# AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY OF SEXUAL MINORITY STRESS AND NONSUICIDAL SELF-INJURY IN SEXUAL MINORITY

# ADULTS

By

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### ABSTRACT OF THE DISSERTATION

# An Ecological Momentary Assessment Study of Sexual Minority Stress and Nonsuicidal Self-Injury in Sexual Minority Adults by KARA BINDER FEHLING

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Lesbian, gay, bisexual, and queer (LGBQ; i.e., sexual minority) people are significantly more likely than their heterosexual counterparts to engage in nonsuicidal self-injury (NSSI). While some research suggests that experiences of minority stress (e.g., discrimination based on sexual identity) increases risk for NSSI in sexual minorities, no studies to date have examined whether minority stress influences NSSI thoughts and behaviors in real-time. The current study fills this gap in the literature by utilizing ecological momentary assessment (EMA) to examine minority stress, NSSI, and mental health in LGBQ adults. 21 LGBQ adults (aged 18-50) with recent histories of NSSI completed multiple surveys a day over a two-week monitoring period, answering questions about minority stress, psychological distress, NSSI thoughts, NSSI behaviors, rumination, and other related constructs. Results largely supported two of three primary hypotheses. First, greater experiences of minority stress concurrently and prospectively predicted greater psychological distress in real-time. Second, greater experiences of minority stress concurrently predicted greater engagement in NSSI thoughts and behaviors at the same timepoint and on the same day during EMA. Third, while

rumination was associated with both minority stress and NSSI, it did not mediate the relationship between minority stress and NSSI. These findings extend current understanding of the impact of minority stress and rumination on NSSI in LGBQ adults, and they have important implications for future research on NSSI as well as potential intervention and prevention methods for self-harm in sexual minority populations.

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#### **I. Introduction**

Nonsuicidal self-injury (NSSI), defined as the purposeful destruction of body tissue without suicidal intent (Klonsky & Muehlenkamp, 2007), is a significant public health issue. While NSSI seems particularly frequent in adolescents, with prevalence rates as high as 36% (Zetterqvist, Lundh Dahlström, & Svedin, 2013), NSSI remains a relevant concern in adult populations as well (Swannell et al., 2014; Klonsky, 2011). Although there are many reasons why an individual may engage in NSSI, most individuals who self-injure report engaging in NSSI to alleviate negative emotions (Klonsky, 2011; Sornberger, Smith, Toste, & Heath, 2013; Klonsky, 2009). Laboratory studies substantiate the emotional negative reinforcement function of NSSI, finding that self-reported negative emotions decrease in self-injurers after completing pain tasks inlab (Bresin & Gordon, 2013; Weinberg & Klonsky, 2012). The literature accordingly supports the idea NSSI is associated with general emotion regulation difficulties through cross-sectional self-report studies (e.g., Perez, Venta, Garnaat, & Sharp, 2012), longitudinal studies (e.g., Andrews, Martin, Hasking, & Page, 2013), and review papers (e.g., Andover & Morris, 2014). Specifically, NSSI has been associated with maladaptive emotion regulation strategies such as rumination (a cognitive process that involves repetitive focus on problems and emotional experiences) (Andover & Morris, 2014; Hoff & Muehlenkamp, 2009). While the connection between NSSI and emotion dysregulation is clear, more research is needed to better predict why and when specifically individuals with intense emotion dysregulation turn to NSSI as a coping method.

Although research on NSSI has drastically expanded in recent decades, NSSI remains relatively misunderstood, hard-to-treat, and ever-increasing in its prevalence

(Klonsky, Muehlenkamp, Lewis, & Walsh, 2011; Nock, 2012). This difficulty to understand and treat NSSI is alarming given that NSSI is associated with a variety of deleterious consequences, most notably increased risk for suicide attempts (Wilkinson, Kelvin, Robberts, Dubicka, & Goodyer, 2011; Guan, Fox, & Prinstein, 2012; Asarnow et al., 2011). NSSI is a complex and heterogeneous behavior that does not appear in specific patterns along diagnoses (Nock et al., 2006), making it important to study within specific sub-populations that face increased risk for self-harm (Reisner, Biello, Perry, Gamarel, & Mimiaga, 2014).

One such sub-population is sexual minorities (people who identify as lesbian, gay, bisexual, queer, [LGBQ] or other non-heterosexual sexual orientations and identities). Research demonstrates that LGBQ people have very high risk of suicidal behaviors, and that this risk applies to both youth (Russell & Joyner, 2001; Eisenberg & Resnick, 2006; Reisner, Biello, Perry, Gamarel, & Mimiaga, 2014) and adult populations (King et al., 2008; Chakraborty, McManus, Brugha, Bebbington, & King, 2011; Plöderl et al., 2013). Relatedly, LGBQ youth and adults are significantly more likely than their heterosexual counterparts to engage in NSSI (Batejan, Jarvi, & Swenson, 2015; Deliberto and Nock, 2009; Blosnich & Bossarte, 2012; Skegg, Nada-Raja, Dickson, Paul, & Williams, 2003; Chakrabort et al., 2011; Fehling et al., in preparation), with some evidence suggesting that bisexual- and queer-identified individuals are at particularly increased risk (Sornberger et al., 2013; Batejan et al., 2015; Blosnich & Bossarte, 2012). This self-harm disparity is so great that one large representative study of 3,131 Massachusetts high school students found that sexual minority adolescents, although comprising only 10% of the sample, accounted for 67% of NSSI cases reported and 79% of suicide attempts

reported in the study (Reisner, Biello, Perry, Gamarel, & Mimiaga, 2014). Although most research on LGBQ self-harm has focused on child and adolescent populations, research suggests that both suicide and NSSI persist into adulthood (Skegg et al., 2003; Marshal et al., 2013; Ryan, Russell, Huebner, Diaz, & Sanchez, 2010), with one study on adults finding NSSI prevalence rates almost twice as high in sexual minorities (Chakraborty et al., 2011).

The higher rates of suicide and of NSSI in sexual minority people may not be surprising, given the population's elevated rates of physical and mental health difficulties generally. Compared to heterosexual people, LGBQ youth and adults are more likely to experience depression (Marshal et al., 2011; Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; King et al., 2008; Bostwick, Boyd, Hughes, & McCabe, 2010), anxiety (King et al., 2008; Bostwick et al., 2010), substance abuse (McCabe, Hughes, Bostwick, West, & Boyd, 2009; Marshal et al., 2008), and a multitude of psychiatric problems (Cochran, Bjorkenstam, & May, 2017; Chakraborty et al., 2011; Cochran, Sullivan, & Mays, 2003; McLaughlin, Hatzenbuehler, Xuan, & Conron, 2012). While these general mental health disparities may help to clarify the self-harm disparity in sexual minorities, more information is needed to understand why exactly LGBQ individuals face these disparities in general. Given that self-harm has been shown to be the strongest prospective predictor of self-harm in LGBQ populations specifically (Mustanski & Liu, 2013), it is paramount to future treatment and prevention efforts that our field better elucidate how and why exactly risk for self-harm, and NSSI specifically, is elevated in sexual minorities. One of the most common explanations for the elevation is minority stress.

## **Minority Stress**

Minority stress refers to the hassles, strains, and traumas that certain individuals face as a result of belonging to a stigmatized, societally devalued, and minority group (e.g., racial/ethnic minorities, women, or sexual minorities) (Meyer, 2003). These individuals are culturally stigmatized due to their minority group membership. They therefore face unique and chronic stressors during daily interpersonal interactions and within social institutions that can increase their likelihood of experiencing psychological distress and related negative consequences. Research broadly supports the concept of minority stress. Discrimination, measured in diverse ways, predicts poorer physical and mental health outcomes in various racial, class, and gender minority groups, even when controlling for other risk factors (Schmitt, Branscombe, Postmes, & Garcia, 2014; Borrell et al., 2010, Tong & Ong, 2010; Meyer, Schwartz, & Frost, 2008; Khan, Ilcisin, & Saxton, 2017).

Despite continually growing societal acceptance of same-gender sexual attraction and behaviors (Andersen & Fetner, 2008; Avery, Chase, Johansson, Litvak, Montero, & Wydra, 2007), LGBQ people continue to face stigmatization and discrimination. About 18% of hate crimes reported in 2015 were based on sexual orientation bias (Federal Bureau of Investigation, 2016), and LGBQ people are more likely than heterosexual people to report discrimination (Mays & Cochran, 2001). As recently as 2009, almost half of LGBQ adults reported experiencing verbal harassment based on sexual orientation, and 20% reported experiencing a person- or property-based crime (Herek, 2009). In 2010, Rankin and colleagues found that up to 68% of a national sample of LGBQ college students reported "subtle mistreatment" based on sexual orientation (e.g., overhearing anti-gay derogatory remarks). Furthermore, research suggests that an LGBQ person's "outness" (or the extent to which their LGBQ identity is public or known by others) does not influence the amount of minority stress that an LGBQ individual experiences, but only influences the *type* of minority stress they experience (Swim, Pearson, & Johnston, 2007).

LGBQ Minority Stressors. In the Minority Stress Theory, Meyer (1995, 2003) posited that these experiences of stigmatization increased LGBQ people's likelihood of experiencing mental health problems such as NSSI. Meyer (1995) originally proposed that LGBQ people experience two over-arching forms of minority stress: distal stressors (i.e., stigma experiences that are *external* to the LGBQ individual) and proximal stressors (i.e., stigma-related processes in which the LGBQ individual engages *internally*). Distal stressors are stressful life events or every day strains related to discrimination and heterosexism, while proximal stressors are heterosexist attitudes or stress-inducing beliefs that LGBQ people have due to the preponderance of heterosexist societal teachings and messages. Over the past several decades, the Minority Stress Theory has been widely explored and has expanded to include several distinct class types of sexual minority stress: external stigmatization events, anticipated stigma, concealment, and internalized anti-LGBT attitudes (Meyer, 2003; Meyer, 2015).

External stigmatization events can be acute or chronic in nature, and they include "extreme" or blatant forms of *discrimination* (e.g., experiencing sexual-orientation-based physical violence or threats, being fired for being LGBQ, or living in an area where same-gender marriages are illegal) as well as "subtle" or everyday forms of discrimination (e.g., experiencing incivility, hearing anti-LGBQ jokes, or hearing negative stereotypes of LGBQ people). Indeed, even "ambient" discrimination (i.e., witnessing other LGBQ people being negatively judged or being verbally or physically harassed due to their sexual/gender identity) negatively impacts mental health (Woodford, Han, Craig, Lim, & Matney, 2014). Many studies of sexual minority stress have focused almost exclusively on experiences of blatant discrimination, despite the fact that everyday *heterosexist hassles* are more common in today's world and can be equally psychologically damaging (Swim et al., 2007; Jewell & Morrison, 2010; Rankin et al., 2010).

Due to the pervasiveness of heterosexist messages and subtle experiences of stigmatization, many LGBQ people learn to expect, at least in certain situations, that they will experience discrimination. These expectations can be considered minority stressors in the form of *anticipated stigma*. Based on previous experiences, LGBQ people can expect negative treatment from others. They may be constantly vigilant for possible discrimination events, and this *hypervigilance* alone can deplete cognitive resources and cause stress (Hatzenbuehler & Pachankis, 2016; Meyer, 2003). Furthermore, in response to anticipated stigma, LGBQ individuals may purposely choose their clothing, voice pitch, gait, or body language in order to conceal their LGBQ identity and decrease the likelihood that they experience discrimination (Herek et al., 2015; Pachankis, 2007). While used by many sexual minorities to cope with and prevent stigmatization, this *concealment* paradoxically can have many deleterious psychological side effects (Pachankis, 2007), and therefore is considered a sexual minority stressor.

Another distinct class of sexual minority stressor is internalized anti-LGBT attitudes, and has been called internalized homophobia, internalized homonegativity, or

internalized heterosexism in the literature. *Internalized heterosexism* refers to the concept that an LGBQ individual can adopt society's negative views of sexual minorities, viewing themselves and other sexual minority people negatively because of their sexual identity (Meyer, 2003; Newcomb & Mustanski, 2010). According to the Minority Stress Theory, this internalization—in addition to experienced discrimination, anticipated discrimination, hypervigilance, and concealment—can lead to decreased sense of self-worth and general psychological distress.

Evidence for The Minority Stress Theory. Research has largely supported the minority stress theory, demonstrating that all types of sexual minority stressors are associated with an array of negative health outcomes. Discrimination, in all its forms, negatively impacts the mental health of LGBQ people across the lifespan according to large-scale cross-sectional research (Eaton, 2014; Lyons, Pitts, & Grierson, 2013; Hershberger & D'Augelli, 1995) as well as longitudinal research (Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010; Hatzenbuehler, Dovidio, Nolen-Hoeksema, & Phills, 2009; Mustanski, Andrews, & Puckett, 2016). Discrimination is specifically associated with increased depression and decreased general psychological well-being (Mustanski et al., 2016; Almeida et al., 2009; Woodford, Han, Craig, Lim, & Matney, 2014; Carter, Mollen, & Smith, 2014), as well as with suicide (Mustanski & Liu, 2013; Almeida et al., 2009; Russell & Joyner, 2001) and NSSI (Liu & Mustanski, 2012; DeCamp & Bakken, 2015; Muehlenkamp, Hily, Ehlinger, & McMillan, 2015). Similarly, several reviews support the proposal that internalized heterosexism negatively impacts mental health in a variety of ways (Berg, Munthe-Kaas, & Ross, 2016; Newcomb & Mustanski, 2010). While internalized heterosexism has been connected to NSSI in qualitative studies

(Alexander & Clare, 2004; Scourfield et al., 2008), quantitative empirical study of the relationship between internalized heterosexism and NSSI is lacking.

The Minority Stress Theory is further supported by research in the area of bisexual mental health. Bisexual people, and other people with non-monosexual identities (e.g., pansexual or fluid), face unique stigma when compared to lesbian and gay people (Bostwick & Hequembourg 2014; Mereish, Katz-Wise, & Woulfe, 2017). Furthermore, bisexual people face particularly high levels of sexual minority stressors (Mereish et al., 2017; Puckett, Saurace, Levitt, & Horne, 2016), partly because they may experience minority stress within their own LGBQ communities (Brewster & Moradi, 2010). Accordingly, compared to gay and lesbian individuals, bisexuals have particularly high rates of mental health difficulties, including depression (Bostwick et al., 2010; Jorm, Korten, Rodgers, Jacomb, & Christensen, 2002), suicide (Brennan, Ross, Dobinson, Velhuizen, & Steele, 2010; Kerr, Santurri, & Peters, 2013), and NSSI (Batejan et al., 2015; Kerr, Santurri, & Peters, 2013; Sornberger et al., 2013). Preliminary research reveals that these elevated risks for mental health difficulties are related to bisexualityrelated minority stressors (Lambe, Cerezo, & O'Shaughnessy, 2017), such as sexual *identity uncertainty* (i.e., being unsure that a chosen sexual identity identifier is appropriate and accurate) and *incorrect assumptions about sexual identity* (i.e., having others incorrectly assume your sexual identity based on one's partner's gender, one's gender expression, or other general heterosexist cultural expectations).

Broadly speaking, research supports the Minority Stress Theory in explaining LGBQ mental health disparities. While research suggests that LGBQ individuals may experience different sexual minority stressors depending on their sexual orientation, gender, outness, or age (Puckett, Saurace, Levitt, & Horne, 2016; Almeida et al., 2009; Newcomb & Mustanski, 2010; Swim et al., 2007), minority stressors of all kinds clearly negatively impact mental health outcomes and psychological well-being.

The Psychological Mediation Framework. While past research has provided a considerable amount of evidence supporting Meyer's Minority Stress Theory, it remains unclear exactly *how* minority stressors increase the likelihood of psychopathology in sexual minority individuals. This question of "how" is particularly important in the study of NSSI in LGBQ people for two reasons. First, as has been previously argued (e.g., Hatzenbuehler & Pachankis, 2016), identifying the mechanisms through which minority stress negatively influences mental health (and increases the likelihood of NSSI) is essential in order to create successful treatment and prevention programs for reducing LGBQ self-harm. Second, current research suggests that neither general mental health difficulties nor minority stressors alone fully explain the elevated risk for suicidal behaviors in LGBQ people (Haas et al., 2010; Bolton & Sareen, 2011; Igartua, Gill, & Montoro, 2009; McLaren, 2015). Due to the connection between suicide and NSSI, it seems probable that further research studying NSSI specifically would reveal a similar pattern, with general psychological risk factors not fully explaining the variance in NSSI in LGBQ people.

To expand upon the Minority Stress Theory and answer *how* minority stress impacts health, Hatzenbuehler (2009) introduced the Psychological Mediation Framework, in which he proposes that LGBQ people face minority stress that causes increases in emotion dysregulation, social difficulties, and cognitive processes that in turn increase the risk of psychopathology in sexual minorities. In this way, stigma-related stress increases the likelihood that LGBQ people engage in various maladaptive coping strategies in response to emotional distress. It is these psychological processes, rather than minority stress itself alone, that cause psychological damage. Hatzenbuehler (2009) and others have identified several examples of these mediating psychological processes, including social isolation, suppression, and cognitive reappraisal.

One of the psychological processes most commonly implicated in the relationship between minority stress and psychopathology is rumination. While rumination is associated with NSSI, as previously mentioned, rumination is also associated with a variety of mental health difficulties (Nolen-Hoeksema, 2000; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Engaging in rumination predicts increases in negative affect, cognitive distortions, and further rumination (Robinson & Alloy, 2003; Selby, Kranzler, Panza, & Fehling, 2016). Indeed, micro-longitudinal research finds that engaging in rumination after a stressor increases the amount of negative affect an individual experiences from that stressor (Connolly & Alloy, 2017). Similar results have been found in LGBQ populations, with rumination mediating the relationship between sexual minority stressors and negative affect (Hatzenbuehler et al., 2009a; Hatzenbuehler et al., 2009b). Rumination may be a particular problem in LGBQ people. Hypervigilance, anticipated discrimination, identity concealment, and identity uncertainty likely engender rumination (Hatzenbuehler, 2009; Pachankis, 2007). While these and other findings support the Psychological Mediation Framework (Hatzenbuehler, 2009; Hatzenbuehler et al., 2009b; Rogers et al., 2017; Hatzenbuehler et al., 2009a; Schwartz, Stratton, & Hart, 2016), most research in this area relies on cross-sectional research in which mediational relationships cannot be properly examined. In order to most accurately study the

Psychological Mediation Framework, and to gather rich information about the plethora of proximal processes involved in sexual minority stress and self-injurious behaviors, researchers must employ longitudinal methodologies.

#### **Ecological Momentary Assessment**

A methodology particularly poised to examine the Psychological Mediation Framework within the context of NSSI is ecological momentary assessment (EMA). EMA, also called "experience sampling" and "real-time data capture" in the literature (Ebner-Priemer & Trull, 2009), is a methodology that collects data from participants multiple times over the course of several days or weeks while participants are in their natural environments. EMA examines life as it is lived, allowing for assessments that are arguably more ecologically valid and reliable than standard cross-sectional, in-laboratory methods (Broderick, Schwartz, Shiffman, Hufford, & Stone, 2003; Ebner-Priemer & Trull, 2009; Bolger, Davis, & Rafaeli, 2003; Shiffman, Stone, & Hufford, 2008). While exact procedures may differ between studies in the materials they utilize (e.g., pen-andpaper materials or survey apps on smart phones) and how often they collect data (e.g., "daily diary" surveys collected once daily or surveys collected several times during each day), all EMA research affords the same types of methodological benefits.

EMA has several specific features that make it particularly well-suited for the study of psychological distress and NSSI (Armey, Schatten, Haradhvala, & Miller, 2015). First, EMA is able to assess dynamic processes. Given that thoughts and emotions are short-lived, measurements must be repeated multiple times over relatively short periods in order to best capture and examine them and their impacts on other psychological processes (Ebner-Priemer & Trull, 2009). Second, EMA studies demonstrate relatively little reactivity, and researchers have monitored coping behaviors (e.g., drinking episodes) without influencing their occurrence (Shiffman et al., 2008; Hufford, Shields, Shiffman, Paty, & Balabanis, 2002). Third, NSSI as a phenomenon is difficult to study in-laboratory, as researchers cannot ethically induce or request self-harm from subjects. EMA provides a way for researchers to examine the correlates of NSSI in participants who already self-injure in their day-to-day lives.

Fourth, and perhaps most notably, EMA offers an advantage over cross-sectional study of psychological distress and dysregulated behaviors due to its ability to reduce recall bias (Ebner-Priemer & Trull, 2009). There are a multitude of cognitive biases that affect retrospective self-report questionnaires in general (Bradburn, Rips, & Shevell, 1987; Shiffman et ak., 2008) and specifically in the assessment of emotions (Solhan, Trull, Jahng, & Wood, 2009; Ebner-Priemer & Trull, 2009; Ben-Zeev, Young, & Madsen, 2009) and past behaviors (Fahrenberg, Myrtek, Pawlik, & Perrez, 2007; Schwarz & Sudman, 1994; Piasecki, Hufford, Solhan, & Trull, 2007). While EMA usually relies on self-report methods and therefore still suffers from similar biases, EMA substantially reduces these biases as compared to standard cross-sectional methods. These advantages make it particularly useful in the study of NSSI. Accordingly, numerous studies of NSSI have utilized EMA methodologies (Kranzler, et al., 2017; Turner, Yiu, Claes, Muehlenkamp, & Chapman, 2016; Armey, Crowther, & Miller, 2011; Nock, Prinstein, & Sterba, 2009), and researchers continue to herald EMA's importance for deepening our understanding of NSSI (Nock, 2012).

These same advantages make EMA valuable in the study of minority stress. Stigma is a phenomenon "expressed, experienced, and challenged in the contexts of interactions with people and social institutions" (pg. 114, Mohr & Sarno, 2016), and therefore benefits from ecologically valid assessment. EMA's ability to assess dynamic and potentially time-ordered relationships between variables also makes it an appropriate methodology to use when testing relationships between minority stress and emotional/cognitive processes, as in the Psychological Mediation Framework. Furthermore, reporting of minority stressors may be particularly susceptible to recall biases. General stress research reveals that people report significantly more stressful experiences when asked concurrently than when they are asked retrospectively, and that people are less likely to remember and retrospectively report "minor" stressful events (Raphael et al., 1991). This pattern persists in minority stress research, with minority people being less able to remember subtle discriminatory events than overt discriminatory events when reporting retroactively on discrimination (Swim et al., 2007; Williams & Mohammed, 2009). Furthermore, an individual's emotional state at the time of research participation influences recall, and reporting of past discrimination could be influenced by recent minority stress experiences (Williams & Mohammed, 2009; Swim et al., 2009). In these ways, EMA is a particularly important methodology for studying minority stress.

Previous Research. Accordingly, researchers have begun to use these methods in research examining discrimination in Latinos (Torres & Ong, 2010), African Americans (Swim et al., 2003), and LGBQ populations (King, Mohr, Peddie, Jones, & Kendra, 2017; Swim et al., 2007; Hatzenbuehler et al., 2009b; Flanders, 2015). These previous EMA studies reveal that experienced discrimination, anticipated discrimination, and internalized heterosexism are associated with both increased psychological distress and decreased positive emotions on a daily basis (Swim et al., 2007; Flanders, 2015; Mohr & Sarno, 2016). Additionally, some EMA studies provide support for the Psychological Mediation Framework, finding that the relationship between minority stress and psychological distress is mediated by social isolation, rumination, and emotional suppression (Hatzenbuehler et al., 2009a; Hatzenbuehler et al., 2009b). This research highlights the utility of EMA methodology to support and refine the Minority Stress Theory and the Psychological Mediation Framework, as well as its potential to inform ways that minority stress could be addressed on a daily basis. Very few studies have examined LGBQ mental health using EMA, however, and substantial work is needed to verify and substantiate the real-time relationships between minority stress and negative mental health outcomes.

#### The Current Study

While some previous EMA research has examined minority stress in LGBQ adults, no previous EMA research on sexual minority stress has included NSSI as a variable. Similarly, while a number of researchers have used EMA to examine closely the antecedents and consequences of NSSI, no previous EMA research has studied NSSI in an LGBQ population specifically. These gaps in the literature are noteworthy given the increased risk of NSSI in LGBQ people (Batejan et al., 2015) and the role of minority stress in explaining this increased risk (as suggested by previous cross-sectional research on the Minority Stress Theory). It is vitally important that more research empirically test theory-driven models of how and why certain risk factors lead to self-harm (Brent, 2011; Nock, 2012). In the ways detailed above, EMA is particularly suited to examine the Minority Stress Theory and the Psychological Mediation Framework within the context

of LGBQ NSSI. The current study was designed to extend the current literature on LGBQ NSSI in these critical ways by examining NSSI, minority stress, and potential mediators (i.e., rumination) in LGBQ adults who self-injure. Specifically, this study explored how LGBQ adults who self-injure experienced minority stress, how these minority stressors affected psychological distress and NSSI, and how rumination influenced the relationship between NSSI and minority stress.

Beyond this study's basic aim to be the first to explore the phenomenology of minority stress and NSSI in LGBQ self-injurers, three primary hypotheses were proposed. First, consistent with previous research, it was expected that greater reported minority stress at one EMA timepoint would be related to greater psychological distress reported at that same timepoint and the next timepoint, and that greater minority stress reported on a certain day would be related to greater psychological distress on that same day. Most previous research primarily has examined overt and blatant discrimination when using EMA to study minority stress and mental health. This study extended previous research by also exploring the impact of anticipated and ambient discrimination. Second, it was expected that greater minority stress reported at one EMA timepoint would predict greater nonsuicidal, self-injurious thoughts and behaviors reported at both that same timepoint and at the next timepoint. And, it was expected that greater daily levels of minority stress would be associated with greater numbers of NSSI behaviors on the same day. Third, consistent with the Psychological Mediation Framework, it was expected that rumination would mediate any relationship between sexual minority stressors and NSSI thoughts and behaviors.

#### II. Method

#### **Participants**

**Recruitment**. Participants were recruited through online advertisements and through flyers placed throughout the greater New Brunswick, NJ community. Targeted recruitment efforts were made by sending flyers to local LGBTQ groups and organizations and posting advertisements in local LGBTQ group emails, publications, and program brochures. Advertisements and flyers directed interested participants to complete an anonymous online survey, or to contact by email the research project personnel who in turn referred them to the survey. This online survey preliminarily assessed inclusion and exclusion criteria, and then prompted potentially eligible individuals to enter their name and email address. A research assistant contacted the potential participant via email, providing further information about the study and inviting them to attend a baseline visit at our laboratory space.

Eligibility Criteria. In order to be eligible for this study, participants had to be over the age of 18 and they had to identify as having a sexual minority sexual orientation. They also had to have engaged in NSSI at least twice in the past two weeks. Participants were required to be fluent in English and to have access to a smartphone to use for the duration of the study. Participants who reported current psychotic disorders were excluded from participation. Finally, participants who were actively suicidal and at elevated risk for suicide (as indicated by elevated suicidal intent, planning, or behaviors in the past four weeks; or, who are determined to be at a moderate level of risk or greater [as described in Appendix 1]) were excluded from the study. **Recruited Participants**. 40 participants were invited into the lab and consented for this study, after appearing to be potentially eligible through the pre-study online screening survey. 19 participants were determined to be ineligible during initial study procedures; 13 of these 19 had not self-injured at least twice in the past two weeks, 3 were at currently elevated risk for suicide (and were referred to appropriate treatment sources), and 2 were experiencing current psychotic symptoms believed to possibly interfere with ability to fully engage in study procedures. 21 participants were determined eligible to complete study procedures; 20 completed all study procedures, and 1 participant dropped out during the EMA monitoring period at day 7 and was lost to follow-up.

Of the 21 eligible participants, mean age was 23 years old (SD = 8.35, range = 18-50). 12 participants were female (57%), 5 were male (24%), and 4 were genderqueer/gender non-conforming/other (19%); 5 participants identified at transgender (24%). In terms of race/ethnicity, 16 participants were white (76%), 4 were Asian (19%), and 1 was Latino/Hispanic (5%). In terms of sexual orientation, 9 identified as bisexual/pansexual (43%), 7 identified as gay/lesbian/homosexual (33%), 2 identified as queer (10%), and 3 identified as other non-heterosexual identities (14%). In terms of highest education level completed, 15 had completed some college (70%), 2 had a bachelor's degree (10%), 2 had graduate or professional degrees (10%), 1 had an associate's degree (5%), and 1 had finished high school (5%). 11 were currently students in college (53%); 12 participants were currently employed (57%) and 9 were not (43%). Annual household income ranged from under \$9,999 (n = 5; 24%) to over \$100,000 (n = 7; 34%). No participants had ever been legally married/partnered; 12 were single (57%),6 were in committed relationships/partnerships (29%), and 3 were dating (14%).

## Procedure

#### **Figure 1. Study Procedures**



**Baseline Visit.** After completing prescreening procedures online and being invited to participate in the study, participants attended a 60-minute in-person visit to the Emotion and Psychopathology Lab at Rutgers University. At baseline visit, the study participants were provided with informed consent forms, and the procedures and potential risks of the study were fully explained to them. After consenting, participants completed a brief demographics questionnaire, and then the research assistant administered a structured interview of psychosis symptoms and of lifetime non-suicidal and suicidal thoughts and behaviors. Through this questionnaire and interview, the research assistant determined the participant's current level of suicide risk and eligibility.

After this interview, if determined to be ineligible to complete study procedures for any reason, participants were compensated \$10 for their time and were provided mental health referrals. If determined to be eligible for full study participation after completion of the interview, participants completed a variety of self-report questionnaires on Qualtrics Online Survey Software using a lab computer. The research assistant then trained the participants in the use of the study smartphone app used during EMA monitoring. The research assistant guided the participants in downloading the app onto their smartphone, setting up the app, and completing several practice surveys through the app. The research assistant explained all language used in the momentary assessments (including "stigma" and "NSSI"), provided examples of all minority stress experiences assessed via the app surveys, and trained the participants in the use of the app until they felt comfortable with its use. Subjects were compensated \$15 for their time after completing all baseline visit procedures.

**EMA monitoring.** After baseline, participants practiced using the app for the remainder of the day of their baseline visit. For the 14 days after the day of their baseline visit, participants used the smartphone app to complete surveys. These surveys involved answering the same possible set of questions each time, and participants were prompted four times daily at random times during pre-determined time intervals from 9am until 9pm. Prompts were delivered to participants via on-screen notifications and concomitant alarms.

**Post-EMA Assessment**. At the end of this 14-day EMA period, participants were contacted via email with debriefing information about the study as well as a list of local mental health resources. They were asked to complete several follow-up questionnaires and a brief survey about their experiences participating in the study. They then were compensated \$40 for the completion of study procedures if they completed less than 75% of the prompted surveys, and \$85 if they completed greater than 75%.

### Measures

**Baseline Assessments.** Baseline self-report questionnaires administered via Qualtrics included assessment of standard demographic information, as well as a variety

of validated measures of NSSI behaviors, minority stress, general stress, and mental health.

*Demographic information*. Demographic information collected included birth sex, current gender identity, age, sexual identity information (i.e., sexual orientation, sexual attraction, lifetime sexual behaviors, and age of coming out), race, ethnicity, annual household income, education, employment, and past mental health treatment history.

*NSSI and suicide risk.* NSSI assessment included the *Self-Injurious Thoughts and Behaviors Interview* (SITBI; Nock, Holmberg, Photos, & Michel, 2007), a validated structured interview of non-suicidal and suicidal behaviors and thoughts. The interview was modified slightly for this study in order to reduce the time needed to administer the assessment. It included assessment of frequency, timing, and methods/content of lifetime suicidal ideation, lifetime suicidal planning, lifetime suicide attempts, lifetime NSSI thoughts, and lifetime NSSI behaviors. It also assessed participants' motivations and reasons for engaging in nonsuicidal self-injury. Finally, it assessed to what extent (from "0 – not at all" to " 4 – extremely") certain types of stressors (e.g., problems in friendships) have to NSSI behaviors in general in the past. For this study, two types of stressors (problems related to sexual orientation and problems related to gender identity) were added to the previously validated items. The SITBI was used to examine the eligibility criteria of past-year NSSI engagement and current suicidal risk level, and baseline lifetime NSSI behavior was used as a covariate in several analyses.

Suicide risk level was assessed using the guidelines established by Joiner and colleagues (1999). In this study, as described above, participants were ineligible to

participate in EMA monitoring if they reported active suicidal intent, planning, or behaviors in the past month, or if they were determined to be at moderate risk or higher using the Joiner guidelines. In these guidelines, overall suicidal risk level was based on a variety of risk factors (e.g., suicide attempt history, suicidal intent, hopelessness, insomnia, or NSSI history). If participants were determined to be at "moderate" to "extreme" risk, the study staff performing the interview consulted with Edward Selby, Ph.D. for supervision and then mental health resources were provided. For this study, no participants were considered to be acutely severe risk for suicide, and therefore study staff did not contact APS or campus police due to safety concerns for any participant.

*Minority stress.* Minority stress assessment included validated self-report measures of various types of sexual minority stress.

*Experienced discrimination* was measured with the Daily Heterosexist Experiences Questionnaire (DHEQ), previously shown to be a valid and reliable measure (Balsam et al., 2013). The seven subscales most relevant to this study's population and goals were used, including 38 of the 50 items from several original subscales: Gender expression, Vigilance, Discrimination and harassment, Vicarious trauma, Family of origin, Victimization, and Isolation. The DHEQ includes assessment of both blatant, extreme forms of discrimination (e.g., "being rejected by your mother for being LGBT" and "being verbally harassed by strangers because you are LGBT") as well as subtle, ambient, and everyday heterosexist hassles (e.g., "hearing someone make jokes about LGBT people" and "pretending you have an opposite-sex partner"). Through this questionnaire, participants reported on whether or not they had experienced certain minority stressors. If they reported a certain stressor, the participant would then select how upsetting this experience was for them on a scale of "1 – It happened, and it bothered me not at all" to "5 – It happened, and it bothered me extremely." Possible scores on this study's modified DHEQ range from 0 to 190, with higher scores indicating greater distressing experiences of heterosexist stigma. In this sample, the DHEQ had strong internal consistency ( $\alpha$  = .90). DHEQ scores were utilized as a covariate variable in this study's hypothesis 1 and 2, in order to control for baseline reported lifetime discrimination experiences. It was also used as a measure of minority stress for some mediational analyses in hypothesis 3.

Due to research suggesting that bisexual individuals face unique stigma experiences, monosexist experienced discrimination in bisexual participants was measured with the 17-item Anti-Bisexual Experiences Scale (ABES; Brewster & Moradi, 2010). This measure asks participants to rate how frequently they had had certain monosexist experiences on a scale of "1 - never" to "6 - almost all of the time" in both heterosexual and LGBTQ spaces. Example experiences include "People have acted as if my sexual orientation is just a transition to a gay/lesbian orientation" and "I have been excluded from social networks because I am bisexual." Possible scores range from 17 to 102 for each subscale (heterosexual versus LGBTQ spaces), with higher scores indicating greater bisexual-specific discriminatory experiences. The ABES has demonstrated good reliability ( $\alpha = .81$ ) and validity (Brewster & Moradi, 2010) in the literature, and it demonstrated very good internal consistency in this sample as well ( $\alpha = .97$ ). ABES scores were examined in basic descriptive statistical analyses, to better understand the phenomenology and types of minority stress experiences of non-monosexual LGBQ people who self-injure.

Internalized heterosexism was measured with the revised 27-item Lesbian, Gay, and Bisexual Identity Scale (LGBIS; Mohr & Kendra, 2011; Mohr & Fassinger, 2000). The LGBIS consists of subscales that measure internalized homonegativity, identity affirmation, identity superiority, difficulty process (of coming out), acceptance concerns (i.e., fears of and discomfort with being negatively judged by others), concealment motivation, and identity centrality. These subscales have been shown to have good validity and reliability (Balsam & Mohr, 2007; Mohr & Kendra, 2011; Mohr & Fassinger, 2000). The measure asks participants to indicate the extent to which they agree with statements using a scale of "1 – Disagree strongly" to "6 – Agree strongly." Example items include "If it were possible, I would choose to be straight," "I keep careful control over who knows about my same-sex romantic relationships," and "I am glad to be an LGB person." Internalized homonegativity scores (i.e., LGBIS-IH) can range from 3 to 18, with higher scores indicating greater internalized heterosexism. The overall LGBIS scale demonstrated good internal consistency in this study ( $\alpha = .75$ ), as did the LGBIS-IH subscale ( $\alpha = .87$ ). LGBIS-IH scores were utilized as a covariate variable in this study's analyses, in order to control for baseline reported general internalized heterosexist minority stress.

*Mental health symptoms.* Assessment of mental health variables included validated self-report measures of various mental health constructs that have previously been found to be associated with self-harm and related behaviors.

Trait *rumination* was measured with the 22-item Ruminative Responses Scale (RRS; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). The RRS asks participants to think about the extent to which they engage in certain ruminative patterns when feeling

down or depressed, on a scale of "1 – almost never" to "4 – almost always." Items include "think 'what am I doing to deserve this?"" "analyze recent events to try to understand why you are depressed," and "think about a recent situation, wishing it had gone better." The RRS is a widely used scale with good internal consistency ( $\alpha$  = .94), test-retest reliability, and validity (Treynor, Gonzalez, & Nolen-Hoeksema, 2003; Butler & & Nolen-Hoeksema, 1994). It demonstrated good internal consistency in this sample as well ( $\alpha$  = .76). Scores range from 22 to 88, with greater scores indicating greater trait rumination. The RRS was used as a covariate in several analyses, and then used as a variable in several exploratory regression analyses.

Current *depression* was measured with the 10-item Patient Health Questionnaire-9 (PHQ-9), a scale with good validity and reliability (Kroenke, Spitzer, & Williams, 2001). This measure asks participants to rate the frequency of depressive symptoms (e.g., "little interest or pleasure in doing things" and "feeling tired or having little energy") in the past 2 weeks, on a scale of "0 – not at all" to "3 – nearly every day." Scores range from 0 to 30, with greater scores indicating greater recent/current depressive symptoms. The PHQ-9 demonstrated good internal consistency in this sample ( $\alpha = .81$ ), and was used as a covariate in several analyses.

General *emotion regulation deficits* were measured with the 35-item Difficulties with Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS asks participants to rate how often they struggle with a variety of emotion regulation difficulties on a scale of "1 – almost never" to "5 – almost always." Items include "I am clear about my feelings," "when I'm upset, I become out of control," and "when I'm upset, I believe that wallowing in it is all I can do." The scale's total score is calculated by summing the scores from six sub-scales: non-acceptance of emotional responses, difficulties engaging in goal-directed behaviors, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Scores on the DERS range from 35 to 175, with greater scores indicating greater emotion dysregulation. The scale has been shown to have good internal consistency ( $\alpha = .93$ ), good test-retest reliability ( $\rho = .88$ ), and good validity (Gratz & Roemer, 2004). In this sample, the DERS demonstrated good internal consistency ( $\alpha = .82$ ). DERS scores were utilized as a covariate variable in most analyses.

*General stress*, not specifically related to one's sexual orientation, was measured with the 10-item Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983). The PSS asks participants to report how often in the past month they have felt various stress-related thoughts and emotions on a scale of "0 – never" to "4 – very often." Items include "how often have you been upset because of something that happened unexpectedly" and "how often have you felt nervous and 'stressed."" The PSS has good internal consistency ( $\alpha = .84$ ) and validity (Cohen, Kamarck & Mermelstein, 1983). Scores range from 0 to 40, with higher scores indicating higher amounts of overall stress in the past month. In this sample, the PSS had good internal consistency ( $\alpha = .72$ ). PSS scores were utilized as a covariate variable in this study's analyses, in order to control for baseline recent general stress levels.

**EMA Momentary Assessments.** EMA procedures involved participants answering surveys on their phone using the LifeData system (an EMA platform that runs on Android and iOS mobile devices, is HIPAA compliant, and is designed specifically for clinical research purposes; <u>https://www.lifedatacorp.com</u>). LifeData keeps data secure and immediately transmits the data onto their external server, not leaving any sensitive data stored on the participants' smart phone. For this study, LifeData prompted participants four times daily when it was time for them to answer surveys that were the same every time. Surveys not completed within 90 minutes of receiving the prompt were counted as missing data. Participants also were allowed to complete EMA surveys whenever desired outside of the prompts, and were encouraged to complete self-initiated surveys after any NSSI behaviors or after stigma experiences during the study period. Surveys included assessments of emotions, NSSI, minority stress, and coping experiences since the previous assessment.

*Emotions*. At each survey, participants were asked to rate how intensely they were currently experiencing 13 different emotions on a scale of "0 – not at all" to "10 - extremely." These emotions included "stressed," five positive emotions (calm/relaxed, happy, energized, proud, content), and seven negative emotions (sad, lonely, anxious, ashamed/embarrassed, angry, rejected/hurt, and guilty). This type of scale has been used previously in EMA studies (Selby et al., 2016; Kranzler et al., 2017). An overall "psychological distress" variable was created for each timepoint by summing together the individual scores for *stressed, sad, lonely, anxious, ashamed/embarrassed, angry, rejected/hurt, and guilty*. Also a daily psychological distress variable was created by averaging the total psychological distress variable scores from each timepoint during each day. These variables were used in hypothesis 1 analyses.

*NSSI*. Next, participants were asked at each EMA survey if they had had any thoughts about engaging in NSSI since the previous survey, and if they had actually engaged in NSSI since the previous survey. If they reported having engaged in NSSI,

they were asked how many times they had self-injured since the previous survey, and what types of behaviors they had engaged in (i.e., cutting, biting, punching, scratching, burning, overdosing, pulling hair, banging head, hitting self with an object, or "other"). These questions have been used in previous EMA research on NSSI (Kranzler et al., 2017; Nock, Prinstein, & Sterba, 2009). The binary variable of NSSI thoughts, the binary variable of NSSI behavior (e.g., "NSSI Presence"), and the count variable of NSSI behaviors were used in hypotheses 2 and 3.

*Minority stress.* Regardless of NSSI thoughts and behaviors, participants were asked at each survey if they had experienced any of 12 minority stressor experiences. Several of these items assessed experienced discrimination, and have been used in previous EMA or cross-sectional studies (Hatzenbuehler et al., 2009b; Borrell, Muntaner, Gil-González, Artazcoz, Rodríguez-Sanz, Rohlfs & Álvarez-Dardet, 2010). Based on previous EMA research suggesting fear-based stigma experiences are common in LGBQ people (Swim et al., 2009) and that identity concealment is related to lower psychological well-being (Beals, Peplau, & Gable, 2009), several additional items were created for this study to capture experiences related to anticipated discrimination and concealment. Finally, several items were created to capture minority stressors that have been noted in non-monosexual individuals, and were based on previous cross-sectional and daily diary research (Flanders, 2015; Flanders, Robinson, Legge, & Tarasoff, 2016; Dyar, Feinstein, Schick, & Davila, 2017). (See Table 1 for full item list.)

Participants were asked to answer these items using a 6-point likert scale, similar to previous EMA research (Hatzenbuehler et al., 2009b) and cross-sectional measures (e.g., the DHEQ [Balsam et al., 2013]), with ratings ranging from "0 – This did not

happen to me" to "5 – It happened, and it bothered me extremely." This EMA measure allowed for examination of EMA minority stress as both a continuous variable (by summing together ratings for the 12 individual items, indicating the extent to which an individual has faced stigma-related distress since previous survey) and a count variable (by adding together how many items were rated as 1 or above, indicating how many individual types of minority stressors have been experienced since previous survey). A "daily minority stress" variable was created by averaging the continuous scores for minority stress from every timepoint during each day. The continuous variable of timepoint minority stress and the daily minority stress were used for this study's primary hypotheses.

Additionally, if they reported experiencing a minority stress experience, participants were then asked to rate the extent to which they believed the stressor was related to their sexual identity on a scale of "-2 – definitely not related to sexual identity" to "2 – definitely related to sexual identity," similar to some previous EMA research on heterosexist experiences (Swim et al., 2007). All analyses on EMA minority stress were run twice. First, all minority stress events reported during EMA were used. Then, for a more conservative analysis, only the minority stress events that were reported as being "definitely" or "probably" related to sexual identity, or that were definitely related to sexual identity according to the stressor description itself (e.g., "Been worried about your LGBT identity being known"), were used.

*Rumination*. If participants reported minority stress experiences, they were asked to answer 5 items about the extent to which they had been ruminating about that minority stressor specifically. These items were based on the Stress-Reactive Rumination Scale-
State version, previously modified for use in EMA (SRRS-S; Connolly & Alloy, 2017). There was an item from each of the five SRRS subscales: Negative Attributions/Stable (*Think about how things like this always happen to you*), Negative Attributions/Global (*Think that the cause of the event will lead to additional stressful events in your life*), Negative Attributions/Internal (*Think about how the stressful event is all your fault*), Negative Inferences/Self (*Think about what the event means about you*), and Negative Inferences/Future (*Think about how the event will negatively affect your future*). As in previous literature (Connolly & Alloy, 2017), a total minority-stress-related rumination variable was created by summing together the scores of the five individual SRRS-S items and dividing by 10 for each timepoint. This minority-stress-specific rumination variable was used in hypothesis 3 analyses and other exploratory analyses.

*General stress and rumination*. Finally, participants were asked at every assessment "since the last entry, did you experience or have you been thinking about a stressful situation unrelated to your sexual identity?" They rated this item using the same 6-point likert scale used for minority stress assessment. The general stress score was used as a covariate in most analyses, due to general stress' potential role in influencing psychological distress and NSSI. To measure general rumination, participants were asked two items from the RRS (modified and used previously in EMA) on a scale of 0 to 100%: "I have been thinking 'what am I doing to deserve this?" and "I have been thinking a lot about shortcomings or personal problems." The scores for these items were combined to create a general rumination score for each timepoint.

# **Data Analytic Strategy**

**Descriptive statistics**. First, baseline information about the participants was examined, including demographic information, lifetime suicidal and nonsuicidal self-injurious behaviors, minority stressor experiences, and mental health difficulties. NSSI thoughts and behaviors reported during EMA were examined in aggregate form in order to determine the frequency and intensity of self-injurious experiences during the monitoring period. Minority stressor experiences during EMA were examined in aggregate form to determine the frequency of minority stress experiences, as well as the average intensity of distress in response to minority stress and the frequency with which these experiences were viewed as being related to sexual identity. Chi-square analyses were used to explore possible group differences in NSSI behaviors and minority stressors reported among participants by gender and sexual orientation (e.g., bisexual versus gay/homosexual). All variables were examined for outliers and random variance as appropriate, and analyses were conducted using SPSS Version 23.0 at a significance level of  $\alpha = 0.05$  (two-sided).

**Hypothesis 1.** It was first hypothesized that, during EMA monitoring, greater reported minority stress at a given timepoint would predict increased psychological distress at the same timepoint and at the next timepoint. Similarly, it was predicted that greater minority stress across a given day would predict greater psychological distress on the same day. EMA data is inherently nested in structure, with multiple assessments administered across multiple days for each participant. It therefore violates the assumption of independence of observations. To account for this nested structure, hierarchical linear modeling was utilized. Hierarchical linear modeling allows for a twolevel examination of the data: within-participant observations within and between EMA days (Level 1) and between-participants variation for measures such as those obtained at baseline (Level 2). For the first hypothesis, mixed models were used to determine whether reports of minority stress (Level 1) at one EMA timepoint are associated with levels of psychological distress (Level 1) reported at the same timepoint. The continuous variables of momentary psychological distress and momentary minority stress were used. Predictor variables were examined as fixed effects, and the model included a random intercept. Then, mixed models were used to determine whether daily level of minority stress experienced was associated with daily level of psychological distress on the same day.

In order to examine how minority stress at one timepoint impacts psychological distress at the next timepoint, a minority stress lag-variable ("lag-MS") was created. This lag-MS variable was created by taking the minority stress score for each participant at one signal and shifting the data one timepoint forward, allowing examination of psychological distress at one timepoint with the minority stress reported at the previous timepoint. A lag-MS variable was created for every participant at every timepoint, except for the first timepoint of each day (which had missing data for lag-MS and accordingly was not utilized in the analyses).

After examining main effects for both the timepoint and daily relationships between distress and minority stress, analyses were conducted controlling for participant age, sexual orientation, gender, baseline discrimination (DHEQ total score), baseline internalized heterosexism (LGBIS-IH subscale score), baseline general stress (PSS total score), baseline depression (PHQ-9 total score), and EMA general stress (either at the timepoint or averaged across the day). Including these covariates allowed us to examine the real-time impact of minority stress on psychological distress above and beyond general lifetime minority stress experiences and mental health difficulties.

**Hypothesis 2.** It also was hypothesized that greater minority stress would predict more self-injurious thoughts and behaviors at the same and next EMA timepoint. Similar to Hypothesis 1, Hypothesis 2 used generalized hierarchical linear modeling to determine whether reports of minority stress (Level 1) at one EMA timepoint are associated with NSSI (Level 1) reported at the same and next timepoint. The relationships between daily minority stress levels and daily NSSI also were examined. All of these relationships were examined separately for NSSI thoughts and NSSI behaviors.

This study had only a binary variable for NSSI thoughts during EMA monitoring (i.e., were NSSI thoughts at all present since last survey). For NSSI behaviors, this study had both a binary variable (i.e., were NSSI behaviors at all present since last survey) and a count variable (e.g., how many distinct times did you self-injure since last survey). These binary and count data distributions were expectedly non-normal. Therefore, a binomial distribution with a logit link function was used for the binary NSSI thoughts and NSSI occurrence variables, and a Poisson distribution with a log link was used for the NSSI count variable (Dobson & Barnett, 2008). Again, the lag-MS variable was used to examine the impact on NSSI at one timepoint by the minority stress reported at the previous timepoint.

Again, as with Hypothesis 1 analyses, predictor variables were examined as fixed effects, and the models including a random intercept. Analyses for concurrent, lag, and daily minority stress were performed first to examine main effects, and then were conducted controlling for covariates. Hypothesis 2 included covariates of age, gender,

sexual orientation, baseline discrimination, baseline general stress, baseline internalized heterosexism, momentary general stress, and baseline lifetime NSSI behaviors (as reported on the SITBI).

**Exploratory Hypothesis 3.** Mixed models were used to test an exploratory hypothesis that rumination would mediate any relationship between sexual minority stressors and NSSI thoughts and behaviors. In order to fully examine these relationships, several analyses were performed. First, it was examined whether levels of lifetime minority stress reported at baseline (via the DHEQ) predicted NSSI thoughts and NSSI behaviors during EMA, and whether this relationship was mediated by overall average rumination reported during EMA. Second, it was examined whether minority stress experienced during EMA predicted NSSI thoughts and behaviors during EMA, and whether this relationship was mediated by rumination specific to the experienced minority stressor. Within these mediational analyses, the predictor and mediator variables were examined as fixed effects, and the model included a random intercept. Then the hypothesized mediational relationship was examined using bootstrapping methods in the PROCESS SPSS macro (Hayes, 2013). These analyses were conducted using biascorrected confidence intervals, which maximize power and diminish Type 1 errors (Zhao et al., 2010), and 5,000 resamples were utilized.

**Other Exploratory Analyses**. Related to Hypothesis 3's examination of rumination's mediational role, this study aimed to explore rumination's overall relationship to minority stressors. To pursue this interest, analyses were performed that examined the relationships between rumination and minority stressors (including specific types of minority stress) during both baseline and EMA. Specifically, analyses were

performed to explore the descriptive statistics for minority-stress-specific rumination for each type of minority stress assessed during EMA. Linear regressions were used to examine whether baseline rumination was related to baseline minority stress in general and to specific minority stressors (e.g., experienced discrimination, internalized heterosexism, etc.) at baseline. Finally, Poisson regressions were utilized to examine whether baseline rumination predicted specific types of minority stressors reported during EMA.

#### **III. Results**

# **Descriptive Statistics**

**Baseline Descriptive Statistics.** All eligible participants completed all baseline measures. First, we explored the participants' baseline reports of their lifetime history of suicidal and nonsuicidal self-injury thoughts and behaviors, their lifetime history of minority stress experiences, and their current and recent mental health difficulties. Analyses also compared lifetime minority stress experiences across sexual orientations, although no significant findings were found due to lack of appropriate power for between-subject analyses.

*Self-harm and mental health*. Out of the 21 eligible participants in this study, 20 reported a lifetime history of suicidal ideation, 14 reported history of suicidal planning, and 6 reported history of suicide attempt. Participants with a history of suicidal ideation had, on average, thought about death or suicide 4.52 times on average (SD = 7.18, range = 0-28) in the past month and 1.38 times on average (SD = 2.42, range = 0-9) in the past week. Out of the 6 who had previous suicide attempts, 4 participants reported one previous attempt, and 2 participants reported two previous attempts.

All 21 participants had previously engaged in nonsuicidal self-injurious thoughts and behaviors, as was required to be eligible for the study. When asked about urges and thoughts related to NSSI, participants reported 11.52 thoughts on average (SD = 6.49, range = 0-22) in the past month, and 2.67 thoughts on average (SD = 1.49, range = 0-5) in the past week. When asked about total lifetime NSSI behaviors, participants reported, on average, engaging in NSSI 639.75 times (SD = 759.23, range = 25-3000). At baseline, on average, participants reported 74.24 past-year NSSI behaviors (SD = 80.54, range = 8250), 8 past-month behaviors (SD = 6.37, range = 2-23), and 4.33 behaviors (SD = 3.58, range = 2-16) in the past two weeks. Participants reported that they, on average, had started engaging in NSSI at 14.14 years old (SD = 4.51, range = 7-30).

Most participants reported engaging in a number of different types/methods of NSSI. The most commonly cited methods was cutting/carving skin (n = 18; 85%), followed by hitting oneself (n = 14; 66%), burning skin (n = 12; 57%), biting oneself (n = 11; 52%), punching something (n = 10; 47%), overdosing (n = 5; 23%), and purposefully getting into physical fights (n = 2; 9%). 12 participants (57%) reported pulling their hair, and 20 (95%) reported picking at wounds. When asked if they engaged in NSSI methods not explicitly assessed, participants reported engaging in several other methods of NSSI: banging one's head, making oneself vomit, drinking until one gets sick, starving oneself, and walking around "bad neighborhoods" hoping to get hurt.

Participants also reported having diverse motivations and reasons for engaging in NSSI. All participants reported engaging in NSSI in order to "get rid of bad feelings" at least somewhat. Most participants also reported at least some motivation for engaging in NSSI to "feel something" (n = 19; 90%) or to "communicate something to someone else or to get attention" (n = 16; 76%). On average, participants most strongly reported that "problems with work or school" led to their engagement with NSSI, followed by "problems with family," and then "problems related to your sexual orientation" and "problems with friends." Most participants (n = 17; 81%) indicated that problems related to sexual orientation led to NSSI at least somewhat, and almost half of the participants reported that these sexuality-related problems led to NSSI "very much" (n = 6; 28%) or "extremely" (n = 3; 14%). Additionally, almost half participants (n = 9; 42%) described

gender concerns influencing NSSI, with 5 participants (23%) reporting that problems related to gender identity "very much" led to NSSI, 3 (14%) reporting "very much", and 1 (4%) reporting "extremely." See Table 2 for baseline self-harm measure outcomes.

When exploring baseline data of mental health questionnaires, participants in this study reported relatively "high" levels of stress, moderate levels of depression, and fairly high levels of rumination and emotion regulation difficulties. See Table 3 for descriptive data from these baseline measures of mental health.

*Minority stress*. Participants in this sample reported a number of sexual minority stress experiences throughout their lives. The average DHEQ total score was 74.05 (SD = 27.67). The average LGBIS total score was 93.38 (SD = 12.49), the average LGBIS internalized homonegativity subscale score was 5.14 (SD = 2.95), and the average LGBIS identity uncertainty subscale score was 8.95 (SD = 3.60). See Table 4 for full baseline minority stress measure outcomes, including subscale scores.

When group differences were examined on baseline measures between sexual orientation and gender groups, very few statistically significant differences were found, likely due to small sample size. Gender minority participants had significantly greater scores on the DHEQ gender expression subscale (M = 13.8, SD = 10.3) as compared to cisgender participants (M = 4.0, SD = 5.6),  $X^2$  (33) = 40.11, p < .05. There were no statistically significant differences between sexual orientation groups. See Table 5 for full baseline minority stress measure outcomes by gender identity, gender minority status, and sexual orientation.

**EMA Monitoring Descriptive Statistics.** Next, analyses examined self-harm, mental health, and minority stress reported during EMA monitoring in aggregate across

participants. Participants completed a total of 1,020 surveys during EMA monitoring across the study, with 919 of these surveys being completed on study days 1-14 post-baseline per protocol. 1 participant dropped out of the study at day 7, and 1 participant did not complete any EMA surveys after day 8. There was an average of 3.2 prompted surveys per participant per day (not including those surveys completed outside the 14-day study window), out of 4 possible prompted surveys per day per participant, for an overall compliance rate of 80%. 16 participants were compliant in completing at least 75% of EMA surveys.

Across all 21 participants and all EMA monitoring days, NSSI thoughts were reported 242 times. NSSI behaviors were reported as being present at 88 separate timepoints, on 68 different days, with a total of 148 distinct NSSI being reported. 227 distinct minority stress events were reported on 120 separate days across all participants and all monitoring periods, with 116 of these events indicated as being "probably" or "definitely" related to sexual orientation or sexual identity.<sup>1</sup> 66 events were reported as being "definitely not" related to sexual identity. The most commonly cited minority stress event was witnessing/hearing other LGBQ person(s) being stigmatized (n = 32), followed by being treated with less courtesy/respect (n = 28) and being made to feel inferior (n = 28). The least commonly reported minority stress event was being harassed or threatened (n = 6). See Table 6 for full EMA outcomes descriptive data.

Gender identity and sexual orientation groups were compared on their minority stress experienced reported during EMA. "Other" sexual orientation-identified

<sup>&</sup>lt;sup>1</sup>As described in the methods section, all analyses for hypotheses 1, 2, and 3, were performed twice; first utilizing all minority stress events reported during EMA, then utilizing only the minority stress events reported as being related to sexual orientation/identity. Significance outcomes were the same for every analysis regardless of the minority stress variable used. Presented below are only the statistics from the analyses using all minority stress events.

participants reported the highest number of NSSI behaviors on average, and bisexual/pansexual-identified participants reported the highest number of NSSI thoughts on average. Non-binary/Other-gender-identified participants reported the highest average of NSSI thoughts and NSSI behaviors, as well as the highest levels of rumination and stress, as compared to any sub-sample examined. None of these results were statistically significant, however. See Table 7 for EMA data outcomes by sexual orientation and gender groups.

# **Hypothesis 1**

It was first hypothesized that greater minority stress experienced at one EMA timepoint would predict greater psychological distress reported at the same timepoint and at the next timepoint, and, similarly, that greater minority stress reported on one day would be related to greater psychological distress reported on that same day. To test these hypotheses, generalized hierarchical linear modeling mixed models were utilized. The observations-within-individuals nesting structure was justified by significant ICCs for psychological distress at the same timepoint (ICC = .65), psychological distress at the next timepoint (ICC = .63) and psychological distress at the day level (ICC = .80). These values indicate that 65% of the variance in timepoint psychological distress, 63% of the variance in next-timepoint psychological distress, and 80% of the variance in daytime distress was between-person, with the remainder being within-person variation.

Fixed effects examinations revealed that greater minority stress predicted greater psychological distress at the same timepoint (t(1,018) = 10.02; B = .69, SE = .07, p < .001, RR = 1.99), with a random intercept variance of 31.07 (SE = 9.98, Wald Z = 3.11, p < .005). Similarly, greater minority stress at one timepoint predicted greater

psychological distress at the next timepoint (t(699) = 2.37; B = .24, SE = .10, p < .05, RR = 1,27), with a random intercept variance of 33.76 (SE = 11.29, Wald Z = 2.98, p < .005). Finally, greater minority stress throughout a given day predicted greater psychological distress on that same day (t(1006) = 11.40; B = 1.29, SE = .11, p < .001, RR = 3.63), with a random intercept variance of 33.97 (SE = 10.85, Wald Z = 3.13, p < .005).

These results remained significant when controlling for gender, age, sexual orientation identity, baseline discrimination, baseline internalized heterosexism, baseline general stress, and EMA general stress. Within this model, timepoint minority stress predicted psychological distress at the same timepoint (t(996) = 8.59; B = .58, SE = .07, p < .001, RR = 1.79), with a random intercept variance of 18.98 (SE = 8.73, Wald Z = 2.17, p < .05). Similarly, when controlling for covariates, greater minority stress predicted greater psychological distress at the next timepoint (t(696) = 2.50; B = .24, SE = .10, p < .24.05, RR = 1.27), with a random intercept variance of 23.43 (SE = 11.49, Wald Z = 2.04, p < .05). Finally, again, when including covariates in the model, day-level minority stress predicted day-level psychological distress (t(1000) = 8.09; B = .68, SE = .08, p < .001, RR = 1.97), with a random intercept variance of 24.36 (SE = 11.08, Wald Z = 2.20, p < .05). Within the same timepoint model, EMA general stress and female gender were also significantly related to psychological distress. Within the next-timepoint model, EMA general stress was also a significant predictor of distress. Within the day-level model, general stress was also a significant predictor of distress. See Table 8 for full hypothesis 1 findings.

# **Hypothesis 2**

Next, it was hypothesized that greater minority stress experienced at one EMA timepoint would predict thoughts and NSSI behaviors at the same timepoint as well as the next timepoint. Similarly, it was hypothesized that greater minority stress reported on one day would be related to NSSI thoughts and behaviors on that same day. To test these hypotheses, generalized mixed models were again utilized, first looking at minority stress' impact on NSSI thoughts and then looking at its impact on NSSI behaviors.

**NSSI Thoughts.** The observations-within-individuals nesting structure was justified by significant ICCs for NSSI thoughts at the same timepoint (ICC = .19), the next timepoint (ICC = .69), and on the same day (ICC = .32). Therefore, 19% of the variance in same timepoint NSSI thoughts, 69% of the variance in next timepoint NSSI thoughts, and 32% of the variance in daytime NSSI thoughts was between persons, with the remainder being within-person variation.

Fixed effects examinations revealed that greater minority stress at each timepoint predicted NSSI thoughts at the same timepoint (t(1,018) = 6.28; B = 0.28, SE = 0.05, p < .001, RR = 1.32), with a random intercept variance of 1.35 (SE = .51, Wald Z = 2.66, p < .01). Minority stress at each timepoint did not predict NSSI thoughts at the following timepoint (p > .05). Finally, greater minority stress on a given day predicted greater NSSI thoughts on that same day (t(1,018) = 7.84; B = 0.30, SE = 0.04, p < .001, RR = 1.35), with a random intercept variance of 0.65 (SE = 0.25, Wald Z = 2.87, p < .005).

These results remained significant when controlling for gender, age, sexual orientation identity, baseline discrimination, baseline internalized heterosexism, baseline general stress, EMA general stress, and baseline lifetime NSSI. Timepoint minority stress predicted NSSI thoughts at the same timepoint, even with all covariates included (*t*(956)

= 5.91; B = .26, SE = .05, p < .001, RR = 1.30), with a random intercept variance of 1.54 (SE = .78, *Wald Z* = 2.00, p > .05). Within this model including covariates, both EMA timepoint general stress and baseline lifetime NSSI behaviors were also significantly related to NSSI thoughts at the same time point.

Daily average minority stress predicted NSSI thoughts on the same day, even with all covariates included (t(956) = 7.10; B = 0.27, SE = 0.04, p < .001, RR = 1.31), with a random intercept variance of 0.62 (SE = 0.29, *Wald Z* = 2.14, p < .05). Within this model with covariates, general stress was also significantly related to NSSI thoughts on the day level. See Table 9 for hypothesis 2 findings on NSSI thoughts.

**NSSI Behaviors**. Analyses were performed for NSSI behaviors using both a binary measure of NSSI (did NSSI occur or not) and a continuous measure of NSSI (how many distinct behaviors of NSSI were reported). When considering hypothesis 2 analyses on the presence of NSSI behaviors, using the binary measure of NSSI, the observations-within-individuals nesting structure was justified by significant ICCs for NSSI behaviors at the same timepoint (ICC = 0.8), the next timepoint (ICC = 0.10), and on the same day (ICC = 0.26). 8% of the variance in same timepoint NSSI behaviors, 10% of the variance in next timepoint NSSI behaviors, and 26% of the variance in daytime NSSI behaviors was between persons, with the remainder being within-person variation. When considering hypothesis 2 analyses on total reported NSSI behaviors, using the continuous measure, the observations-within-individuals nesting structure was justified by significant ICCs for NSSI behaviors at the same timepoint (ICC = .06), the next timepoint (ICC = 0.08), and on the same day (ICC = 0.16). 6% of the variance in same timepoint (ICC = .06), the next timepoint (ICC = 0.08), and on the same day (ICC = 0.16). 6% of the variance in same timepoint NSSI behaviors, and 16% of the variance

in daytime NSSI behaviors was between persons, with the remainder being within-person variation.

Fixed effects examinations revealed that greater minority stress at each timepoint predicted the presence of NSSI behaviors at the same timepoint (t(1,018) = 2.88; B = .12, SE = .04, p < .005, RR = 1.13), with a random intercept variance of 1.20 (SE = .56, *Wald* Z = 2.14, p < .05). Greater minority stress at each timepoint also predicted greater number of NSSI behaviors at the same timepoint (t(1,018) = 4.32; B = .10, SE = .02, p < .001, RR = 1.11), with a random intercept variance of 1.69 (SE = .72, *Wald* Z = 2.36, p < .05). Minority stress on each timepoint did not predict either the presence of NSSI behaviors at the next timepoint or the number of NSSI behaviors reported at the next timepoint. Finally, greater minority stress on a given day did predict the presence of NSSI on that same day (t(1,018) = 6.21; B = 0.66, SE = 0.11, p < .001, RR = 1.93), with a random intercept variance of total number of NSSI behaviors reported on that same day (t(1,018) = 3.53; B = 0.15, SE = 0.04, p < .001, RR = 1.16), with a random intercept variance of 3.11 (SE = 1.23, *Wald* Z = 2.53, p < .05).

These results remained significant when controlling for gender, age, sexual orientation identity, baseline discrimination, baseline internalized heterosexism, baseline general stress, EMA general stress, and baseline lifetime NSSI. With all covariates included in the model, timepoint minority stress significantly predicted the presence of NSSI behavior (t(956) = 2.22; B = .11, SE = .05, p < .05, RR = 1.12) at the same timepoint, as did general stress. In this model, there was a nonsignificant random intercept variance of 1.53 (SE = .91, Wald Z = 1.68, p = .09), suggesting that there was

not substantial variance between participants. With all covariates included in the model, timepoint minority stress significantly predicted the total number of distinct NSSI behaviors at the same timepoint (t(956) = 2.80; B = .07, SE = .03, p < .01, RR = 1.07), as did general stress and baseline lifetime NSSI behaviors. In this model, there was a nonsignificant random intercept variance of 1.73 (SE = .93, Wald Z = 1.86, p = .06), suggesting that there was not substantial variance between participants.

When controlling for covariates, average daily minority stress predicted the presence of NSSI behaviors on the same day when controlling for all covariates (t(956) = 6.02; B = 0.65, SE = 0.11, p < .001, RR = 1.92), as did general stress, with a non-significant random intercept variance of 4.43 (SE = 2.30, Wald Z = 1.93, p = .054), indicating non-substantial variance between participants in this model. Similarly, greater average daily stress predicted greater NSSI behaviors on the same day, even with all covariates included (t(956) = 3.02; B = .13, SE = .04, p < .005, RR = 1.07), with a significant random intercept variance of 3.34 (SE = 1.69, Wald Z = 1.97, p < .05). Within this model, greater daily average stress also predicted greater NSSI behaviors on the same day. See Table 10 for hypothesis 2 findings on NSSI presence, and Table 11 for hypothesis 2 findings on NSSI behaviors.

#### Hypothesis 3

Finally, for an exploratory third hypothesis, it was hypothesized that rumination would mediate the relationship between sexual minority stress and NSSI. The PROCESS macro was used to examine whether overall EMA rumination mediated the relationship between baseline minority stress and total NSSI behaviors reported during EMA. The indirect effect of rumination was not significant in either the relationship between baseline experienced discrimination and EMA NSSI thoughts (*indirect effect* = .01, *SE* = .03, *95% CI* [-.04, .08]), or between baseline experienced discrimination and EMA NSSI behaviors (*indirect effect* = -.13, *SE* = .22, *95% CI* [-.58, .27]). Within these models, experienced discrimination was positively associated with baseline rumination (B = .12, SE = .06, Wald = 4.55, p < .05). Baseline discrimination also significantly predicted total NSSI behaviors reported during the EMA monitoring period (B = .01, SE = .00, Wald = 10.34, p < .005)

Similarly, when the same relationships were examined entirely within the EMA monitoring period, minority stress, rumination, and NSSI were highly linked, but there was no mediational relationship. The indirect effect of momentary rumination between momentary minority stress and subsequent NSSI behaviors, however, was not significant (*indirect effect* = -.13, *SE* = .22, *95% CI* [-.58, .27]). The indirect effect of rumination was similarly not significant between momentary minority stress and subsequent NSSI thoughts (*indirect effect* = .10, *SE* = .07, *95% CI* [-.02, .26]). Minority stress experienced at a certain timepoint predicted general rumination scores at the same timepoint (*B* = 1.29, *SE* = .11, *p* < .001), as well as next timepoint (*B* = .02, *SE* = .00, *p* < .05). General rumination at a certain timepoint predicted NSSI behaviors at the same timepoint (B = .14, *SE* = .02, *p* < .001), but not at the following timepoint. Similarly, minority-stress-specific rumination at a certain timepoint predicted NSSI behaviors at the same timepoint (B = .02, *SE* = .00, *p* < .001), but not at the following timepoint.

# **Further Exploratory Analyses Related to Rumination and Minority Stress**

Linear regressions demonstrated significant relationships between baseline rumination and some lifetime minority stressors. Baseline rumination was significantly associated with lifetime experienced minority stress in general (e.g., baseline DHEQ total scores; B = 1.44, SE = .67, wald = 4.55, p < .05, RR = 4.22). Baseline rumination was significantly associated with lifetime minority stress from hypervigilance (B = .43, SE = .16, wald = 7.20, p < .01, RR = 1.54) and lifetime minority stress from vicarious trauma (B = .28, SE = .12, wald = 5.81, p < .05, RR = 1.32). Baseline rumination did not predict either internalized heterosexism specifically or general stress reported at baseline. See Table 12.

Next, Poisson regressions were used to examine whether baseline rumination predicted the number of specific minority stressors reported during EMA. Baseline rumination predicted the number of times during EMA that participants reported the minority stressor of having "avoided a situation in which [one] expected to be stigmatized" (B = .23, SE = .07, wald = 9.85 p < .005, RR = 1.26) and the minority stressor of having "witnessed or heard about other LGBQ people being stigmatized" (B = .06, SE = .03, wald = 4.99 p < .05, RR = 1.06). See Table 13.

The descriptive statistics of momentary minority-stress-specific rumination for each type of minority stressor assessed during EMA monitoring were also examined. "Made to feel inferior" had the highest average level of associated rumination (M = 4.99, SD = 11.87), followed by "treated with less courtesy or respect" (M = 4.33, SD = 10.61), and "having unfair or incorrect assumption made about you" (M = 3.17, SD = 9.04). See Table 14.

#### **IV. Discussion**

Previous literature demonstrates that sexual minorities face a number of negative experiences that are unique to their sexual identities, including experiences of discrimination, anticipated discrimination and hypervigilance, and internalized heterosexism. The Minority Stress Theory (Meyer, 2003) argues that these stigmatization experiences cause psychological distress and explain the physical and mental health disparities that sexual minorities face. Indeed, LGBQ people are significantly more likely than their heterosexual counterparts to engage in self-injurious behaviors (Batejan et al., 2015), and research suggests that this disparity can at least in part be explained by minority stress (Muehlenkamp, Hily, Ehlinger, & McMillan, 2015). While ample research supports the Minority Stress Theory, few studies have utilized longitudinal methodologies to examine minority stress and its effects on psychological distress and various mental health outcomes. In fact, no previous study, to our knowledge, has utilized EMA methodology to examine NSSI, NSSI risk factors, and NSSI phenomenology in LGBQ people exclusively. The current study was designed to fill this gap in the literature by using micro-longitudinal methods to examine the real-time relationship between minority stress and NSSI in 21 sexual minority adults who self-injure regularly.

This study aimed to provide novel information about the phenomenology of minority stressors and NSSI within this population, while also providing answers to three primary hypotheses. First, it was hypothesized that minority stress would predict psychological distress in real-time. It was then hypothesized that minority stress also would predict NSSI thoughts and behaviors in real-time. Finally, it was hypothesized that rumination would mediate any relationship between minority stress and NSSI in LGBQ adults who self-injure. The results from the analyses for each of these hypotheses are reviewed below, followed by a discussion of other notable findings and limitation considerations that could inform future work in this area.

#### **Relationship Between Minority Stress and Psychological Distress**

For the first hypothesis, it was expected that greater minority stress reported during one EMA assessment would predict greater psychological distress during that same assessment and during the following assessment. Additionally, it was expected that greater levels of minority stress across a given day during EMA monitoring would predict greater levels of psychological distress on that same day.

The first hypothesis was supported. Minority stress significantly predicted psychological distress, even when controlling for a variety of demographic variables, mental health difficulties, and lifetime levels of minority stress. These findings are in line with previous EMA research that has found that experiences of heterosexism, LGBQrelated discrimination, or LGBQ identity concealment are associated with increased negative affect (Eldahan et al., 2016; Swim et al., 2009; Mohr & Sarno, 2016; Mohr et al., 2019; Mason, 2015). Almost all previous studies in this area, however, utilize oneassessment-per-day "daily diary" methods, relying on aggregated measures of minority stress and negative affect across entire days. This study assessed these constructs multiple times per day for two weeks, allowing for more nuanced examination of temporal relationships between minority stress and psychological distress. The results suggest that experiences of minority stress are acutely associated with negative affect in real-time, in addition to across days. These findings further support the Minority Stress Theory and suggest there might be a causal relationship from minority stress to psychological distress. Accordingly, it seems likely that discussing minority stress and addressing stigma-related coping would be beneficial in psychological treatments with LGBQ people.

Interestingly, when controlling for covariates in hypothesis 1, greater general stress was predictive of greater psychological distress in the same timepoint model and in the day-level model but not in the next timepoint model. This finding suggests that minority stress could have a more "resonating" impact than general stress, with minorityspecific stress leading to acute increases in negative affect that might linger longer or build up more strongly than general stress' impact on negative affect. While these results could be due to lack of power, previous research corroborates the idea that minority stress is a more potent influence on negative affect and mental health as compared to general stress in LGBQ people (Mereish & Miranda, 2019). It seems that LGBQ adults who selfinjure may face stressors specifically related to their sexual identity, and these minority stressors might have greater affective consequences than general stressors. While more research is needed to substantiate this idea, treatment providers should be aware that minority stressors might require specific attention within psychotherapy when working with self-injuring LGBQ clients. Future research should explore more directly whether LGBQ individuals demonstrate more acute or intense impact on their distress levels and on their NSSI by minority stress than by general stress, and what factors drive this differential effect.

# **Relationship Between Minority Stress and NSSI**

Next, it was hypothesized that minority stress would predict self-injurious thoughts and behaviors in real-time. Specifically, it was expected that greater minority

stress would predict self-injurious thoughts and behaviors at the same timepoint, at the next timepoint, and within the same day during EMA monitoring. This hypothesis was partially supported. Participants were significantly more likely to report both NSSI thoughts and NSSI behaviors at EMA assessments when they reported more minority stress. Further, greater intensity of minority stress was associated with greater number of distinct NSSI behaviors at the same EMA assessment. When minority stress was aggregated across each day, greater minority stress predicted whether participants thought about NSSI or engaged in NSSI on that same day, and it predicted how much they engaged in NSSI. Greater minority stress reported during one assessment, however, did not predict NSSI thoughts or behaviors at the following EMA assessment.

These findings largely mirror the results from hypothesis 1, and they are consistent with the existing literature in a number of ways. First, previous EMA studies demonstrate that higher levels of stress/distress predict higher levels of NSSI thoughts and behaviors in general samples of people who engage in NSSI (Kranzler, et al., 2017; Turner et al., 2016; Armey, Crowther, & Miller, 2011). Within sexual minorities, research repeatedly finds that self-harm is connected to minority stress on societal (Hatzenbuehler, 2011) and individual levels (Liu & Mustanski, 2012; DeCamp & Bakken, 2015; Muehlenkamp, Hily, Ehlinger, & McMillan, 2015). Additionally, EMA studies in LGBQ people have found that minority stress is associated with emotional experiences that are in turn associated with maladaptive coping behaviors. For example, Mason (2015) found that heterosexism was associated with negative affect which was in turn associated with binge eating in a daily diary study, and Livingston and colleagues (2017) found that discrimination predicted psychological distress and substance use in an EMA study. The current study expands upon these studies by being the first EMA study in LGBQ samples to examine self-harm behaviors.

Specifically, this study extends support for the Minority Stress Theory as it applies to NSSI and minority stress in every day life. The results demonstrate that minority stress is associated with both NSSI urges and NSSI behaviors in real-time, and that higher intensity of minority stress is directly related to higher amounts of NSSI. Furthermore, as with hypothesis 1, hypothesis 2 analyses were performed controlling for a number of mental health and demographic variables. Again, general stress was also significantly related to NSSI thoughts and behaviors during EMA, as might be expected given the literature on interpersonal and other stressors on NSSI.

The finding that minority stress at one timepoint did not predict NSSI thoughts or behaviors at the following timepoint contradicted hypothesis 2, however. This finding could be due to low power. It's also possible that participants engaged in NSSI quickly after experiencing minority stress, such that time-lagged analyses of minority stress' impact on NSSI showed no significant relationship because participants had already selfinjured by the time they were reporting related minority stress via EMA assessment. Alternatively, it is possible that NSSI events reported at the same timepoint as minority stress actually occurred prior to the minority stress events. More analyses would need to be performed to examine these various suppositions, and future research could make more precise efforts to assess the temporal nature of minority stress, psychological distress, and NSSI.

# **Mediational Role of Rumination**

For the third and final hypothesis, the mediational role of rumination was explored. Specifically, based on previous literature on the Psychological Mediation Framework (Hatzenbuehler, 2009), it was anticipated that rumination would mediate the relationship between minority stress and NSSI thoughts and behaviors. Despite the fact that minority stress at baseline significantly predicted NSSI behaviors during EMA, rumination did not significantly mediate this relationship. Similarly, both general rumination and minority-stress-specific rumination were positively associated with NSSI at the same EMA timepoint, and minority stress predicted general rumination at the same and next EMA timepoint. But, minority-stress-specific rumination did not mediate the relationship between minority stress and NSSI thoughts or behaviors within the EMA monitoring period. This result stands in contrast to previous EMA studies finding that rumination mediates the relationship between minority stress and psychological distress in LGBQ people (Hatzenbuehler et al., 2009a; Hatzenbuehler et al., 2009b), as well as previous research finding that negative affect and rumination are associated with NSSI (Selby, Franklin, Carson-Wong, & Rizvi, 2013).

Notably, relatively few studies have examined the Psychological Mediation Framework in relationship to maladaptive coping strategies specifically, and none have examined NSSI. The initial review on the Psychological Mediation Framework (Hatzenbuehler, 2009) suggested that previous research at that point more robustly revealed that rumination is associated with internalizing problems (e.g., depression and anxiety) in LGBQ people, as compared to its association with externalizing behaviors (e.g., alcohol abuse). One recent EMA study found that minority stress predicted increased substance use behaviors that were reported to be "coping-motivated" and therefore possibly mediated by emotion regulation strategies (Livingston et al., 2019). Most existing research, however, has relied largely on cross-sectional methodology. The current study's use of EMA methodology, hierarchical linear modeling, and time-lagged analyses allowed for a nuanced temporal examination of mediation within each individual. Within this sample, a mediational model between minority stress, rumination, and NSSI was not supported.

It is possible that rumination after minority stress might increase specific negative affect or other internalizing experiences that *in turn* increase risk for NSSI. Thus, rumination might mediate the relationship between minority stress and psychological distress, without directly mediating the relationship between minority stress and NSSI or other maladaptive coping strategies. One previous EMA study on minority stress and binge-eating supported this more complex and indirect mediational relationship between minority stress, rumination, psychological distress, and dysregulated behaviors (Mason, 2015). Follow-up analyses could explore this possibility. Future studies should examine whether there are additional mediators or moderators in the relationship between minority stress, rumination, psychological distress, and NSSI and other maladaptive coping strategies or externalizing behaviors.

Previous research has repeatedly supported that rumination has a role in negative mental health outcomes in LGBQ people (Hatzenbuehler, 2009) and that rumination has a role in increasing risk for NSSI (Andover & Morris, 2014; Hoff & Muehlenkamp, 2009). Indeed, in this study, rumination during EMA was positively associated with NSSI behaviors. Similarly, rumination and minority stress have frequently been connected (Hatzenbuehler, 2009; Pachankis, 2007), and, in this study, minority stress predicted rumination during baseline and EMA assessments. Therefore, despite this study's lack of significant findings on rumination's role in the direct relationship between minority stress and NSSI, it was important to explore rumination's relationship to minority stress in the current sample of self-injuring LGBQ adults. A number of additional analyses that supported or extended previous research were performed.

First, the relationships between trait rumination and lifetime minority stress were examined via baseline data. While not significantly related to internalized heterosexism, rumination was significantly positively associated with experienced discrimination. Rumination also was related to the vigilance and vicarious trauma subscales of the DHEQ specifically. These findings corroborate previous research that has theorized or found rumination to be particularly related to discrimination and subsequent hypervigilance for future discrimination (Pachankis, 2007; Mendoza-Denton et al., 2002; Mays, Cochran & Barnes, 2007). Accordingly, follow-up analyses found that greater baseline rumination predicted greater reports of the minority stress events "witnessed or heard about other LGBQ people being stigmatized" and "avoided a situation in which [one] expected to be stigmatized" during the following EMA period. This finding extends previous literature by suggesting through longitudinal methodology that trait rumination seems to prospectively predict overall hypervigilance for discrimination, while increasing the likelihood that an LGBQ person reports minority stress events associated with anticipated stigma. This finding would support previous discussions about how LGBQ people might engage in concealment or avoidance in order to protect themselves from stigma, yet these behaviors could engender unique forms of minority stress (Pachankis, 2007). More analyses would need to be performed to better understand the relationships

between rumination, hypervigilance-related minority stress, and negative mental health outcomes.

Other follow-up analyses indicated that the highest levels of minority-stressrelated rumination during EMA were found in response to the minority stress events of "made to feel inferior," "treated with less courtesy or respect," and "having unfair or incorrect assumption made about you." These three minority stressors are notable in that, out of the minority stressors that were available for participants to select during EMA, they are some of the most subtle stressors (as opposed to more blatant examples of "insulted or called names" or "harassed or threatened"). Also, they are some of the stressors more likely to be ambiguous and therefore more difficult to directly attribute to an LGBQ identity (as opposed to more explicit examples of "witnessed or heard about other LGBQ person(s) being stigmatized", "hidden sexual orientation from others," "worried about LGBQ identity being known," and "felt uncertain about sexual orientation or queer identity"). This finding could be attributed to the fact that greater ambiguity about interpersonal situations could lead to greater ruminative self-focus, which in turn would lead to greater psychological distress if the interpersonal situation caused negative affect in the first place (Lyubomirsky et al., 1999). Perhaps examinations of NSSI and rumination in response to specific types of minority stressors or in response to particularly distressing minority stressors would uncover significant mediational relationships. These examinations are outside the scope of this current study primarily due to lack of power. Future studies should explore more nuanced temporal relationships among specific minority stressors, negative affect, rumination, and NSSI to better clarify if and when rumination could be a target for interventions to reduce NSSI.

# **Other Findings and Comparisons to Past Research**

General NSSI findings. Similarly to follow-up analyses on rumination, it is appropriate to highlight several other non-hypothesized findings here, in order to provide more descriptive data that substantiate the literature or could inspire future studies. For example, the current sample of self-injuring LGBQ adults engaged in NSSI relatively frequently. This study's LGBQ adult participants reported an average of 11.5 NSSI thoughts, 4.8 NSSI episodes, and 7 distinct NSSI behaviors during the two-week monitoring period. One previous EMA study reported an average of 10 NSSI thoughts and 3 NSSI episodes over two weeks in a sample of adolescents and young adults with a recent history of NSSI (Nock, Prinstein, & Sterba, 2009), while another reported an average of 11 NSSI thoughts, 3 NSSI episodes, and 3 NSSI behaviors over two weeks in a sample of adolescents and young adults with a history of NSSI comparable to the current sample (Kranzler et al., 2017). While it is beyond the scope of the current study to directly analyze whether these differences in NSSI are statistically significant, the sample in this study demonstrates at face value to have had more frequent NSSI behaviors (i.e., 68 days with 88 reported NSSI episodes, but with 148 distinct NSSI behaviors, among only 21 participants). This observation parallels past research suggesting that, when they engage in self-harm, LGBQ people engage in more serious self-harm behaviors (Fox et al., 2018).

Participants in this study generally reported similar lifetime NSSI methods to participants in other studies, identifying cutting to be their most used method (Armey, Crowther, & Miller, 2011; Bresin, 2014; Victor & Klonsky, 2014). Similarly, as in past research (Kranzler et al., 2017; Nock et al., 2009), the most common reported function of NSSI at baseline was to "get rid of bad feelings." One novel finding is that, when asked directly, 81% of the self-injuring LGBQ adults in this study reported that problems related to their sexual orientation has triggered NSSI behavior in the past, with almost half identifying problems related to sexual orientation as significant triggers. Relatedly, almost half (43%) participants reported problems related to their gender identity as triggers for NSSI behaviors. While there are no studies to which it's appropriate to compare, it should be noted that participants in this study reported a very large range of age of NSSI onset (7-30 years old; M = 14.14, SD = 4.51). Taken all together, these NSSI-related findings demonstrate that NSSI in LGBQ adults may appear and function similarly to NSSI in general/heterosexual samples, but that the phenomenology and triggers for NSSI might diverge.

General minority stress findings. Similar to the above findings on NSSI, the current sample reported greater numbers of minority stress during EMA than has been noted in previous EMA studies examining minority stress. In this study, 21 LGBQ adults reported a total of 227 minority stress events and 116 minority stress events be "definitely" or "probably" related to sexual identity. On average per week, participants reported 5.4 minority stress events and 2.8 minority stress events that were reported to be "definitely" or "probably" related to sexual identity. In a previous one-week daily diary study, 69 LGBQ adults reported 2.03 "heterosexist hassles" per week and 8.47 "hassles" that participants did not view as heterosexist (Swim et al., 2009). In another 30-day daily diary study, 91 bisexual adults reported on average .29 "negative identity events" per week (Flanders, 2015). Lastly, in a 7-10 day daily diary study, 61 LGBQ young adults experienced negative "identity-salient experiences" with heterosexuals on 13% of days

and with LGBQ people on 7% of days (Mohr & Sarno, 2016). In this study, minority stress events were reported on 120 days out of a possible 287 (41% of days). Again, while no direct statistical comparisons can be made among studies, it is noteworthy that this sample of self-injuring LGBQ adults demonstrated higher levels of minority stress on a daily basis as compared to previous EMA studies.

Findings within gender minority participants. Finally, this study specifically recruited sexual minority adults, but 5 of 21 participants also identified as transgender. Therefore, some exploratory analyses were performed, comparing cisgender participants and transgender participants on various measures of minority stress and mental health. It was discovered that the transgender participants in this study reported higher numbers of NSSI thoughts and behaviors during EMA on average per participant, as well as higher average levels of general stress during EMA. Non-binary participants had the highest levels of all sub-groups. Transgender and non-binary participants also reported particularly high levels of lifetime experienced minority stress. When directly comparing gender groups with Chi-Square analyses, however, most of these differences were nonsignificant due to lack of power. Notably, despite low power, transgender participants and non-binary participants reported statistically significantly higher baseline levels of minority stress related to gender expression, indicating very large group differences. These findings corroborate past research that demonstrates transgender people face particularly high levels of discrimination (James et al., 2016) and experience particularly high levels of mental health difficulties and engagement in self-harm (Marshall et al., 2016; Reisner & Juntunen, 2015). While not the focus of this study, these findings demonstrate that future research must be devoted to exploring minority stress and NSSI

in transgender populations, in order to better reduce self-harm in this doubly-stigmatized subpopulation of the LGBTQ community.

# **Limitations and Future Directions**

As mentioned above, this study is the first study to our knowledge that utilizes EMA methodology to examine NSSI in LGBQ people. The robust micro-longitudinal methodology of EMA enabled us to examine temporal relationships among minority stress, psychological distress, and NSSI. Thus, it also allowed for particularly reliable assessment of the minority stress theory and the Psychological Mediation Framework within the context of NSSI. The current results provide some important foundational data upon which future studies could jump off, as described above. Despite this study's strengths, its results should be considered in light of a number of limitations. These limitations are highlighted below, with discussion of additional recommendations for follow-up analyses and studies to address these limitations.

**Sample size.** First and foremost, this study had a relatively small sample size of 21 participants, with 20 participants completing study procedures. Participants were required to identify as LGBQ, an overall population minority group, and they were required to be regular self-injurers currently (e.g., having engaged in self-injury at least twice in the past two weeks), a particularly small subgroup of the general population. Recruitment was therefore difficult. Due to the stringent NSSI inclusion criteria, however, participants reported a fairly large number of NSSI behaviors, with each participant reporting an average of 7.05 NSSI behaviors during the EMA monitoring period, adding up to 148 behaviors total. Participants also had a fairly large number of distinct timepoints at which they reported NSSI thoughts (n = 242) or NSSI behaviors (n

59

= 88) across EMA monitoring. Additionally, ICC statistics for hypothesis 2 analyses related to NSSI behaviors (which provide some of the more novel data contributions to the field) suggest that most variance in the analyses was within-person, indicating strong within-person power despite low between-person power. Indeed, power curve analyses (conducted using the "Power Curves for Multi-level Studies" online app; https://kleimanlab.org/power-curves/) estimate that power ranged between .2 to .8 for various analyses, but nonetheless some significant findings were able to be found due to moderate to large effect sizes.

Furthermore, it can be noted that this study's number of participants and number of reported NSSI events are comparable to or greater than those found in previous EMA studies of NSSI (e.g. Muchlenkamp et al., 2009; Nock et al., 2009). Similarly, participants in this study reported 227 distinct minority stress events during the EMA period, with 10.81 events on average per participant, which is comparable to or greater than previous EMA studies of minority stress (Swim et al., 2009; Livingston et al., 2017). Even when considering only minority stress events definitely and probably related to sexual identity, this study had greater or comparable minority stress events reported during EMA. Yet, despite this study's comparability to previous EMA studies, the small sample size still limited the study's overall statistical power. This limited power likely impacted several analyses relevant to between-person outcomes (e.g., mediational analyses in hypothesis 3, and chi-square comparisons of gender and sexual orientation groups) and should be considered when interpreting the results.

**Minority stress versus sexual minority stress.** A second large limitation of this study is the general reliability and validity of minority stress assessments. The

intersectionality of minority identities hinders the ability to differentially distinguishing between sexual minority stress and other identity-based stressors (e.g., discrimination based on gender or race/ethnicity) in self-report research. Additionally, a number of factors influence the self-report of discrimination, including basic retrospective biases, personality characteristics, a participant's current mood state, and more (Major & O'Brien, 2005; Stangor et al., 2003; Williams & Mohammed, 2009). This study employed several previously used methodologies in order to reduce these biases during EMA monitoring: providing detailed and standardized EMA instructions to participants at baseline (including providing definitions of stigma and minority stress), instructing participants to report minority stress experiences at least possibly related to their LGBQ identities, assessing specific types of stress events, assessing the extent to which minority stress experiences actually caused subjective distress, and assessing the extent to which participants believed the minority stress event was related to their sexual orientation/identity.

Despite these methodological efforts, participants in this study reported a number of minority stress experiences as being unrelated or possibly unrelated to their LGBQ identities (e.g., 111 out of 227 minority stress events reported during EMA). Data from all 227 minority stress events were used for a number of reasons. There is a possibility that any of the minority stressors experienced by participants could have been related to LGBQ identity, regardless of whether the participant attributed them to be related to their sexual identity or not. Past research suggests that minority people might deny that a stressful event is discriminatory as an active attempt to better cope with the event's subsequent distress (Williams & Mohammed, 2009). Furthermore, previous research suggests that various individual differences (e.g., the centrality of a stigmatized identity) and situational factors (e.g., the number of other people around who are known to be of the same stigmatized identity) influence whether or not a person classifies a discriminatory event as related to a certain stigmatized identity category (Major & O'Brien, 2005; Stangor et al., 2003), making it difficult to trust the reliability of selfreported attributions of minority stress events. Indeed, some factors that appear related to attributing ambiguous rejection events to discrimination also seem likely to be indirectly related to NSSI risk, including self-blame tendencies, low self-esteem, and low optimism (Major, McCot, Kaiser, & Quinton, 2003). Interestingly, in this sample, the minority stress event most commonly attributed to LGBQ stigma was "witnessing/hearing other LGBQ person(s) being stigmatized." This finding is in line with past research on discrimination attribution that found that people are more likely to attribute events to discrimination for others than for themselves (Stangor et al., 2003). Of course, it is possible that some minority stress events were attributed to LGBQ identity when an event was not objectively or truly discriminatory in nature.

All in all, there are a number of reasons why a participant might or might not have appraised a minority stress event as related to LGBQ identity, or why a participant might or might not have chosen to report the event as LGBQ-related. Notably, during this study's baseline visit, participants were provided explicit EMA instructions to report only events that seemed to them to involve stigma. This study did not assess during EMA, however, participants' perceptions of which specific identities were stigmatized during minority stress events they experienced, partly because participants were also informed at baseline that the study was interested in hearing about LGBQ stressors specifically. Therefore, a number of reported minority stressors, whether identified as being related to LGBQ identity or not, could have been related to gender identity, gender expression, race, age, or other salient identities. Based on instructions provided to participants at baseline, it can be assumed that most stress events reported were indeed identity-/stigma-related, even if not sexual-identity-related specifically.

Regardless of whether minority stress events reported during EMA were truly related to LGBQ identity or not, they all likely contributed to the overall experience of stress and stigmatization in this study's sexual minority participants. In line with theories on stress proliferation (Pearlin, Schieman, Fazio, & Meersman, 2005), the "true" sexual minority stress events experienced by participants in this study likely caused or influenced a number of other ambiguous minority stressors they experienced. Therefore many of the ambiguous events could be related to sexual identity, even if indirectly or distantly. Finally and importantly, for the primary hypotheses, analyses were run using data from all minority stress events as well as using data only from minority stress events reported as being probably-/definitely-related to sexual identity. Results were exactly the same in terms of significant findings, and most statistical values were similar between sets of analyses. Of course, current findings should still be interpreted in light of this significant limitation. It could be beneficial to perform follow-up analyses examining possible differences between minority stress events attributed to sexual orientation and events not attributed to sexual orientation.

**Self-report biases.** Third, this study struggles from biases common in all selfreport-based studies, not just from those biases specific to minority stress. Indeed, emotion-related assessments and stress assessments seem to be particularly susceptible to various biases (Solhan et al., 2009; Ebner-Priemer & Trull, 2009; Ben-Zeev et al., 2009; Dohrenwend, 2006). This study's EMA methodology reduced recall biases and increased validity, compared to in-lab studies and compared to daily diary studies with one assessment per day, but it still relied on self-report assessments of minority stress, NSSI, rumination, and emotion. Luckily, a recent study by Mereish and Miranda (2019) demonstrated that inducing stigma-specific stress is possible in the laboratory. Future studies should continue to expand upon the Minority Stress Theory and Psychological mediation Framework by utilizing experimental designs less susceptible to biases and better suited to establishing causal relationship. Additionally, future studies, whether utilizing EMA methodology or experimental methodology, could utilize psychophysiological examinations of stress in addition to self-reported distress in response to stigma and minority stressors, in order to further reduce possible biases.

**Study participant sample.** A fourth large limitation of this study is its sample's participant demographics. This study's sample is simultaneously homogeneous (e.g., a heavy majority of participants identified their race as white, and all participants were recruited from the same geographic location) and heterogeneous (e.g., cisgender and transgender as well as monosexual and bisexual/pansexual participants were recruited for this study). Other research suggests that race/ethnicity may have significant impacts on NSSI (Gholamrezaei, De Stefano, & Heath, 2017) and that gender and sexual identities have significant impacts on both NSSI (Bresin & Schoenleber, 2015; Batejan et al., 2015) and minority stress (Balasam, Beadnell, & Molina, 2013). Therefore, this study's convenience sampling and the participants' diversity (or there lack of) bring into question the external validity of our findings. It possibly further decreases the power and
generalizability of the current analyses. Nonetheless, this study was the first EMA study to examine NSSI in a sample of regularly self-injuring LGBQ people. It is therefore appropriate to consider this study pilot in nature, and future studies can expound upon this study's findings by examining larger samples with either more homogeneous or heterogeneous recruitment criteria. Larger studies would allow for greater power and validity, while also offering opportunities for nuanced explorations into group comparisons and intersectionality considerations.

Other future directions. Several additional recommendations are offered on ways for future studies to extend the current study or to advance the field further. Of course, the current study could be improved with a larger sample size as mentioned above, but its strength could also be increased by lengthening the EMA monitoring period or by assessing suicidal thoughts and behaviors in addition to NSSI. Novel and important data could be gained by performing similar studies that also recruited and compared self-injuring LGBQ adults with non-self-injuring LGBQ adults and/or selfinjuring heterosexual adults. Furthermore, simply adding a qualitative component to the current study (e.g., allowing for free-form text descriptions of minority stress events) could also allow for more nuanced understandings of the phenomenology of minority stress, as well as possible explorations into characteristics about events that make a person interpret an event as being related to sexual identity or not.

It would also be important for future studies to assess and examine other possible mediators that appear related to minority stress and mental health, including suppression (Hatzenbuehler et al., 2009a). Perhaps suppression as another maladaptive coping strategy could better explain the relationship between minority stress and NSSI in LGBQ people. Alternatively, perhaps participants in this study used other *adaptive* coping strategies in response to minority stress that influenced whether or not they engaged in NSSI. It would be important that future studies also include other such mediators. Coping-based social support has been identified as one such possible coping strategy beneficial to use in the face of minority stress (Hatzenbuehler et al., 2009b). Identifying the most significant mediators, whether negative or positive, in the relationship between minority stress and NSSI would allow for targeted treatments and prevention efforts to be developed.

Relatedly, more research is needed to determine protective factors in addition to risk factors for NSSI. While LGBQ people demonstrate significantly high levels of mental health difficulties compared to their heterosexual counterparts (Cochran, Bjorkenstam, & May, 2017), most LGBQ people do not suffer from mental illness despite facing significant minority stress in society. Some research even suggests that minority stress can be harnessed to create positive coping strategies through stress-related growth (e.g., observing positive changes in response to stressful), for example (Wang, Rendina, & Pachankis, 2017). Given the medical and psychological fields' own history of discriminating against sexual and gender minorities, it would be beneficial and imperative for future studies to examine strengths and resilience within LGBTQ populations who engage in self-harm.

## Conclusion

This study was the first study to our knowledge to examine sexual minority stress and NSSI using EMA methodology. Despite its limitations, the current study contributes to a growing body of research substantiating, extending, and challenging the Minority Stress Theory and the Psychological Mediation Framework. This study found experiences of minority stress predicted both psychological distress and NSSI in realtime. While rumination appeared to be connected to both minority stress and NSSI in various ways, it did not mediate the relationship between the two in this small sample of LGBQ adults. These findings extend the current literature in a number of novel ways and provide important information to support future study and NSSI-related interventions in sexual minority patients.

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Appendix 1. Suicide Risk Level Assessment Protocol

## EMOTION AND PSYCHOPATHOLOGY LABORATORY RUTGERS UNIVERSITY RESEARCH PROGRAM

Suicide Risk/Distress Assessment Protocol

## Edward A. Selby, Ph.D., Lab Director

The first step will involve the completion of the suicidal behavior and self-injurious interview (i.e., the SITBI). If, during this interview, a participant reports the presence of suicidal ideation, he or she was assessed for suicide risk based on the following framework (Joiner et al., 1999):

- a. An individual's risk for suicide is designated *nonexistent* if he or she has no current suicidal symptoms, no history of suicide, and no or few other risk factors.
- b. Risk for suicide is considered *mild* if the individual is a multiple attempter with no other risk factors or is a non-multiple attempter experiencing suicidal ideation of limited intensity and duration, no or mild Resolved Plans and Preparation, and no or few other risk factors.
- c. An individual is designated at *moderate* risk if he or she is a multiple attempter with any other significant risk factor. A non-multiple attempter with moderate to severe Resolved Plans and Preparations or moderate to severe Suicidal Desire and Ideation accompanied by at least two other risk factors is also considered to be at *moderate* risk for suicide.
- d. A multiple attempter with two or more risk factors or a non-multiple attempter with moderate to severe symptoms of Resolved Plans and Preparations accompanied by one other risk factor is designated at *severe* risk for suicide.
- e. An individual is at *extreme* risk for suicide if he or she is a multiple attempter with severe Resolved Plans and Preparation or is a non-multiple attempter with Resolved Plans and Preparations and two or more other risk factors.

Once an individual has been assessed for suicide risk, the researcher will take the following actions, as suggested by Joiner et al. (1999).

If an individual is considered to be at *nonexistent* or *mild* risk, he or she were entered into the study as eligible otherwise, and instructed to use self-control strategies and to seek out social support in the event that he or she becomes suicidal. If these strategies fail, he or she were instructed contact an emergency mental health resource or go to the emergency room, the phone numbers for which were provided.

A person who is at *moderate risk* for suicide were given a card with a list of steps to follow in case of emergency. This card will contain phone numbers for:

- i. Rutgers CAPS: 732-932-7884 (business hours)
- ii. Rutgers Psychological Services Clinic: 848-445-6111
- iii. Suicide Crisis Hotline: 1-800-273-TALK (24-hour)
- iv. County Designated Mental Health Professional (CDMHP), an appropriate mental health provider for suicidal crisis **732-235-5700**
- v. Call 911 in extreme crisis

Someone who is at *severe* or *extreme* risk for suicide were asked to contact APS with the experimenter from the lab. If the risk is imminent and serious, and in cases where the participant refuses further voluntary assessment, then study staff will contact County Designated Mental Health Professional (CDMHP) and Rutgers Police on behalf of the client.

Table 1. EMA Minority Stress Question Items

Minority Stressor Type	Item Text	Previously Used in EMA Research?
Experienced	Felt stigma, or been stigmatized	Previously used in EMA <sup>1</sup>
Discrimination	Been treated with less courtesy and respect than others	Previously used in EMA <sup>1</sup>
	Been harassed or threatened	Previously used in EMA <sup>1</sup>
	Been avoided, excluded, or rejected	New (Similar to item previously used in EMA <sup>1</sup> )
	Been made to feel inferior	New (Based on previous research on discrimination <sup>2</sup> )
	Been insulted or called names	New in this study
	Had unfair or incorrect assumptions made about me*	New in this study
Anticipated discrimination	Been worried about your LGBT identity being known	New in this study
	Avoided a situation in which I thought I'd be stigmatized	New in this study
Concealment	Hid or tried to hide your sexual orientation from others	New in this study
Ambient discrimination	Witnessed or heard about (an)other LGBQ person(s) being stigmatized	New in this study
Identity uncertainty	Felt uncertain about my sexual orientation	New (based on previous bisexual minority stress measure item <sup>3</sup> )

*References:* 1. Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009 2. Krieger et al., 2005 3. Flanders et al., 2015

Suicidal	Behav	ior			
	Ν	%	Μ	SD	Range
Lifetime SI	20	95	-	-	-
Lifetime SP	14	67	-	-	-
Lifetime SA	6	29	-	-	-
1 lifetime SAs	4	19	-	-	-
2 lifetime SAs	2	10	-	-	-
Past-Month SI Instances	16	76	4.52	7.18	0-28
Past-Week SI Instances	10	47	1.38	2.42	0-9
Past-Week SI Intensity	10	47	2.11	.78	0-4
Nonsuicidal Se	elf-Inju	ry (NSS	SI)		
	Ν	%	Μ	SD	Range
Past-Month NSSI Thoughts	21	100	11.52	6.49	0-22
Past-Week NSSI Thoughts	21	100	2.67	1.49	0-5
Lifetime NSSI Behaviors	21	100	639.75	759.23	25-3000
Past-Year NSSI Behaviors	21	100	74.24	80.54	8-250
Past-Month NSSI Behaviors	21	100	8	6.37	2-22
Past-Two-Week NSSI Behaviors	21	100	4.33	3.48	2-16
Onset age of NSSI Behaviors	-	-	14.14	4.51	7-30
Lifetime NSSI Me	ethods a	and Tri	ggers		
	Ν	%			
NSSI Method					
Cutting/Carving skin	18	86			
Hitting oneself	14	67			
Burning skin	12	57			
Biting oneself	11	52			
Punching something	10	47			
Overdosing	5	23			
Purposefully getting into fights	2	9			
Pulling own hair	12	57			
Picking at wounds	20	95			
	Ν	%	M*	SD*	
NSSI Triggers					
Problems with work/school	20	95	2.19	1.21	
Problems with family	19	90	2.29	1.45	
Problems related to SO	17	81	2.10	1.38	
Problems with friends	17	81	1.48	1.12	
Problems with romantic relationships	16	76	1.95	1.36	
Problems with gender identity	9	43	1.10	1.38	

Descriptive Data for Baseline Measures of Self-Harm

Table 2.

*Notes*: N = number of participants reporting behavior/method/trigger, SI = Suicidal Ideation, SP = Suicide Planning, SA = Suicide Attempts, SI Intensity = reported intensity of past week SI rated on 0-4 scale, NSSI Triggers = stressors that have self-reportedly led to NSSI, M\* = average extent to which types of stressors have led to NSSI engagement in the past as rated from "0-not at all" to "4-extremely", SD\* = standard deviation of rated extent to which stressors led to NSSI, SO = sexual orientation.

Deser iprive Dura jor Daserin	e measi	ares of men	iiai 110aii	
	Ν	Μ	SD	Range
RRS	21	60.76	8.12	45-74
PSS	21	26.23	4.62	15-33
Low stress (0-13)	0	-	-	-
Moderate stress (14-26)	8	-	-	-
High stress (27-40)	13	-	-	-
PHQ-9	21	14.43	5.16	5-23
Depression cut-off	12	-	-	-
DERS	21	111.24	14.10	87-141
Non-Acceptance	21	20	4.93	12-28
Goal-Directed Behavior	21	18.86	3.95	9-25
Impulse Control	21	17.33	5.28	10-27
Emotional Awareness	21	16.29	4.05	11-24
ER Strategies	21	25.14	4.81	17-34
Emotional Clarity	21	13.62	3.60	7-21

Descriptive Data for Baseline Measures of Mental Health

Table 3.

*Notes*: RRS = Ruminative Responses Scale PHQ-9 = Patient Health Questionnaire-9; *Depression cut-off* = number of participants reporting PHQ-9 scores greater than 15 indicating possible clinical depression, PSS = Perceived Stress Scale; DERS = Difficulties with Emotion Regulation Scale, *Non-Acceptance* = DERS subscale of non-acceptance of emotional responses, *Goal-Directed Behavior* = DERS subscale of difficulties engaging in goal-directed behaviors, *Impulse Control* = DERS subscale of impulse control difficulties, *Emotional Awareness* = DERS subscale of lack of emotional awareness, *ER Strategies* = DERS subscale of limited access to emotion regulation strategies, *Emotional Clarity* = DERS subscale of lack of emotional clarity

	Baseline Meas	ure Scores	
	Μ	SD	Range
LGBIS	93.38	12.49	66-123
Internalized homonegativity	5.14	2.95	3-14
Acceptance Concerns	12.48	2.46	8-17
Concealment motivation	10.19	3.49	5-16
Identity Uncertainty	8.95	3.60	4-17
Difficult Process	10.57	3.85	3-16
Identity Superiority	8.52	4.74	3-18
Identity Affirmation	15.10	2.57	8-18
Identity Centrality	22.43	4.06	14-29
DHEQ	74.05	27.67	23-121
Gender Expression	6.33	7.93	0-28
Vigilance	13.81	6.89	4-26
Discrimination/Harass.	10.76	7.71	0-28
Vicarious trauma	24.71	4.93	17-30
Family of origin	7.14	6.87	0-20
Victimization	.91	1.70	0-5
Isolation	10.38	3.88	1-19
ABES	97.89	36.19	43-152
ABES-Straight Spaces	51.33	17.29	26-76
ABES-LGBTQ Spaces	46.56	20.08	17-80

Descriptive Data for Baseline Measures of Minority Stress.

Table 4.

Selected DHEQ Items – Frequency of Repor	ting	
	Ν	
9. Hearing other people called [derogatory names].	20	
31. Hiding part of your life from others.	19	
13. Feeling like you don't fit in with other LGBT people.	18	
12. Your family avoiding talking about your LGBT identity.	17	
3. Having very few people you can talk to about being LGBT.	17	
15. Pretending that you are heterosexual (or a different orientation	15	
than you are).		
28. People laughing at you or making jokes at your expense	14	
because you are LGBT.		
8. Being called [derogatory names].	13	
25. Being verbally harassed by strangers because you are LGBT.	11	
19. Being harassed in public because of your gender expression.	5	
27. Being treated unfairly in stores or restaurants because you are	4	
LGBT.		
47. Being raped or sexually assaulted because you are LGBT.	3	
45. Being punched, hit, kicked, or beaten because you are LGBT.	1	

*Notes*: LGBIS = Lesbian, Gay, and Bisexual Identity Scale, DHEQ = Daily Heterosexist Experiences Questionnaire, ABES = Anti-Bisexual Experiences Scale; N = number of participants reporting having experienced specific minority stressor in their lifetime

Descriptive Data and Uro	oup compari	sons for bas	eune minoruy	nerss by Uen	ider and Sexual	Untertation Uro	nps.	
	Ŭ	Gender Identi	ty	Gender Mi	inority Status	Sexu	al Orientation	
	Female	Male	Nonbinary/	Cisgender	Transgender	Gay/Lesbian/	<b>Bisexual</b> /	Other
	( <u>n</u> =12)	( <u>n=5</u> )	Other	( <u>n</u> =16)	(n=5)	Homosexual	Pansexual	( <u>n=5</u> )
			(0-4)			(n=7)	(n=9)	
	W(SD)	W(SD)	(ISD)	W(SD)	W(SD)	W(SD)	(ISD)	M(SD)
LGBIS	92.9 (14.4)	95.2 (10.0)	92.5 (12.0)	92.8 (12.9)	95.4 (12.2)	95.4 (8.9)	93.1 (16.3)	91.0 (10.8)
Internalized homonegativity	6.3 (3.5)	3.4 (.5)	4.0 (1.4)	5.6 (3.2)	3.8 (1.3)	3.4 (.5)	6.4 (3.6)	5.2 (2.9)
Acceptance Concerns	12.0 (2.3)	14.4(1.7)	11.5 (3.1)	12.4 (2.1)	12.6 (3.6)	14.2 (1.5)	12.0 (2.6)	10.8 (1.9)
Concealment Motivation	10.3 (3.5)	11.6 (4.0)	8.0 (2.2)	10.5 (3.7)	9.0 (2.9)	10.0 (3.6)	11.4 (3.8)	8.2 (1.9)
Identity Uncertainty	9.2 (3.9)	8.0 (3.7)	9.5 (3.0)	8.8 (3.9)	9.6 (2.6)	7.3 (2.6)	8.8 (4.3)	11.6(1.8)
Difficult Process	10.5 (3.3)	9.0 (5.8)	12.8 (1.5)	9.7 (3.9)	13.4 (1.9)	11.4 (4.5)	10.1 (3.5)	10.2 (4.1)
Identity Superiority	6.8 (3.7)	11.4 (5.4)	10.0 (5.7)	7.9 (4.7)	10.4(5.0)	9.7 (5.8)	8.3 (5.1)	7.2 (2.3)
Identity Affirmation	15.9 (1.8)	14.4 (2.1)	13.5 (4.4)	15.6 (1.9)	13.4 (3.8)	15.9 (2.4)	14.6 (1.9)	15.0 (3.9)
Identity Centrality	21.9 (4.5)	23.0 (3.1)	23.3 (4.5)	22.2 (4.2)	23.2 (3.9)	23.4 (3.7)	21.4 (4.3)	22.8 (4.5)
рнед	72.0 (26.0)	75.4 (36.2)	78.5 (28.8)	70.9 (27.8)	84.0 (27.8)	79.7 (29.6)	76.1 (33.0)	62.4 (10.1)
Gender Expression	4.2 (6.0)*	8.4 (11.7)*	10.3 (7.5)*	4.0 (5.6)*	13.8 (10.3)*	8.4(10.8)	5.3 (6.1)	5.2 (7.5)
Vigilance	13.3 (7.0)	16.0 (7.8)	12.8 (6.9)	13.6 (7.0)	14.6 (7.3)	14.2 (6.0)	16.2 (8.2)	8.8 (1.8)
Discrimination/Harass.	11.3 (7.0)	8.0 (6.8)	12.8 (11.7)	10.3 (7.1)	12.4 (10.16)	12.2 (9.8)	11.4 (7.5)	7.4 (4.5)
Vicarious trauma	25.3 (5.1)	24.2 (5.1)	23.8 (5.6)	24.7 (5.0)	24.8 (5.4)	25.0 (4.4)	24.6 (5.4)	24.6 (5.8)
Family of origin	7.8 (7.4)	5.4 (6.3)	7.5 (7.2)	7.3 (7.2)	6.6 (6.5)	9.0 (8.1)	6.5 (7.5)	5.6 (3.8)
Victimization	1.0(1.9)	.60 (1.3)	1.0 (2.0)	.94 (1.7)	.80 (1.8)	1.0(1.7)	1.3 (2.1)	0 (0) 0
Isolation	9.3 (3.8)	12.8 (3.9)	10.5 (3.7)	10.2 94.1)	11.0 (3.4)	9.7 (2.5)	10.7 (5.2)	10.8 (3.1)
ABES	92.3 (34.4)	83.0 (N/A)	152.0 (N/A)	91.1 (32.0)	152.0 (N/A)		51.3 (17.3)	
ABES-Straight Spaces	49.3 (17.8)	45.0 (N/A)	80.0 (N/A)	48.8 (16.5)	72.0 (N/A)		46.6 (20.1)	
ABES-LGBTQ Spaces	43.0 (18.0)	38.0 (N/A)	72.0 (N/A)	42.4 (16.8)	80.0 (N/A)		97.9 (36.2)	
Notes: LGBIS = Lesbian, Gay,	, and Bisexual I	dentity Scale, 1	DHEQ = Daily H	eterosexist Exper	riences Questionna	ire, ABES = Anti-B	isexual Experi	ences Scale.

Ċ tatio 1 Onio S F -Ċ . ð ŝ Min à Ś -Ć U P 4 ŝ Table 5.

N/A = sample was comprised of only one participant and therefore SD cannot be calculated. • = Chi-Square analyses indicated significant group differences in this category with p < 0.5.

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Table 6.

	Total N	Μ	SD	Range
NSSI				
NSSI Thoughts	242	11.52	8.60	1-33
NSSI Presence	88	4.88	5.9	0-23
NSSI Behaviors	148	7.05	9.51	0-31
Days with NSSI Reported	68	3.19	3.25	0-13
Minority Stress				
Minority Stress Events	227	10.81	8.47	0-28
SO-Related Events	116	5.52	5.88	0-19
Days with Events	120	5.71	3.95	0-14
<b>General Rumination</b>	_	6.37	4.28	.67-17
General Stress	-	.95	.98	0-3.05

Descriptive Data for EMA Measures of Self-Harm, Mental Health, and Minority Stress Across Full Monitoring Period.

Specific Minority Stressors	Total N	SO-Related N	Unsure Relation N	Distress M(SD)
Witnessed/heard other LGBQ person being stigmatized	32	29	2	3.53(1.08)
Treated with less courtesy/respect	28	4	0	3.61(1.13)
Made to feel inferior	28	4	1	3.39(1.17)
Hidden sexual orientation from others	23	23	0	2.39(1.03)
Unfair/incorrect assumptions made about you	22	5	0	3.27(1.03)
Worried about LGBQ identity being known	22	22	0	2.59(0.80)
Insulted or called names	18	4	2	3.11(1.02)
Avoided, excluded, or rejected	17	1	1	3.53(.94)
Felt uncertain about sexual orientation or queer identity	13	13	0	2.92(1.26)
Avoided situation where you'd be stigmatized	10	8	0	3.10(0.99)
Other stigmatization	8	1	0	3.38(1.06)
Harassed or threatened	6	2	0	3.33(1.51)

*Notes*: NSSI Thoughts = NSSI thoughts reported at all (y/n), NSSI Presence = NSSI behaviors reported at all (y/n), NSSI Behaviors = number of distinct NSSI behaviors reported, SO-Related = minority stress events reported to be "probably" or "definitely" related to sexual orientation, Unsure Relation = minority stress events about which participants reported to be "unsure" in their relationship to sexual orientation, Distress = intensity of distress scores reported in response to minority stress event experiences (range 0-5)

Descriptive Data for EMA M	easures by S	exual Orienta	tion. Gender Ia	entity. and Gene	ter Minority St	atus.
	Bisexual	Bisexual	Homosexual	Homosexual	Other SO	Other SO
	N	M(SD)	N	M(SD)	N	M(SD)
ISSN						
NSSI Thoughts	111	12.33(9.85)	75	10.71(8.73)	56	11.20(7.66)
NSSI Presence	35	3.89(4.04)	24	3.43(2.51)	29	5.80(9.96)
NSSI Behaviors	63	7.00(10.21)	48	6.86(7.56)	37	7.40(12.56)
Minority Stress						
Minority Stress Events	119	13.22(10.11)	55	7.86(5.55)	53	10.60(8.91)
SO-Related Events	66	7.33(6.89)	28	4.00(4.28)	22	4.40(6.11)
General Rumination	•	7.59(5.47)		5.88(3.39)	•	4.86(2.83)
General Stress		.85(1.05)		.78(.75)		1.37(1.19)
	Female	Female	Male	Male	Nonbinary	Nonbinary
	N	(ISD)	N	W(SD)	N	(III) (III) (III) (III)
ISSN						
NSSI Thoughts	131	10.92(6.08)	34	6.80(4.26)	17	19.25(14.66)
NSSI Presence	41	3.42(3.92)	15	3.00(2.65)	32	8.00(10.23)
NSSI Behaviors	91	7.59(10.29)	16	3.20(2.77)	41	10.25(12.84)
Minority Stress						
Minority Stress Events	144	12.00(9.65)	63	12.60(7.47)	20	5.00(6.78)
SO-Related Events	78	6.50(5.16)	37	7.40(8.02)	1	.25(.50)
General Rumination	•	6.92(4.43)	•	4.04(4.07)	•	7.61(3.99)
General Stress		(66.)88.		.75(.72)		1.43(1.27)
	Cisgender	Cisgender	Transgender	Transgender		
	N	M(SD)	N	M(SD)		
ISSN						
NSSI Thoughts	158	9.88(5.95)	84	16.80(13.83)		
NSSI Presence	54	3.38(3.61)	34	6.80(9.26)		
NSSI Behaviors	105	6.56(9.10)	43	8.60(11.72)		
Minority Stress						
Minority Stress Events	191	11.94(8.61)	36	7.20(7.67)		
SO-Related Events	103	6.44(5.91)	13	2.60(5.27)		
General Rumination	•	6.24(4.50)		6.79(3.91)		
General Stress		.83(.93)		1.34(1.12)		
Notes: NSSI = Nonsuicidal self-inji	ury, NSSI Thou	aghts = NSSI tho	ughts reported at a	ill (y/n), NSSI Pres	ence = NSSI beha	viors reported at
all (y/n), NSSI Behaviors = number	r of distinct NS	SI behaviors rep	orted, SO-Related	Events = minority	stress events repo	rted to be
"probably" or "definitely" related t	o sexual orients	ation/identity,				

Table 7. Descripti

							0	0				
	Psy	chologi Same 1	cal Distress Time Point	At	Psych	ological Tim	Distress At tepoint	Next	Psy	chologi Sar	cal Distress me Day	on
	B	SE	1	RR	B	SE	1	RR	B	SE	1	RR
Within level												
Minority Stress	.58	.07	8.59***	1.79	.24	.10	2.50*	1.27	.68	.08	8.09***	1.97
EMA Stress	1.20	.13	9.57***	3.32	1.75	.16	11.05***	5.75	1.62	.13	12.01***	5.05
Between level												
Age	24	.24	-1.01	,	21	.27	78	•	21	.27	77	•
Gender - Male	-9.94	6.64	-1.50		-7.83	7.47	-1.05	•	-8.40	7.46	-1.13	•
Gender - Female	-9.54	3.64	-2.62*		-8.24	4.10	-2.01	•	-8.52	4.08	-2.09	•
SO – Gay/Lesbian	5.74	4.69	1.224		4.48	5.26	.85		5.26	5.27	1.00	
SO – Bi/Pansexual	5.80	3.32	1.75		5.70	3.70	1.54	,	6.16	3.74	1.65	
SO – Queer	-2.16	4.09	53	,	-3.21	5.56	71	•	-2.29	4.61	50	•
DHEQ	02	.05	-1.01	,	00	90.	06	÷	01	90.	22	
<b>LGBIS-IH</b>	.91	.43	2.12	,	.94	.48	1.97	÷	.85	.48	1.76	
6-ДНЧ	08	.30	26	,	08	.34	25	,	.01	.33	.04	•
PSS	.13	.48	.27	'	.24	.54	.44	•	.19	.54	.73	'
Note: SO = Sexual On	ientation,	DHEQ =	baseline discr	imination m	neasure scon	e, LGBIS-	-IH = baseline	internaliz	ed hetero	sexism n	neasure score,	

PHQ-9 = baseline depression measure score, PSS = baseline general stress measure score, EMA Stress = general stress rating either at same timepoint during EMA or on same day during EMA monitoring.  $\bullet_{R} < .05, \bullet^{\bullet}p < .01, \bullet^{\bullet \bullet}p < .005$ "Other/Nonbinary" gender and "Other" Sexual Orientation categories were taken out of the model due to low sample response rates.

Table 9. Hypothesis 2: Gen	ieralized	Linear	Mixed Mod	els of Min	ority Stres	s Predic	ting NSSI 1	houghts	With C	Covaria	tes	
	ISSN	Though F	tts At Same oint	Time	ISSN	Thoug  Tim	hts At Prev epoint	ious	NSS	I Thou	ghts On Sa Day	ame
	B	SE	ţ	RR	В	SE	ţ	RR	B	SE	ţ	RR
Within level												
Minority Stress	.26	.05	5.49***	1.30	0.05	0.6	80.	,	.27	<u>8</u>	7.10***	1.31
EMA Stress	.45	.08	5.81***	1.57	.56	.10	5.70***	1.75	.15	.03	4.92***	1.16
Between level												
Age	13	60.	-1.38		-00	60.	-1.09	•	06	90.	-1.10	
Gender	1.57	0.87	1.80		1.35	.82	1.65	•	80	.53	1.65	
SO	79	4	-1.78		61	.42	-1.47	•	44	.27	-1.62	
DHEQ	00	.01	15		.01	.02	.51	•	00	.01	33	
<b>LGBIS-IH</b>	60.	П.	.78		.12	.13	1.19	•	.05	.07	.75	
PSS	-00	.13	69		04	.13	31	•	04	.08	47	
<b>ISSN-T</b>	.001	.001	2.04*	1.001	00.	.001	1.96		8	8	1.97	
Note: NSSI Thoughts baseline internalized lifetime NSSI behavi Stress = general stress $*p_{<} < .05, ***p < .005$	= NSSI ti heterosexii ors reporte s rating eiti	ioughts re sm measu d at basel her at san	sported at all ( ire score, PHQ line, Psych Dis ne timepoint d	y/n), SO = S -9 = baselin stress = psyc uring EMA (	exual Orien e depression hological di or on same (	tation, DH 1 measure stress repo lay during	IEQ = baselin score, PSS = l orted at same t g EMA monito	e discrimi baseline g imepoint ring.	nation me eneral str during E?	ess meas MA or of	ore, LGBIS-I ure score, L-l a same day, E	H = MA

Hypothesis 2: Gen	teralizea	Linear	Mixed Moa	tels of Min	iority Stre	ss Predic	ting NSS	I Presen	ce, With	Covari	iates	
	ISSN	Present	ce At Same oint	Time	ISSN	Presenc	e At Pre point	vious	ISSN	Presen	ce On Sam	e Day
	в	SE	1	RR	B	SE	1	RR	в	SE	1	RR
Within level												
Minority Stress	0.11	.05	2.22*	1.12	60.	.08	1.09	•	99.	Π.	6.02***	1.92
EMA Stress	.29	.10	2.95***	1.31	.23	.13	1.74	•	.23	.08	2.77**	1.26
Between level												
Age	02	.05	24		.03	.12	.85	•	00	.15	03	,
Gender	1.14	96.	1.20		96	1.13	.85	•	2.08	1.45	1.43	,
SO	49	.49	-1.01		05	.59	08	,	78	.75	-1.03	
DHEQ	.01	.02	.52		.01	.02	99.	•	<u>0</u>	.03	.32	
<b>LGBIS-IH</b>	<u>6</u>	.12	.31		00	.014	<u>6</u>	•	08	.19	40	
PSS	07	.15	50		00	.13	00	•	17	.22	78	
<b>T-NSSI</b>	00.	00'	1.49		00	00.	.57	,	<u>0</u>	8	96.	,
<i>Note:</i> NSSI Presence baseling internalized 1 L-NSSI = lifetime NS	= NSSI be heterosexi SI behavi	chaviors r sm measu ors report	eported at all tre score, PHC ed at baseline	(y/n), SO = 2-9 = baselir , Psych Dist	Sexual Orier te depression ress = psych	ntation, DH n measure iological di	HEQ = base score, PSS istress repo	eline discr = baselin rted at san	imination e general : ne timepo	measure stress me int durin	score, LGBIS asure score, g EMA or on	5-IH = same
$P_{R} < .05, **p < .01, *$	p < .002	ss raung o	siuter at sattle	umepoint ut	TING BUILT	OF OIL SALLIC	immn (an		omormg.			

Hypothesis 2: Gen	eralized	Linear	Mixed Mo	dels of M	inority Sti	ress Pre	dicting N	SSI Beh	aviors,	With C	ovariates	
	SSN	I Beha	viors At S	ame	ISSN	<b>Sehavio</b>	rs At Pre	vious	Min	ority S	tress On S	ame
		Tim	e Point			Time	point				Day	
	B	SE	ţ	RR	В	SE	ţ	RR	B	SE	t	RR
Within level												
Minority Stress	.07	.03	2.80**	1.07	.07	90.	1.22	,	.13	<u>6</u>	3.02***	1.14
EMA Stress	.19	.08	2.35*	1.21	.21	60.	2.16*	1.23	60.	<u>6</u>	2.17*	1.09
Between level												
Age	06	.10	61		.02	.12	.12	•	03	.13	26	•
Gender	1.20	.98	1.22		1.07	1.23	.87		1.46	1.26	1.16	
SO	73	.49	-1.47		23	.74	36	•	83	.65	-1.28	•
DHEQ	.01	.02	.53		.02	.02	.68	•	.01	.02	.59	•
<b>LGBIS-IH</b>	.08	.12	.62		.03	.15	.21	•	<u>6</u>	.16	.24	•
PSS	05	.15	31		.01	.19	0.03		07	.19	38	•
<b>L-NSSI</b>	00.	00	2.07*	1.001	00.	00.	.64	•	00.	00.	1.48	•
Note: NSSI Behaviors score, LGBIS-IH = ba measure score. L-NSS	i = Total n seline inte I = lifetim	number of srnalized te NSSI }	f distinct NS heterosexisn	SI behaviors n measure so	s reported, S core, PHQ- eline, Psvol	SO = Sexu 9 = baseli h Distress	tal Orientat ne depressi = psvcholo	ion, DHE on measu	Q = base ire score, tress rend	PSS = $b_{1}$	rimination m aseline genera	easure il stress t during
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measure score, L-NSSI = lifetime NSSI behaviors reported at baseline, Psych Distress = psychological distress reported at same timepoint EMA or on same day, EMA Stress = general stress rating either at same timepoint during EMA or on same day during EMA monitoring. • $p_c < .05, \bullet \bullet p < .01, \bullet \bullet \bullet \bullet c < .005$ N 3

Table 12

Minority Stress	<u>B</u>	SE	Wald	RR
LGBIS	.46	.32	2.04	-
Internalized homonegativity	.03	.08	.11	-
Acceptance Concerns	.15	.06	7.05**	1.16
Concealment Motivation	.09	.09	.95	-
Identity Uncertainty	.04	.10	.15	-
Difficult Process	.02	.10	.02	-
Identity Superiority	.06	.13	.25	-
Identity Affirmation	.02	.07	.07	-
Identity Centrality	.06	.11	.26	-
DHEQ	1.44	.67	4.55*	4.22
Gender Expression	.15	.21	.47	-
Vigilance	.43	.16	7.20**	1.54
Vicarious trauma	.28	.12	5.81*	1.32
Family of origin	.29	.17	2.87	-
Victimization	.07	.04	2.72	-
Isolation	.06	.10	.37	-
Discrimination/Harass.	.16	.20	.57	-
PSS	01	.07	.03	-

Regression analyses of associations between baseline rumination (RRS scores) and baseline minority and general stressors.

*Notes*: RRS = Ruminative Responses Scale, LGBIS = Lesbian, Gay, and Bisexual Identity Scale, DHEQ = Daily Heterosexist Experiences Questionnaire, PSS = Perceived Stress Scale. \*p<.05, \*\*p<.01

Table 13

and number of minority stressors reported during Ecological Momentary Assessment.					
EMA Minority Stress	В	SE	Wald	RR	
Made to feel inferior	.03	.03	1.39	-	
Treated with less courtesy/respect	00	.02	.05	-	
Unfair/incorrect assumptions made about you	01	.03	.04	-	
Witnessed/heard other LGBQ person being stigmatized	.06	.03	4.99*	1.06	
Avoided, excluded, or rejected	.02	.03	.24	-	
Insulted or called names	.03	.03	.75	-	
Hidden sexual orientation from others	.06	.03	3.43	-	
Worried about LGBQ identity being known	.04	.03	2.09	-	
Felt uncertain about sexual orientation or queer identity	01	.03	.145	-	
Harassed or threatened	.02	.05	.19	-	
Avoided situation where you'd be stigmatized	.23	.07	9.85**	1.26	

-.06 .04

1.62

-

Regression analyses of predictive associations between baseline rumination (RSS scores) and number of minority stressors reported during Ecological Momentary Assessment.

Notes: RSS = Ruminative Responses Scale

\*p<.05, \*\*p<.005

Other stigmatization

Table 14

	Μ	SD	Range
Made to feel inferior	4.99	11.87	0-50
Treated with less courtesy/respect	4.33	10.61	0-43
Unfair/incorrect assumptions made about you	3.17	9.04	0-40
Witnessed/heard other LGBQ person being stigmatized	2.94	7.18	0-37
Avoided, excluded, or rejected	2.84	8.80	0-39
Insulted or called names	2.55	7.99	0-39
Hidden sexual orientation from others	2.33	7.04	0-34
Worried about LGBQ identity being known	1.98	6.18	0-33
Felt uncertain about sexual orientation or queer identity	1.91	7.38	0-46
Other stigmatization	1.44	6.61	0-39
Harassed or threatened	.96	5.35	0-41
Avoided situation where you'd be stigmatized	.83	4.39	0-35

Descriptive data for momentary minority-stress-related rumination for each type of minority stress reported in Ecological Momentary Assessment, across all participants.