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The Role of Perceived Heterosexism in Posttraumatic Stress Symptom Severity Among Trauma-Exposed Sexual Minority Individuals

by

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Submitted in partial fulfillment
of the requirements for the degree of
Master of Arts Psychology, Hunter College
The City University of New York

2020

May 15, 2020

Date

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Thesis Sponsor

May 15, 2020

Date

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Second Reader

Abstract

Sexual minority (SM) (i.e., gay, bisexual, lesbian, pansexual, queer) individuals have a significantly greater lifetime risk of developing posttraumatic stress disorder (PTSD) than do heterosexual individuals. Explanatory theories of PTSD provide limited insight into the uneven distribution of PTSD across social groups, nor do they account for contexts in which ongoing exposure to identity-based threats may influence PTSD symptoms and psychological covarying constructs, such as negative affect. Minority stress theory proposes that SM individuals' disproportionate exposure to stigma-related SM stress contributes to health disparities, including elevated PTSD risk. Yet, important questions remain about the role of SM stress in PTSD etiology and persistence, as well as risk mechanisms accounting for interindividual differences. This thesis employed structured PTSD assessments and a micro-longitudinal 30-day daily diary assessment to investigate the unique and interactive effects of traumatic stress and daily SM-related discrimination ("daily SM stress") on PTSD symptoms and negative affect in a diverse sample of 38 trauma-exposed SM individuals. Results of multilevel modeling indicated that on average, individuals that experienced more daily SM stress reported greater weekly PTSD severity; however, when controlling for the between-person variance in PTSD scores, there was insufficient evidence to demonstrate a relationship between within-person daily SM stress and same-week PTSD severity. Consistent with hypotheses, baseline endorsement of a sexual identity-related index traumatic event significantly moderated the relationship between within-person daily SM stress and weekly PTSD symptom severity, controlling for variation in between-person baseline symptom severity, psychiatric comorbidity, and exposure to other discrimination. Within-person daily SM stress was positively associated with same-day negative affect controlling for baseline PTSD symptom severity, exposure to other discrimination and

autoregressive effects. Exploratory analyses of symptom clusters further suggested that daily SM stress served as a salient traumatic stress cue over and above other forms of discrimination.

Analyses herein provide support for the unique interaction between traumatic stress and minority stress and encourage further research to expand the conceptual framework of PTSD through the inclusion of contextual factors, such as minority stress, that interact with socioemotional processes associated with PTSD.

keywords: minority stress, PTSD, discrimination, negative affect, trauma, stigma, daily diary

Acknowledgements

This thesis would not have been possible without the guidance of mentors and support of colleagues in the Gender-Based Violence Laboratory at Hunter College.

I am deeply grateful to my thesis advisor and mentor, Dr. Danielle Berke, for her guidance, responsiveness, humor, and compassion. Thank you for giving me the opportunity to work on a study that challenged me to think critically about issues that are meaningful to me. Your contagious energy, tireless intellect, and devotion to advancing the science, while nurturing your community and making our world a better place, has been an inspiration to me. I hope to humbly pay it forward in my future endeavors.

To Dr. H. Jonathan Rendina, thank you for your initial consultations on running the multilevel analyses for this project, as well as your thoughtful feedback on my writing and statistical analyses. Thanks to your feedback, the final product is greatly improved, and I am confident that my future thinking as a scientist will benefit as well.

To my husband Mel, thank you for your unwavering support for me as I pursued this time-intensive project during the planning of our wedding and our first year as a married couple. Thank you for understanding my passion for this research. Your support made this possible.

Last, but not least, I want to thank my friends and family for their support during this process. Thank you for making me laugh amid uncertainty and challenging work.

The Role of Heterosexism in Posttraumatic Stress Symptom Severity Among Trauma Exposed Sexual Minority Individuals

Posttraumatic stress disorder (PTSD) is a heterogeneous and distressing psychiatric disorder characterized by intrusive and distressing trauma reminders, avoidance of memories, thoughts, feelings and external reminders of the trauma, negative changes in mood and cognition, and dysregulated arousal and reactivity symptoms following exposure to threatened death, serious injury or sexual violence (i.e., a “Criterion A” Event: American Psychiatric Association, 2013). PTSD is a public health concern, associated with depression, anxiety, alcohol and substance misuse, as well as an increased likelihood of hospitalization, suicide attempts, diminished work performance, and a significantly reduced quality of life (Davidson, 2000).

Although exposure to a traumatic event as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5: “Criterion A event”), is ubiquitous, ranging from 70% cross-nationally to 89.7% within the U.S. (Kilpatrick et al., 2013; Benjet et al., 2016), PTSD risk is unequally distributed (Kessler et al., 2017). Of the 6.8% to 7.3% Americans that will experience PTSD, sexual minority (SM) (i.e., lesbian, gay, bisexual, queer) individuals experience PTSD at elevated rates, ranging from 10.3% to 13.6% for SM men and 18.6% to 26.6% for SM women (Roberts, Rosario, Corliss, Koenen, & Austin, 2012). Although explanatory theories of PTSD identify putative mechanisms that account for the onset and maintenance of PTSD (Brewin, 2003; Olf, 2005), existing theories provide limited insight into the uneven distribution of PTSD across social groups, nor do they account for contexts in which daily identity-based threats, elusive safety, or ongoing traumatic exposure may influence adaptations to trauma exposure implicated in PTSD etiology (Stein, Wilmot, & Solomon, 2016; Ngamake, Walch, & Raveepatarakul, 2016).

Minority stress theory is a conceptual framework for understanding health disparities among stigmatized groups, which are posited to result from disproportionate exposure to stigma-related stress (“minority stress”), such as discriminatory policies, interpersonal violence, and daily discrimination (Meyer, 2003). SM individuals, in particular, face excessive personal and institutional discrimination across a variety of contexts (Hatzenbuehler, 2016; Harvard T. H. Chan School of Public Health, 2017) and experience poor mental health outcomes, including elevated rates of PTSD (Gilman et al., 2001; Roberts, Austin, Corliss, Vandermorris, & Koenen, 2010; Roberts, Rosario, Corliss, Koenen, & Austin, 2012; Cochran, Balsam, Flentje, Malte, & Simpson, 2013). Minority stress theory has been employed to explain this well-established “epidemiology of risk” (i.e., the uneven distribution of risk for psychiatric morbidity among SM individuals; Hatzenbuehler, 2009), but important questions remain about the role minority stress plays in PTSD etiology and persistence, as well as the mechanisms for risk and resilience that account for interindividual differences.

Integration of minority stress theory and psychological theories of PTSD etiology and maintenance has significant potential to advance our understanding of how minority stress and traumatic stress processes interact to jointly influence the trajectory of PTSD in SM individuals. To stimulate a critical examination of the role of both traumatic and minority stress processes in the etiology and expression of PTSD in SM individuals, in the introduction that follows, I review the available epidemiological research on PTSD risk among SM populations and provide an overview of prominent etiological theories of PTSD and SM mental health disparities drawing from both the traumatic stress and minority stress literatures.

Epidemiology of Trauma and PTSD in Sexual Minority Populations

Exposure to a Criterion A Event is necessary but not sufficient to establish a PTSD diagnosis; accordingly, epidemiological research has investigated factors (e.g. trauma type, quantity of trauma exposure), that elevate risk for PTSD development and maintenance. For example, trauma types, such as interpersonal violence and childhood abuse, which can precipitate PTSD directly, increase the risk of subsequent trauma exposure, as well as increase the conditional risk of developing PTSD to subsequent stressors (Kilpatrick et al., 2013; Benjet et al., 2016; Roberts et al., 2010). With respect to quantity of exposure, individuals that experience four or more potentially traumatic events (PTEs) are more likely to report severe PTSD symptoms, greater functional impairment and comorbidity than individuals who experience three or less PTEs (Karam et al., 2014).

Epidemiological research on PTSD in the general population is well-developed, but there are few studies on PTSD prevalence in SM populations that evaluate data from nationally representative samples and employ reliable ways of measuring SM status (e.g. biological sex of current sexual partner may not account for an individual's identity, sexual attraction, and/or lifetime sexual partners) (Alessi, Meyer, & Martin, 2013; Roberts, et al, 2010). Despite these limitations, research suggests that SM individuals are at heightened risk by virtue of their exposure to a greater number of PTEs and high-risk trauma types strongly associated with PTSD in the general population. Roberts, et al. (2010) found that SM individuals exposed to a PTE had between a 1.6 and 3.9 times greater lifetime risk of developing PTSD compared to the reference group consisting of heterosexual individuals with opposite-sex partners; furthermore, they found that this elevated risk was largely accounted for by a greater exposure to violence and child maltreatment, a greater number of PTEs prior to the Criterion A event and an earlier age of

exposure to the Criterion A event. In a population-based study, Roberts, et al. (2012) found that greater rates of child victimization among SM individuals accounted for one-third to one-half of the PTSD disparities.

While SM individuals as a group are exposed to alarming rates of high-risk trauma types and a greater number of PTEs, the degree to which quantity and type of trauma exposure play a role in elevated PTSD risk in this population is still unclear. For example, Roberts, et al. (2010) found that trauma-exposed lesbians (18.04%) had a lower risk of developing PTSD than trauma-exposed bisexual women (25.68%), despite somewhat comparable levels of trauma and PTE exposure (49.2% lesbians and 51.2% bisexual women reported exposure to child maltreatment or interpersonal violence). However, studies systematically evaluating whether PTSD disparities persist when trauma type is held constant are lacking, precluding conclusions about whether disproportionate exposure to high-risk trauma types (i.e. child maltreatment, violence) is driving inter- and intragroup disparities. In a meta-analysis on biological sex and PTSD, Tolin & Foa (2006) demonstrated that when trauma type was held constant, women were more likely to meet PTSD criteria and report greater symptom severity than men. A similar analysis would be helpful in understanding PTSD risk among SM individuals.

Moreover, factors beyond type and quantity of trauma exposure likely play a role in disparities. In fact, meta-analyses of PTSD risk factors across population groups indicate that post-trauma factors (e.g. social support and concurrent life stressors), in addition to peritraumatic factors (e.g. severity and uncontrollability of trauma, immediate reactions to trauma), are more significant predictors of PTSD onset than pre-trauma factors (e.g. minority status, previous trauma exposure, gender, family history of psychiatric disorders) (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). However, research investigating the role of SM individuals'

relative overexposure to post-trauma factors, such as diminished social support (Hatzenbuehler, Keyes, & McLaughlin, 2011), chronic heterosexism (Harvard T. H. Chan School of Public Health, 2017), and barred access to competent and sensitive healthcare services (Baptiste-Roberts, Oranuba, Werts, & Edwards, 2017; Luk, Gilman, Haynie, & Simons-Morton, 2017), in elevated prevalence and chronicity of PTSD is lacking.

SM individuals may also experience Criterion A events or PTEs that are directly related to SM identity (e.g., hate crimes). However, data on the unique impact of PTEs that originate from heterosexism, a form of sexual minority stress, are scarce. In the Roberts, et al. (2012) epidemiological study, gender non-conformity in young age partly accounted for the elevated rate of child abuse and maltreatment in the SM sample, suggesting that a significant proportion of child abuse experienced by SM populations may be related to hetero/cissexism; additional analyses could evaluate the degree to which trauma-exposed SM individuals attribute the Criterion A event to their sexual identity (or non-conforming behaviors that signal SM identity) and whether this attribution impacts PTSD risk. Fredriksen-Goldsen, Kim, Bryan, Shiu, & Emlet (2017) found that identity processes impacted by experiences of victimization, such as identity appraisal and identity management, moderated the relationship between marginalization and health outcomes in a sample of older LGBT adults. Thus, the experience of PTEs related to SM identity (as compared to PTEs not originating from heterosexism) may uniquely impact how SM individuals manage identity disclosure and concealment, which in turn may shape access to social resources, mental health outcomes and health promoting behaviors, relevant to PTSD onset and maintenance.

Taken together, the literature on the epidemiology of PTE exposure and PTSD in SM populations points to a need for a more nuanced, mechanistic understanding of PTSD risk and

resilience that goes beyond a dose-response relationship, in which PTSD risk varies as a function of exposure magnitude. “Objective” indicators of PTE exposure (e.g. number of PTEs) and researcher’s *a priori* decisions about severity, such as trauma type (Tolin & Foa, 2006) and duration of traumatic event (Kaysen, et al., 2010), provide a limited account for disparities in terms of PTSD onset and maintenance. Even in populations where trauma load (i.e., quantity of PTEs experienced) accurately predicts PTSD outcomes (i.e. populations exposed to war and political unrest: Neuner et al., 2004; Kolassa et al., 2010), researchers have found that *stigma* associated with traumatic exposure was an even more salient predictor of PTSD chronicity, severity, and resistance to treatment (Schneider et al., 2018). In other words, the post-trauma context may provide critical information in terms of symptom maintenance that is not supplied by PTE exposure alone. While Schneider, et al. (2018) did not explore the impact of stigma on PTSD symptoms, future research could do so longitudinally, providing insight into how stigmatizing contexts interact with intraindividual coping strategies and psychobiological responses implicated in PTSD.

Psychological Theories of PTSD Onset and Maintenance

Psychological theories of PTSD etiology and maintenance have advanced our understanding of the ways in which trauma may alter cognition, physiology, and psychology; and in doing so, provide mechanisms that account for the negative alterations in cognition and mood, avoidance behaviors, and altered patterns of arousal and reactivity that characterize the disorder (American Psychiatric Association, 2013). However, these lines of research have not considered the impact of institutionalized and interpersonal stigma on the appraisal and coping processes that mediate trauma exposure and PTSD; and therefore, fall short in accounting for the well-established disparities borne by structurally vulnerable groups.

Cognitive theories of PTSD identify key posttraumatic cognitive processes that mediate the causal relationship between a potentially traumatic exposure and PTSD onset. For example, Ehlers & Clark's cognitive model (2000) proposes that posttraumatic cognitive processes produce a "sense of serious current threat," that directly precipitate or maintain the maladaptive behavioral and cognitive coping strategies associated with PTSD. Exaggerated and excessively negative appraisals can pertain to oneself (e.g. *I am incompetent; I am changed for the worst; it's my fault*), other people (e.g. *no one can be trusted; nobody cares for me*), and subsequent stressors (e.g. *I am threatened; I am never safe*). Other cognitive processes, such as overgeneralized fear and involuntary, intrusive memories, amplify this "sense of serious current threat," by making it more difficult to differentiate the traumatic event from subsequent stressors and to view the traumatic event as "time-limited."¹ To control the distress from ongoing threat, Ehlers & Clark (2000) theorize that individuals engage in coping behaviors (e.g. thought suppression; attentional bias to threatening cues) that produce PTSD symptoms directly or prevent the reversal of negative appraisals that sustain PTSD behaviors (e.g. avoidance of trauma reminders; hypervigilance).

Psychobiological models of PTSD that account for dysregulated neuroendocrinological patterns also frame negative appraisals as critical mediators in PTSD onset. For example, Olff, et al. (2005) propose that appraisals of stressors as *challenging* or *threatening* not only influence whether one employs an adaptive coping strategy, but also impact whether an individual's

¹ Ehlers & Clark (2000), as well as other theorists, also propose that trauma memory in PTSD is encoded differently than other memories: they are poorly organized, fragmented, lack temporal context, and fail to be integrated with other memories retrieved via semantic routes. Such aberration is thought to result in difficulty with deliberate recall of the event in a verbally accessible format while increasing the frequency of involuntary, intrusive sensory memories (Brewin, Dalgleish, & Joseph, 1996; Brewin & Holmes, 2003). A debate as to whether special processes (unique to PTSD) or general processes contribute to these memory-related symptoms is undecided (cf. Rubin, Boals, & Berntsen, 2008); and for that reason, such mechanisms are excluded from this review.

neuroendocrine system mounts an adaptive response that provides for a rapid, short-lived production of stress hormones that quickly recovers and habituates to subsequent, similar stressors or a less adaptive neuroendocrine response that results in higher, sustained levels of cortisol and cardiovascular reactivity. Less adaptive neuroendocrine responses are implicated in the dysregulation of the hypothalamic pituitary adrenal (HPA) axis and a number of PTSD symptoms related to arousal and reactivity (e.g. hyperarousal, irritability, sleep and concentration difficulties). Thus, appraisals of threat are believed to sustain maladaptive neuroendocrine responses and hyperarousal.

These models that focus on maladaptive fear learning account for cognitive and physiological processes that promote a number of PTSD symptoms; however, they do not explain why certain individuals persistently endorse posttraumatic negative appraisals and others endorse more adaptive appraisals. Benight & Bandura (2004) attempt to answer this question in their social cognitive theory of posttraumatic recovery, in which they conceptualize *coping self-efficacy* as the core determinant of posttraumatic recovery. Coping self-efficacy, the belief that one can effectively manage stressors and exercise control over one's life, is posited to confer posttraumatic resilience by attenuating stress reactions and guiding individuals towards healthy coping strategies in the aftermath of PTEs. In this model, individuals are proactive agents that respond, rather than react, to the environment; their ability to view themselves as capable and thus proactively cope depends on cognitive and social factors that "enable" them to act as agents. Accordingly, social support is conceived as a protective factor to the extent that it promotes individual beliefs of self-efficacy. While the social cognitive theory of posttraumatic recovery (Benight & Bandura, 2004) makes the important step towards including social factors, its narrow construction of coping ability, as one strictly informed by subjective appraisal, constrains our

understanding of how contextual factors may promote or diminish adaptive self-appraisals. For example, protective factors, such as posttraumatic caregiver support, may mechanistically buffer the trauma-exposed against physiological and cognitive processes associated with PTSD (McLaughlin & Lambert, 2017); and conversely, risk factors, such as the absence of social support and negative social support (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003; Charuvastra & Cloitre, 2008) may diminish agency and bar access to resources that enable coping self-efficacy.

Social theorists have critiqued appraisal-based psychological theories for their failure to consider how the absence of economic, social, and cultural resources impact individual threat and self-appraisals (Vogt, Erbes, & Polusny, 2017). For example, the conservation of resources (COR) theory argues that psychological theories err in viewing threat appraisals as one-dimensional constructs, in which perceived threat is a function of comparing one's coping ability to the demands presented by a stressor (Benight & Bandura, 2004), without accounting for the environmental factors (e.g. poverty, homelessness, unstable social networks) that constrain coping ability (Hobfoll & Schumm, 2009). Hobfoll & Schumm (2009) concede that idiographic appraisals are significant mediators in PTSD etiology when adequate resources are available, but they become less influential in the face of diminished resources that enable coping ability. Similar to the theory of allostasis in which chronic stress has a cumulative effect on physiological health (McEwen & Seeman, 1999), COR theory predicts that ongoing stressors cumulatively deplete financial, social, and cultural resources, making recovery to subsequent stressors less likely.

Similarly, socio-interpersonal theories of PTSD, broaden the conceptual framework of PTSD etiology and maintenance to more fully consider contextual processes that interact with

intrapersonal adaptations to traumatic stress. Maercker & Horn (2013) argue that while clinical theorists may recognize the importance of *intraindividual* social representations (i.e. beliefs about the world, others, or one's relationship to others) and related emotions ("social affective states"), they have not adequately investigated the ways in which interpersonal and community processes influence such states (Maercker & Horn, 2013; Maercker & Hecker, 2016). Indeed, the DSM-5 Cluster D PTSD symptoms include social-referential cognitions (distorted blame) and emotions (persistent anger, shame, guilt), as well as interpersonal behaviors (detachment and estrangement from others) (Maercker & Horn, 2013), which critics argue are not well accounted for in traditional PTSD models (Brown, et al., 2018).

Clinical theorists and researchers have begun to show more interest in the role of social cognitive and emotional processes as both risk and resilience factors in PTSD development and maintenance (Stevens & Jovanovic, 2019; Sharp et al., 2012). Negative affect may be such a factor. Studies have identified negative affect as a risk factor for PTSD (Weems et al., 2007; Bennett et al., 2001) and as a correlate of PTSD in micro-longitudinal studies (Cohn et al., 2014; DiMauro et al., 2016; Dornbach-Bender et al., 2020). Daily diary researchers have demonstrated that daily negative affect is associated with same-day PTSD symptom severity (Cohn et al., 2014) and that baseline PTSD diagnosis is associated with subsequent elevated negative affect (Dornbach-Bender et al., 2020) as well as increased levels and fluctuations of daily negative affect (DiMauro et al., 2016). Building on empirical research and theory regarding sustained engagement with threat in PTSD (Lazarov et al., 2019; Ehlers & Clark, 2000) and the potential role of negative affect in PTSD's comorbidity with depression (Price et al., 2019), Mekawi et al. (2020) demonstrated that negative affect was not only associated with PTSD symptoms, but also shown to partially mediate the relationship between attentional bias to threat and each of the

PTSD symptom clusters in a trauma-exposed population. While limited by cross-sectional design, the Mekawi, et al. (2020) findings suggest that negative affect could be an important construct that links perceived discrimination (i.e., attentional bias to threat) with intraindividual PTSD symptoms. These studies collectively expand the PTSD framework to include affective states beyond the “fear circuitry model” that has traditionally focused on maladaptive fear learning, without considering other intraindividual factors that interact with the environment (Brown et al., 2018).

While expanding the framework, research on PTSD and affect typically constructs and investigates negative affect as an intraindividual phenomena: one that is associated with chronic PTSD (Dornbach-Bender et al., 2020), individual beliefs (perceived inability to regulate negative mood: DiMauro et al., 2016) or health behaviors (alcohol use: Cohn et al., 2014). Intraindividual constructions are not inaccurate per se, but they are arguably incomplete, especially when studying populations exposed to stigma (Schmitt, et al., 2014). In terms of SM populations, ongoing exposure to SM stressors has been identified as a predictor of daily negative affect in SM populations (Eldahan, et al., 2016; Rendina, et al., 2018; Mohr, et al., 2016). Despite associations between negative affect and both PTSD and perceived SM stress, no study to date, has investigated whether daily minority stress is associated with PTSD symptoms and negative affect in a trauma-exposed sample.

Together, theories that account for the limits of intrapersonal theories of PTSD etiology and maintenance are valuable because they provide a basis for broadly understanding the impact of chronic sociocultural and interpersonal stressors, such as daily discrimination and institutionalized prejudice, on SM individuals. Despite these advantages, social-oriented theories have been critiqued for their lack of specificity and methodological rigor. For example, Maercker

& Horn (2013) have specifically advocated for the use of multilevel modeling, a data analytic technique that accounts for the nesting of the individual within contexts. Multilevel modeling is equipped to test longitudinal interactional effects within and between individuals, and thus holds the promise of investigating how deleterious sociocultural phenomena, such as heterosexist threat, may sustain negative appraisals and affect, as well as impair adaptive coping strategies, in SM individuals over time.

Minority Stress Theory: Factoring in Stigma

Minority stress theory successfully predicts adverse health outcomes in SM populations by accounting for disproportionate exposure to stigma-related stressors that arise from heterosexism (“SM stress”). SM stress may systematically bar access to resources and diminish resources belonging to targeted individuals or social networks (e.g. legacy of laws banning same-sex marriage; absence of legal protections against hate crimes, employment discrimination and housing discrimination) (Hatzenbuehler, 2016; Human Rights Campaign, 2018; Harvard T. H. Chan School of Public Health, 2017).

Researchers have taken particular interest in the effects of daily exposure to minority stress on individuals. Minority stress-informed studies have consistently found positive associations between perceptions and reported experiences of daily SM-based discrimination and a range of adverse mental health outcomes and health-adverse behaviors, including distress and depression, anxiety, and substance use symptoms (Mays & Cochran, 2001); depressive symptoms (Huebner, Nemeroff, & Davis, 2005); and daily nicotine, alcohol, and substance use (Livingston, 2017). These findings persist after controlling for potentially confounding variables, such as minority race and ethnicity, personality measures, and discrimination based on other stigmatized identities. To explain interindividual health differences within SM populations,

researchers have aimed to identify pathways through which minority stress exposure translates into negative health outcomes (Hatzenbuehler, 2009; Lick, Durso, & Johnson, 2013), while also examining factors that may promote resilience in these populations (Fredriksen-Goldsen, Kim, Bryan, Shiu, & Emlet, 2017). Collectively, minority-stress informed researchers have demonstrated that SM-specific internal, affective processes (i.e. expectations of rejection, concealment of sexual identity, and internalized heterosexism) as well as general processes associated with psychopathology (e.g. emotional regulation deficits, maladaptive coping behaviors, external locus of control) mediate the relationship between minority stress exposure and psychopathology (Hatzenbuehler, 2009; Feinstein, Goldfried, & Davila, 2012; Pachankis, Hatzenbuehler, & Starks, 2014; Carter, Mollen, & Smith, 2014; Ngamake, Walch, & Raveepatarakul, 2016).

Perceived SM-based discrimination is an appropriate measure for capturing daily minority stress because of its prevalence (Mays & Cochran, 2001; Huebner, Nemeroff, & Davis, 2005; Szymanski & Balsam, 2011; Hatzenbuehler, 2016; Harvard T. H. Chan School of Public Health, 2017; Human Rights Campaign, 2018) and well-established relationship with measures of poorer psychological well-being across populations (e.g. depression, anxiety, negative affect) (Schmitt et al., 2014). In their meta-analyses of discrimination and psychological well-being, Schmitt, et al. (2014) conceptualize perceived discrimination as both a manifest occurrence, an unpleasant interpersonal stressor, as well as a symbolic act that signals social exclusion, thwarted belonging, closed off opportunities, and invalidation, especially when perceived as pervasive and personally experienced. Furthermore, Schmitt, et al. (2014) found that discrimination attributed to concealable stigmas (e.g. sexual orientation, mental illness) had larger effect sizes than discrimination based on non-concealable stigmas

(e.g. race, age), which they hypothesized could be related to diminished access to coping through social support. As a stressor and signal of social exclusion, with potential correlates to absence of social support and amplified effect size when attributed to concealable stigmas, perceived sexual identity-based discrimination provides a starting point for better understanding whether post-trauma factors (e.g., concurrent life stressors) are relevant to trauma-exposed SM populations' posttraumatic stress symptoms over time.

Researchers have begun to investigate the role of SM stress as a potentially traumatic experience (PTE) or as a factor that promotes and sustains PTSD symptoms by testing the relationship between SM stress exposure and posttraumatic symptoms, as well as the role of SM-specific and general psychological processes as potential mediators of this relationship. For example, in a cross-sectional study of 247 individuals identifying as lesbians, Szymanski & Balsam (2011) found that recent SM-related hate crime victimization (i.e. PTEs related to sexual identity) and recent SM-related discrimination were significantly associated with self-reported posttraumatic symptoms. Self-esteem was found to partially mediate but not moderate the relationship between discrimination and symptoms, suggesting that discrimination influenced post-traumatic symptoms directly and indirectly by reducing self-esteem. The authors noted that their study was limited by a reliance on self-report, cross-sectional design, and a limited survey of PTSD symptoms that precluded establishing a PTSD diagnosis. The absence of a clinical interview also precluded investigators from determining whether reported hate crimes were probable antecedents to reported symptoms (i.e. whether the hate crimes exposed the participants to actual or threatened death, serious injury, or sexual violence, and thus could be classified as DSM-5 PTSD Criterion A events), and whether the reported symptoms were associated with the event.

Straub, et al. (2018) employed a more reliable method for assessing PTSD symptoms: participants reported history of exposure to PTEs on the Life Events Checklist for DSM-5 (Gray, et al. 2004: LEC-5) and subsequently rated the severity of posttraumatic symptoms on the PTSD Checklist for DSM-5 (Weathers, Litz, et al., 2013a: PCL-5). Participants were directed to report only those symptoms that directly related to their most distressing PTE endorsed on the LEC-5, thereby eliminating symptoms better attributed to another psychiatric disorder or general distress. Among the cross-sectional community sample of 326 PTE-exposed SM women, internalized heterosexism was significantly associated with PTSD symptom severity through its effect on shame-related withdrawal tendencies—a behavioral construct linked to PTSD in the general population.

Finally, in a 3-year longitudinal study of 348 PTE-exposed young adult SM women, Dworkin, et al. (2018) found that exposure to minority stress and Criterion A events were longitudinally associated with an increase in cognitive processes that maintain PTSD in general populations (i.e. self-blame and negative beliefs about self and the world). Dworkin and colleagues also found that trauma-related cognitions about the self, as well as internalized heterosexism, were independently associated with PTSD severity. Contrary to minority stress theory, Dworkin, et al. (2018) did not find a longitudinal association between minority stress exposure and internalized heterosexism during the study's three-year period. The authors suggest the possibility that internalized heterosexism may not be caused by distal minority stress exposure directly, but rather moderate the impact minority stress has on PTSD outcomes in this subpopulation.

While these studies have established that SM stressors are associated with PTSD symptoms, the literature remains limited by an overreliance on cross-sectional designs, clinical

assessment tools with limited reliability, and use of relatively homogenous samples, all of which preclude causal inferences and specificity with respect to delineating the ways that SM stress and traumatic stress jointly influence PTSD symptoms in SM individuals.

Moving Beyond Population-Level Data and Contextualizing Psychological Theories of PTSD: A Novel Research Study

While a significant disparity in PTE exposure exists between SM individuals and heterosexual individuals, elevated PTE exposure does not fully account for PTSD disparities borne by SM individuals (Roberts, et al., 2010; Roberts, et al., 2012). Given the prevalence of minority stress encountered by SM individuals (Mays & Cochran, 2001; Huebner, Nemeroff, & Davis, 2005; Szymanski & Balsam, 2011; Hatzenbuehler, 2016), and the important, yet understudied, role of contextual post-trauma factors in PTSD etiology and maintenance (Maercker & Horn, 2013; Maercker & Hecker, 2016; Vogt, Erbes, & Polusny, 2017), stigma related to sexual identity plausibly accounts for part of the elevated risk of PTSD in SM individuals. To improve our understanding of PTSD risk in SM populations, research should contextualize dose-response models by examining the interaction of stress exposure and environmental factors that may promote or protect against intraindividual psychological and physiological mechanisms associated with PTSD (i.e. emotional and behavioral dysregulation, enhanced attention to perceived environmental threat, negative affect) (Olf, et al. 2005; Ehlers & Clark, 2000; Mekawi et al., 2020).

The current study aims to advance the extant literature by investigating the unique and interactive effects of traumatic stress and minority stress on PTSD symptoms and psychological covarying constructs (e.g. negative affect), while improving upon earlier studies' methodological limitations, which collectively include cross-sectional design, absence of rigorous clinical

assessment, and use of homogenous samples. First, the current study employs a daily diary micro-longitudinal design to assess daily fluctuations in stress exposure (minority stress, PTEs, and Criterion A events), posttraumatic symptoms and correlates of posttraumatic symptoms (i.e. negative affect), while controlling for interindividual differences in stress exposure and PTSD severity. This study design allows for measurement of variance within and between individuals, as well as the testing of causal relationships between factors of interest. Daily diary measurements allow for the tracking of intraindividual variability on a more precise level than possible in traditional longitudinal studies that collect data less frequently and over longer periods of time. While researchers have used daily diary methods to study the complex interactions between daily discrimination and risky health behaviors among SM individuals (cf. Livingston, et al., 2017; Pachankis, Hatzenbuehler, & Starks, 2014), no published studies, to date, have employed daily diary methodology to study the impact of SM-related discrimination on PTSD symptoms.

Second, earlier studies heavily rely on self-report to determine PTSD diagnosis and symptom severity. Given the prevalence of mental health challenges in SM populations (Hatzenbuehler, 2009) and trauma-exposed populations (Price & van Stolk-Cooke, 2015), the high rate of comorbidity in PTSD and symptom overlap with other disorders, such as Major Depressive Disorder (MDD) (Keane & Kaloupek, 1997; Gros et al., 2012; Price et al., 2019), differential diagnosis is an essential task for this line of research. To meet this challenge, the current study employs a gold standard PTSD assessment tool, the Clinician-Administered PTSD Scale for DSM-5 (Weathers, F. W. et al., 2015; CAPS-5; Weathers, et al., 2018) to identify and assess the impact of Criterion A PTE exposure. The current study also allows for an examination of the effects of intersectionality by studying a racially/ethnically diverse sample and measuring

individual experiences of discrimination based on other stigmatized identities (e.g. race, ethnicity, gender, disability).

Empirical assessment of the minority stress-informed and psychological microprocesses contributing to PTSD in SM populations is warranted for several reasons. Daily SM stress is common, yet exposure varies significantly between persons (Eldahan et al., 2016). Due to recall bias, minority stress's effect on PTSD symptoms and other correlates (i.e. daily affect) may be lost if measured less frequently. PTSD symptoms fluctuate over time (Kessler, 2017; Biggs, et al., 2019); however, to my knowledge, no published minority stress-informed study has investigated the influence of daily SM stress on PTSD symptom fluctuation micro-longitudinally. Appraisal-based PTSD theories provide that maladaptive appraisals and coping behaviors maintain a sense of threat; however, little research has examined the time-limited or additive effects of daily SM stress on factors that may influence these appraisals and coping behaviors (i.e., negative affect).

To address these important gaps in the literature, the following hypotheses were advanced in a diverse sample of trauma-exposed individuals:

Hypothesis 1: Consistent with minority stress theory and previous research (Szymanski & Balsam, 2011; Straub, et al., 2018; Dworkin, et al., 2018), I predicted that exposure to daily SM-related discrimination would be positively associated with greater weekly PTSD symptom severity.

Hypothesis 2: In light of early research examining the potential contribution of SM-based PTEs to coping processes (Fredriksen-Goldsen, Kim, Bryan, Shiu, & Emlet, 2017) and PTSD symptoms (Szymanski & Balsam, 2011), I hypothesized that exposure to a Criterion A event based on SM identity would moderate the relationship between SM stress and PTSD symptoms.

In other words, I predicted that daily SM-related discrimination would be associated with a greater increase in weekly PTSD symptoms for individuals who endorsed a sexual identity-related Criterion A event at baseline.

Hypothesis 3: Given empirical evidence linking negative affect with PTSD (Mekawi et al., 2020) and minority stress exposure (Eldahan et al., 2016), I predicted that daily SM-related discrimination would be associated with higher same-day negative affect.

Exploratory Aim: Associations between sexual minority stress exposure and each of the PTSD symptom clusters (i.e. re-experiencing, avoidance, negative alterations in cognition and mood, and hyperarousal) were assessed as an exploratory aim.

Method

Participants

Participants were recruited from the Hunter College undergraduate psychology research volunteer pool, maintained by Hunter College's cloud-based SONA recruitment system, and through broader community-based recruitment efforts, during the time period June 2019 through January 2020. At the conclusion of the study, community participants were compensated \$20.00 for attending the baseline laboratory session and up to an additional \$20.00 (for a total of \$40.00) based on their completion rate of daily diary entries. The Hunter College Institutional Review Board approved the study protocol.

Inclusion criteria, assessed via a computerized Qualtrics survey or over the phone, included (a) a minimum age of 18 years and maximum age of 65 years, (b) self-identified as a sexual minority (e.g. individual whose sexual orientation is described as gay, lesbian, bisexual, queer, pansexual, or non-exclusively heterosexual individual), (c) reported exposure to a potentially traumatic event that *prima facie* satisfies the A1 criterion specified in the DSM-5, (d)

willingness to participate in an in-person interview about the traumatic experience, (e) willingness to complete daily diary surveys over a 30-day period, and (f) ability to write and speak in English to complete the interview and questionnaires.

A total of 45 eligible participants completed baseline and daily diary assessments. Of the forty-five participants in the study, seven participants were excluded from analysis: One participant's baseline PTSD symptoms were anchored to a non-Criterion A event in the CAPS-5 instrument; five participants did not complete weekly surveys (containing the outcome variable in the main effect hypothesis); one participant was excluded due to weekly PCL scores that fell three standard deviations outside of the expected value based upon their baseline PCL and other modeled variables (the participant anchored weekly PTSD symptoms to a non-Criterion A event). Thus, the final analytic sample consisted of 38 participants. Across these participants, data for the present analysis were collected on a total of 983 days (excluding baseline), representing a median of 27 ($M = 25.87$) days of completion per participant or median adherence of 90% ($M = 86.23\%$).

Procedures

In-Person Laboratory Session

The scheduled 120-minute laboratory visit consisted of 1) informed consent, 2) a clinical interview, 3) a battery of brief computerized questionnaires, 4) risk assessment, 5) daily diary training, and 6) debriefing. Laboratory sessions were administered by the principle investigator (PI), Danielle Berke, PhD., and doctoral- and masters-level graduate research assistants supervised and trained by the PI in PTSD and risk assessment, differential diagnosis, and clinical interviewing. Ongoing training and consensus decisions on challenging cases were supported by

weekly clinical management meetings, audio recordings of interviews and one-on-one clinical consultation.

Daily Diary Period (30 Days)

During the 30-day daily diary assessment period, participants responded to Qualtrics-powered questionnaires on their personal smartphones or by email once daily, commencing on the Sunday following their baseline interview. On six days of the week (Sunday through Friday), the questionnaires asked participants to report on daily discrimination experiences, attributions and emotional reactions to discrimination, and daily affect. These questionnaires were estimated to take approximately 3-4 minutes to complete (“daily surveys” or “dailies”). One day of the week (Saturdays), the participants were asked to complete surveys that included the daily survey prompts mentioned above, as well as questions about potentially traumatic exposure since the beginning of the study, PTSD symptom severity, and minority-related risk and resilience mechanisms measured at baseline. These weekly-administered questionnaires were estimated to take 10-12 minutes to complete (“weekly surveys” or “weeklies”). To minimize interference with school, work, commuting and sleep, dailies and weeklies were delivered to participants’ preferred contact address at 7:00 p.m. and were available for completion through 8:30 p.m. Previous research suggests that the within-day effects of SM discrimination may be cumulative in nature (cf. Livingston, et al., 2017), indicating that data collected in the evening may be more informative than data collected in the morning.

Measures

Dependent variables.

PTSD Checklist for DSM-5 (PCL-5; Weathers, et al., 2013a). To track the fluctuation of self-reported PTSD symptoms over time, participants completed the PCL-5, a 20-item self-report

measure that assesses DSM-5 PTSD symptom presence and concurrent distress, at baseline and on a weekly basis during the daily diary phase. The PCL-5 questions mirrors the structure of the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) instrument, assessing Criterion B intrusion symptoms (five items: e.g., “Repeated, disturbing, and unwanted memories of the stressful experience?”), Criterion C avoidance symptoms (2 items: e.g., “Avoiding memories, thoughts, or feelings related to the stressful experience?”), Criterion D negative alterations in cognition and mood (7 items: e.g., “Having strong negative beliefs about yourself, other people, or the world...?”), and Criterion E marked alterations in arousal and activity (6 items: e.g., “Irritable behavior, angry outbursts, or acting aggressively?”). The instrument begins with the prompt: “In the past month, how much were you bothered by:?” and provides response options on a 5-point Likert scale ranging from 0 (“at all”) to 4 (“extremely”), with higher scores indicating greater symptom severity. The PCL-5 has strong psychometric properties, with strong internal consistency ($\alpha = .94 - .96$), test-retest reliability ($r = .82 - .84$), and convergent and discriminant validity in undergraduate and veteran samples (Blevins, Weathers, Davis, Witte, & Domino, 2015; Bovin et al., 2016). Furthermore, the PCL-5 has demonstrated good sensitivity to clinical change and thus is a good measure for monitoring PTSD symptoms over time (Wortmann et al., 2016).

During the diary phase of the study, on a weekly basis, participants were administered a version of the PCL-5 that included a trauma screener, the Life Events Checklist (LEC-5), and a detailed Criterion A assessment (PCL-5 – LEC-5 and Extended Criterion A measurement, Weathers, et al., 2013c). The weekly PCL instrument instructed respondents to identify and subsequently anchor their past-week symptoms to the “worst event” identified in the Criterion A assessment (i.e. the Criterion A event reported during the clinical interview or a traumatic

event that had occurred since baseline). A *Weekly PCL* variable was computed by summing PCL items 1-20, yielding scores ranging from 0 to 80, for each week during the daily diary period. The weekly PCL-5 Cronbach's alpha for this sample were as follows: Week 1: $\alpha = .90$, Week 2: $\alpha = .93$, Week 3: $\alpha = .94$, Week 4: $\alpha = .95$.

At baseline, participants were administered the standalone PCL-5 and were instructed to anchor their symptoms to the Criterion A event identified during the clinical interview. To characterize the sample and to adjust for baseline scores, a *Baseline PCL* variable was calculated by summing the twenty PCL items and was included as a covariate in analyses. For this sample, the Cronbach's alpha for the baseline PCL-5 score was .91. Self-reported cluster symptom severity scores were determined by adding the cluster sub-item severity scores as done with the CAPS-5. The Cronbach's alphas for Clusters B, C, D, and E were .85, .87, .83 and .58, respectively.

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988).

The PANAS is a 20-item widely used scale to measure emotion. The instrument consists of two 10-item subscales that measure orthogonal latent variables, *Negative Affect* (NA) (e.g. distressed, scared) and *Positive Affect* (PA) (e.g. strong, interested). On a daily basis, participants were asked to indicate the extent to which they felt each of the items on a Likert scale, with response options of "very slightly or not at all", "a little," "moderately," "quite a bit" and "extremely". Only the negative affect subscale was used for primary analyses. The decision to focus on negative affect was based on earlier findings indicating that perceived discrimination primarily impacts psychological well-being through the amplification of negative indicators (e.g. depression, anxiety) rather than through the diminishment of positive

indicators (e.g. positive affect, self-esteem) (Schmitt, 2014), as well as inconclusive findings regarding the reduction of daily positive affect in PTSD populations (Dornbach-Bender, 2020).

Independent variable.

Everyday Discrimination Scale (EDS; Williams, Yan, Jackson, & Anderson, 1997).

During the daily diary phase of the study, participants were administered an adapted version of the EDS, a widely used 9-item instrument, that measures exposure to perceived everyday discrimination (i.e., an episodic or chronic subjective experience of “relatively minor” interpersonal mistreatment). The EDS measures the scope, frequency, and, if applicable, attributions or reasons for daily discrimination. As originally administered in a cross-sectional context, respondents are asked to report how frequently they experience nine different mistreatment scenarios, ranging from less severe (“You were treated with less courtesy than other people.”) to more severe (“You were threatened or harassed.”) on a 6-point Likert scale, ranging from “Never” to “Almost Everyday”; and if applicable (i.e. exposure is reported), whether they believe that mistreatment was related to an aspect of their identity (e.g., race, physical disability, sexual orientation, etc.) by endorsing one or multiple marginalized identities from a list. Participants are also provided an open-ended answer option to report a reason for mistreatment unrelated to their identity or an aspect of identity not covered in the list of possibly marginalized identities. The internal consistency of this scale was originally reported as $\alpha = .88$ in a sample of American adults (Williams, et al., 1997). The EDS has indicated good construct validity with various measures of psychological distress (depression, perceived distress), convergent validity with other self-report discrimination measures, and discriminant validity with potentially confounding variables, such as hostility and social

desirability in an American adult sample (Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005) and in an older African American adult sample (Taylor, Kamarck, & Shiffman, 2004).

To suit the daily diary format of this study, the EDS scale's frequency dimension was modified from a Likert scale to a dichotomous scale to assess whether different types of mistreatment occurred. Given evidence that SM individuals with non-conforming gender identities are exposed to disproportionate levels of mistreatment and trauma across the lifespan (e.g., Roberts, et al., 2012), as well as the widespread conflation of gender expression with sexuality (Valdes, 1996; American Psychological Association, 2015; Bosse & Chiodo, 2016), the attribution "gender expression" was added to the EDS scale in the current study. The predictor *SM-Related Discrimination* was computed by coding "0" (no experiences of mistreatment based on sexual orientation) or "1" (experience of mistreatment based on sexual orientation). *Other Discrimination* coded as "0" (no experience of mistreatment based on reasons other than sexual orientation) and "1" (experience of mistreatment based on reasons other than sexual orientation) was included as a covariate to adjust for the effects of these discrimination experiences.

Covariates and descriptive variables

Demographics. Participants were asked to report several demographic characteristics including age, race, sexual orientation, gender identity, educational background, and relationship status. With the exception of age, which was assessed using a free-response format, demographic characteristics were assessed using standard predefined response options as well as text entry to account for unrepresented categories. For race, responses were collapsed into a binary measurement to produce meaningful comparisons for the analysis: a Race variable was created

by coding “0” (not White) or “1” (White) for each participant and was included as a covariate in analyses. Demographic characteristics of the sample are summarized in Table 1.

Mini International Neuropsychiatric Interview (MINI-5; Sheehan, 2014). To assess and control for potential psychiatric comorbidities at baseline, selected modules from the MINI-5, a short diagnostic structured interview, were administered to assess the presence of a major depressive episode and major depressive disorder (Module A), (hypo)manic episodes and bipolar disorder (Module C), obsessive compulsive disorder (Module G), alcohol use disorder (Module I), substance use disorder (Module J), psychotic disorders (Module K), anorexia nervosa (Module L), bulimia nervosa (Module M), and binge-eating disorder (Module MB). The instrument is based on the MINI-4 which has evidenced good internal reliability and convergent validity with other diagnostic instruments (Sheehan, 1997); however, to date, I am unaware of any published psychometric studies on the MINI-5.

For the current study, three dummy coded variables were computed to indicate participants with past-year substance-use disorder (*Substance Use Disorder*), past-year alcohol use disorder (*Alcohol Use Disorder*), and the presence of Major Depressive Disorder, Bipolar-I, and/or Bipolar-II (*Current Mood Disorder*).

Life Events Checklist for DSM-5 (LEC-5; Weathers, et al., 2013b). At baseline, participants were administered, in paper-and-pencil format, a modified version of the LEC-5, a widely used measure for screening exposure to potentially traumatic events (PTEs) and for facilitating the identification of the index trauma (i.e. the Criterion A traumatic event) upon which to anchor the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers, et al., 2015). To ensure its completion, clinical interviewers reviewed the instrument with the

participant during the interview. The LEC-5 lists sixteen PTEs—events that *prima facie* meet the DSM-5 definition of a PTSD Criterion A event (e.g. physical assault, violent death, sexual assault). For each event type, the respondent is asked to specify how the exposure(s) occurred: directly (“Happened to me”), as a bystander (“Witnessed it”), vicariously (i.e. “learned about it happening to a close family member or close friend”), or as part of one’s job. Respondent may also indicate whether they are uncertain of exposure (“Not sure”) or if exposure has never occurred (“Doesn’t apply”). The LEC-5’s temporal stability, convergent validity with the Traumatic Life Events Questionnaire (TLEQ), and expected associations with PTSD symptoms have been found to be adequate in a sample of non-treatment seeking college undergraduates (Gray, Litz, Hsu, & Lombardo, 2004).

In this study, the instrument was modified for the purposes of assessing baseline exposure to sexual identity-related potentially traumatic events: in addition to reporting exposure type, participants were instructed to indicate whether any endorsed exposure was related to their sexual orientation. A *SM-Related PTE Exposure* variable was created by coding “0” (no exposure to SM-related PTE) or “1” (exposure to SM-related PTE) for each event type and summing the total number of SM-related PTE types experienced by each participant. Item Number 17, “Other Stressful Life Event” was excluded from the analysis due to the ambiguity of the category and inability to *prima facie* designate such endorsements as PTEs.

To assess ongoing exposure to PTEs (i.e., re-traumatization) a past-week version of the modified LEC-5 was administered as part of the weekly survey. Participants were asked if they were exposed to a PTE, whether it was related to their sexual identity, and then were asked to briefly describe the event. Descriptions were qualitatively analyzed. A *Weekly PTE Exposure* variable was created by coding “0” (no exposure to a weekly Criterion A event) or “1” (exposure

to a weekly Criterion A event). A dummy-coded sexual identity-relatedness variable was also created to understand whether weekly PTE exposures were attributed to sexual identity; however, no participants in this sample reported exposure to a Criterion A PTE during the daily diary period.

Clinician-Administered PTSD Scale for DSM-5 (CAPS-5: Past Month Version; Weathers, et al., 2015). The CAPS-5, a 30-item clinician-administered structured diagnostic interview, was administered at baseline to assess the presence and severity of DSM-5 PTSD symptoms in the past-month, establish a PTSD diagnosis, and characterize the Criterion A trauma (i.e. event and exposure type) to which the PTSD symptoms were anchored (Weathers, et al., 2015). The CAPS is a widely used and well-validated measure for PTSD symptom severity and diagnostic status (Weathers, Keane, & Davidson, 2001). The CAPS-5 items assess symptoms as they are chronologically ordered and conceptually organized in the DSM-5: 20 core symptoms are organized into the following four symptom groups or clusters: Criterion B intrusion symptoms (five items: e.g., “In the past month, have you had any unwanted memories of (EVENT) while you were awake, so not counting dreams?”); Criterion C avoidance symptoms (two items: e.g. “In the past month, have you tried to avoid thoughts or feelings about (EVENT)?”); Criterion D negative alterations in cognitions and mood (7 items: e.g., “In the past month, have you had strong negative beliefs about yourself, other people, or the world?”); and Criterion E marked alterations in arousal and activity (6 items: e.g., “In the past month, have you had any problems falling or staying asleep?”).

The CAPS-5 assesses the presence, trauma-relatedness, intensity, and frequency of symptoms, which are then combined by the clinical interviewer to calculate a severity score ranging from 0 (“Absent”) to 4 (“Extreme/incapacitating”). To reach symptom threshold, the

symptom severity score must be 2 (“Moderate/threshold”) or greater. A PTSD diagnosis requires threshold symptoms from each of the clusters: 1 Cluster B symptom, 1 Cluster C symptom, 2 Cluster D symptoms, and 2 Cluster E symptoms. The CAPS-5 total score ranges from 0 to 80, with higher scores indicating greater PTSD severity and/or the presence of a greater number of symptoms. The CAPS-5 total severity score has demonstrated high internal consistency ($\alpha = .88$), good test-retest reliability ($ICC = .78$) and convergent validity with the Posttraumatic Stress Disorder Checklist for DSM-5 ($r = .66$) in military veteran samples (Weathers, et al., 2018).

To characterize the sample, baseline total PTSD severity score was determined by summing the symptom severity scores for CAPS-5 items 1 through 20 (covering symptom clusters B – E) (*CAPS Severity Score*) and a dummy-coded variable, *PTSD Diagnosis*, was computed based on the presence of a Criterion A traumatic event, endorsement of at least 1 Cluster B symptom, 1 Cluster C symptom, 2 Cluster D symptoms, and 2 Cluster E symptoms experienced for at least 1 month, and impairment in at least two areas of functioning. In this sample, the Cronbach’s alpha for the CAPS-5 total was .91, and alphas for Cluster B, Cluster C, Cluster D, and Cluster E severity scores were .80, .57, .82, and .70, respectively.

The CAPS-5 was modified to additionally assess the SM identity-relatedness of the Criterion A trauma. After describing their index trauma, participants were asked whether they believed the event was related in any way to sexual identity. A *SM-Related Criterion A Event* variable was created by coding “0” (index trauma unrelated to SM-identity) and “1” (index trauma related to SM identity). This variable was used as a moderator in Hypothesis 2.

Data Analytic Plan

Given the micro-longitudinal design and the consequent nested structure of the data, I tested study hypotheses by building multilevel models (MLM). MLM is a data analytic technique

that takes into account the clustering of data and the dependence of observations that results from the structure. As such, MLM allows for the parsing of within and between sources of variation in variables of interest (Nezlek, 2012; Iida et al., 2012). Conceptually, the data were structured on two levels—a repeated measurement (level 1) was nested within a person-level (level 2), such that repeated level 1 effects corresponded to fluctuations from the individual's overall mean level (i.e. within-person effects) and the level 2 effects corresponded to differences between overall mean levels (i.e. between-person effects). To prepare the data for MLM, the data were structured into long format (i.e. one row for each data collection time point). To temporally situate participants' survey responses and to control for time effects, time variables *Day* (1-30), *Week* (1-4), and dummy-coded *Weekend* (0 = Monday through Friday; 1 = Saturday through Sunday) variables were computed for each data point.

Separate multilevel models were constructed to assess each outcome of interest (i.e., *Weekly PCL*; *Negative Affect*). Across all models, *Baseline PCL*, *Race*, *Current Mood Disorder*, *Substance Use Disorder*, and *Alcohol Use Disorder* were included as between-person (level 2) covariates; *Other Discrimination Experience*, was included as a within-person (level 1) covariate. *Negative Affect* models employed confirmatory factor analysis to identify the latent variable structure of the PANAS instrument, and *Weekend* was added as an additional covariate to account for day-of-week effects on negative affect (Helliwell & Wang, 2014). Across all MLM analyses, the continuous *Baseline PCL* covariate was grand-mean centered to facilitate interpretation of the intercept values, and AR(1) covariance structures were fitted to test for the autocorrelation of within-subject repeated measurements. The SPSS estimation of maximum likelihood (ML) and the degrees of freedom default of Satterthwaite approximation were utilized.

Results

Participants in this study were between 18 and 62 years of age ($M = 22.10$, $SD = 8.55$). The sample was relatively diverse in terms of racial identity, sexual orientation and gender identity, with the largest proportion identified as cisgender female (63.16%), white (34.21%) and bisexual (44.74%). LEC-5 and CAPS-5 scoring indicated that 39.47% ($n = 15$) met DSM-5 criteria for PTSD, 55.26% ($n = 21$) reported a Criterion A event related to their SM identity, and 71.05% ($n = 27$) reported lifetime exposure to a SM identity-related PTE.

Over the 30-day study period, participants completed an average of 86.23% of prompts ($M = 25.87$, $SD = 4.65$; range = 9 – 30 out of 30 total prompts). 60.53% ($n = 23$) did not report any instance of SM-related discrimination and 13.16% ($n = 5$) did not report any instance of other forms of discrimination. Across a total of 983 daily prompts, there were a total of 37 days in which SM-related discrimination was reported ($M = .04$, $SD = .19$) and a total of 211 days in which other discrimination was reported ($M = .21$, $SD = .41$).

Hypothesis 1: SM-Related Discrimination Experience and Weekly PTSD Symptoms

Multilevel Model Building for Main Effect

To test the hypothesis that exposure to daily sexual minority stress was associated with more severe weekly PTSD symptoms, multilevel modeling was conducted in *SPSS* Version 26 using random intercepts, which allows for between-subject variation in the outcome variable in the absence of the predictor (i.e. PTSD symptom severity in the absence of SM-related discrimination). Since the PCL instrument measured past-week symptoms, temporal precedence of daily discrimination data was assumed: no lagged predictor was computed. In lieu of a lagged variable, I computed weekly totals of SM-related discrimination and other discrimination (i.e. total days of within-week SM-related discrimination and total days of other discrimination) and

aggregated those weekly scores onto the corresponding weekly PCL score for each participant. Only daily surveys with a corresponding weekly PCL score were included in the analysis: 867 (88.20%) of total 983 daily surveys.

To justify the use of multilevel modeling, a null model was initially run to assess the proportion of variation attributed to the clustering structure of the data. Based on covariance estimates (within- and between-variance), I computed the intraclass correlation coefficient (ICC) for *Weekly PCL* (ICC = .79), indicating that the majority of the variation in the measure can be attributed to between-subject differences. The ICC for the predictor, *Weekly SM-Related Discrimination*, was considerably smaller (ICC = .34), indicating that days of perceived within-week SM-related discrimination varied more within individuals than between individuals.

Model building was approached in a stepwise fashion, commencing with the most parsimonious models and gradually adding more complex elements, while assessing model fit criteria (i.e., -2Restricted Loglikelihood (-2LL), Akaike's Information Criterion (AIC), and Schwarz's Bayesian Criterion (BIC)). Table 2 presents model fit information and model dimensions (degrees of freedom, covariance structure, variance of random intercepts when specified, fixed effect estimates) for the sequence of main effect MLM models.

The first iteration of the model included a fixed intercept, level-1 predictor (i.e., *Weekly SM-related discrimination*) and outcome (i.e., *Weekly PCL*), scaled identity covariance structure which makes the assumption of constant variance and absence of autocorrelation, and *Week* as the repeated measurement. The overall effect of the predictor was statistically significant: $F(1, 128) = 10.60, p = .001$. A significant parameter coefficient was also detected: $B = 6.25, t(128) = 4.41, p < .001, 95\% \text{ CI } [6.51, 16.97]$, indicating that for every day of reported SM-related discrimination, same-week PCL scores rose by 6.25 points on average. Upon adding a random

intercept, the hypothesized main effect was no longer significant, indicating insufficient evidence for a relationship between within-person daily SM-related discrimination exposure and same-week PTSD symptom severity when accounting for between-person variation in PCL scores.

In the next model, the *a priori* within-person covariate, *Weekly Other Discrimination*, and *a priori* between-person covariates, *Substance Use Disorder*, *Alcohol Use Disorder*, *Current Mood Disorder*, *Baseline PCL*, and *Race* were added simultaneously to the model. *Alcohol Use Disorder* and *Current Mood Disorder* were non-significant predictors in the model and excluded from the subsequent and final step in model building. Adding the more complex AR(1) covariance structure to the model did not significantly improve the model fit; furthermore, the AR1 rho covariance parameter was insignificant, suggesting that a simpler covariance structure may be used. As Table 2 indicates, model fit improved through the addition of a random intercept and *a priori* covariates, suggesting that between-person characteristics and the inclusion of discrimination based on other stigmatized identities (which was a more common interpersonal stressor than SM-related discrimination) may better approximate this sample's change in PCL scores over time.

Ordinary Least Squares Regression Models

Given the large ICC for *Weekly PCL*, ordinary least squares (OLS) linear regressions were performed to elucidate this between-person effect. To check linear model assumptions, normal distribution of the outcome variable was assessed and confirmed through a non-significant Shapiro-Wilk value, $W(38) = .96, p = .25$. To limit the analysis to between-subject effects and to account for variability in the number of weekly surveys completed (i.e. number of *Weekly PCL* scores), an average days of SM-related discrimination exposure (*Mean SM-Related Discrimination*), average weekly PCL score (*Mean Weekly PCL*), and average days of other

discrimination exposure (*Mean Other Discrimination*) variables were computed for each participant. Correlations and descriptive statistics for these between-person variables and aggregated daily variables appear in Table 3.

A simple linear regression model was calculated to predict between-participant differences in average weekly PCL scores based on average number of reported SM-related discrimination experiences during the 30-day study period. The model was statistically significant, $F(1,36) = 7.67, p = .01$, and accounted for 17.6% of the variance in weekly PCL scores ($R^2 = .18$). A significant parameter coefficient was also detected: $\beta = .42, t(36) = 2.77, p = .01, 95\% \text{ CI } [21.79, 140.87]$, indicating that in this sample between-person differences in average days of SM-related discrimination perception are related to PTSD severity over time.

A multiple linear regression was also conducted to control for pertinent covariates (*Baseline PCL, Current Mood Disorder, Substance Use Disorder, Alcohol Use Disorder, Race, and Mean Other Discrimination*) by entering covariates at step 1 and the focal predictor (i.e., *Mean SM-Related Discrimination*) at step 2. Multicollinearity was assessed among the predictor and each of the covariates: No correlations reached the threshold of .70; all collinearity tolerance statistics were less than 1 and variance inflation factors were less than 2. Maximum and minimum standardized residuals were within the recommended range -3 and 3 (-2.23, 1.53).

In Step 1, the overall model accounted for a significant proportion of variance in average weekly PCL scores: $F(6,31) = 19.09, p < .001, R^2 = .79$. *Baseline PCL* ($\beta = .85, t(31) = 7.48, p < .001$) and *Substance Use Disorder* ($\beta = -.21, t(31) = -2.28, p = .03$) were significant predictors in the model, accounting for 64.32% and 14.44% of the weekly PCL score variance respectively. None of the other covariates emerged as significant predictors in the first step of the model. In Step 2, inclusion of the focal predictor (i.e., *Mean SM-Related Discrimination*) produced a

nonsignificant parameter estimate: $\beta = .03$, $t(30) = .24$, $p = .81$. When controlling for the covariates, perceived sexual discrimination exposure accounted for only .18% of additional variability in the weekly PCL score and did not significantly change the model's predictive power, $F(1,30) = .06$, $p = .81$, $R^2 < .001$. *Baseline PCL* ($\beta = .85$, $t(30) = 7.24$, $p < .001$) and *Substance Use Disorder* ($\beta = -.21$, $t(30) = -2.12$, $p = .04$) remained significant predictors in this step of the model. Parameters for the main effect OLS regression models are summarized in Table 4.

A simple linear regression model was also calculated to test the reversed causal pattern from that hypothesized (i.e. whether between-person differences in baseline PTSD symptom severity, on average, predicted, a greater number of SM-related discrimination experiences over each participant's reporting period). The model was statistically significant, $F(1, 36) = 4.51$, $R^2 = .11$, $p = .04$, accounting for 11.1% of the variance in average number of reported SM-related discrimination experiences ($R^2 = .11$). The reversed causal pattern for other discrimination experiences was also tested as a simple linear regression; however, the model was insignificant, $F(1, 36) = 1.21$, $R^2 = .03$, $p = .28$, indicating that between-person differences in baseline PTSD symptom severity, on average, did not predict a greater number of other discrimination (i.e. non SM-related discrimination) experiences.

Hypothesis 2: Moderation of Main Effect

To test the second hypothesis that endorsement of a Criterion A event related to one's SM identity moderates the relationship between SM-related daily discrimination and weekly PTSD symptoms, a nested cross-level interaction term (i.e. SM-related discrimination x trauma type) was tested as a moderator in the main effect multilevel model (i.e. dependent variable: *Weekly PCL*; independent variable: *Weekly SM-Related Discrimination*). The *a priori* covariates

(level 2: *Baseline PCL, Current Mood Disorder, Alcohol Use Disorder, Substance Use Disorder, Race*; level 1: *Weekly Other Discrimination*) and interaction term were specified as fixed effects. The addition of a random slope led to convergence issues and problems estimating variance; for that reason, parameters for the fixed effects model are reported herein. The interaction term was significant, $F(1, 118) = 4.84$, $B = 5.32$, $t = 2.20$, $p = .03$, 95% CI [.53, 10.11], indicating that among individuals experiencing weekly sexual identity-related discrimination, those who endorsed sexual identity-related index traumas experienced greater increases in weekly PTSD symptom severity when compared to individuals endorsing index traumas unrelated to sexual identity. This moderation of fixed level 1 slopes (versus random level 1 slopes) suggests that slopes of sexual identity-related discrimination over PTSD symptoms vary, in part, as a function of the index trauma's relationship to one's identity. For model fit information and the final results of the moderated MLM analysis, see Table 5.

Hypothesis 3: Daily Sexual ID-Related Discrimination & Daily Negative Affect

To test the hypothesis that exposure to daily sexual minority stress was associated with greater same-day negative affect, a 2-factor confirmatory factor analysis (CFA) was used to verify the latent structure of the dependent variable and multilevel models were subsequently built to test the association between daily minority stress and negative affect.

Confirmatory Factor Analysis of PANAS

To confirm item validity and discriminant validity between the latent constructs *Negative Affect* (NA) and *Positive Affect* (PA) on the within and between level, a 2-factor multilevel confirmatory factor analysis (CFA) was run in *MPlus*. Results of the initial multilevel CFA revealed indicators of poor model fit (CFI = .82, TLI = .80, SRMR_{within} = .07, SRMR_{between} = .14, RMSEA = .06). Item 12 (alert) was not correlated with PA as originally

specified and was cross-loaded onto the NA subscale. Upon removal of item 12, the model fit improved, however indices still indicated inadequate fit (RMSEA = .06, CFI = .84, TLI = .82, SRMR_{within} = .06, SRMR_{between} = .11). Pairs of items sharing the most residual covariance were then identified using the MODINDICES command in MPlus; subsequently, the item from the pair with a lower factor loading, higher residual, and/or higher shared residual with other items was eliminated from the model to improve fit. For example, Item 20 (Afraid) shared a considerable amount of covariance with 7 (Scared) on the within and between level. Afraid had a negative residual variance and shared residual covariance with several other items on the within level, so it was removed from the measurement model. Using this method, Item 11 (Irritable) and Item 8 (Hostile) were also eliminated from the model. In total, 4 indicators (Item 12, Alert; Item 20, Afraid; Item 11, Irritable; and Item 4, Upset) were removed from the model. These changes resulted in the following model fit indices: RMSEA = .04, CFI = .90, TLI = .89, SRMR_{within} = .05, SRMR_{between} = .07. Table 6 presents model fit information of the various CFAs tested and Table 7 provides the results of the final CFA.

Multilevel Model Building for Hypothesis 3

A multilevel model was conducted in SPSS Version 26 using random intercepts, Satterthwaite approximation, and a AR(1) covariance structure, while controlling for the level-2 covariates (*Baseline PCL, Current Mood Disorder, Alcohol Use Disorder, Substance Use Disorder, and Race*) and level-1 covariates (*Other Discrimination and Weekend*). The fluctuating level-1 NA was the designated target and fluctuating *SM-Related Discrimination* was the designated factor. All completed surveys were included in the analytic sample (983 surveys, 100%).

I first computed the intraclass correlation coefficient for *Negative Affect* ($ICC = .61$), indicating that the variation in the measure can be attributed to both within-subject differences and between-subject differences. The first iteration of the model included a fixed intercept, level-1 predictor and outcome, scaled identity covariance structure, and *Day* designated as the repeated measurement in the Mixed Model feature in SPSS. A significant parameter coefficient was detected for *SM-Related Discrimination*: $B = 6.86, t(983) = 7.24, p < .001, 95\% CI [5.00, 8.72]$. To allow for variance of NA intercepts across individuals, a random intercept was then specified. The significant parameter coefficient for the factor, $B = 3.08, t(954.64) = 4.59, p < .001, 95\% CI [1.76, 4.39]$, indicates that when accounting for between-subject variance in daily NA, individual's NA scores rose on average by 3.08 points on days when they encountered SM-related discrimination.

To account for the contribution of potential autoregressive effects (i.e. the correlation of NA scores over time), the AR(1) covariance structure was examined tested by examining the model fit information criterion. The parameter for the predictor remained statistically significant with the AR(1) covariance structure: $F(1, 926.46) = 19.10, B = 2.76, t = 4.37, p < .001, 95\% CI [1.52, 3.99]$, indicating that even when taking into account the correlation of NA scores over time, NA scores increased by 2.76 points on days of exposure to SM-related discrimination.

Next, pertinent covariates (i.e., *Baseline PCL, Race, Current Mood Disorder, Substance Use Disorder, Alcohol Use Disorder, Other Discrimination Experience, Weekend*) were simultaneously added to the model. The model fit improved from previous iterations and the predictor's fixed effect remained statistically significant, $F(1, 929.26) = 8.10, p = .005$.

Removing the non-significant covariates and adding a random effect for the focal predictor, *SM-Related Discrimination*, and the time-varying covariate, *Other Discrimination*,

reduced the model's deviance as indicated by a lower -2LL. While the Wald Statistic in the model's covariance parameters output was insignificant, indicating insignificant variation in slopes, a lowered deviance (-2LL) indicating superior model fit may trump a non-significant Wald Statistic in the case of smaller samples (Heck, Thomas, & Tabata, 2013). The main effect remained statistically significant in the random effects model: $F(1, 23.56) = 5.38$, $B = 2.16$, $t = 2.32$, $p = .029$. In summary, MLM model building indicated that daily experiences of SM-related discrimination are temporally associated with higher negative affect, adjusting for between-level (*Baseline PCL*) and time-varying covariate (*Other Discrimination*) associated with daily negative affect. See Table 8 for model fit information, Table 9 for the parameters of the final model, and Figure 1 for the estimated marginal means of daily negative affect by daily sexual discrimination exposure.

Exploratory Aim

Ordinary Least Squares Regressions for PCL Cluster Analyses

To explore the differential impact of minority stress exposure on each PTSD symptom cluster (i.e., Cluster B: intrusions; Cluster C: avoidance; Cluster D: negative alterations in cognition and affect; Cluster E: hyperarousal), simple OLS regressions were run to determine whether between-participant differences in average monthly SM-related discrimination exposure predicted significant differences in average weekly PCL cluster scores. Subsequently, hierarchical linear regressions were run to adjust for the level-2 covariates, including baseline cluster scores, *Current Mood Disorder*, *Alcohol Use Disorder*, *Substance Use Disorder*, *Race*, and the level-1 covariate, *Other Discrimination*. Weekly cluster PCL scores were computed for each week and participant, and the mean of those weekly scores was used for these between-

level analyses (i.e. *Weekly Cluster B*, *Weekly Cluster C*, *Weekly Cluster D*, and *Weekly Cluster E*). The results of these exploratory regressions are presented in Table 10.

With the exception of Cluster C, all simple linear regressions were statistically significant. In the absence of other covariates, SM-related discrimination, explained, on average, the most variance in weekly cluster B (i.e., intrusion) symptoms ($R^2 = .23$, $\beta = .47$, $t(36) = 3.23$, $p < .005$), followed by Cluster E ($R^2 = .16$, $\beta = .39$, $t(36) = 2.57$, $p = .02$) and Cluster D (i.e., negative alterations in cognition and affect) symptoms ($R^2 = .14$, $\beta = .37$, $t(36) = 2.41$, $p = .02$). However, when controlling for covariates in the hierarchical linear regressions, the effect of SM-related discrimination on the three clusters (B, D, and E) was no longer significant, suggesting that between-level characteristics, particularly baseline cluster score, explained more variance in subsequent week scores than daily identity-related stressors encountered during the study.

Discussion

The aims of this study were to examine the relationships among daily SM-related discrimination, sexual minority identity-related traumatic exposures, weekly PTSD symptom severity and daily negative affect in a diverse sample of trauma-exposed SM individuals. The current study builds upon earlier research examining the impact of minority and traumatic stress on trauma-exposed SM individuals through the employment of gold standard clinical assessment tools and daily diary methodology. These methods offer greater temporal and mechanistic specificity than permitted by cross-sectional analyses and thus stronger evidence for causal relationships.

I hypothesized that I would find support for a relationship between daily SM-related discrimination and within-week PTSD symptom severity, controlling for covariates hypothesized to impact between-person variability in PTSD symptom severity (i.e., baseline PTSD symptom

severity and psychiatric comorbidity) and the interaction of PTSD symptoms and SM-related discrimination (i.e. race, other discrimination experiences). Although results support a relationship between SM-related discrimination experiences and PTSD symptom severity in the following time period, this effect was lost when accounting for between-person variation in PTSD symptom severity and relevant between-person covariates. These mixed results suggest that while overall SM-related discrimination was related to PTSD symptom severity over time (consistent with earlier studies: Straub, et al., 2018; Szymanski & Balsam, 2011; Dworkin, et al., 2018), between-person differences in baseline PTSD symptom severity may be a more reliable predictor of an individual's stability and variability in PTSD symptom severity than exposure to subsequent everyday SM-related discrimination.

There are several reasons for these mixed results. First, PTSD symptom severity is a relatively stable construct with high test-retest reliability (Blevins, Weathers, Davis, Witte, & Domino, 2015). Furthermore, PTSD symptom severity is even less variable in individuals who meet subthreshold PTSD: In a two-week diary study of former U.S. service members, Biggs, et al. (2019) demonstrated that individuals with probable PTSD showed significant variation in day-to-day PCL scores (2.51 – 9.35 points), while individuals with improbable PTSD did not show significant variation (.23 –1.83 points). Since the majority of the sample in the current study did not meet the probable PTSD threshold ($n = 23$, 60.52%), we would expect much less variability in the weekly PCL score from the baseline score. As follows, PCL scores' variability was primarily between-person ($ICC = .80$) and baseline symptom severity accounted for the largest portion of between-person variation in weekly symptom severity (64.32%). In comparison, earlier studies that found significant interactions between traumatic and minority stress, may have controlled for between-person covariates, including education, age, annual

income, and race/ethnicity; however, such covariates either accounted for a low proportion of the variation in PTSD symptom scores (i.e. in Szymanski & Balsam, 2011, the “education” covariate accounted for 2.4% of variation in PTSD symptoms) or the covariates did not significantly impact the hypothesized regression and were excluded from the final model (Straub, et al., 2018). Additionally, the impact of perceived discrimination on negative health outcomes may be less dramatic when measured longitudinally: Schmitt, et al. (2014), for example, found that the effect size in cross-sectional analyses were more robust.

Second, the majority of participants did not report SM-related discrimination during the 30-day study period; accordingly, discrimination varied more within- than between- participants ($ICC = .34$), with only 39.47% of participants ($n = 15$) collectively reporting 37 SM-related discrimination experiences. Given the stability of the outcome measure and the low base rate of the predictor, a large sample size or a dramatic effect would be needed to find a statistically significant relationship. In contrast to a low frequency of daily SM-related discrimination, 86.84% of participants ($n = 33$) in the current study collectively reported 211 other discrimination experiences. Perhaps, as a result, we detected a subtle but significant effect of weekly other discrimination on within-person PTSD symptom severity. A previous study also found that SM participants were more likely to endorse discrimination experiences unrelated to sexual identity (Livingston, 2017). In a two-week ecological momentary assessment study examining the impact of sexual and gender identity-related discrimination on substance and nicotine use ($N = 50$), only 26% of the sexual and gender minority sample ($n = 13$) reported 97 instances of sexual or gender identity-related discrimination and 72% of the sample ($n = 36$) reported 210 instances of other discrimination (Livingston, 2017). This difference may be attributable to the concealable nature of sexual identity in contrast to race, ethnicity, gender

expression, etc. However, it is also conceivable that our sample experienced or perceived less personal SM-related discrimination than other SM populations.

Third, the data supported a between-person reversed causal pattern from that hypothesized; baseline PTSD symptom severity, on average, predicted a greater number of SM-related discrimination experiences over the 30-day period. In the current study, participants reporting SM-related discrimination had an average baseline PCL score of 36.20 (approximately 4.5 points higher than the sample's average of 31.55). Moreover, roughly half of those participants reporting SM-related discrimination met criteria for PTSD in the CAPS-5 ($n = 8$, 53.33%), and 70.27% of the SM-related discrimination instances were reported by participants meeting PTSD criteria. Interestingly, baseline PTSD symptom severity did not significantly predict rates of non SM-related (i.e., other) discrimination experiences on average, suggesting that traumatic stress may uniquely interact with SM stress to shape social perception of SM-related discrimination in SM populations.

While associations between PTSD symptom severity and reported frequency of SM-related discrimination presents difficulty with respect to establishing temporal order, the reverse pattern indicates a few possibilities: 1) Participants with higher baseline PTSD symptom severity tend to be nested within environments in which SM-related discrimination is more commonplace and blatant. 2) Elevated instances of reported SM-related discrimination among individuals with greater PTSD symptom severity is a consequence of attentional bias towards trauma-related cues (Cluster B) and/or enhanced threat detection (Cluster E) found in PTSD (Brewin & Holmes, 2003; Olff, 2005; Dunsmoor & Paz, 2015). Researchers, particularly those interested in altered fear learning circuitry, have employed fear conditioning paradigms to demonstrate that participants with PTSD exhibit asymmetric biases towards emotionally threatening stimuli along

a gradient of physical similarity, as shown through elevated autonomic arousal (Dusnmoor & Paz, 2015) and neural activity in areas of the brain associated with learning (Morey, et al., 2015). With respect to our sample, those with higher baseline symptom severity (and particularly those with a history of interpersonal trauma) may be most attentive towards interpersonal experiences that signal or intimate rejection, exclusion, or threat on the basis of one's sexual identity (i.e. SM-related discrimination). 3) PTSD symptoms and minority stress exposure may interact in a bi-directional relationship, in which SM stress exposure maintains PTSD symptoms in a feedback loop: past and ongoing SM stress exposure reinforces the emotional salience of sexual identity, Criterion A exposure results in physiological and psychological shifts that promote fear learning biased towards emotionally salient stimuli (e.g. sexual identity-based threat) resulting in intrusion symptoms and emotional distress (Cluster B) (Morey, et al., 2015). Emotional distress may prompt subsequent attempts to remove or diminish distress (i.e. avoidance, Cluster C), amplify post-traumatic cognitions and shifts in mood (Cluster D), &/or reinforce hyperarousal (Cluster E). Unique associations between PTSD symptom severity and SM-related discrimination but not of other discrimination experiences in this sample suggests that PTSD symptoms, rather than intensifying general threat detection (i.e. all forms of discrimination, Cluster E), symptoms are selectively biasing attention towards stimuli that are particularly salient.

Based on the premise that SM-related discrimination experiences would be more salient to those with a history of a sexual identity-related Criterion A, I hypothesized that sexual identity-related Criterion A exposure would moderate the relationship between SM-related discrimination and weekly PTSD symptom severity. MLM results supported this hypothesis. Findings indicate that, as a group, individuals with sexual identity-related Criterion A events

who encounter sexual identity-related discrimination may be at heightened risk for protracted or elevated PTSD symptoms. This significant cross-level interaction lends support for contextualizing trauma exposure when understanding PTSD risk in SM populations; although identity-related discrimination and trauma type did not significantly predict within-person weekly PTSD symptom severity as fixed predictors, the interaction of trauma type and contextual interpersonal minority stress explained significant variation in weekly symptom severity. These findings offer early evidence that higher-order cognitive representations of traumatic incidents (i.e. identity-relatedness) may meaningfully impact appraisals of subsequent interpersonal stressors which in turn impact posttraumatic symptoms in SM individuals. While research on fear generalization has been explored along perceptual dimensions (i.e. investigation of trauma cues along physical similarity and emotional intensity gradients) (Dunsmoor & Paz, 2015; Morey et al., 2015), future research can improve the ecological validity of fear generalization by incorporating such higher order cognitive representations to capture the full complexity of traumatic events (Dunsmoor & Murphy, 2015). Clinically, these findings highlight the importance of attending to SM individuals' retrospective appraisals of their trauma in relationship to identity and daily perceptions of heterosexism.

Consistent with my third hypothesis, SM-related discrimination was significantly associated with same-day negative affect, a psychological construct associated with PTSD (Dornbach-Bender, et al., 2020) and minority stress exposure (Eldahan, et al., 2016). This significant main effect remained after accounting for individual differences in average daily negative affect, variability of negative affect in response to SM-related discrimination, psychiatric comorbidity, race, exposure to other forms of discrimination, day of the week and autoregressive effects. These results corroborate earlier findings linking SM stress and perceived

discrimination with negative affect and provide compelling evidence for the impact of daily SM stress on the lives of trauma-exposed SM individuals. In the current sample, both SM-related discrimination and other discrimination experiences roughly impacted negative affect scores to the same degree, despite the larger number of other discrimination reports and greater proportion of participants reporting other discrimination. Future studies could expand upon these findings by testing lagged effects of SM-related discrimination on subsequent day negative affect (in line with Eldahan, 2016) and employing cross-lagged models to determine what role, if any, negative affect associated with perceived discrimination plays in sustaining PTSD symptoms among SM individuals over time (extending Mekawi, et al.'s 2020 cross-sectional findings on negative affect's role in attentional bias to threat and PTSD symptom severity).

Results of exploratory analyses indicated that SM-related discrimination, on average, explained significant variation in weekly intrusion, cognitive/emotional, and hyperarousal symptoms of PTSD, but did not significantly explain variation in PTSD avoidance symptoms. The reverse causal pattern (i.e. baseline PTSD symptom cluster score as predictor and SM-related discrimination as outcome) was only found for PTSD intrusion symptoms. In contrast, other discrimination experiences, only explained significant variation in weekly hyperarousal symptoms of PTSD; and in the reverse causal pattern, no cluster scores predicted other discrimination experiences on average. Together with the significant moderation effect, these findings lend more plausibility to a hypothesized salience response model, in which ongoing SM stress exposure (e.g. SM-related Criterion A events) interacts with traumatic stress pathology (asymmetric fear learning and attentional biases towards emotionally salient cues), resulting in greater attention to sexual identity-based discrimination (as a function of emotional salience) and an amplification of Cluster B (i.e., intrusion) symptoms in turn (versus generalized threat

detection, i.e. Cluster E hyperarousal symptoms). Future studies with larger samples could employ cross-lagged models to determine whether such a feedback loop exists between intrusion symptoms and reported experiences of SM-related discrimination and whether emotional distress in response to SM-related discrimination uniquely predicts weekly PTSD intrusion symptom severity.

Limitations

Despite its novel contributions, this study is not without limitations. First, the sample primarily consists of undergraduate students attending Hunter College in New York City, which may limit generalizability to other SM individuals who live in climates less accepting of SM individuals and to different SM cohorts that have experienced varying levels of minority stress over their life course. Our sample was diverse with respect to racial/ethnic background, but less heterogeneous with respect to age, educational attainment, and gender, which likely biased findings. Second, while the current study progresses methodology by including a clinician-administered instrument, longitudinal assessment of PTSD symptoms still relied on self-report which may bias findings. Third, while other discrimination and race were covaried in statistical analyses, these analyses did not examine the impact of intersectionality on participants in the sample. Given the diversity of our sample, the effects of racial and sexual minority stigma are not likely mutually exclusive. Following the lead of English et al., 2018, future analyses from this study could investigate the interaction and multiplicity of racial stigma (i.e. discrimination attributed to race) with distal or proximal sexual minority stressors (i.e. discrimination attributed to sexual identity, internalized heterosexism, etc.). Fourth, the dichotomization of the Everyday Discrimination Scale constrained within-subject variability of daily perceptions of sexual minority-related and other discrimination experiences, resulting in lower estimates of perceived

discrimination. Dichotomization of the EDS precluded a granular analysis if and when participants perceived multiple mistreatment experiences and multiple attributions (i.e. it wasn't possible to discern how the individual interpreted each form of mistreatment). Fifth, factors that confer resilience to trauma-exposed SM individuals were not tested in my analyses and would likely provide important clues as to why certain SM individuals are more resilient to subsequent minority stress following trauma exposure. Future analyses should assess relevant resilience factors including social support, pride, and identity affirming experiences. Finally, the small sample size may have underpowered results, resulting from an inflated type 2 error risk.

Conclusions

Trauma-exposed SM individuals remain at high risk for the development of PTSD relative to general population. While 6.8 – 7.3% of trauma-exposed Americans will develop PTSD, 39.47% of our sample met criteria for PTSD providing direct evidence of the epidemiology of risk. While the literature to date demonstrates a compelling relationship between SM stress exposure and PTSD symptom severity, temporal specificity is still lacking. Close associations between traumatic stress symptom clusters and SM stress (over and above other forms of discrimination) provide further evidence of an interaction between traumatic stress and minority stress and the salience of sexual identity-related threat for trauma exposed SM individuals. Preliminary results described herein provide evidence of the interaction between traumatic stress and minority stress and suggest future research directions with the aim of better understanding minority stress's role in PTSD etiology and persistence.

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Table 1
Demographic Characteristics of the Sample (N = 38)

	<i>M</i>	<i>SD</i>
	<i>n</i>	%
Age	22.10	8.55
Sexual Orientation		
Bisexual	17	44.7
Other Non-Exclusively Heterosexual Identity (e.g., queer, pansexual, asexual)	10	26.3
Lesbian	7	18.4
Gay	4	10.5
Gender Identity		
Cisgender Female	24	63.2
Gender Non-Conforming (e.g. genderqueer, non-binary)	6	15.8
Cisgender Male	5	13.2
Transgender	3	7.9
Race/ethnicity		
White/Caucasian	13	34.2
Asian/Pacific Islander	9	23.7
Multiple races/ethnicities	6	15.8
Hispanic/Latino	5	13.2
Black	2	5.3
Middle Eastern	2	5.3
Decline to answer	1	2.6
Educational Attainment		
Some College	20	52.6
High school degree or equivalent	8	21.1
Associate's Degree	3	7.9
Bachelor's Degree	4	10.5
Some Graduate School or Graduate Degree	3	7.9
Mental Health Treatment		
In Treatment	16	42.1
Not in treatment, but history of treatment	15	39.5
No history of treatment	4	10.5
Decline to report	3	7.9

Table 2

Fit Information for Multilevel Model Investigating Impact of Daily Minority Stress on Same Week PCL (n weekly observations = 128)

Model	1	2	3	4
	Fixed Intercept	Random Intercept	Random Int., covariates	Random Int., sig. covariates, AR(1)
Fixed Parameter Est. (B)				
Intercept	22.90***	24.62***	12.43	12.37
Within-Person Level				
Weekly SM-Related Discrimination	6.25***	-.11	-1.56	-1.59
Weekly Other Discrimination	--	--	1.18*	1.22*
Between-Person Level				
Baseline PTSD Severity	--	--	.85***	.90***
White Race	--	--	5.76*	5.44*
Substance Use Disorder	--	--	-13.31*	-15.09*
Current Mood Disorder	--	--	3.60	--
Alcohol Use Disorder	--	--	-5.35	--
Variance				
Intercept	--	208.78***	34.45***	33.05*
Model dimensions				
Number of parameters	3	4	10	9
Covariance structure for: Repeated Measures / Random Effects	Identity	Identity/VC	Identity/VC	AR(1)/VC
Model Fit				
-2LL	1061.52	973.01	913.50	915.49
AIC	1067.52	981.01	933.50	933.49
BIC	1076.08	992.41	962.02	959.16
Change in Model Fit				
Δ -2LL	--	-88.51***	59.51***	1.99
Δ Model df	--	1	6	-.01
Δ AIC	--	-86.51	-47.51	-1
Δ BIC	--	-83.67	-30.39	-2.86

Notes. Model fit estimates are unweighted. Maximum Likelihood (ML) estimation was employed for comparing model fit estimates. -2LL = -2 Log Likelihood. AIC = Akaike's Information Criterion. BIC = Schwarz's Bayesian Criterion. AR(1) = autoregressive. VC = Variance Components. *** $p < .005$, ** $p < .01$, * $p < .05$.

Table 3

Correlations Among Between-Person Traumatic Stress and Minority Stress Variables, Demographic Covariates, and Post-Hoc Variables of Interest

	1	2	3	4	5	6	7	8	9	10	11	12
1. Weekly PTSD Symptom Severity (PCL-5)	--											
2. Mean SM-Related Discrimination (EDS)	.42**	--										
3. Baseline PTSD Severity (PCL-5)	.82***	.33*	--									
4. Mean Other Discrimination (EDS)	.33*	.62***	.18	--								
5. Race	.12	.07	-.09	.26	--							
6. Substance Use Disorder (MINI-5)	.08	.01	.33*	.18	.08	--						
7. Current Mood Disorder (MINI-5)	.53**	.38*	.64***	.16	-.24	.17	--					
8. Alcohol Use Disorder (MINI-5)	-.04	.08	.16	-.05	-.07	.30	.24	--				
9. SM-Related Criterion A Event (CAPS-5)	-.003	.08	-.05	.20	.20	.21	-.18	-.04	--			
10. PTSD Diagnosis (CAPS-5)	.64***	.35*	.71***	.10	-.24	.29	.64***	.25	.08	--		
11. SM-Related PTEs (LEC-5)	.26	.13	.36*	.13	.09	.04	.22	.06	.13	.21	--	
12. Mean All Discrimination (EDS)	.38*	.70***	.19	.96***	.27	.03	.20	-.08	.14	.12	.12	--
<i>M</i>	24.48	.04	31.55	.23	.34	.05	.21	.11	.39	.55	1.74	6.53
<i>SD</i>	15.31	.08	15.34	.25	.48	.23	.41	.31	.50	.50	1.52	7.47

Notes. *** $p < .005$, ** $p < .01$, * $p < .05$. Between-person values for daily diary variables (i.e., SM-Related Discrimination, Other Discrimination, Weekly PTSD Symptom Severity) were computed by averaging repeated measurements across each participant's reportage period.

Table 4

Hierarchical Linear Regression Analysis of Between-Person Effect of Daily Sexual Identity-Related Discrimination on Weekly PTSD Symptom Severity

Weekly PTSD Symptom Severity (PCL-5)					
<i>A Priori</i> Covariates, Step 1					
Variance explained, Model sig.	$R^2 = .79, p < .001$				
	B	S.E.	β	<i>t</i>	<i>p</i>
Constant	-5.54	3.50		-1.58	.12
Baseline PTSD Symptom Severity (PCL-5)	.85	.11	.85	7.48	<.001
White Race	5.56	2.87	.18	1.94	.06
Current Mood Disorder (MINI-5)	2.44	4.26	.07	.57	.57
Substance Use Disorder (MINI-5)	-14.38	6.29	-.21	-2.28	.03
Alcohol Use Disorder (MINI-5)	-5.37	4.43	-.11	-1.21	.23
Mean Frequency Other Discrimination (EDS)	9.74	5.60	.16	1.74	.09
Sexual ID-Related Discrimination, Step 2					
Variance explained, Model sig.	$\Delta R^2 = 0, R^2 = .79, p = .81$				
	B	S.E.	β	<i>t</i>	<i>p</i>
Constant	-5.36	3.64		-1.47	.15
Mean Sexual ID-Related Discrimination (EDS)	5.49	23.09	.03	.24	.81
Baseline PTSD Symptom Severity (PCL-5)	.84	.12	.85	7.24	<.001
White Race	5.57	2.91	.18	1.91	.07
Current Mood Disorder (MINI-5)	2.24	4.41	.06	.51	.62
Substance Use Disorder (MINI-5)	-13.99	6.59	-.21	-2.12	.04
Mean Other Discrimination (EDS)	8.68	7.24	.14	1.20	.24
Alcohol Use Disorder (MINI-5)	-5.50	4.53	-.11	-1.22	.23

Table 5

Model Fit Information and Results of Final Multilevel Model Investigating Interaction of Sexual Identity-Related Criterion A Event & Daily Minority Stress on Same Week PCL (n weekly observations = 128)

	<i>B</i>	S.E.	<i>t</i> value	<i>p</i>
Within-Person Level				
Weekly SM-Related Discrimination	.98	1.80	.55	.59
Weekly Other Discrimination	1.22*	.54	2.26	.03
Between-Person Level				
Baseline PTSD Severity	.82***	.10	8.17	.000
White Race	4.74	2.53	1.87	.07
Substance Use Disorder	-13.72*	6.11	-2.25	.03
Current Mood Disorder	3.71	3.83	.97	.34
Alcohol Use Disorder	-4.40	3.87	-1.14	.26
Sex ID-Related Criterion A Event	.17	2.45	.07	.95
Cross-Level Interaction				
Sex ID-Related Criterion A Event * SM-Related Dsc	5.32*	2.42	2.20	.03
Variance				
Intercept	29.64**			
Model dimensions				
Number of parameters	12			
Covariance structure for: Repeated Measures / Random Effects	Identity/VC			
Model Fit				
-2LL	908.37			
AIC	932.37			
BIC	966.60			

Notes. Model fit estimates are unweighted. Maximum Likelihood (ML) estimation was employed for comparing model fit estimates. -2LL = -2 Log Likelihood. AIC = Akaike's Information Criterion. BIC = Schwarz's Bayesian Criterion. AR(1) = autoregressive. VC = Variance Components. *** $p < .005$, ** $p < .01$, * $p < .05$.

Table 6

Model Fit Information for Tested Confirmatory Factor Analyses of PANAS instrument (n daily observations = 940)

Model	1	2	3	4	5
Modification	Unmodified	Removed Item 12	Removed Items 12, 20	Removed Items 12, 20, 11	Removed Items 12, 20, 11, 4
Mod. Rationale		Cross-loading of 12 (Alert) on NA (Negative Affect)	20 (Afraid) had a negative residual variance (-.01), cross-loaded onto PA (positive affect), and shared residual covariance with 4, 7, 8, 11, and 15 on the within- level and with 7 on the between- level	11 (Irritable) shared residual covariance with 8 (Hostile) at within and between level; cross-loading of 11 on PA	4 (Upset) shared variance with 2 (Distressed) at within and between level
Mod. Index		66.52	261.5	99.68	67.94
Std. EPC		.28	.23	.21	.32
χ^2 (df)	1351.07 (338)	1155.15 (302)	922.44 (268)	741.819 (236)	569.53 (206)
Model Fit					
RMSEA	.06	.06	.05	.05	.04
CFI	.82	.84	.86	.88	.90
TLI	.80	.82	.85	.87	.89
SRMR _{within}	.07	.06	.05	.05	.05
SRMR _{between}	.14	.11	.10	.09	.07

Notes. Std. EPC = Standardized Expected Parameter Change. RMSEA = Root Mean Square Error of Approximation. CFI = Comparative Fit Index. TLI = Tucker Lewis Index. SRMR = Standardized Root Mean Square Residual.

Table 7*Results of the final multilevel confirmatory factor analysis of the PANAS scale*

Item	Within Level		Between Level		ICC
	λ	S.E.	λ	S.E.	
Positive Affect Subscale					
1. Interested	.68	.03	.89	.05	.40
3. Excited	.73	.02	.93	.04	.30
5. Strong	.65	.03	.89	.07	.44
9. Enthusiastic	.76	.03	.95	.03	.44
10. Proud	.66	.03	.87	.07	.40
14. Inspired	.62	.03	.95	.03	.40
16. Determined	.61	.04	.93	.05	.41
17. Attentive	.45	.05	.77	.09	.50
19. Active	.48	.04	.72	.11	.46
Negative Affect Subscale					
2. Distressed	.71	.04	.72	.08	.33
6. Guilty	.54	.08	.96	.02	.44
7. Scared	.57	.07	.90	.06	.42
8. Hostile	.40	.05	.51	.16	.41
13. Ashamed	.61	.07	.99	.01	.44
15. Nervous	.61	.05	.91	.03	.44
18. Jittery	.45	.07	.87	.05	.57

Notes. Factor loadings (λ) are presented in standardized form. All results are significant at the $p < 0.001$ level. ICC = intraclass correlation.

Table 8

Model Fit Information for Multilevel Models Investigating Impact of Daily SM Stress on Same Day Negative Affect (n daily observations = 983)

Model	1	2	3	4	5	6
	Fixed Intercept	Random Intercept	Random Intercept, AR(1)	Random Intercept, AR(1), covariates	Random Intercept, AR(1), sig. Covariates	Random Slope, AR(1), Sig. Covariates
Fixed Parameter Est. (B)						
Intercept	20.32***	16.72***	16.44***	14.85***	14.62***	15.01***
Within-Person Level						
SM-Related Discrimination	6.86***	3.08***	2.76***	1.83**	1.82**	2.16*
Other Discrimination				2.03***	2.03***	1.87***
Between-Person Level						
Baseline PTSD Symptom Severity				.18***	.18***	.18***
White Race				2.66*	2.78*	2.67*
Substance Use Disorder				-5.68*	-6.29**	-6.08**
Weekend				-.72**	-.72**	-.66**
Alcohol Use Disorder				-1.65		
Current Mood Disorder				-.19		
Variance						
Intercept		18.56***	17.93***	8.63***	8.87***	5.55*
Slope of SM-Related Dsc						3.04
Slope of Other Dsc						1.05
Model dimensions						
Number of parameters	3	4	5	12	10	12
Covariance structure for: Repeated/Random Effects	Identity	Identity	AR(1)	AR(1)	AR(1)	AR(1) / VC
Model Fit						
-2LL	6197.06	5490.16	5358.87	5290.26	5291.21	5283.69
AIC	6203.06	5498.16	5368.87	5314.26	5311.21	5307.69
BIC	6217.73	5517.72	5393.33	5372.94	5360.12	5366.37
Change in Model Fit						
Δ -2LL		-706.90***	-131.29***	-68.61***	.34	-7.52*
Δ Model df		1	1	7	-2	2
Δ AIC		-704.90	-129.29	-54.61	-3.66	-3.52
Δ BIC		-700.01	-124.39	-20.39	-13.44	6.25

Notes. Model fit estimates are unweighted. Maximum Likelihood (ML) estimation was employed for comparing model fit estimates. -2LL = -2 Log Likelihood. AIC = Akaike's Information Criterion. BIC = Schwarz's Bayesian Criterion. AR(1) = autoregressive. VC = Variance Components. *** p < .005, ** p < .01, *p < .05.

Table 9

Results of final multilevel model examining the role of sexual identity-related discrimination on same-day negative affect

	<i>B</i>	S.E.	<i>t</i> value	<i>p</i>
Within-Person Level				
SM-Related Discrimination	2.16*	.93	2.32	.03
Other Discrimination	1.87***	.37	4.99	<.005
Between-Person Level				
Baseline PTSD Symptom Severity	.18***	.03	5.09	<.005
Race	2.67*	1.06	2.52	.02
Substance Use Disorder	-6.08*	2.41	-2.52	.02
Weekend	-.66***	.24	-2.71	.01

*** $p < .005$, ** $p < .01$, * $p < .05$.

Table 10

Results from Simple and Hierarchical Linear Regression Analyses of Between-Person Effect of Sexual Identity-Related Discrimination on Weekly PTSD Cluster Symptoms^a

	Weekly Cluster B		Weekly Cluster C		Weekly Cluster D		Weekly Cluster E	
Simple Regression								
Explained variance, std. coefficient, sig.	R ² = .23, β = .47, p < .005		R ² = .03, β = .17, p = .30		R ² = .14, β = .37, p = .02		R ² = .16, β = .39, p = .02	
A priori covariates, Step 1								
Variance explained, Model sig.	R ² = .68, p < .005		R ² = .57, p < .005		R ² = .76, p < .005		R ² = .59, p < .005	
	β	p	β	p	β	p	β	p
Baseline Cluster Severity (PCL-5)	.78	<.005	.46	<.005	.74	<.005	.66	<.005
White Race	.17	.14	.13	.32	.12	.21	.24	.08
Current Mood Disorder (MINI-5)	.01	.97	.45	.01	.23	.06	.02	.90
Substance Use Disorder (MINI-5)	-.23	.06	.12	.36	-.16	.14	-.20	.15
Alcohol Use Disorder (MINI-5)	-.12	.28	-.22	.11	-.12	.23	.00	.98
Mean Frequency Other Discrimination (EDS)	.03	.84	.07	.67	.13	.31	.19	.27
Sexual ID-Related Discrimination, Step 2								
	ΔR ² = .01, p = .35		ΔR ² = .01, p = .50		ΔR ² = .00, p = .91		ΔR ² = .01, p = .57	
Sexual Identity-Related Discrimination	.14	.35	-.11	.50	.12	.91	.09	.57

^a All standardized regression coefficient values are derived from the final step in each cluster model.

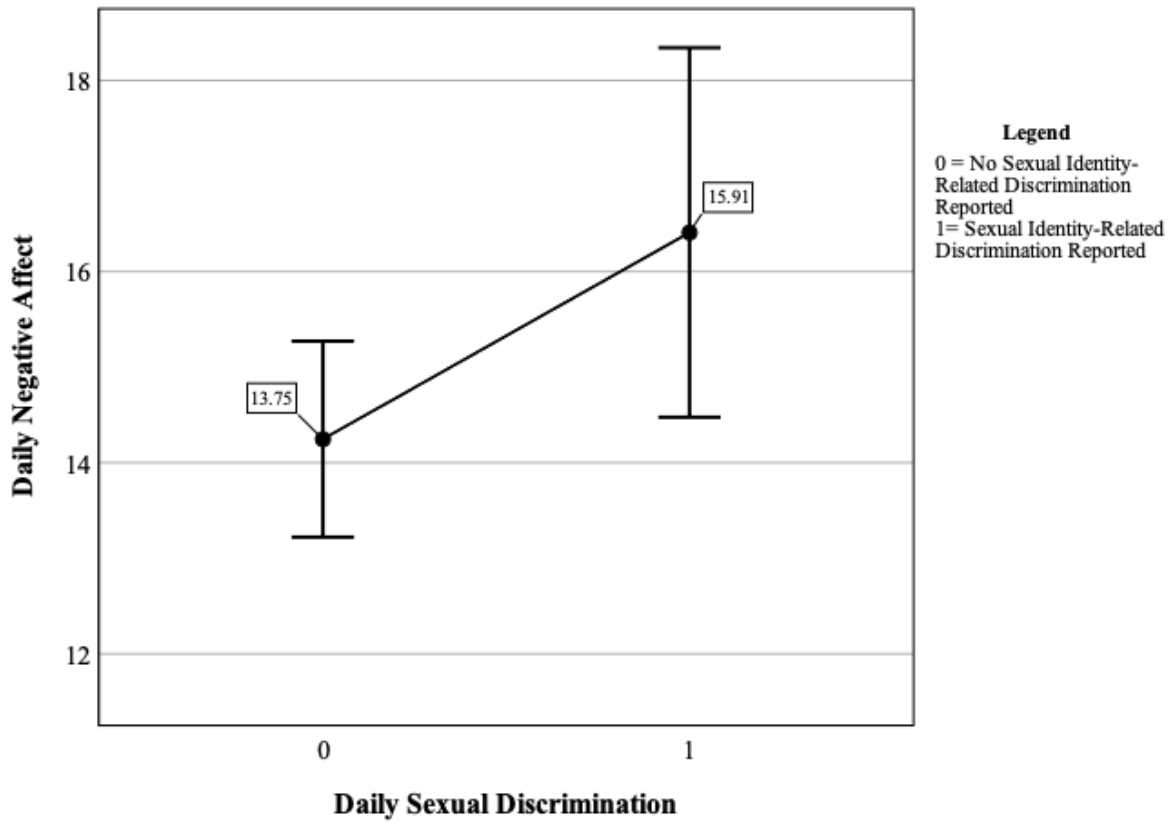


Figure 1. Estimated Marginal Means for Significant Random Effect: Daily Negative Affect by Sexual Identity-Related Discrimination. Significant covariates appearing in the model are evaluated at the following values: *Significant covariates appearing in the model are evaluated at their grand-mean centered values: Other Daily Discrimination = .2146, Baseline PCL = 31.3632, Substance Use Disorder = .0366, White Race = .3388, Weekend = .2909.