily diary data were collected concurrently. Though I hypothesized about the direction of effects based on the available literature, reverse paths of influence cannot be ruled out. For example, I have argued that internalized stigma predicts diet quality, but it is also possible that diet quality predicts internalized stigma. More longitudinal research on these processes is needed.

Relatedly, there are several limitations associated with the choice of health outcomes in this study. First, many researchers have pointed out that BMI is a highly flawed measure of health (Burkhauser & Cawley, 2008; Rothman, 2008). Associations between BMI and chronic disease risk are generally quite small, and BMI criteria are less predictive of health for certain demographic groups, including racial/ethnic minorities and women (Bacon & Aphramor, 2011; Stanford et al., 2019). Thus, future research should use less error-prone health markers (e.g., cardiovascular fitness), rather than BMI. Additionally, intake of fruits and vegetables was utilized as a proxy for diet quality. While research has reliably demonstrated an association between fruit and vegetable intake and chronic disease risk (Aune et al., 2017), other food groups (e.g., fried foods) and macronutrients (e.g., lean protein) provide additional valuable information about health (Gadiraju et al., 2015; Tian et al., 2017). Future research should examine the hypothesized predictors in relation to a multi-faceted measure of diet quality.

Finally, the context of the COVID-19 pandemic presents a significant limitation. My findings suggest that participants' health behaviors and health status were substantially impacted by the pandemic and the related disruptions to everyday life. The results of this study were likely impacted by these changes. For example, a majority of participants reported exercising less

frequently since the start of the pandemic. As a result, the associations between predictors of interest and physical activity may have been attenuated during this time. Furthermore, many predictors (e.g., experiences of discrimination, interaction with sexual minority others) were likely impacted by social distancing requirements. Future research should attempt to replicate the current study's findings after the conclusion of the pandemic.

Implications

The current study has many important implications for clinical interventions with SMW. Healthcare providers interested in improving SMW's physical health should be attentive to the impact of identity-related processes on their diet quality, physical activity, BMI, and global health status. In particular, my findings suggest that helping SMW cope with heterosexist discrimination and internalized stigma may have a substantial positive impact on their health. Furthermore, interventions aimed at reducing depressive symptoms will likely have positive downstream effects on physical health. My findings also suggest that it may be beneficial to help SMW engage with their desire for muscularity in healthy ways. For example, public health campaigns that emphasize the importance of a high-quality diet and participation in physical activity to the development of muscularity, while discouraging pathological eating and exercise behaviors, may help improve the mental and physical health of SMW's communities.

From a research perspective, the results of this study highlight the need for more research on the physical health of sexual minority groups, including the identity-relevant processes that may contribute to their health behaviors and status. Research that investigates the impact of both minority stress and minority affirmative processes is particularly needed. Daily diary and other microlongitudinal methods offer several advantages to cross-sectional designs for this research, including the ability to collect high-quality data on health behaviors, examine identity-related

and health variables as they occur from day to day, explore within-person variability in predictor-outcome associations, and identify theory-building mechanisms. Research that examines the complex psychological, behavioral, and social factors underlying SMW's health, rather than simply comparing them to heterosexual women, is crucial to improving their wellbeing.

Appendix A: Extended Literature Review

Research suggests that sexual minority women are at greater risk for overweight and obesity than heterosexual women. However, relatively little research has examined other physical health outcomes among this population. This review examines theoretical and empirical literature relevant to sexual minority women's physical health. I begin by reviewing the evidence regarding sexual minority women's body weight and perspectives on the association between body weight and physical health. Next, I review the evidence on sexual minority women's chronic disease risk, health-related quality of life, and engagement in health behaviors. Finally, I review theoretical perspectives on physical health processes among sexual minority groups, as well as potential health-promoting and health-harming mechanisms suggested by these perspectives.

Body Weight among Sexual Minority Women

Sexual Orientation-Related Disparities

Beginning in the 1990's, researchers began to posit that sexual minority women may be heavier than heterosexual women, and some research has confirmed this notion (Eliason et al., 2015). Several studies have found that sexual minority women tend to have higher body mass indices (BMI; calculated as weight in kilograms/height in meters squared) than heterosexual women (Case et al., 2004; Engeln-Maddox et al., 2011; Hatzenbeuhler et al., 2013; Richmond, et al., 2012; Roberts et al., 1998; Roberts et al., 2003; Zaritsky & Dibble, 2010), though some studies have found no differences by sexual orientation (Koh, 2000; Moore & Keel, 2003; Schneider et al., 1995). When found, the average weight difference between sexual minority and heterosexual women appears to be between one and five pounds (Bowen et al., 2008).

Furthermore, multiple studies have found that sexual minority women are more likely to be classified as overweight or obese than their heterosexual peers (Aaron et al., 2001; Boehmer & Bowen, 2009; Boehmer et al., 2007; Cochran et al., 2001; Dilley et al., 2010; Everett & Mollborn, 2013; Fredriksen-Goldsen et al., 2013; Garland-Forshee et al., 2014; Smith et al., 2010; Valanis et al., 2000), and some research suggests that sexual minority women may be twice as likely to be overweight or obese compared to heterosexual women (Boehmer et al., 2007). Again, however, some research has found no differences in women's weight status by sexual orientation (Blosnich et al., 2014; Blosnich et al., 2013; Bogaert, 2010; Farmer et al., 2013; Fredriksen-Goldsen et al., 2010).

There are several methodological issues in this body of research that make it difficult to draw strong conclusions about whether sexual minority women have higher body weights and are greater risk for overweight and obesity than heterosexual women (Bowen et al., 2008; Eliason et al., 2015). First, studies on this topic vary dramatically in quality. For example, many studies include no direct heterosexual comparison group (e.g., Austin & Irwin, 2010) or include heterosexual comparison groups that are inappropriate (e.g., comparing sexual minority women recruited from the community to heterosexual women recruited from a university; Strong, et al., 2000). Most of the studies also utilize on convenience or snowball sampling techniques, introducing concerns about generalizability of the results. Second, there is a lack of consistency in terms of how weight is quantified. Weight-related outcome variables have included BMI, various BMI cutoffs, waist circumference measurements, and waist-to-hip ratios, making it difficult to discern patterns across studies. The majority of these studies also rely on self-reported weight and height data. Given well-known biases in self-reported anthropometric measurements (Tokmakidis et al., 2012), the validity of studies that rely solely on self-report is questionable.

Additionally, the vast majority of studies on sexual minority women's body weight are cross-sectional. To my knowledge, there is only one available longitudinal study, which found that sexual minority women were more likely to be on moderate or rapid weight gain trajectories than heterosexual women (Jun et al., 2012). The lack of longitudinal data limits researchers' ability to control for possible cohort effects and paths of reverse causation. Finally, most of the studies' samples are relatively young, on average. Since women's body weight tends to change most dramatically during middle age (Brown et al., 1998), these studies may miss important age-related phenomena among sexual minority women and their heterosexual peers.

Despite these concerns, it appears that most of the existing evidence supports a pattern of higher BMIs and elevated rates of overweight and obesity among sexual minority women compared to heterosexual women. Indeed, three systematic reviews on the topic have come to this conclusion (Bowen et al., 2008; Eliason et al., 2015; Simoni et al., 2017). For instance, Eliason and colleagues (2015) reviewed empirical studies published between 1993 and 2014 that examined weight among sexual minority women. The authors concluded that 65% of the studies that included a heterosexual comparison group found evidence for higher BMIs or rates of overweight and obesity among sexual minority women. Furthermore, it appears that higher-quality studies, particularly those that use representative sampling and appropriate comparison groups, may be more likely to find weight differences between heterosexual and sexual minority women.

Three high-quality representative studies will be described here. First, Boehmer and Bowen (2009) analyzed the results of an annual survey completed with a probability-based representative sample of California residents, and concluded that sexual minority women were more likely to be overweight or obese than heterosexual women based on self-reported height

and weight data. Second, Richmond et al. (2012), using researcher-measured BMI data from a nationally representative sample of US adults, found that sexual minority women had significantly higher average BMIs than heterosexual women. Finally, Roberts et al. (2003) recruited sexual minority women and their heterosexual sisters closest in age and found significantly higher self-reported BMIs among the sexual minority participants, even after controlling for age and education.

Within-Group Differences

An ongoing question in this literature whether bisexual and other bisexual women (i.e., women who are attracted to people of more than one sex or gender) have higher average BMIs and elevated rates of overweight and obesity compared to heterosexual women. The majority of the studies on weight among sexual minority women have either included lesbians only (e.g., Dibble et al., 2002; Moore & Keel, 2003) or have lumped lesbian and bisexual women together into one group (e.g., Bogaert, 2010; Farmer et al., 2013; Fredriksen-Goldsen et al., 2013; Hatzenbeuhler et al., 2013). These methodological choices have obscured potential differences between lesbians and bisexual women and raise the possibility that weight differences between sexual minority and heterosexual women may be driven exclusively by lesbians. The few studies that do compare lesbian women and bisexual women to heterosexual women separately have come to conflicting conclusions. Some studies have found higher BMIs and increased overweight and obesity risk among bisexual women compared to heterosexual women (Garland-Forshee et al., 2014; Ward et al., 2014), while other research has found no differences between bisexual and heterosexual women (Boehmer et al., 2007; Conron et al., 2010). In their systematic review, Eliason and colleagues (2015) concluded that there was not enough evidence to

determine whether bisexual women specifically are heavier or more likely to be overweight or obese than heterosexual women.

The question of whether bisexual women are heavier than heterosexual women is further complicated by significant inconsistency in the measurement and conceptualization of sexual orientation (Bowen et al., 2008; Eliason et al., 2015). Some studies base their inclusion criteria on self-identification (i.e., the selection of an identity label), others on past or current sexual behavior, and others on past or current sexual attractions. Some studies include only bisexual and lesbian groups, whereas other studies include a greater number of more specific groups (e.g., exclusively homosexual, mostly homosexual, mostly heterosexual, unsure). These inconsistencies make it challenging to draw conclusions across studies. Furthermore, research suggests that how sexual orientation is measured can impact the study's findings. For example, Dyar et al. (2019) found that women who identified as bisexual were not more likely to be obese than women who identified as heterosexual, but women who were behaviorally bisexual (i.e., they had had both same-sex and different-sex sexual partners over the course of their lifetimes) were more likely to be obese than women who were behaviorally heterosexual (i.e., they had only had different-sex partners over the course of their lifetimes). On the other hand, lesbian women were more likely to be obese than heterosexual women whether they were self-identified or behaviorally identified. Thus, it appears that the measurement and conceptualization of sexual orientation may play an important role in determining whether bisexual women are heavier than their heterosexual peers.

It is also unclear how race, ethnicity, and sexual orientation interact to predict BMI and weight status. Very few studies have included large enough sample sizes to stratify their samples by both race/ethnicity and sexual orientation, and the studies that done so have produced an

inconsistent pattern of results. For instance, Deputy and Boehmer (2014) found that African American and White lesbian and bisexual women were more likely than their heterosexual counterparts to be overweight at age 18 and to maintain their overweight status into adulthood, but sexual orientation was unrelated to weight among Latina and Asian women. However, a different study found that White and Latina bisexual women had higher BMIs than their heterosexual counterparts, whereas there were no differences by sexual orientation among African American women (Katz-Wise et al., 2014). To date, it appears that these are the only studies that examine the interaction of race, ethnicity, and sexual orientation in predicting body weight. As such, there is simply not enough evidence to draw conclusions about how sexual orientation-related trends in BMI and weight status may differ across racial and ethnic groups.

Body Weight and Physical Health

Mainstream View

In field of medical science, the mainstream view is that increased body weight, including overweight or obese weight status, is causally related to poorer health (GBD Obesity Collaborators, 2017; Haslam & James, 2005; Kopelman, 2006). Indeed, overweight and obesity have been described as “among the most significant contributors to ill health” (Kopelman, 2006, p. 13). Research undertaken from this framework has suggested that elevated body weight is causally associated with over 20 diseases and health problems, including heart disease, stroke, diabetes, hypertension, coronary artery disease, dyslipidemia, several cancers, kidney disease, degenerative joint disease, depression, and sleep apnea, as well as with all-cause mortality and cardiovascular mortality (GBD Obesity Collaborators, 2017). Increased body weight is hypothesized to negatively impact health in two ways. First, the increased mass of fat itself may produce negative effects, such as increased strain on the joints and airway restriction. Second,

enlarged fat cells may secrete an excess amount of their typical metabolic products (such as free fatty acids). The greater concentration of these products is thought to have negative downstream effects on other tissues and organs (Bray, 2004; Bray & Bellanger, 2006).

The view that increased body weight causes greater morbidity and mortality has been widely accepted by major public health organizations, the American public, and the media (Boero, 2007). For instance, the 2001 *Surgeon General's Call To Action To Prevent and Decrease Overweight and Obesity* called Americans' increased rates of overweight and obesity "a public health issue that is among the most burdensome faced by the Nation" (p. 1). Approximately 39% of Americans identify obesity as the most urgent public health problem faced by the US, surpassing cancer and infectious diseases (Roper Center, 2020), and 73% agree that obesity is an extremely serious or very serious health problem (Kam, 2017). Media organizations regularly publish stories about the number of lives and dollars lost per year as a result of the "obesity epidemic" (Boero, 2007; Saguy & Almeling, 2008). As a result of this perspective, it has become accepted practice for medical professionals to recommend intensive weight loss interventions, including prescription medications and bariatric surgery, to their overweight and obese patients (Buchwald et al., 2004; Hendricks et al., 2009).

Alternative View

On the other hand, a growing body of research and theory suggests that body weight and health may not be as strongly linked as the mainstream view posits, especially among certain populations (Bacon & Aphramor, 2011; Campos et al., 2005). Researchers who endorse this alternative view argue that heavier body weights and fatness, per se, do not significantly increase disease risk. Rather, certain factors that increase disease risk (e.g., poor diet, lack of physical activity, stress) may also cause some individuals to gain weight. Thus, these researchers argue

either that there is no direct causal link between body weight and physical health or that this link is weaker than is commonly believed (Chiolero, 2018; Muller & Soares, 2019). Indeed, research that controls for potential confounding variables (e.g., physical activity, weight cycling) has found that BMI accounts for little variability in physical health (Farrel et al., 2012; Lissner et al., 1991). Further, these researchers contend that, except at statistical extremes, BMI is only weakly associated with mortality and that people who are overweight or moderately obese tend to live just as long as people who are classified as normal weight (Bacon & Aphramor, 2011; Childers & Allison, 2010). In fact, some studies have shown that overweight and moderate obesity are protective with regard to certain medical events, a finding that has been referred to as the *obesity paradox* (Habbu et al., 2006; Hainer & Aldhoon-Hainerová, 2013).

Furthermore, researchers who ascribe to his alternative view tend to assert that BMI, despite its almost universal use in research, is a problematic measure of weight and body composition (Burkhauser & Cawley, 2008; Rothman, 2008). BMI is an imperfect proxy for adiposity, which is hypothesized to be the main driver of the presumed negative health effects of elevated weight. BMI cannot distinguish between fat, muscle, bone, and other lean mass; as a result, adults with higher levels of muscularity are often misidentified as obese (Burkhauser & Cawley, 2008). It also cannot distinguish between types of adiposity (i.e., subcutaneous, visceral, and hepatic), which are thought to impart different levels of health risk (Geer & Shen, 2009). Furthermore, the numerical criteria used to classify individuals as underweight, normal weight, overweight, or obese are arbitrary and flawed. Different populations (e.g., certain racial and ethnic groups) experience different levels of health at equal BMIs (Stanford et al., 2019). Researchers who are critical of BMI argue research on the health risks of body weight and adiposity should use more specific, less error-prone measures (Shah & Braverman, 2012). They

also suggest that non-weight-related measures of health (e.g., health-related quality of life, chronic disease risk) and health behaviors (e.g., dietary intake, physical activity, alcohol intake) should be measured in addition to BMI when conducting health-related research (Bacon & Aphramor, 2011; Burgard, 2009; Robison, 2005).

An additional flaw of the BMI system relates to sex differences. Research has suggested that the hypothesized relationships between body weight, adiposity, and health may be particularly weak among women. Across weight statuses, women tend to have greater levels of adiposity than men of the same BMI. However, women's adipose tissue tends to be distributed peripherally (i.e., in the limbs and hips), whereas men's adipose tissue tends to be distributed centrally. Women also tend to have a greater proportion of subcutaneous adipose tissue than men, whereas men tend to have a greater proportion of visceral adipose tissue. Centrally distributed adiposity and visceral adiposity are stronger risk factors for health problems, including insulin resistance and hypertension, than are peripherally distributed adiposity, subcutaneous adiposity, or overall weight status (Geer & Shen, 2009). Thus, women may experience lesser health risk than men at equal BMIs (Power & Schulkin, 2006).

Physical Health among Sexual Minority Women

Drawing on the alternative view of body weight and health, some researchers have argued that sexual minority women's seemingly higher rates of overweight and obesity do not necessarily predispose them to higher levels of morbidity and mortality (Eliason, 2014; Eliason et al., 2015). For example, Eliason and colleagues (2015) state that "A growing body of literature is finding that overweight or obese people may have similar or even better outcomes than their normal-weight peers" and suggest that more research is needed with regard to the "larger, but possibly healthy physical status" of sexual minority women (pp. 170, 173). Research on sexual

minority groups' physical health has lagged behind research on their mental health (Boehmer, 2002). However, the emerging pattern of results do not demonstrate a clear association between sexual minority women's higher body weights and poorer physical health status. The available research on sexual minority women's chronic disease risk, physical health-related quality of life, and engagement in three health behaviors will be reviewed below.

Chronic Disease Risk

Research on sexual minority women's risk for common chronic diseases has produced an inconsistent pattern of results. Some research finds increased chronic disease prevalence among sexual minority women compared to heterosexual women, including increased risk for arthritis, asthma, cardiovascular disease, diabetes, reproductive cancers (Blosnich et al., 2013; Boehmer et al., 2014; Diamant & Wold, 2003; Dilley et al., 2010; Farmer et al., 2013; Fredriksen-Goldsen et al., 2012; Valanis, 2000). On the other hand, some research shows no sexual orientation effects for women with regard to cardiovascular disease, diabetes, hypertension, or high cholesterol (Blosnich, et al., 2014; Conron et al., 2010; Diamant & Wold, 2003; Dilley et al., 2010; Everett & Mollborn, 2013; Jackson et al., 2016; Matthews & Lee, 2014). Interestingly, a study of the association between sexual orientation and cardiovascular disease biomarkers found that sexual minority women had lower levels of C-reactive protein than heterosexual women (Hatzenbeuhler et al., 2013).

Two recent reviews of chronic disease risk among sexual minority women concluded that there is only enough available evidence to support an increased risk of asthma among sexual minority women compared to heterosexual women (Eliason, 2014; Meads et al., 2018). Another review suggested that there is enough evidence to support an increased risk of asthma, arthritis, and cardiovascular disease (Simoni et al., 2017). However, the latter review cited only one study

in support of elevated cardiovascular disease risk among sexual minority women. Citing a lack of evidence, none of these reviews reported separate conclusions for lesbian and bisexual women. All three reviews noted the relative dearth of high-quality empirical studies on the physical health of sexual minority women and the need for more research on this topic.

Health-Related Quality of Life

Researchers who challenge the link between body weight and health often argue that researchers should examine non-weight-related physical health indicators in addition to or in place of BMI, suggesting that these outcomes are likely to be more illuminating about a person's overall health and functioning (Bacon & Aphramor, 2011; Burgard, 2009; Robison, 2005). One informative outcome is physical health-related quality of life, a measure of an individual's perceived global physical health status (Guyatt et al., 1993). Most physical health-related quality of life measures assess the extent to which the respondent's physical health interferes with physical activity and daily tasks and their subjective assessment of their overall health (Centers for Disease Control, 2000; Ware et al., 1994). Research suggests that self-reported physical health-related quality of life is reliably associated with chronic disease diagnoses (Idler & Benyamini, 1997; McHorney et al., 1993; Rothrock et al., 2010), and physical health-related quality of life also predicts functional impairment over and above chronic disease diagnoses (Megari, 2013).

There are relatively few studies examining physical health-related quality of life among sexual minority women, and the results of these studies have been inconsistent. Some research has indicated that sexual minority women have poorer physical health-related quality of life than heterosexual women (Austin et al., 2017; Charlton et al., 2018). However, other studies have found poorer physical health-related quality of life among bisexual women only (Diamant &

Wold, 2003; Potter & Patterson, 2019). In contrast, other research has demonstrated similar levels of physical health-related quality of life among all sexual minority women and heterosexual women, particularly when controlling for demographic variables and mental health (Boehmer et al., 2012; Cochran & Mays, 2007; Diamant et al., 2000). Currently, there is not enough research to draw strong conclusions about differences in physical health-related quality of life between heterosexual, lesbian, and bisexual women.

Health Behaviors

Many researchers have also suggested that more attention should be paid to the behavioral determinants of health (Cawley & Ruhm, 2011; McGinnis et al., 2002), particularly given that health behaviors such as physical activity, dietary intake, and alcohol use have a significant effect on overall health regardless of BMI, contribute significantly to preventable disease risk, and are directly modifiable (Kruger et al., 2007; Ness & Powles, 1997; Roerecke & Rehm, 2013). However, there is relatively little high-quality research on health behaviors among sexual minority women. However, extant research on physical activity, dietary intake, and alcohol use is reviewed below.

Physical Activity

The evidence surrounding levels of physical activity among sexual minority women is inconsistent. The majority of studies have found no difference in physical activity levels between sexual minority and heterosexual women (Blosnich et al., 2014; Boehmer & Bowen, 2009: Dilley et al., 2010; Hatzenbuehler et al., 2013; Polimeni et al., 2009; Yancey et al., 2003). On the other hand, some research has suggested that sexual minority women may participate in more physical activity than heterosexual women, and that lesbian women may be especially likely to participate in moderate or vigorous physical activity (Aaron et al., 2001; Boehmer et al., 2012;

Everett & Mollborn, 2013; Roberts et al., 2003). However, some researchers have suggested that older studies are more likely to find this effect due to outdated stereotypes about athleticism among sexual minority women (Eliason et al., 2015). A few studies have suggested that sexual minority women may participate in less physical activity than heterosexual women (Zaritsky & Dibble, 2010) or that they do not meet public health recommendations for physical activity (McElroy & Jordan, 2014). However, one study suggested that only bisexual women (rather than sexual minority women as a whole) are at risk for low activity levels (Laska et al., 2015). Given the relative lack of research on this topic and the inconsistency of available evidence, it is not possible to draw conclusions about whether heterosexual, lesbian, and bisexual women differ in terms of the frequency or quality of physical activity.

Diet Quality

There is very little research on diet quality among sexual minority women; however, the available evidence seems to suggest that sexual minority women's diet quality is similar to that of heterosexual women. For instance, Roberts et al. (2003) reported that sexual minority women and their heterosexual sisters were similar on all diet-related variables (e.g., fat intake, ever having been vegetarian), except that sexual minority women were less likely to have recently consumed red meat. Similarly, Valanis et al. (2000) found that postmenopausal sexual minority and heterosexual women did not differ in terms of typical fruit and vegetable intake in their nationally representative sample. Dilley and colleagues (2010) also found no sexual orientation-related differences in mean fruit and vegetable intake in their population-based sample of women in the Pacific Northwest. On the other hand, VanKim et al. (2017) found that sexual minority female nurses reported higher quality, lower glycemic index diets than heterosexual female nurses. Sexual minority women's dietary patterns remain an understudied health behavior,

though the existing evidence points to similar diet quality among sexual minority and heterosexual women.

Alcohol Consumption

Unlike physical activity and diet quality, there is clear evidence that sexual minority women consume more alcohol than heterosexual women, with bisexual women displaying particularly risky patterns of alcohol consumption. For example, Diamant et al.'s (2000) population-based study found that both lesbian and bisexual women were more likely than heterosexual women to report heavy alcohol consumption (i.e., regularly consuming 3 or more drinks per sitting), though only bisexual women were more likely than heterosexual women to report consuming alcohol almost daily. Similarly, Wilsnack et al. (2008) found that urban sexual minority women reported higher rates of heavy drinking and hazardous drinking than exclusively heterosexual women, with bisexual women reporting the greatest number of hazardous drinking indicators. Finally, Burgard et al. (2005) found that women who reported same-sex sexual experience within the past five years were more likely to report consuming alcohol most days of the week and to report binge drinking (i.e., consuming five or more drinks on one occasion), compared to women with no same-sex sexual experience. In this study, women with recent same- and different-sex sexual experience were at particular risk for risky alcohol use. A review of the literature on alcohol use among sexual minority women concluded, "there is ample evidence that sexual minority women are at greater risk than heterosexual women for hazardous drinking and that they are more likely to experience alcohol-related problems and alcohol-use disorders" (Hughes, 2011, p. 13). Further, it appears that bisexual women are at particular risk.

Methodological Issues

In sum, the pattern of results that has emerged from research on sexual minority women's physical health is unclear, despite their seemingly higher risk for overweight and obesity. Further, this body of research suffers from similar methodological issues as the research on body weight (Bowen et al., 2008; Eliason, 2014). For instance, most of these studies have been cross-sectional, limiting researchers' ability to examine how weight, health, and other factors influence one another over time. There has also been a lack of appropriate heterosexual comparison groups, as well as a tendency to oversample certain groups of sexual minority women (e.g., White, highly educated, young women; Eliason et al., 2015). In addition, many studies have either excluded bisexual women or analyzed them together with lesbian women, making it difficult to draw conclusions about differences between these groups. Finally, and perhaps most importantly, the majority of this research is comparative in nature (i.e., comparing prevalence rates between heterosexual and sexual minority women). As a result, research has rarely examined the mechanisms that may be driving weight and physical health among sexual minority women, making it difficult to draw conclusions or develop theory about underlying processes.

Perspectives on Physical Health among Sexual Minority Groups

Multiple scholars have pointed out the relative lack of theory related to the physical health of sexual minority communities, particularly compared to the greater focus on psychological health among these groups (e.g., Boehmer, 2002; Lick et al., 2013). Research with sexual minority participants that examines physical health outcomes unrelated to HIV/AIDS and other sexually transmitted infections appears to be especially uncommon (Boehmer, 2002). However, over the past several years, multiple conceptual models of physical health among sexual minority groups have been published. While most of these theories are not specific sexual

minority women, they shed light on potential mechanisms driving physical health disparities among this population. It is important to note that most researchers do not conceptualize these theories as being in opposition to one another. Rather, the theories are thought to complement one another to produce a more holistic view of the processes that affect the physical health of sexual minority groups (Meyer, 2015).

Minority Stress Perspective

The first group of theories focuses on the impact of minority stress processes on sexual minority individuals' physical health. These theories are based on Meyer's (2003) minority stress theory, which posits that distal minority stressors (i.e., stressors external to the sexual minority person, such as discrimination and harassment) and proximal minority stressors (i.e., stressors internal to the sexual minority person, such as internalized homonegativity) may negatively impact sexual minority individuals' physical and psychological health (Frost et al., 2015). These models include multiple pathways through which stressors are thought to impact physical health, including psychological distress, relational processes, physiological dysregulation, participation or nonparticipation in health behaviors, and changes to biological processes (e.g., cardiovascular function, immune function). While these theories include and emphasize different pathways, they share a focus on the ways that minority stressors "get under the skin" and harm sexual minority individuals' health.

Flentje and colleague's (2014) model focuses primarily on the biological pathways linking minority stressors and physical health outcomes. Their model includes both distal and proximal minority stressors, including experiences of discrimination, expectations of discrimination, sexual orientation concealment, and internalized stigma. These inputs are hypothesized to lead to a chronically oversensitized physiological stress response (i.e.,

hypothalamic-pituitary-adrenal axis dysregulation and allostatic overload) and changes in genetic expression (i.e., epigenetic and transcriptional changes). These mechanisms, in turn, are thought to produce changes to physical functioning in multiple systems throughout the body (e.g., inflammatory response, metabolic function, immune function), which lead to health outcomes such as cancer, heart disease, and diabetes. This model places little emphasis on the impact of psychological factors or health behaviors on physical health. However, the model includes coping behaviors as a moderator of the relationship between minority stressors and physical mechanisms, and the authors note that coping behaviors include any cognitive or behavioral processes that occur in response to stress. Based on their review of the literature, the authors concluded that there is mixed evidence for the minority stress model of physical health, with the strength of the evidence varying by physical outcome (e.g., strong evidence for cardiovascular outcomes, weak evidence for inflammatory outcomes).

Lick and colleagues (2013) proposed a similar but distinct model of minority stress and physical health. Their model suggests that distal stressors, including experiences of prejudice, discriminatory social policies, and limited access to quality healthcare, may lead to maladaptive cognitive traits, such as hypervigilance and heightened rejection sensitivity. In combination, these stressors and traits produce psychological stress (i.e., distress, negative affect, and psychopathology) and physiological stress (i.e., hypothalamic-pituitary-adrenal axis activation, autonomic nervous system reactivity, and allostatic overload). These stress responses, in turn, are hypothesized to impact an individual's health status both directly and through the mediator of health behaviors (e.g., substance use). Interestingly, the authors also suggest that minority stress can harm sexual minority individuals' health indirectly by altering their health beliefs and perceptions of collective norms. For instance, even when one has not experienced a minority

stressor directly, spending time with peer groups who are participating in unhealthy behaviors to cope with their own experiences of minority stress may alter one's perceptions about how acceptable or common these behaviors are. In turn, these perceptions may influence one's own current and future behavior. The authors conclude that while there is significant evidence that minority stress processes impact sexual minority individuals' physical health, there are notable gaps in the empirical literature, particularly with regard to the physiological mechanisms linking stress processes and health outcomes.

Mereish and Poteat (2015) extended these minority stress-focused models using insights from relational cultural theory. The authors posit that distal and proximal stressors impact sexual minority individuals' physical and psychological health primarily through relational processes. In particular, they suggest that stressors such as discrimination and internalized homonegativity impact physical health through the mediators of shame, loneliness, and poorer quality relationships with peers and within the sexual minority community. In a study with sexual minority adults, the authors found that that these factors mediated the relationship between distal and proximal stressors and physical and psychological symptoms, providing support for their conceptual model. However, the authors also found that distal stressors impacted physical and psychological symptoms directly (that is, outside of the relational constructs). They also found support for a modification of their model based on Hatzenbuehler's (2009) psychological mediation framework, in which distal stressors predict proximal stressors. Finally, the study's results also provide support for a somatization effect, wherein psychological distress predicts physical distress. The authors note the need for more research examining the pathways through which minority stress impacts psychological and physical health.

Health Promotion Perspective

In the field of public health, the health promotion perspective focuses on factors that allow individuals and communities to manage and improve their emotional and physical wellbeing (Nutbeam, 1998). Importantly, health promotion factors do not only include the absence of unhealthy traits and behaviors, but also the presence of salutogenic (i.e., health-enhancing) traits and behaviors (Antonovsky, 1996). Further, the health promotion framework goes beyond individual-level factors to examine the social, environmental, and economic contexts and conditions that impact health. A group of theories, operating from a health promotion perspective, has attempted to elucidate traits and behaviors that may improve the physical health of sexual minority individuals specifically. However, there is relatively little research on health-promoting processes among sexual minority individuals, particularly compared to the relative wealth of research on stress processes (Kwon, 2013; Meyer, 2015).

Meyer's (2015) theoretical paper focused specifically on the connection between resilience factors and health among sexual minority individuals. Resilience factors can be viewed as a subset of health-promoting factors that help the individual "survive and thrive in the face of adversity" (Meyer, 2015, p. 50). Thus, by definition, the activation of resilience factors requires the presence of a stressor, while health-promoting factors in general do not. In Meyer's model of sexual minority resilience, resilience factors are thought to buffer the impact of distal and proximal minority stressors (e.g., discrimination, internalized stigma) on sexual minority individuals' health. Based on the Wheaton's (1985) work on buffering effects, he notes that resilience factors can have suppressor effects (i.e., the presence of the stressor activates the buffer, which in turn reduces the negative impact of the stressor) or moderating effects (i.e., a pre-existing buffer reduces the impact of the stressor).

Meyer also makes the distinction between individual- and community-level resilience. Individual-level resilience factors exist within the individual and allow them to cope with stress (e.g., personal mastery, internal locus of control, hardiness). On the other hand, community-level resilience factors operate within a social context, such as the larger sexual minority community or any of its subcommunities. According to Meyer, community-level resilience factors include community mastery (i.e., the belief that one's community will be able to overcome challenges as a result of the community's interconnectedness and strength), community norms and beliefs that promote effective coping, the availability of positive role models, the provision and receipt of social support, community connection, and tangible resources (e.g., an LGBTQ community health center). Though Meyer does not discuss how these resilience factors might impact sexual minority individuals' physical health in detail, it is thought that these factors would improve sexual minority individuals' ability to cope with minority stressors.

Fredriksen-Goldsen and colleagues' (2014) Health Equity Promotion Model focuses on how a variety of factors impact sexual minority individuals of diverse social positions over the life course. Like the previously discussed minority stress theories, this model includes individual- and structural-level stressors as potential sources of poor health among sexual minority individuals. The model suggests that adverse health behaviors (e.g., consuming alcohol, smoking), psychological processes (e.g., avoidant coping, rumination), social processes (e.g., social isolation), and biological processes (e.g., allostatic overload) may mediate or moderate the link between minority stress and disease risk. However, the Health Equity Promotion Model differs from the minority stress-focused theories in that it also explicitly considers the role of health-promoting factors in sexual minority individuals' physical health. Again, potential health-promoting factors are thought to include health behaviors (e.g., physical activity), psychological

processes (e.g., identity integration), and social processes (e.g., social support, community integration). These factors are thought to influence sexual minority individuals' physical health primarily by buffering the impact of minority stress; however, they may also enhance sexual minorities' health outside of the minority stress process (e.g., by reducing general stress).

Minority Affirmative Perspective

A third perspective on the health of sexual minority groups, which I term the minority affirmative perspective, seeks to affirm the unique positive aspects of sexual minority individuals' identities, experiences, and communities (Riggle et al., 2008; Savin-Williams, 2008). Savin-Williams (2008) noted the lack of strengths-based research on sexual minority groups, stating, "I am hard pressed to identify any data-based positive attribute that characterizes the lives of [sexual minority individuals] relative to heterosexuals. Can this possibly be true?" (p. 137). Unlike the health promotion perspective, the strengths identified by the affirmative perspective are not necessarily beneficial for sexual minority individuals' health. Rather, the affirmative perspective emphasizes the qualities of sexual minority identities and communities that researchers or sexual minority individuals themselves perceive to be inherently positive, regardless of their health impact (Riggle et al., 2008; Vaughan & Rodriguez, 2014). It appears that the affirmative perspective on physical health has not yet been the subject of a formalized conceptual model. Nevertheless, several authors have theorized about how perceived sexual minority strengths may impact physical health.

For instance, Eliason and colleagues (2015) identified several strengths unique to sexual minority women, including feminist and body positive community norms, social support from same-sex romantic partners, and community-based support. The authors suggest that these strengths may be responsible for what they term the *lesbian paradox*. This paradox is based on

the fact that sexual minority women tend to be heavier than heterosexual women, but do not appear to be at increased risk for chronic physical health conditions that are thought to be associated with higher weight (e.g., cardiovascular disease, higher blood pressure). The authors suggest that sexual minority women's strengths may enhance their health and protect them from disease risk without encouraging lower body weight per se.

On the other hand, the minority stress perspective suggests that these strengths could also contribute to poorer physical health among sexual minority women. For example, community support could encourage sexual minority women to engage in positive emotion-driven overeating or alcohol consumption (Armeli et al., 2000; Bongers et al., 2013), and some research shows that same-sex female partners may encourage one another to engage in unhealthy behaviors (Reczek & Umberson, 2012). Regardless of their impact on physical health, however, these aspects of the sexual minority women's community are seen by many researchers and sexual minority women themselves as inherently positive (Bowen et al., 2006; Rothblum, 2002; Rothblum, 2010). Further, as Eliason and Fogel (2015) acknowledge, it is possible that these strengths could have health-promoting and health-harming impacts on sexual minority women's health simultaneously.

Potential Mechanisms Influencing Sexual Minority Women's Physical Health

Discrimination

All of the minority stress theories described above include discrimination as a key distal stressor that may negatively impact sexual minority individuals' physical health. Indeed, research with other marginalized populations has demonstrated that experiences of discrimination have a strong impact on individuals' body weight, health-related quality of life, and engagement in health behaviors (for review, see Pascoe & Smart Richman, 2009). For

instance, numerous cross-sectional and longitudinal studies have linked perceived racial discrimination and self-reported BMI, obesity, and weight gain among Black women (Cozier, et al., 2009; Cunningham et al., 2012; Gee et al., 2011; Reid et al., 2016). Discrimination has also been linked with poorer health-related quality of life among several racial/ethnic minority groups in the United States (Gee & Ponce, 2010; Howarter & Bennett, 2013; Otiniano & Gee, 2011). Finally, research shows that discrimination is associated with poorer diet quality (Forsyth, et al., 2014; Sims et al., 2016), less physical activity (Chen & Yang, 2014), and increased alcohol intake (Gibbons et al., 2004; Tran et al., 2010) among racial/ethnic minority adults, though some studies have found a positive association between discrimination and physical activity (e.g., Corral & Landrine, 2012).

Several studies have examined the links between sexual orientation-related discrimination and physical health among sexual minority adults. Mereish's (2014) cross-sectional study found that experiences of heterosexist discrimination were associated with higher odds of being overweight or obese among a sample of lesbian women. Similarly, Coulter et al. (2015) found that perceived discrimination within the past month was associated with the likelihood of being overweight or obese among young sexual minority women. Additionally, both Mereish and Poteat (2015) and Walch et al. (2016) found that experiences of discrimination were negatively related to physical health-related quality of life in sexual minority adults in cross-sectional studies. Similarly, Frost, Lehavot, and Meyer (2015) also found that experiencing an event that was externally rated as prejudicial was related to greater odds of developing a physical health condition over a yearlong period among a sample of lesbian, gay, and bisexual adults. There is very little research examining the impact of perceived discrimination on physical activity or diet quality among sexual minority adults, though some research has demonstrated an

association between discrimination and overeating among sexual minority women (Panza, 2018). Finally, Slater et al. (2017) cross-sectional study of sexual minority adults found that experiences of discrimination were positively associated with excessive alcohol use, an association that was particularly strong among bisexual participants. Qualitative research with sexual minority women has similarly suggested that sexual orientation-based discrimination is associated with alcohol use (Condit et al., 2011). While the overall pattern of findings clearly suggest that discrimination is a risk factor for poor health among sexual minority women, more research is needed, particularly with regard to the impact of discrimination on engagement in health behaviors.

Internalized Stigma

Internalized stigma is included as a proximal stressor in most minority stress models. Regarding other marginalized populations, research has shown that internalized weight bias is related to poorer physical health among overweight and obese adults, even controlling for the effect of BMI (Latner et al., 2013). In fact, some research has shown that there is only a correlation between BMI and health-related quality of life among individuals with high levels of internalized weight bias (Latner et al., 2014). Internalized weight bias is also related to overeating and binge eating (Haines et al., 2006; Mensinger et al., 2016; Puhl & Brownell, 2006) and avoidance of physical activity (Vartanian & Novak, 2011) among overweight and obese adults. Internalized racism has also been shown to be related to abdominal obesity (Tull et al., 1999), abnormal fasting glucose levels (a risk factor diabetes; Butler et al., 2002) and alcohol consumption (Taylor & Jackson, 1990) among Black women.

Among sexual minority adults, internalized sexual orientation stigma (i.e., internalized heterosexism, internalized monosexism) has mostly been studied in terms of its impact on mental

health (e.g., Dyar, 2016; Newcomb & Mustanki, 2010). However, some research has demonstrated a negative association between internalized heterosexism and physical health status among sexual minority adults (Mereish & Poteat, 2015), while other research has found no association between internalized heterosexism and physical health (Walch et al., 2016). Evidence for the impact of internalized stigma on physical health among sexual minority women specifically has been similarly mixed. For example, internalized heterosexism has been shown to be related to greater alcohol use among lesbian women (Amadio, 2006). However, Molina, et al.'s (2014) study of sexual minority women found no association between internalized heterosexism and diet quality, physical activity, BMI, or health status. With regard to internalized monosexism, there is strong support for a link between internalized monosexism and excess alcohol consumption among bisexual women (Feinstein & Dyar, 2017). However, very few studies have examined the relationship between internalized sexual orientation stigma and physical health among sexual minority women, especially as these processes occur from day to day.

Depressive Symptoms

Research with people of all sexual orientations has demonstrated robust associations between depressive symptoms and poor physical health (Moussavi et al., 2007; Rajan et al., 2020) and engagement in health behaviors (Hallgren et al., 2019; Kenny et al., 2017; Liu et al., 2016). Longitudinal research suggests that the association between depression and physical health is bidirectional (Alzoubi et al., 2018; Bondesson et al., 2018; Keefer & Kane, 2017). Depressive symptoms can exacerbate existing illnesses or contribute to the development of new conditions (Gaynes et al., 2002; Niles & O'Donovan, 2019). Depressive symptoms can also arise as a result of pain and functional limitations associated with poor heath (Gayman et al., 2008).

Proponents of the minority stress model have suggested that distal and proximal minority stressors may result in heightened psychological distress, including depressive symptoms, among sexual minority individuals. Distress and depression, in turn, may inhibit sexual minority individuals' participation in health behaviors, promote participation in unhealthy behaviors, and directly contribute to poorer overall physical health (Lick et al., 2013). The impact of depression on physical health is particularly relevant to sexual minority women, who report higher rates of depressive symptoms than their heterosexual peers (Cochran et al., 2017). Research with sexual minority individuals has demonstrated a link between depression and physical health status (Cochran & Mays, 2007; Fredriksen-Goldsen, 2010), as well as between depression and some health behaviors (e.g., binge eating and problematic alcohol use; Mason & Lewis, 2015; Wilsnack et al., 2008). However, there has been relatively little research on the effect of depressive symptoms on health and health behaviors among SMW. For instance, there is no available evidence on the impact of depression on diet quality or exercise behaviors among SMW. This gap in the literature is especially surprisingly given the hypothesized role of distress in most minority stress models of health.

Interactions with Sexual Minority Others

Most health promotion models include positive social processes that take place between sexual minority peers as potential health-promoting mechanisms. These pathways include sexual minority community mastery, sexual minority-specific social support, community integration, and community connectedness (Fredriksen-Goldsen et al., 2014; Meyer, 2015). These social processes occur in the context of interactions with other sexual minority individuals (Frost & Meyer, 2012; McConnell et al., 2015). Even factors that refer to global perceptions of support

from or connection to the LGB community are predicated on some degree of interaction with sexual minority peers (Lin & Israel, 2012).

Research has consistently shown that interactions with sexual minority others (or related processes) are associated with better psychological functioning (Puckett et al., 2015; Snapp, et al., 2015). However, surprisingly little research has examined the impact of these processes on physical health among sexual minority adults, and the research that does exist suggests that these processes can have both positive and negative effects on physical health. For example, participation in the LGBT community was associated with greater alcohol use among a sample of sexual minority adults (Demant et al., 2017). Similarly, living with one's female partner is associated with higher BMI among sexual minority women (Yancey et al., 2003), and being partnered is associated with less frequent physical activity among lesbians (Thayer, 2010), suggesting that interactions with sexual minority others may sometimes have health-harming effects. On the other hand, loneliness, which can be conceptualized as a lack of connection and support, has been shown to be associated with poorer physical health outcomes among sexual minority adults (Mereish & Poteat, 2015).

What explains these mixed findings? According to the health promotion perspective, interactions with sexual minority others and related social processes buffer the impact of minority stressors on physical health by helping people cope more effectively with these stressors (Fredriksen-Goldsen et al., 2014; Meyer, 2015). Interactions with sexual minority others may also have a direct, positive impact on physical health by reducing physiological arousal (Fredriksen-Goldsen et al., 2014). On the other hand, some minority stress theorists have suggested that contact between sexual minority peers can transmit the impact of minority stress beyond the individual who immediately experienced the stressor. Through these interactions,

sexual minority individuals who have not directly experienced a minority stressor may be exposed to their peers' unhealthy attempts to cope with minority stress (e.g., increased alcohol use, poor nutrition) and come to view these behaviors as normative (Lick et al., 2013). Thus, sexual minority individuals' health may suffer as a result of interactions with sexual minority others. More research is needed to determine the impact of interactions with sexual minority others on physical health, as well as the moderators of this association (e.g., quality of interaction, type of relationship, social context).

Appearance Norm Internalization

Several affirmation theorists have suggested that sexual minority women's potentially lower levels of sociocultural appearance norm internalization are a strength of this population (e.g., Eliason et al., 2015; Fogel et al., 2012; Rothblum, 2014), and qualitative research suggests that many sexual minority women themselves also view this as a positive aspect of their community (Bowen et al., 2006; Chmielewski & Yost, 2013). Appearance norm internalization refers to the extent to which an individual cognitively accepts and internalizes the mainstream appearance standards that are prevalent in their culture and society. For women in modern Western cultures, two prevalent appearance norms are thinness and lean muscularity (Schaefer, et al., 2017). The majority of research on this topic suggests that sexual minority women exhibit lower levels of appearance norm internalization than heterosexual women (Bankoff & Pantalone, 2014; Cohen & Tannenbaum, 2001; Share & Mintz, 2002), though other research has found no differences between sexual minority and heterosexual women (Hazzard et al., 2019; Huxley, Clark, & Halliwell, 2014a).

There appear to be several positive health outcomes related to low levels of appearance norm internalization. For example, lower levels of norm internalization have been shown to be

associated with decreased risk of disordered eating behaviors among women (Moradi et al., 2005; Slevec & Tiggemann, 2011), including sexual minority women (Watson et al., 2015). Norm internalization has also been linked compulsive exercise and unhealthy dieting among general samples of adult women (Homan, 2010), suggesting that sexual minority women's lower levels of norm internalization may help them avoid these pathological behaviors. Currently, I am not aware of any studies that directly examine the impact of appearance norm internalization on diet quality, typical (i.e., non-compulsive) physical activity, alcohol use, or overall physical health status. However, research suggests that appearance norms may encourage healthy as well as pathological engagement in health behaviors (Pankratow et al., 2013), suggesting that sexual minority women's relatively low levels of appearance norm internalization may also have health-harming effects.

Several authors have discussed how appearance norm internalization may impact physical health and health behaviors among sexual minority women. For example, Eliason et al. (2015) suggested that result of sexual minority women's relatively low levels of appearance norm internalization might encourage them to engage in health promotion behaviors such as healthy eating and physical activity with the goal of improving their overall health, rather than losing weight, and qualitative research with sexual minority women has supported this notion (Bowen et al., 2006). Thus, sexual minority women's elevated body weights compared to heterosexual women may not be indicative of poorer health, but rather, a different set of health-related priorities. Rejecting weight-based appearance norms may also enhance sexual minority women's health directly by reducing psychological distress associated with body dissatisfaction (Lick et al., 2013). On the other hand, some authors have argued that sexual minority women's relatively low levels of appearance norm internalization may damage their health, since sexual

minority women may be less motivated engage in health behaviors (e.g., healthy eating, physical activity) in order to maintain a low body weight (Mason & Lewis, 2014; Thayer, 2010). Given these conflicting perspectives, more research on the impact of appearance norm internalization on health and health behaviors among sexual minority women is needed.

Gender Nonconformity

Supporters of the affirmative perspective have also identified gender nonconformity among sexual minority women as a strength of this population (Chmielewski & Yost, 2013; Eliason & Fogel, 2015). Indeed, research has demonstrated that sexual minority women's gender identities and expressions vary more widely than heterosexual women's (Levitt, Puckett, Ippolito, & Horne, 2012). Sexual minority women are more likely than heterosexual women to identify with nonconforming (i.e., masculine and nonbinary) gender expressions and identities (Kachel et al., 2016; Levitt et al., 2012). Alternative gender identities among sexual minority women include butch, femme, androgynous, fluid, and genderqueer (Levitt & Horne, 2002). These identities may be expressed through a sexual minority woman's physical appearance, emotional expression, and sexual and social roles (Lehavot et al., 2011).

To date, there has been relatively little empirical research on the impact of gender nonconformity on physical health among adults generally or sexual minority women specifically, and the available evidence is mixed. Gender nonconformity is clearly linked to lower levels of eating disorder symptoms among adult women, a health-promoting effect (Green et al., 2011). However, one study indicated that gender nonconformity was associated with poorer physical health-related quality of life among a sample of adolescents and adults in the US, likely due to experiences of gender-related discrimination and harassment (Gordon et al., 2017). Gender nonconformity has also been associated with higher BMI among female adolescents (Austin et

al., 2016) and higher wait-to-hip ratios among sexual minority women (Singh et al., 1999), although the directionality of these effects is unclear. Finally, it has also been shown that gender nonconformity is associated with greater alcohol use among young adult women (Kaya, et al., 2016). It appears that no studies have examined how gender nonconformity is related to diet quality or physical activity.

Several authors have theorized about how gender nonconformity among sexual minority women may impact their physical health. Since there is a strong cultural expectation of thinness for women (Wiseman et al., 1992), gender nonconforming SMW may be less preoccupied with their weight and more focused on their overall health than other women (Eliason et al., 2015). As a result, gender nonconforming sexual minority women may participate in health behaviors with a focus on improving their body's functionality and health, rather than losing weight (Bowen et al., 2006). Additionally, gender nonconformity may encourage sexual minority women to participate in more vigorous physical activity, given gender-based stereotypes that code athleticism as masculine (Eliason et al., 2015). Finally, gender nonconformity could improve sexual minority women's health by reducing psychological and physiological distress associated with the performance of rigid gender roles (Bromberger & Matthews, 1996). On the other hand, it is also possible that gender nonconformity could lead to poorer health among sexual minority women. For instance, gender nonconformity could decrease sexual minority women's motivation to participate in physical activity in order to maintain a low body weight, as well as increase the perceived acceptability of excessive alcohol use. Gender nonconformity could also expose sexual minority women to higher levels of discrimination, violence, and harassment, which could impact their health status and health behaviors (Gordon et al., 2017). Again, more research on the impact of gender nonconformity on physical health among sexual minority women is needed.

Sexual Orientation

As reviewed above, there is currently not enough evidence to draw strong conclusions about whether lesbian and bisexual women differ in terms of body weight, chronic health risk, physical health-related quality of life, or health behaviors (with the exception of alcohol intake, which seems to higher among bisexual women). However, there are theoretical reasons to believe that lesbian and bisexual women might differ in terms of their physical health. For instance, report higher rates of poverty (Badgett et al., 2019), poorer access to health care (Diamant et al., 2000), lower frequency of preventative healthcare (Koh, 2000), and lower levels of sexual orientation disclosure to their healthcare providers (Durso & Meyer, 2013) than lesbian women. All of these factors could have a significant (and likely harmful) impact on the physical health of bisexual women.

Bisexual women may also differ from lesbian women in terms of the proposed mechanisms outlined above. For example, research suggests qualitative differences in lesbian and bisexual women's experiences with sexual orientation-related discrimination. Lesbian women are more likely than bisexual women to report explicitly heterosexist discrimination and harassment from strangers and problems with their families of origin (Balsam et al., 2013). On the other hand, bisexual women report unique experiences with monosexist discrimination, the erasure of bisexual identities, and invisibility within or rejection from the larger sexual minority community (Brewster & Moradi, 2010; Roberts et al., 2015). Similarly, lesbian and bisexual women report different experiences with internalized stigma, with bisexual women reporting higher levels of internalized heterosexism (Costa et al., 2013), as well as struggling uniquely with internalized monosexism (Beaber, 2008). Bisexual women also report higher levels of depressive symptoms than their lesbian peers (Ross et al., 2018).

Compared to lesbian women, bisexual women report feeling less connected to and less belonging within the sexual minority community (Kertzner et al., 2009; Lin & Israel, 2012), lower levels of social support (Hsieh, 2014), more feelings of isolation (Balsam et al., 2013), and fewer sexual minority friends (Galupo, 2007), all of which suggest that they may have fewer high-quality interactions with sexual minority peers. In addition, lesbian women report lower levels of appearance norm internalization (Hazzard et al., 2019; Huxley et al., 2014b) and less traditional gender expressions (Kachel et al., 2016) than bisexual women. Sexual orientation-related differences in any of these mechanisms could produce differences in lesbian and sexual minority women's physical health outcomes.

Finally, the gender of bisexual women's romantic partner or partners could also influence their physical health through the mechanisms proposed above. For instance, research has suggested that bisexual women in relationships with men are exposed to unique monosexist discrimination (Dyar et al., 2014; Molina et al., 2015), whereas bisexual women in relationships with women or nonbinary individuals may be more likely to experience heterosexist discrimination. Experiences of internalized stigma may also differ between same- and different-gender partnered bisexual women (Feinstein & Dyar, 2017). Additionally, research indicates that female-partnered bisexual women are more likely to feel included within the sexual minority community, suggesting that they are likelier than male-partnered bisexual women to have high-quality interactions with sexual minority others (Dyar et al., 2014). Finally, qualitative research has also indicated that bisexual women may express their gender more traditionally and be more attuned to sociocultural appearance norms when partnered with men than when partnered with women (Huxley et al., 2011; Pennington, 2009). Thus, among bisexual women, partner gender may predict health outcomes through mediating factors such as discrimination and gender

conformity. However, the impact of partner gender on bisexual women's health is highly understudied.

Developmental Stage

Research suggests that the physical health trajectory that one establishes during the period from the mid-teens to the early thirties is likely to maintained throughout middle age. In particular, young adulthood is a critical period for the development of health habits, the effects of which compound over the life course (Frech, 2012; Wiium et al., 2015). For instance, young adulthood appears to be a particularly risky stage for the development of problematic BMI (Malhotra et al., 2012), physical activity (Rovniak et al., 2002), and diet quality (Thorpe et al., 2013; Winpenny et al., 2012) trajectories. An improved understanding of the factors associated with engagement in health behaviors during young adulthood is critical to the development of effective interventions that can place individuals on healthier trajectories.

Furthermore, research suggests that sexual orientation-related processes may be more relevant to the physical health of younger versus older sexual minority adults. For sexual minority individuals, young adulthood is often a period of significant sexual orientation identity exploration and identity fluidity (Kaestle, 2018). Sexual minority women and bisexual individuals, in particular, may be reaching sexual orientation milestones during this period (Bishop et al., 2020; Katz-Wise et al., 2017). As a result, young sexual minority adults may be more affected by both minority stress and minority affirmative processes than older sexual minority adults, who may be more established in their sexual orientation identities and communities. In contrast, older adults' health behaviors may be more influenced by general contextual factors (e.g., marital and parenting status, income; Nordin, 2010; Robards et al.,

2012). Thus, it may be particularly important to study the effects of identity-specific processes on physical health during young adulthood.

Conclusions

In sum, there is strong evidence that sexual minority women are heavier than their heterosexual peers, but the evidence for other health outcomes (i.e., chronic disease risk, health-related quality of life, and health behaviors) is more mixed. Given emerging research and theory that challenges the link between body weight and physical health, more research on diverse physical health outcomes among sexual minority women is needed. Further, research on sexual minority women's physical health has been limited by the exclusion of bisexual women, cross-sectional study designs, and a lack of attention to underlying mechanisms. However, minority stress, health promotion, and affirmation theories of health among sexual minority groups point to several promising mechanisms that may influence physical health among sexual minority women, including discrimination, internalized stigma, depressive symptoms, interactions with sexual minority others, appearance norm internalization, and gender nonconformity. Future research should examine the impact of these and other mechanisms on lesbian and bisexual women's physical health using longitudinal, experimental, and other rigorous designs. Young adulthood may represent a particularly important developmental stage for future study.

Appendix B: Recruitment Materials

Are you a lesbian or bisexual cisgender woman between the ages of 18 and 30?
If so, we invite you to participate in a PAID research study!

Project Bloom is a research study investigating physical health outcomes among of lesbian and bisexual women.

By participating, you can help improve the health of sexual minority women like you and earn up to $20!

Interested? Visit
https://go.umd.edu/projectbloom2020
(password: health) or email
projectbloom2020@gmail.com!

Are you a lesbian or bisexual cisgender woman between the ages of 18 and 30?
If so, we invite you to participate in a PAID research study!

Are you a lesbian cisgender woman between the ages of 18 and 30?
If so, we invite you to participate in a PAID research study!

Project BLOOM

Project Bloom is a research study investigating physical health outcomes among of lesbian and bisexual cisgender women.

By participating, you can help improve the health of sexual minority women like you and earn up to $20!

Interested? Visit https://go.umd.edu/projectbloom2020 (password: health) or email projectbloom2020@gmail.com!

Appendix C: Eligibility Survey

Thank you for your interest in Project Bloom! This study will gather much needed information about the physical health of lesbian and bisexual women. You have the potential to earn up to $20 by participating in Project Bloom. This study is being run by a graduate student researcher at the University of Maryland, who is herself a bisexual woman.

Please answer the following questions to determine if you are eligible to participate. *Please note that several of these questions are included to ensure that you are a human participant.*

Where did you hear about this study?

____

How old are you?

____

In which country do you currently reside? *[dropdown menu]*

Do you identify as transgender?

○ Yes

○ No

Which of the following best describes your gender identity?

○ Woman

○ Man

○ Nonbinary

○ Genderqueer

○ Other (please describe): ________________________________

Which of the following **best** describes your sexual orientation?

- ○ Bisexual
- ○ Heterosexual/straight
- ○ Lesbian
- ○ Pansexual
- ○ Queer
- ○ Other (please describe): ______________________________

Which of the following describe your racial or ethnic background? (*select all that apply*)

- ☐ American Indian or Alaska Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other (please describe):

____

Are you currently pregnant or planning to become pregnant within the next 6 months?

- ○ Yes
- ○ No

In what year were you born?

____

What is your favorite type of music?

____

We have good news - you are eligible to participate in Project Bloom! **Please enter your email address below.** If we still need participants matching your description, we will email you a link to the main survey within 48 hours.

If you have any questions, please email projectbloom2020@gmail.com.

Please enter your email address here.

____

Why are you interested in participating in Project Bloom?

____

____

____

____

____

Please click on the **heaviest** animal and the animal with **stripes.**

Thanks again! Please look out for an email from projectbloom2020@gmail.com over the next 48 hours.

Appendix D: Consent Form

CONSENT TO PARTICIPATE
Project Bloom: An Investigation of Lesbian & Bisexual Women's Physical Health
IRB Package #1638689-3

1. PURPOSE: This research is being conducted by Colleen A. Kase and Jonathan J. Mohr at the University of Maryland, College Park. We are inviting you to participate in this research project because you are a cisgender lesbian or bisexual woman between the ages of 18 and 30. The purpose of this research project is to better understand the mechanisms that drive physical health outcomes among young lesbian and bisexual women.
2. PROCEDURES: The procedures of this study involve two parts. During Part One, you will complete this informed consent form and an online survey. Thus survey will ask you questions about your physical health, health behaviors, and experiences as a sexual minority person. You will also be given information about how to participate in Part Two of the study. Part One is to be completed now, and it will take most participants about 35 minutes in total.

Not all participants will be selected to participate in Part Two. However, if you are selected and choose to participate, you will participate in Part Two over a nine-day period, which will be scheduled for a time frame that is convenient for you. During Part Two, you will complete a 10-minute survey each evening within two hours of going to sleep. These surveys will ask about your health behaviors and your experiences as a sexual minority person that day.

3. POTENTIAL RISKS AND DISCOMFORTS: There may be some risks from participating in this research study. Although the protection of your privacy will be maximized by a number of measures, there remains some risk of the potential for the loss/breach of confidentiality. An additional foreseeable risk of participating in this study includes feelings of discomfort associated with revealing private and potentially sensitive information about yourself. Sometimes answering questions about personal aspects of one's identity can cause individuals to feel uncomfortable. You do not have to answer any question that makes you uncomfortable. If you experience feelings of discomfort and wish to discuss them or seek help, then we encourage you to either seek local support (e.g., counseling center, mental health professional), engage with the resources below, or contact the principal investigator for this study, Colleen Kase, at projectbloom2020@gmail.com. You may also contact Dr. Jonathan Mohr, the faculty advisor overseeing this project, at 301-405-5907 or jmohr@umd.edu. In the case that you contact us—and your discomfort is directly related to an aspect of our research (e.g., feeling as though item wording was insensitive)—we are happy to listen to your concerns, explain our rationale, and consider it in the design of future studies. If the discomfort is related to a personal concern that arose through participation and you are contacting us because you are in distress, we will be happy to briefly discuss your experience via phone. If your distress endures, we can refer you to a number of supportive resources, depending on the specific nature of your concern.

Resources
Immediate help: If you feel you are having a mental health emergency at this time, please call 911 or go to the nearest emergency room for help.

24/7 Crisis Textlines:

Crisis Text Line: 741741

Trevor Text: Text START to 678678

24/7 Crisis Hotlines:

National Suicide and Crisis Intervention Lines: 1-800-784-2433 or 1-800-273-8255

TrevorLifeline:1-866-488-7386

Trans Lifeline: 1-877-565-8860

Helplines:

National Alliance on Mental Illness Helpline: 1-800-950-6264

National Eating Disorders Association Helpline: 1-800-931-2237

Lesbian, Gay, Bisexual, and Transgender National Hotline: 1-888-843-4564

More information:

National Alliance on Mental Illness: https://www.nami.org/Home

National Eating Disorders Association: https://www.nationaleatingdisorders.org/

CDC page on Lesbian & Bisexual Women's Health: https://www.cdc.gov/lgbthealth/women.htm

It Gets Better Project: www.itgetsbetter.org

Human Rights Campaign: www.hrc.org

4. POTENTIAL BENEFITS: There are no direct benefits from participating in this research. However, the results may help the investigators learn more about lesbian and bisexual women's physical health and well-being.

5. CONFIDENTIALITY: Any potential loss of confidentiality will be minimized by measures put in place to protect your privacy. Your responses to this survey will be transmitted over the Internet in an encrypted format that would be very difficult for others to interpret. All survey responses will be kept in a secure computer environment. Data will be stored in a secure format on a password-protected computer once the research team receives them. You will be required to provide an email address in order to participate in this study. However, your survey responses and your email address will be stored separately. We will assign you a confidential ID number, which will link your responses to the various surveys. Through the use of the ID number, the researchers will be able to link your survey to your email(s). Only the researchers will have access to the ID number. None of the information you provide will be able to be traced back to you after your participation is complete.

If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.

6. COMPENSATION: All participants will receive $5 for participating in Part One. Participants who are selected to participate in Part Two will also receive $1.50 for each their first seven completed daily surveys and $2.25 for each their last two completed daily surveys. Payment for Part Two will only be provided if participants complete at least seven of the nine nightly surveys (including two weekend days). In total, participants will receive between $5 and $20 for their participation in the study. All payments will be made in the form of an Amazon e-gift card. You

will be responsible for any taxes assessed on the compensation.

Note that if responses to the survey are determined to be fraudulent (e.g., bots, en masse responses, etc.) or careless, multiple responses are made by the same user, or an individual is found to be purposefully manipulating the survey (e.g., responding to a survey for which they are not eligible), payment will be withheld.

Participant IP addresses will be collected in Qualtrics for data quality purposes. IP addresses will be discarded at the conclusion of the study.

7. RIGHT TO WITHDRAW AND QUESTIONS: Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator or faculty advisor:

Colleen Kase (Principal Investigator)
Department of Psychology
Biology-Psychology Building
University of Maryland
College Park, MD 20742
(610) 301 8738projectbloom2020@gmail.com

Dr. Jonathan Mohr (Faculty Advisor)
Department of Psychology
Biology-Psychology Building
University of Maryland
College Park, MD 20742
(301) 405-5907
jmohr@umd.edu

8. PARTICIPANT RIGHTS: If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:

University of Maryland, College Park
Institutional Review Board Office
1204 Marie Mount Hall
College Park, MD, 20742
301-405-0678
irb@umd.edu

For more information regarding participant rights, please visit:
https://research.umd.edu/irb-research-participants

This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.

Your consent indicates that you are at least 18 years of age; you have read the previous consent page or have had it read to you; your questions have been answered to your satisfaction; and you voluntarily agree to participate in this research study. You may print or save a copy of this consent form for your records.

If you agree and intend to participate, please click "I consent and wish to participate" below. If you do not agree or do not intend to participate, please click "I do not wish to participate."

○ I consent and wish to participate

○ I do not wish to participate

Please provide your signature to indicate your consent: [ ]

Please indicate the time and date for your signature.

Time: ____

Date: ____

Appendix E: Baseline Survey

Thank you for your interest in Project Bloom! This **paid** study will gather much needed information about the physical health of lesbian and bisexual women. This study is being run by a graduate student researcher at the University of Maryland, who is herself a bisexual woman.

Participation in this study involves **two parts:**
Part One: You will complete an informed consent form and an online survey, which should take most participants about 35 minutes. You can complete this survey today. You will receive a $5 Amazon e-gift card for completing Part One in its entirety.
Part Two: For a period of nine days, you will complete a 10-minute online survey each night before going to sleep. Part Two will be scheduled for a nine-day period that is convenient for you. You can receive up to a $15 Amazon e-gift card for completing Part Two in its entirety. Please note that not all participants will be chosen to participate in Part Two.
If you choose to participate in Project Bloom, you will be contributing much needed information about the lived experiences of lesbian and bisexual women. Ultimately, the researcher hopes to use the information generated by this study to improve the lives of other lesbian and bisexual women like you.

Please note that a few of these questions are intended to ensure that you are a human participant and that you are paying attention to the survey. If a question seems strange, please just answer the best you can and move on.

What is your email address (the one where you received the invitation to participate in this study)?

____

How old are you?

____

Which of the following best describes your sexual orientation?

○ Bisexual
○ Heterosexual/straight
○ Lesbian
○ Pansexual
○ Queer
○ Other (please describe): ____

Please **describe** your sexual orientation.

____

____

____

To what extent are you...

	Not at all	A little bit	Somewhat	Very much	Completely
sexually attracted to **men**	○	○	○	○	○
sexually attracted to **women**	○	○	○	○	○
sexually attracted to **nonbinary or genderqueer individuals**	○	○	○	○	○
romantically attracted to **men**	○	○	○	○	○
romantically attracted to **women**	○	○	○	○	○
romantically attracted to **nonbinary or genderqueer individuals**	○	○	○	○	○

What are the gender(s) of the romantic/sexual partner(s) you have had **throughout your lifetime**? (*check all that apply)*

- ☐ Have never had romantic/sexual partners
- ☐ Men
- ☐ Women
- ☐ Nonbinary or genderqueer individuals

Which best describes your **current** relationship status?

- ○ Single
- ○ Casually dating one partner
- ○ Casually dating multiple partners
- ○ In a committed relationship (including marriage) with one partner
- ○ In committed relationships (including marriage) with multiple partners
- ○ In both committed relationship(s) (including marriage) and casual relationship(s)
- ○ Other (please describe): ____

What are the gender(s) of your **current** romantic/sexual partner(s)? (*check all that apply)*

- ☐ Man
- ☐ Woman
- ☐ Nonbinary or genderqueer

Which of the following describe your racial or ethnic background? (*select all that apply*)

- ☐ American Indian or Alaska Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other (please describe): ____________________

In which US state do you currently reside? *[Dropdown menu]*

I read instructions carefully. To show that you are reading these instructions, please leave this question blank.

- ○ Paid employment
- ○ Education
- ○ Caretaking

Please choose the option that best describes where you live.

- ○ Urban
- ○ Suburban
- ○ Rural

What is the highest level of education you have completed?

- ◯ Less than high school
- ◯ High school or GED
- ◯ Some college but no degree
- ◯ Associate's degree (2-year degree)
- ◯ Bachelor's degree (for example, BA, BS, AB)
- ◯ Master's degree (for example, MA, MS, MEng, MEd, MSW, MBA)
- ◯ Professional school degree (for example, MD, DDS, DVM, JD)
- ◯ Doctoral degree (for example, PhD, EdD)

What is your total combined household income per year?

- ◯ Less than $10,000
- ◯ $10,000 - $19,999
- ◯ $20,000 - $29,999
- ◯ $30,000 - $39,999
- ◯ $40,000 - $49,999
- ◯ $50,000 - $59,999
- ◯ $60,000 - $69,999
- ◯ $70,000 - $79,999
- ◯ $80,000 - $89,999
- ◯ $90,000 - $99,999
- ◯ $100,000 and above

What is your employment status (*check all that apply*)?

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Self-employed
- ☐ Full-time student
- ☐ Part-time student
- ☐ Furloughed
- ☐ Unemployed and currently looking for work
- ☐ Unemployed and NOT currently looking for work due to being retired
- ☐ Unemployed and NOT currently looking for work due to being disabled
- ☐ Unemployed and NOT currently looking for work due to being a stay-at-home parent or caretaker

What is your height (in feet and inches)? *Please be as accurate as possible.*

- ○ Feet ____
- ○ Inches ____

What is your weight (in pounds)? *Please be as accurate as possible.*

- ○ Pounds ____

How would you say that your **weight** has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

- ○ Lost a lot of weight
- ○ Lost a little weight
- ○ About the same
- ○ Gained a little weight
- ○ Gained a lot of weight

How has the novel coronavirus (COVID-19) pandemic changed your living situation, employment/financial situation, and daily life?

____

____

____

____

____

How has the novel coronavirus (COVID-19) pandemic changed your routines related to physical health (e.g., physical activity, eating, receiving medical care, drinking alcohol, using other substances)?

____

____

____

____

____

In general, would you say your health is:

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Fair
- ○ Poor

The following items are about activities you might do during a typical day. Does your **health now limit you in these activities**? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	○	○	○
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	○	○	○
Lifting or carrying groceries	○	○	○
Climbing **several** flights of stairs	○	○	○
Climbing **one** flight of stairs	○	○	○
Bending, kneeling, or stooping	○	○	○
Walking **more than a mile**	○	○	○

Walking **several blocks**	○	○	○
Walking **one block**	○	○	○
Bathing or dressing yourself	○	○	○

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities as a **result of your physical health**?

	Yes	No
Cut down the **amount of time** you spent on work or other activities	○	○
Accomplished less than you would like	○	○
Were limited in the **kind** of work or other activities	○	○
Had **difficulty** performing the work or other activities (for example, it took extra effort)	○	○

How much **bodily** pain have you had during the **past 4 weeks**?

○ None

○ Very mild

○ Mild

○ Moderate

○ Severe

○ Very severe

During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

- ○ Not at all
- ○ A little bit
- ○ Moderately
- ○ Quite a bit
- ○ Extremely

How true or false is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
I seem to get sick a little easier than other people	○	○	○	○	○
I am as healthy as anybody I know	○	○	○	○	○
I don’t like getting speeding tickets.	○	○	○	○	○
I expect my health to get worse	○	○	○	○	○
My health is excellent	○	○	○	○	○

How would you say that your **physical health** has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

- Much worse
- A little worse
- About the same
- A little better
- Much better

Please read each of the following items carefully and indicate the answer that best reflects your agreement with the statement.

	Definitely disagree	Mostly disagree	Neither agree nor disagree	Mostly agree	Definitely agree
It is important for me to look athletic.					
I think a lot about looking muscular.					
I want my body to look very thin.					
My favorite subject is agronomy.					
I want my body to look like it has little fat.					
I think a lot about looking thin.					
I spend a lot of time doing					

things to look athletic.					
I think a lot about looking athletic.	○	○	○	○	○
I want my body to look very lean.	○	○	○	○	○
I think a lot about having very little body fat.	○	○	○	○	○
I spend a lot of time doing things to look more muscular.	○	○	○	○	○

Please select the option that best describes you.

	1 - Very masculine	2	3	4	5	6	7 - Very feminine
I consider myself as…	○	○	○	○	○	○	○
Ideally, I would like to be...	○	○	○	○	○	○	○
Traditionally, my interests would be considered as...	○	○	○	○	○	○	○
Traditionally, my attitudes and beliefs would be	○	○	○	○	○	○	○

considered as...							
Traditionally, my behavior would be considered as...	○	○	○	○	○	○	○
Traditionally, my outer appearance would be considered as...	○	○	○	○	○	○	○

Over the previous year, how often have you consumed the following foods?

	Less than once per week	Once per week	2-4 times per week	Nearly daily or daily	Twice or more per day
Dark green leafy vegetables (e.g., spinach, kale, collard greens, arugula)	○	○	○	○	○
Cruciferous vegetables (e.g., broccoli, cauliflower)	○	○	○	○	○
Carrots	○	○	○	○	○
Other vegetables (e.g., peppers, onions, lettuce, green beans)	○	○	○	○	○

Citrus fruits (e.g., oranges, grapefruits, lemons)	○	○	○	○	○
Other fruits (e.g., apples, bananas, berries)	○	○	○	○	○
Whole milk dairy foods (e.g., full-fat cheeses, butter, and yogurts; whole milk)	○	○	○	○	○
Low fat dairy foods (e.g., reduced- or low-fat cheeses, butter, and yogurts; skim, 1%, or 2% milk)	○	○	○	○	○
Whole eggs	○	○	○	○	○
Margarine	○	○	○	○	○
Whole grain foods (e.g., whole wheat bread, bagels, or buns)	○	○	○	○	○
Pasta, rice, noodles	○	○	○	○	○
Baked good (e.g., doughnuts, cookies,	○	○	○	○	○

brownies, cake)					
Beef, pork, or lamb	○	○	○	○	○
Processed meats (e.g., deli meats, hot dogs, bacon, sausage, jerky)	○	○	○	○	○
Fish or seafood (not fried)	○	○	○	○	○
Deep fried food (e.g., fried chicken, fried fish, french fries)	○	○	○	○	○
Added salt (e.g., chips, crackers, condiments, prepared meals)	○	○	○	○	○

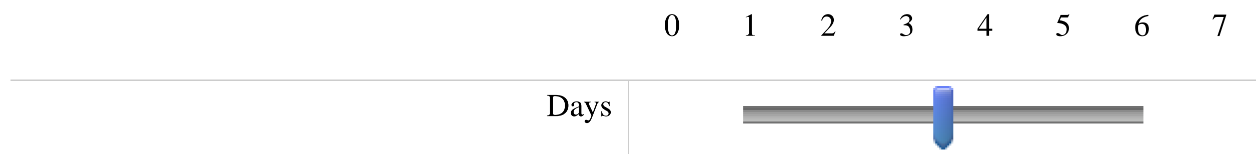
How would you say that the **quality of your diet** has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

- ○ A lot less healthy
- ○ A little less healthy
- ○ About the same
- ○ A little healthier
- ○ A lot healthier

The questions below will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise, or sport.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?



How many minutes did you usually spend doing **vigorous** physical activities on each **one** of those days?

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? *Do not include walking.*

How many minutes did you usually spend doing **moderate** physical activities on each **one** of those days?

0 360

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

0 1 2 3 4 5 6 7

How many minutes did you usually spend **walking** physical activities on each **one** of those days?

0 360

How would you say that the **amount of physical activity** that you do has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

- ○ A lot less physical activity
- ○ A little less physical activity
- ○ About the same amount of physical activity
- ○ A little more physical activity
- ○ A lot more physical activity

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

	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	○	○	○	○
Feeling down, depressed, or hopeless	○	○	○	○
Trouble falling or staying asleep, or sleeping too much	○	○	○	○
Feeling tired or having little energy	○	○	○	○
Poor appetite or overeating	○	○	○	○
Feeling bad about yourself - or that you are a failure or have let yourself or your family down	○	○	○	○
Trouble concentrating on things, such as reading the newspaper or watching television	○	○	○	○
Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety	○	○	○	○

or restless that you have been moving around a lot more than usual				
Thoughts that you would be better off dead, or of hurting yourself	○	○	○	○

How would you say that your **level of depression** has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

- ○ A lot less depression
- ○ A little less depression
- ○ About the same amount of depression
- ○ A little more depression
- ○ A lot more depression

How much has this problem distressed or bothered you during the **past 12 months**?

	Did not happen/not applicable to me	It happened, and it bothered me NOT AT ALL	It happened, and it bothered me A LITTLE BIT	It happened, and it bothered me MODERATELY	It happened, and it bothered me QUITE A BIT	It happened, and it bothered me EXTREMELY
Being called names such as “fag” or “dyke”	○	○	○	○	○	○
People staring at you when you are out in public	○	○	○	○	○	○

because you are LGBT						
Being verbally harassed by strangers because you are LGBT	○	○	○	○	○	○
Being verbally harassed by people you know because you are LGBT	○	○	○	○	○	○
Being treated unfairly in stores or restaurants because you are LGBT	○	○	○	○	○	○
People laughing at you or making jokes at your expense because you are LGBT	○	○	○	○	○	○

How would you say that the **amount of sexual orientation-related discrimination** that you encounter has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

○ A lot less discrimination

○ A little less discrimination

○ About the same amount of discrimination

○ A little more discrimination

○ A lot more discrimination

Please consider your *sexual orientation group* (i.e., ${Q35/ChoiceGroup/SelectedChoices}) when answering the following questions.

	Strongly disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Strongly agree
I often regret that I belong to the sexual orientation group I do.	○	○	○	○	○	○	○
In general, I'm glad to be a member of the sexual orientation group I belong to.	○	○	○	○	○	○	○
Overall, I often feel that the sexual orientation group of which I am a member is not worthwhile.	○	○	○	○	○	○	○
I feel good about the sexual orientation group I belong to.	○	○	○	○	○	○	○
It feels good to be appreciated.	○	○	○	○	○	○	○

How would you say that your **connection to the LGBT community** has changed since the beginning of the novel coronavirus (COVID-19) outbreak in the US (approximately March 1, 2020)?

- ○ A lot less connected
- ○ A little less connected
- ○ About the same amount of connectedness
- ○ A little more connected
- ○ A lot more connected

Please click on the **eggplant** and the **lemon**.

Thank you for completing Part One of Project Bloom! We really appreciate your participation.

To finish Part One of the study, you need to read instructions explaining how to participate in Part Two and sign up for a nine-day participation window. Please see below.

If selected to participate, you will complete Part Two of the study for nine consecutive days. You will have the opportunity to schedule Part Two for a 9-day window during the fall of 2020 that is convenient for you.

Each night during Part Two, you will be required to take an approximately 10-minute online survey. You will receive an email at 6pm EDT each evening that will provide you with the unique link to that night's survey. Please try to take the survey within two hours of going to bed each night. The surveys will close at 6am EDT the following morning. If you have not responded to the survey by then, you will receive an email explaining that the survey has closed with instructions on how to proceed. This process will be repeated each evening during Phase Two, and the link to the nightly survey will be different each day. If you have questions at any point during the study, you can email the principal investigator at projectbloom2020@gmail.com.

You will receive $5 for completing Part One of Project Bloom. Not all participants will be selected to participate in Part Two. However, if you are selected, you will receive an additional $1.50 for the first seven nightly surveys you complete and $2.25 for the last two nightly surveys you complete (for a total of $15). Note that payment for Part Two will only be disbursed if you complete at least seven of the nine nightly surveys, including two weekend nights. Payments are structured this way in order to ensure that there is enough data to get a full picture of participants' day-to-day lives. All payments will be made in the form of an Amazon e-gift card.

We strongly encourage you to participate in Part Two, if you are selected. The success of the study depends on invited participants engaging in Part Two. You will be assisting the research team and helping us gather important information about lesbian and bisexual women's health.
I have read the instructions above.

○ Yes

○ No

Please list the email address that is the **best** way to get in touch with you for Part Two.

____

Please select the 9-day window(s) when it would be most convenient for you to participate in Part Two. You may choose as many as would work for you.

○ 9/5/20 – 9/13/20

○ 9/12/20 – 9/20/20

○ 9/19/20 – 9/27/20

○ 10/3/20 – 10/11/20

Please indicate whether you would like to receive a $5 Amazon e-gift card for completing Part One of the study.

- ◯ Email me the gift card
- ◯ Decline payment - do not send me a gift card

Do you have any questions about the study or anything you think we should know before you begin Part Two (if selected)?

____

____

____

____

____

We are looking for a **diverse sample** of lesbian and bisexual women to complete this study. However, certain groups of women may be less likely to hear about our study, including women who are less out about their sexual orientation, those who do not participate in LGBTQ+ groups, those who are partnered with men, and those who are members of racial or ethnic minority groups.

If you know of any women who fit these qualifications, we would *sincerely* appreciate it if you would tell them about our study. You can send them to this link: https://go.umd.edu/projectbloom2020 (password: health). Remind them that there is the potential to earn up to $20! Thanks very much for your help.

Appendix F: Daily Survey

Thanks for your continued participation in Project Bloom! This is your nightly survey.

Would you say your health **today** is:

- Excellent
- Very Good
- Good
- Fair
- Poor

How many servings of **fruits** did you eat **today**? One serving of fruit is equal to one handful of cut raw, frozen, cooked, or canned fruits or one glass of 100% fruit juice.

____

How many servings of **vegetables** did you eat **today**? One serving of vegetables is equal to one handful of cut raw, frozen, cooked, or canned vegetables or one glass of 100% vegetable juice.

____

Did you do any vigorous activities **today**? Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

- Yes
- No

How many minutes did you spend doing **vigorous** physical activities **today**?

0 360

Did you do any moderate **activities today**? Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time. *Do not include walking.*

- ◯ Yes
- ◯ No

How many minutes did you spend doing **moderate** physical activities **today**? *Do not include walking.*

0 360

Did you do any walking **today**? This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

- ◯ Yes
- ◯ No

How many minutes did you spend **walking today**?

0 360

Did you experience mistreatment, harassment, or discrimination that you perceived to be **related to your <u>sexual orientation</u> today**?

○ Yes

○ No

Please briefly describe this experience related to your sexual orientation. If you had more than one experience, describe the one that had the biggest impact on you.

____

____

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Did you experience mistreatment, harassment, or discrimination that you perceived to be **related to your <u>weight</u> today**?

○ Yes

○ No

Please briefly describe this experience related to your weight. If you had more than one experience, describe the one that had the biggest impact on you.

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For each of the following statements rate how much this experience describes something that happened to you **today** **<u>because you identify as a sexual minority woman</u>**.

	1 - Not at all	2	3	4 - Somewhat	5	6	7 - A lot
I was verbally harassed by someone.	○	○	○	○	○	○	○
I was told I was overreacting or being oversensitive regarding sexual minority issues.	○	○	○	○	○	○	○
Someone responded defensively or disagreed with me when I pointed out heterosexist language or thought something was homophobic or biphobic.	○	○	○	○	○	○	○
I heard others make fun of, mock, or call sexual minority people names.	○	○	○	○	○	○	○

Someone laughed at me, made jokes at my expense, or called me a name.	○	○	○	○	○	○	○
I was explicitly threatened with harm as a result of my sexual minority identity.	○	○	○	○	○	○	○
I heard anti-LGBT talk.	○	○	○	○	○	○	○
I perceived a situation, individual, or environment to be unsafe because of my sexual minority identity.	○	○	○	○	○	○	○

For each of the following questions, please mark the response that best indicates your experience **today**.

	Disagree strongly	Disagree	Disagree somewhat	Agree somewhat	Agree	Agree strongly
If it were possible, I would choose to be straight.	○	○	○	○	○	○
I wish I were heterosexual.	○	○	○	○	○	○

I believe it is unfair that I am attracted to people of the same sex.	○	○	○	○	○	○

To what degree have you been bothered by the following problems **today**?

	Not at all	A little	Somewhat	To a great extent
Little interest or pleasure in doing things	○	○	○	○
Feeling down, depressed, or hopeless	○	○	○	○
Trouble falling or staying asleep, or sleeping too much	○	○	○	○
Feeling tired or having little energy	○	○	○	○
Poor appetite or overeating	○	○	○	○
Feeling bad about yourself - that you are a failure or have let yourself or your family down	○	○	○	○
Trouble concentrating on things, such as reading the newspaper or watching television	○	○	○	○

Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual				
Thoughts that you would be better off dead, or of hurting yourself				

Please consider **every** person who you interacted with for **more than 10 minutes today**. This includes interactions that take place in-person, online, through a telephone call or text messaging, or through another medium.

Do not include people who you interacted with solely in a work or school capacity. For example, you would not include a co-worker who you had a work-related meeting with. However, you would include a co-worker who you ate lunch with socially. You should also exclude people who you interacted with solely in a professional capacity (e.g., doctors, nurses, store clerks).

Fill out the following questions for each person who fits this description. If you interacted with more than five people, choose the five people who you spent the most time with.
Provide each person's initials:

○ Person 1: ________________________________

○ Person 2: ________________________________

○ Person 3: ________________________________

○ Person 4: ________________________________

○ Person 5: ________________________________

Approximately how many minutes did you spend interacting with this person today?

- ○ ${Q47/ChoiceTextEntryValue/1}: ________________________________
- ○ ${Q47/ChoiceTextEntryValue/2}: ________________________________
- ○ ${Q47/ChoiceTextEntryValue/3}: ________________________________
- ○ ${Q47/ChoiceTextEntryValue/4}: ________________________________
- ○ ${Q47/ChoiceTextEntryValue/5}: ________________________________

Which of the follow best describes this person's **gender**?

○ Cisgender woman	○ Cisgender man	○ Transgender woman	○ Transgender man	○ Nonbinary or genderqueer	○ Other	○ Not sure
○ Cisgender woman	○ Cisgender man	○ Transgender woman	○ Transgender man	○ Nonbinary or genderqueer	○ Other	○ Not sure
○ Cisgender woman	○ Cisgender man	○ Transgender woman	○ Transgender man	○ Nonbinary or genderqueer	○ Other	○ Not sure
○ Cisgender woman	○ Cisgender man	○ Transgender woman	○ Transgender man	○ Nonbinary or genderqueer	○ Other	○ Not sure
○ Cisgender woman	○ Cisgender man	○ Transgender woman	○ Transgender man	○ Nonbinary or genderqueer	○ Other	○ Not sure

What is this person's **sexual orientation**?

○ Heterosexu al/straight	○ G ay	○ Lesb ian	○ Bise xual	○ Panse xual	○ Qu eer	○ O ther	○ N ot sure
○ Heterosexu al/straight	○ G ay	○ Lesb ian	○ Bise xual	○ Panse xual	○ Qu eer	○ O ther	○ N ot sure
○ Heterosexu al/straight	○ G ay	○ Lesb ian	○ Bise xual	○ Panse xual	○ Qu eer	○ O ther	○ N ot sure
○ Heterosexu al/straight	○ G ay	○ Lesb ian	○ Bise xual	○ Panse xual	○ Qu eer	○ O ther	○ N ot sure
○ Heterosexu al/straight	○ G ay	○ Lesb ian	○ Bise xual	○ Panse xual	○ Qu eer	○ O ther	○ N ot sure

Which of the following best describes your **relationship** with this person?

◯ Partner/spouse	◯ Family member	◯ Friend	◯ Co-worker or classmate	◯ Boss or professor	◯ Acquaintance	◯ Stranger	◯ Other
◯ Partner/spouse	◯ Family member	◯ Friend	◯ Co-worker or classmate	◯ Boss or professor	◯ Acquaintance	◯ Stranger	◯ Other
◯ Partner/spouse	◯ Family member	◯ Friend	◯ Co-worker or classmate	◯ Boss or professor	◯ Acquaintance	◯ Stranger	◯ Other
◯ Partner/spouse	◯ Family member	◯ Friend	◯ Co-worker or classmate	◯ Boss or professor	◯ Acquaintance	◯ Stranger	◯ Other
◯ Partner/spouse	◯ Family member	◯ Friend	◯ Co-worker or classmate	◯ Boss or professor	◯ Acquaintance	◯ Stranger	◯ Other

Thanks for participating in Project Bloom today!

Please click the next button below to complete the survey.

<u>Resources</u>
Immediate help: If you feel you are having a mental health emergency at this time, please call 911 or go to the nearest emergency room for help.
24/7 Crisis Textlines:
Crisis Text Line: 741741
Trevor Text: Text START to 678678
24/7 Crisis Hotlines:
National Suicide and Crisis Intervention Lines: 1-800-784-2433 or 1-800-273-8255
TrevorLifeline:1-866-488-7386
Trans Lifeline: 1-877-565-8860
Helplines:
National Alliance on Mental Illness Helpline: 1-800-950-6264
National Eating Disorders Association Helpline: 1-800-931-2237
Lesbian, Gay, Bisexual, and Transgender National Hotline: 1-888-843-4564
More information:
National Alliance on Mental Illness: https://www.nami.org/Home
National Eating Disorders Association: https://www.nationaleatingdisorders.org/
CDC page on Lesbian & Bisexual Women's Health: https://www.cdc.gov/lgbthealth/women.htm
It Gets Better Project: www.itgetsbetter.org Human Rights Campaign: www.hrc.org

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