THESIS

IDENTITY AS A MODERATOR OF THE ASSOCIATION BETWEEN MINORITY STRESS AND STRESS PHYSIOLOGY

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ABSTRACT

IDENTITY AS A MODERATOR OF THE ASSOCIATION BETWEEN MINORITY STRESS AND STRESS PHYSIOLOGY

Lesbian, gay, bisexual, transgender, queer or questioning, and other sexual and gender minority identifying (LGBTQ+) youth are at increased risk for experiencing a multitude of social and structural disparities compared to their cisgender, heterosexual counterparts. These include but are not limited to higher rates of childhood abuse, school bullying, victimization, and discrimination. The cumulative negative impact of these factors on health is known as *minority stress*. Much of the existing research on minority stress in LGBTQ+ adolescents has focused on psychological outcomes, such as anxiety and suicidal ideation. Fortunately, previous research has identified several protective factors against negative mental health outcomes, including identity pride, mindfulness, and community connectedness. Drawing from Minority Stress Theory and Identity Theory, we hypothesized a significant association between minority stress and physical health indicators (i.e., stress physiology) (hypothesis 1). We additionally hypothesized that identity pride (hypothesis 2), mindfulness (hypothesis 3), and community connectedness (hypothesis 4) would moderate this relationship. To test these hypotheses, we administered 21 LGBTQ+ adolescents, ages 12 to 18, an online survey measuring the target variables. A multiple regression was conducted to test main effects and moderators. Results revealed support for all four hypotheses. In other words, minority stress was positively associated with stress physiology (B= .38, p < .001). Identity pride (B = -.13, p= .04), mindfulness (B = .21, p < .001), and community connectedness (B= -.20, p =.02) significantly moderated the association between

minority stress and stress physiology. These associations indicate that for participants who reported higher levels of one or more of the variables, identity pride, mindfulness, and community connectedness, the association between minority stress and stress physiology was weakened.

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CHAPTER 1 – INTRODUCTION

LGBTQ+ Population

The population comprised by lesbian, gay, bisexual, transgender, queer or questioning, and other diverse gender-identifying individuals (LGBTQ+) is continually expanding and growing ever more diverse. Its members reflect the world's population, cutting across age, race, ethnicity, social class, and geography (Centers for Disease Control and Prevention, 2014). Transgender refers to someone whose gender identity differs from their birth sex. As of 2021, nearly 6% of Americans identify as LGBTQ+ (Jones, 2021). That number jumped by nearly 1 percent, compared to 2017. Notably, 17% of Generation Z adults are LGBTQ+ (Jones, 2021). This demonstrates the LGBTQ+ population is growing rapidly, particularly among up-and-coming generations.

LGBTQ+ Adolescents

A person's sexual orientation, gender identity and expression are inherently fundamental building blocks in consolidating an identity. Obviously, each adolescent will follow their own unique developmental trajectory. For example, the level of confusion about sexuality and gender identity spans from hardly any to all-consuming (Poirier, Fisher, Hunt, & Bearse, 2014). Exploring one's gender identity, sexual orientation, and connected roles is a lifelong journey for most, influenced by personal, cultural, and social factors (Poirier et al., 2014).

As of 2020, there were at least 2 million LGBTQ+ youth in the US (Conron, 2020). These young people are at higher risk for experiencing adversity and disparities compared to their cisgender, heterosexual peers. Before discussing the specific experiences of LGBTQ+ youth and adults, it is important and relevant to invoke Identity Theory.

Identity Theory

Identity Theory is a popular lens used to examine and understand the structure and integration of multiple parts of self (Morris, 2013). Identity Theory considers how roles and role-taking evolve into role-identities (Merolla et al., 2012). For example, a role (e.g., spouse, caretaker) prescribed by one's family and/or society will have important lifelong implications in formulating one's core identity. Identity Theory helps explain how the meanings attached to certain identities take shape, heavily influenced by interpersonal, transactional processes (Stets & Serpe, 2013). For example, identity theorists look for ways in which identities relate to each other and impact behavior, feelings, self-concept, social structure, along with overall health and wellness of any given individual (Stets & Serpe, 2013). Embedded within Identity Theory is the concept of *Identity Importance* (Morris, 2013).

Identity Importance

The idea of identity importance references, "the significance of a particular component [identity and] its location in the self-concept structure – whether it is central or peripheral…a major or minor part of the self" (Rosenberg, 1979). Importance relates to the concept of *intensiveness* because intensiveness is "the 'importance' of others to whom one relates…" within an identity-based social group (Stryker, 1980; Ervin & Stryker, 2001). According to Stryker (1980), if a role identity is considered important to an individual, then others sharing that role identity inside a social support network are also likely considered important.

The notion of salience is related to importance. Salience refers to the likelihood that one's given identity will be "acted out" across situations (Morris, 2013). Identities are hierarchical. Identities placed closer to the top of the hierarchy, i.e., considered more salient, are more likely to be performed (Morris, 2013). For example, if a person attaches greater value to their role as

parent or spouse, ahead of worker, they are more likely to behave as a parent or spouse compared to worker across varied settings.

Identity importance requires self-awareness, which, in turn, impacts self-concept and associated attitudes and behaviors (Morris, 2013; Hutchinson & Skinner, 2007; Silvia & Duval, 2001). Indeed, a person must be aware of an identity for that component of self-concept to be deemed important. Self-awareness is the term describing a conscious attention focused inward toward the self, including self-evaluation (Wicklund, 1979). According to Identity Theory, identities can be characterized by how important or central they are to individuals and the likelihood they are to be performed (salience). Self-awareness must be achieved for an identity to be experienced as important or salient (Morris, 2013). Identity importance can also apply to sexual or gender identities.

Identity Importance and LGBTQ+ Identity.

The weight assigned to an identity within one's self-concept (i.e., identity importance) impacts the experiences of minority groups, such as LGBTQ+, in the realms of health and prejudice (Hinton et al., 2021). Individuals with greater levels of identity importance are more likely to use the lens of an identity to view the world. For example, a sexual or gender minority individual is more likely to assess current events according to their impact on rights tied to their identity and community. An advantage of viewing the world through this lens includes the opportunity to engage in positive identity-relevant experiences, such as identity-specific community events. Conversely, it could escalate their perceptions and experiences of in-group threat, including prejudice and discrimination (Hilton, 2021). *Minority stress* is the term describing the effects of prolonged, identity-based prejudice and discrimination (Meyer, 1995).

Minority Stress

LGBTQ+ communities often experience persistent social and structural injustices (Fish, Almack, Hafford-Letchfield, & Toze, 2021). Some examples include legal discrimination in the realms of health care, employment, housing, and marriage/adoption access. Also lacking are adequate social programs designed to support LGBTQ+ individuals (Fish, Almack, Hafford-Letchfield, & Toze, 2021). These disparities collectively comprise minority stress (Meyer, 1995). The concept of minority stress denotes the level of societal conflict experienced by minority group members due to their discrepancies in dominant values (Meyer, 1995; Mirowsky & Ross, 1989; Pearlin, 1989). Minority stressors are triggered by a heteronormative society that often inflicts lifelong prejudice, discrimination, and victimization on sexual and gender minorities (Marshal et al., 2008; Meyer, 2003). LGBTQ+ people are at higher risk to suffer enduring stressful events that result in negative health outcomes (Kelleher, 2009).

Health Disparities

Following minority stress theory, the degree of risk for several negative physical and mental health outcomes hinges largely upon the level of stress caused by experiences of stigma and discrimination (Meyer, 1995; McConnell et al., 2018). LGBTQ+ populations face inequities in health and health care across the world (Connors, Carolina-Casares, Honigberg, & Davis, 2019). LGBTQ+ people constitute a population subjected to health disparities, legally defined as: "A population is a health disparity population if there is a significant disparity in the overall rate of disease incidence, prevalence, morbidity, mortality or survival rates in the population as compared to the health status of the general population" (Minority Health and Health Disparities Research and Education Act, 1999-2000; Connors et al., 2019). Accessibility and quality of health care are important components of health disparity. Compounding the problem is the fact that LGBTQ+

people additionally experience numerous disparities in health (Connors et al., 2019). They are at higher risk for certain conditions *and* have less access to health care. Hence, they are more likely to be sick with less chance of being healed. These disparities exist in physical and mental health (Connors et al., 2019).

The challenges faced by LGBTQ+ young people are largely contingent upon the reactions of others to their sexual orientation or gender identity/expression. The same applies to youth who are questioning their sexual orientation, gender identity, or are assumed to be LGBTQ+ or gender variant by peers (Youth.gov, n.d.). A recent large survey found that 75% of LGBTQ+ youth experienced discrimination based on their sexual orientation or gender identity (The Trevor Project, 2021). The discrimination pertaining to their sexual orientation and/or gender identity took the form of emotional bias; physical violence; and rejection by school, work, and communities (The Trevor Project, 2021).

Physical Health.

The LGBTQ+ population is more likely to suffer certain conditions, diseases, and infections. For example, a higher percentage of gay and bisexual men are afflicted by HIV/AIDS compared to their heterosexual counterparts (Parsons, 2005). On top of that, homophobia and discrimination contribute to hesitancy among gay and bisexual men in getting tested and treated for HIV, fueling the spread. It is transgender women who face the highest risk for HIV infection (Clark et al., 2017). The elderly subpopulation of the LGBTQ+ community report poorer health, more chronic conditions, and less social support (Emlet, 2016).

Higher percentages of lesbian and bisexual women are afflicted by breast cancer and obesity compared to their heterosexual counterparts (Azagba, Shan, & Latham, 2019; Baker, 2020). Transgender men and women are at greater risk for breast cancer as well (Baker, 2020).

The LGBTQ+ population as a whole face greater risk for HPV infection and related cervical or anal cancers (Quinn et al., 2015). This issue is again compounded by the fact that LGBTQ+ individuals stand less chance of having a regular health care provider (Stimpert, 2020).

Mental Health.

Health disparities experienced by LGBTQ+ people expand beyond physical health. They additionally face greater risk of behavioral health issues, including mental health, substance abuse, and addiction (Graham et al., 2011). LGBTQ+ youth and adults experience greater risk of depression, suicidal ideation, and suicide attempts (Graham et al., 2011). The likelihood of them using and abusing nicotine, alcohol, and other drugs is higher compared to their heterosexual, cisgender counterparts (Graham et al., 2011). Furthermore, sexual and gender minorities experience higher rates of mood disorders, anxiety, and eating disorders (Wilson & Cariola, 2020).

Youth Disparities.

Research shows that LGBTQ+ youth have higher rates of negative health outcomes, stemming from minority stress. Examples include heightened likelihoods of attempted suicide, homelessness, and illegal drug use (Reis, 1999; Reis & Saewyc, 1999; Ray, 2006; Ryan, Huebner, Diaz, & Sanchez, 2009; SAMHSA, 2014). It's probable these issues contribute to anxiety, depression, and a sense of isolation. Additionally, youth expressing their gender in ways discrepant from societal norms are more likely to experience childhood physical, emotional, and sexual abuse (Roberts et al., 2012). This population is more likely to be targeted by school-based bullying and victimization (Toomey, Ryan, Diaz, & Russell, 2013). As a result, they may have even lowered sense of well-being than lesbian, gay, and bisexual peers whose gender expression more closely aligns with societal expectations (Rieger & Savin-Williams, 2012). The identification of several

protective factors bodes the promise of reducing risk of negative health outcomes in the LGBTQ+ population. These include identity pride, mindfulness, and community connectedness.

Protective Factors

Identity Pride

Identity pride has been identified as playing a protective role against minority stress and associated negative health outcomes in LGBTQ+ individuals. Psychological distress among LGBTQ+ adults is inversely proportional to degree of identity pride (Bockting et al., 2013). Greater identity pride protects against depression in LGBTQ+ youth (Chang et al., 2021). Further research highlighted that self-acceptance (including self-esteem and internalized LGBTQ+ pride) mediates the relationship between discrimination and psychological distress among LGBQ college students (Woodford, Kulick, Sinco, & Hong, 2014). Pride moderates the relationship between victimization and depression among trans students (Woodford et al., 2018). Among gender minority adolescents, gender-related pride additionally mediates the link between gender minority stressors and substance use (Katz-Wise, Sarda, Austin, & Harris, 2021). Extensive research literature suggests pride (or lack thereof) plays important roles in mediating *and* moderating the relationship between minority stress and psychological distress. Associated behaviors (i.e., substance use) are included in that. Thus, pride seemingly dilutes the potency of minority stress.

Perrin et al. (2019) developed and validated the minority strengths model, outlining the role personal and collective strengths play in fostering resilience and health in minority populations. Their model tagged identity pride, self-esteem, and resilience as mediators (Perrin et al., 2019). Identity pride and self-esteem were consistently associated both directly and indirectly with mental health, including reduced depression and anxiety. They were also associated with positive health behaviors, such as exercise, dietary habits, weight management, along with

utilization of health information and primary care (Perrin et al., 2019). Identity pride positively (albeit, indirectly) impacted mental and physical health outcomes (Perrin et al., 2019). Identity pride has shown itself to be an essential ingredient in buffering the impacts of minority stress.

For the purposes of our study, we conceptualized identity pride as one (positive) individual-level manifestation of identity importance. To be proud of an identity, one must first be aware of it, consider it important, and hold it central to self. Insofar as identity pride predicts identity expression, it is also an individual-level indicator of identity salience, i.e., the likelihood of identity expression. For instance, a person is more likely to express or enact an identity of which they are proud compared to that which they are ashamed.

Mindfulness

Mindfulness has been theorized as an additional protective factor against minority stress and negative health outcomes among LGBTQ+ youth. Mindfulness practice reduces mental health symptoms commonly reported among sexual and gender minority youth (SGMY). Examples include stress, depression, anxiety, and relationship challenges (Ernould, 2018; Neff & Tirch, 2013; Segal et al., 2002; Tan, 2016). Mindfulness-based interventions (MBIs) may help SGMY cope better with stress by increasing "psychological flexibility (i.e., a dynamic process that allows for adapting to changing situational demands and shifts perspective)," providing mental space that enables healthier choices when facing adversity (Kashdan, 2010; Semple et al., 2010). LGBTQ+ youth's capacity to tolerate emotional distress is raised through mastery of mindfulness (Grabovac et al., 2017; Holzel et al., 2011). At the same time, it enables a healthier interpretation of difficult thoughts and feelings across varied situations (Kashdan, 2010).

An advantage of mindfulness for SGMY is that it can be learned (Gilbert, 2009; Segal et al., 2002). MBIs confer a gentle, compassionate awareness, aiding the intentional examination of

the self, conditioned beliefs, narratives, and traumas. These variables play important roles in work with LGBTQ+ youth due to their elevated levels of psychological distress (Marshal et al., 2011, 2013). When acceptance of psychological distress is out of reach, SGMY can apply compassionate awareness to their experience of psychic pain (Iacono, 2019). Research with SGM adults suggests mindfulness can serve to help them cope better with varied psychosocial stressors. For example, a trial of a MBI for gay men living with HIV showed significantly reduced depression, and increased positive affect and mindfulness, compared to a control group (Gayner et al., 2012). Other studies have suggested self-compassion can be raised through mindfulness (Crews, 2012). During the coming-out process, self-compassion enhances this population's mental health via conferring emotional safety (Crews, 2012). Chandler (2013) found that self-compassion, cultivated through mindfulness, predicted lowered internalized stigma and fear of rejection, while increasing mood positivity in a sample of SGM individuals.

Research shows mindfulness may facilitate resistance to stigma and lower distress among sexual minorities. Mindfulness has been associated with lower levels of self-stigma, accompanied by lower rates of depression and anxiety, among LGB individuals (Chan, 2021). Another study demonstrated the role dispositional mindfulness can play in buffering negative effects of minority stress on psychosocial health in sexual minority young adults. Young adults who reported less mindfulness also reported greater suffering and negative coping related to minority stress (Li et al., 2019).

A systematic review of mindfulness-based interventions for sexual and gender minorities revealed MBIs improve behavioral outcomes and health indicators via biomarkers. Examples include eating and addiction behaviors, stress biomarkers, and HIV viral suppression (Sun, Nardi, Loucks, & Operario, 2021). A study aimed at identifying the mechanism by which mindfulness

affects minority stress found mindfulness reduced the believability and impact of negative thoughts about one's sexual identity (Yadavavia & Hayes, 2012). Such a pattern of change is consistent with the philosophy of MBIs that assigns greater importance to the individual's *relationship* with their thoughts than the thoughts, themselves (Crane et al., 2017). A potential mechanism by which MBIs remediate adverse consequences of proximal minority stress (e.g., internalized stigma) is through increasing SGM participants' awareness of negative automatic thoughts, enabling a healthier response to them (e.g., reduced rumination, noting them non-judgmentally, letting go) (Sun, Nardi, Loucks, & Operario, 2021).

While the mindfulness literature has historically focused on adults, it demonstrates positive effects of mindfulness across several common adolescent health conditions. MBIs can reduce symptoms of anxiety and depression (Lin, Chadi, & Shrier, 2019). They can also help prevent and treat binge eating, over-eating, and restrictive eating disorders. In the substance use disorder realm, mindfulness has improved emotion regulation, while reducing withdrawal and craving (Lin, Chadi, & Shrier, 2019). Mindfulness is associated with improved overall quality of life for chronic pain patients. Mindfulness has also helped adolescents with ADHD, sleep problems, chronic illness, and stress (Lin, Chadi, & Shrier, 2019).

Mindfulness research with youth has shown these interventions significantly improve mental health in youth (Biegel et al., 2009; Burke, 2010; Zoogman et al., 2015). Specifically, it reduced anxiety, depression, and somatic distress, while increasing self-esteem and sleep quality (Biegel et al., 2009). Mindfulness programs delivered in schools demonstrated reduced depression, anxiety, rumination, and disruptive behavior (Sapthiang et al., 2019). A mixed-methods study of mindfulness in LGBTQ+ youth found mindfulness effective in minimizing stress and increasing life satisfaction and coping skills (Cochrane, 2017).

We conceptualized mindfulness as the requisite psychological component of identity importance and salience. Someone using mindfulness on a daily basis is also more likely to be mindful of their identity. Being mindful of one's identity may be reflected by frequent thoughts and emotions related to one's identity and how it interacts with any given environment. Similarly, being mindful of one's identity would likely necessitate general trait mindfulness. The core components of mindfulness are present-centered awareness, non-judgment, and self-compassion. We theorized that identity importance and salience are forms of mindfulness related to identity, in this case, LGBTQ+ identity. A person able to express their identity openly across situational domains (salience) is presumed to be more mindful, accepting, and compassionate toward that identity. Enactment can include dressing as or otherwise expressing an identity, doing activities associated with that identity, and affiliating with individuals who share that identity.

Community Connectedness

The benefits of social support on the mental health of LGBTQ+ individuals have been well-documented, conferring protection against psychological distress (Pflum et al., 2015), suicidality (Ryan et al., 2010), and substance use (Rothman, Sullivan, Keyes, & Boehmer, 2012). The previously described model in Perrin et al. (2019) suggested that social support robustly impacts mental health and positive health behaviors. The same study found a statistically significant effect of community consciousness on mental and physical health through its association with identity pride. Notably, the survey measuring community consciousness tapped into two aspects of the construct, one of which was connectedness. Sample items included, "I feel a bond with other people who are LGBTQ+" (Perrin et al., 2019).

Feeling connected is an important part of minority identity development (Frost & Meyer, 2012). Connection may be especially significant for marginalized individuals, such as LGBTQ+,

as they may harbor shame toward their identity (Lambe, Cerezo, & O'Shaughnessy, 2017). Connecting to a larger community provides access to non-stigmatizing environments, while catalyzing positive identity development and pride. So, too, it promotes more positive self-appraisals (Meyer, 2003).

Previous work in sexual minorities identified community connectedness was associated with personal and social well-being (Kertzner, Meyer, Frost, & Stirratt, 2009). Collectively, the minority strengths model (Perrin et al., 2019) describes the ripple effects of social support and community consciousness (connectedness and solidarity) on mental and physical health. Social support promotes self-acceptance, self-worth, and resilience for overcoming minority stress. Further, it fosters mental and physical well-being (Perrin et al., 2019). Individuals who establish a connection with the LGBTQ+ community stand to perceive greater social support, identity pride, and subsequent self-worth. In the end, this adds up to increased resilience, health, and healthy behaviors (Perrin et al., 2019).

A conceptual review described how social isolation and connectedness affect the well-being of LGBTQ+ youth (Garcia et al., 2019). Social isolation contributed to higher rates of suicidality, self-harm, high-risk sex behaviors, and substance use. Frameworks ranging from minority stress theory to positive youth development support a role for interventions targeting isolation and connectedness in schools, community organizations, and online (Garcia et al., 2019). Garcia et al. (2019) emphasized the need to address social, cultural, and structural facets of social isolation in service of promoting environments that enable LGBTQ+ youth to thrive. The review suggests that youth's individual transformations result from opportunities to meaningfully shape their environment. Such is made possible when their social environments nurture their personal capabilities (Garcia et al., 2019).

Gender diverse youth who are more connected to their community exhibit less emotional distress, substance use, and suicidality (Fish, Moody, Grossman, & Russell, 2019). Participation in community organizations serving LGBTQ+ youth has been linked to decreased substance abuse. Additionally, LGBTQ+ youth who are consistently involved in a community-based organization report higher self-esteem (Fish et al., 2019).

Finally, we conceptualized community connectedness as the interpersonal materialization of identity importance and salience. If one's identity is important and salient, they are more likely to seek identity-oriented support, events, and social networks. For example, imagine a 13-year-old transgender female has just come out to her friends and family. Her gender identity figures prominently, as manifested by her initial experimentation with female gender expression in social settings. During this time, she is more likely to seek LGBTQ+ recreational activities, social events, along with support and advocacy groups, than in the past. As noted previously, identity importance overlaps directly with intensiveness, or the "emotional significance of the others implicated with one in a given social network" (Ervin & Stryker, 2001). Intensiveness overlaps with community connectedness because community connectedness is characterized as an individual's desire to emotionally connect and form ideological solidarity with a larger collective (Frost & Meyer, 2012). In other words, someone with high community connectedness would likely attribute greater emotional significance to the members of their community.

Hypotheses

We proposed four hypotheses: one main effect hypothesis and three moderating (or interaction) hypotheses. We hypothesized minority stress would be positively associated with stress physiology (H1). We hypothesized three moderators: identity pride (H2), mindfulness (H3),

and community connectedness (H4). We hypothesized pride, mindfulness, and connectedness would moderate the association between minority stress and stress physiology.

CHAPTER 2 – METHODS

Participants

21 LGBTQ+ adolescents (~12-18 years old) living in Colorado were recruited as part of a larger study on mindfulness. The mean age of participants was 16.57 years old, with a standard deviation of 0.93 years. 7 participants identified as female, 10 as male, 3 as non-binary, and 1 as genderqueer. Additionally, 29.2% of the sample identified as lesbian, 37.5% as gay, 12.5% as bisexual, 4.2% as asexual, and 4.2% as demisexual. Our sample was 61.9% Black, 28.6% White, 4.8% Asian, and 4.8% Native Hawaiian or Pacific Islander. Recruitment flyers were posted in LGBTQ-focused centers, in-person and online (e.g., school pride centers, online support groups, Facebook groups, etc.). Participants were administered online surveys on a one-time basis at the onset of the study, measuring minority stress, stress physiology, identity pride, mindfulness, and community connectedness.

Measures

Minority Stress

Minority stress was measured using the rejection, victimization, non-affirmation, and internalized transphobia subscales of the Gender Minority Stress and Resilience Measure for Adolescents (GMSR-A) (Hidalgo, Petras, Chen, & Chodzen, 2019). This totaled 27 items, and response options ranged from "Never" to "Yes, before the past year." "N/A, doesn't apply to me" was also a response option (Hidalgo et al., 2019). Survey questions were adapted to include sexual identity (e.g., "I have had difficulty finding someone to date or have had a relationship end because of my *sexual* and/or gender identity.").

The rejection subscale measured rejection based on sexual and/or gender identity and included items like, "I have been rejected or made to feel unwelcome by a religious community

because of my sexual and/or gender identity" (Hidalgo et al., 2019). The victimization subscale measured identity-based discrimination and included items like, "I have been verbally harassed or teased because of my sexual and/or gender identity. (For example, being called "it.")." The non-affirmation subscale measured denial or rejection of one's sexual and/or gender identity and included items such as, "I have to repeatedly explain my sexual and/or gender identity to people or correct the pronouns people use." Finally, the internalized transphobia subscale measured discomfort with one's transgender identity resulting from internalizing society's normative gender expectations (Bockting et al., 2020). It included items like, "I resent my sexual and/or gender identity" (Hidalgo et al., 2019).

The original Gender Minority Stress and Resilience Measure (GMSR) has demonstrated sufficient internal consistency for each of the separate scales, with Cronbach's alphas ranging from .61 to .93 (Testa et al., 2015). The GMSR subscales correlate with indicators of mental health outcomes, demonstrating criterion validity, with effect sizes ranging from .10 to .50 (Testa et al., 2015). The measure has also been validated with adolescents (Hidalgo et al., 2019).

Stress Physiology

Stress physiology was measured using the PROMIS Pediatric Item Bank v1.0 – Physical Stress Experiences – Short Form 8a (Bevans et al., 2013). It is an 8-item self-report scale of physical stress symptoms over the past 7 days. Items included, "My heart beat faster than usual, even when I was not exercising or playing hard," and "My body shook." Response options were, "never," "rarely," "sometimes," "often," and "always" (Bevans et al., 2013).

The PROMIS Pediatric Physical Stress Experiences measure has strong internal consistency and retest-reliability and discriminates between varying levels of stress (Bevans et al., 2018). The instrument's construct validity has been demonstrated using known-group comparisons

and convergence with legacy measures (Bevans et al., 2018). Internal consistency and test-retest reliability for the short form are $\alpha = 0.87$ and $ICC = 0.68$, respectively. Concurrent validity is $r = 0.59$ (Bevans et al., 2018).

Identity Pride

Identity pride was measured using the Lesbian, Gay, Bisexual Positive Identity Measure (LGB-PIM) (Riggle et al., 2014). The items were adapted to include transgender identity (e.g., "My LGBT identity leads me to important insights about myself."). Other items were, "I am more aware of how I feel about things because of my LGBT identity," and "I have a sense of inner peace about my LGBT identity." The survey totaled 10 items, and responses ranged from "strongly disagree" to "strongly agree" (Riggle et al., 2014).

Preliminary evidence of convergent validity demonstrates significant correlation ($p < .001$) with each of the subscales: Self-Awareness, $r = .54$; Authenticity, $r = .67$; Community, $r = .57$; Intimacy, $r = .45$; and Social Justice, $r = .52$. These correlations indicate the multiple dimensions of the measure touch on positive LGB identity (Riggle et al., 2014). Internal consistency estimates range from .89 to .94, and the test-retest reliability estimate is .91. Alpha in the instrument development studies sample was .90 (Riggle et al., 2014).

Mindfulness

Mindfulness was measured using the 5-item, Mindful Attention Awareness Scale (MAAS) – 5 (Brown & Ryan, 2003). The timescale was the last month, and response options ranged from "almost always" to "almost never." Items included, "It seems I am 'running on automatic,' without much awareness of what I'm doing," and "I find myself doing things without paying attention" (Brown & Ryan, 2003). The MAAS is a popular instrument to measure mindfulness, and it appears to be reliable and valid. Cronbach's alpha of the MAAS is .92, and

corrected item-total correlations range from .46 to .74 (Ruiz, Suárez-Falcón, & Riaño-Hernández, 2016).

Community Connectedness

The community connectedness subscale of the GMSR-A was used to measure connection to the LGBTQ+ community (Hidalgo et al., 2019). Items were adapted to include sexual identity, too. Items included, "I feel part of a community of people who share my sexual and/or gender identity," and "I feel isolated and separate from other people who share my sexual and/or gender identity." Similar to aforementioned subscales, answers ranged from "strongly disagree" to "strongly agree" (Hidalgo et al., 2019). See ***Minority Stress*** section for psychometric properties.

CHAPTER 3 – RESULTS

A total of 21 adolescents participated in the study (see participant section above). A multiple regression was conducted to test main effects and moderators. A moderation analysis requires a predictor and a dependent variable to be related. First, we established the relationship between the predictor and dependent variable. Next, we tested the unique effect of each proposed moderator. To do this, we created an interaction term, in the multiple regression, for each moderating variable. We first turned each moderating variable into z-scores. Then, we added the z-scored variable interaction term into the multiple regression. This resulted in 4 separate multiple regression analyses.

Measure information and bivariate data are provided below in tables 1 and 2 respectively. Results revealed support for the first main effect hypothesis wherein minority stress was shown to be positively associated with stress physiology, $B = .38$, $p < .001$. Next, multiple regression analyses revealed support for the moderation effect of identity pride on the association between minority stress and stress physiology, $B = -.13$, $p = .04$, thus supporting hypothesis 2. This association indicates that for those who feel more prideful of their identity, the association between minority stress and stress physiology was weaker. Similarly, higher self-report of mindfulness (hypothesis 3), $B = .21$, $p < .001$, and community connectedness (hypothesis 4), $B = -.20$, $p = .02$, also weakened the relationship between minority stress and stress physiology.

CHAPTER 4 – DISCUSSION

The current study examined the association between minority stress and stress physiology in LGBTQ+ adolescents. Additionally, we sought to identify important moderators in the connection between minority stress and stress physiology. Results revealed that all hypotheses were significant. First, we found that minority stress was significantly linked to stress physiology. Consistent with previous literature (Lick, Durso, & Johnson, 2013) and our prediction, higher reports of minority stress are associated with higher self-reported stress physiology such as poorer sleep, inactivity, and negative health coping behaviors. It seems that as LGBTQ+ adolescents experience stressors such as discrimination or bullying, they may resort to coping behaviors that may negatively impact their physical health and physical stress physiology.

Next, we found that identity pride moderated the relationship between minority stress and stress physiology among LGBTQ+ youth. Numerous studies focused on this population have demonstrated that identity pride reduces *psychological* distress (Bockting et al., 2013; Woodford et al., 2014). Chang et al. (2021) found that identity pride can protect against depression. Woodford et al. (2014) not only replicated this finding, but also found that pride mitigated discrimination-based distress. So, it is quite possible that identity pride positively impacts physical health indirectly, through its mitigation of mental health symptoms. Pride may also, however, directly impact health behaviors, such as substance use (Katz-Wise et al., 2021). It seems that someone who experiences greater pride in their identity (i.e., who likes themselves for who they are and how they identify) may also be motivated to engage in healthy behaviors, taking care of their body, avoiding risky or harmful health behaviors, thus sustaining and enhancing their positive identity experience. Finally, identity pride seems to lower psychological distress connected to experiences

of minority stress (discrimination, victimization); as such, identity pride also likely lowers levels of cortisol and other stress response hormones in the body, promoting positive physical health.

Mindfulness was found to buffer the association between minority stress and stress physiology. Mindfulness likely protects against negative health outcomes in LGBTQ+ adolescents through a variety of mechanisms. First, mindfulness is known to impart greater psychological flexibility, potentially allowing adolescents to hold their thoughts and emotions more lightly, adapting to changing/stressful circumstances, and allowing them to act on values, as opposed to short term impulses (Silberstein, Tirch, Leahy, & McGinn, 2012). This may also help LGBTQ+ adolescents cope with minority stress. Increased psychological flexibility can provide more mental space for making healthier decisions in the face of adversity. With mastery of mindfulness also comes expanded emotional distress tolerance for LGBTQ+ youth. This component is especially relevant for these youth who often experience elevated levels of psychological distress. Mindfulness is associated with many cognitive benefits, not least of which is a more balanced and adaptive interpretation of difficult thoughts and feelings across diverse environments. Especially important for sexual and gender minority young people, mindfulness encourages gentle self-compassionate, yet conscious awareness and evaluation of harmful, socialized beliefs and traumas. Applying compassionate awareness to their psychic pain can reduce its intensity and its subsequent impact on mental and physical health. Furthermore, self-compassion, a major outcome of mindfulness, has been shown to reduce internalized stigma and fear of rejection (Chandler, 2013), preventing these minority stressors' negative impacts on the body (Meyer, 1995).

Community connectedness was the third and final significant moderator of the association between minority stress and stress physiology, in our model. Social support, like the previous

variables, has been shown to protect against psychological distress in SGMY (Pflum et al., 2015). It additionally can be protective against suicidality (Ryan et al., 2010) and substance use (Rothman et al., 2012). Not only does social support profoundly impact mental health, but it is also associated with positive health behaviors (Perrin et al., 2019). Connectedness is associated with lower rates of self-harm, high-risk sex behaviors, and substance use (Garcia et al., 2019). Connection to and solidarity with a community that celebrates a shared identity fosters individual identity pride. Community consciousness has been found to positively impact on LGBTQ+ individuals' physical health, through this very association with identity pride. Individuals who are more connected to the LGBTQ+ community are positioned to experience greater social support, identity pride, and self-worth, culminating in strengthened resilience (to minority stress), health, and healthy behaviors (Perrin et al., 2019).

A clear limitation of this pilot study is the small sample size (21 adolescents). This limited the statistical power of the study and may limit the representativeness of the sample and generalizability of results. On one hand, because this was a virtual study, it increased accessibility to rural LGBTQ+ adolescents who may not be able to travel to a physical survey location. On the other hand, it excluded participants who may not have access to a smart phone or computer and reliable internet. Additionally, we relied on self-reports of physical health, which could be subject to reporter bias or inaccuracy. A future direction for this research would be to replicate this study using scientific equipment to collect data on stress biomarkers (blood pressure, cortisol level, etc.) to develop a more precise and nuanced operationalization of stress physiology. More research also needs to be conducted on the effects of mindfulness specifically on sexual and gender minority youth. As previously stated, most of the mindfulness research has been on cisgender, heterosexual individuals, the general population, or sexual and gender minority adults. It would be valuable to

develop and test an adapted mindfulness program tailored specifically to the unique minority stressors facing LGBTQ+ youth. Lastly, following the aftermath of the COVID-19 pandemic and the world becoming increasingly "virtual," it would be interesting and relevant to examine the potential protective and promotive effects of LGBTQ+ online spaces on physical health.

TABLES

Table 1

Measures Information

Variable	M	SD	Range
Mindfulness	4.32	.60	1.00-5.00
Pride	2.42	1.00	1.00-5.00
Non-affirm	2.35	1.01	1.00-5.00
Internal Transphobia	4.04	1.24	1.00-5.00
Comm. Connect	3.02	.55	1.00-5.00

Note. "Mindfulness" refers to the moderator variable, Mindfulness. "Pride" refers to Identity Pride. "Non-affirm." refers to Non-affirmation. "Internal transphobia." pertains to Internalized Transphobia. "Comm. Connect." refers to Community Connectedness. "Stress Phys." refers to Stress Physiology. Minority stress is comprised of the variables, non-affirmation and internalized transphobia.

Table 2

Bivariate Correlations

	Mindful	Pride	Non-aff.	Internal. Trans.	Comm. Connect.	Stress Phys.
Mindful	-	.442*	0.260	0.405	-0.136	-0.308
Pride	.442*	-	.634**	0.076	0.020	0.315
Non-affirm	0.260	.634**	-	0.441	-0.174	-0.034
Internal Transphobia	0.405	0.076	0.441	-	-0.399	-0.372
Comm. Connect.	-0.136	0.020	-0.174	-0.399	-	0.116
Stress Phys.	-0.308	0.315	-0.034	-0.372	0.116	-

Note. “Mindful” refers to the moderator, Mindfulness. “Pride” refers to Identity Pride. “Non-affirm.” refers to Non-affirmation. “Internal transphobia.” pertains to Internalized Transphobia. “Comm. Connect.” refers to Community Connectedness. “Stress Phys.” refers to Stress Physiology. Minority stress is comprised of the variables, non-affirmation and internalized transphobia.

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 3

Summary of Regression Analysis Predicting Stress Physiology

Model	Variable	*B*	*SE*	*b*
1	Minority Stress	0.38	0.22	.11**
2	Pride	0.13	0.04	1.03**
	Mindfulness	0.21	0.55	1.36**
	Comm. Connect	0.20	0.03	0.37***

Note. “Mindfulness” refers to the moderator, Mindfulness. “Pride” refers to Identity Pride. “Comm. Connect.” refers to Community Connectedness. Minority stress is comprised of the variables, non-affirmation and internalized transphobia.

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

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