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ECOLOGICAL MOMENTARY ASSESSMENT OF DAILY MICROAGGRESSIONS AND STIGMA-BASED SUBSTANCE USE AMONG LESBIAN, GAY, AND BISEXUAL INDIVIDUALS

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ECOLOGICAL MOMENTARY ASSESSMENT OF DAILY MICROAGGRESSIONS AND

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INDIVIDUALS

By

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Ecological momentary assessment of daily microaggressions and stigma-based substance use among lesbian, gay, and bisexual individuals

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  Background: People who identify as LGBTQ experience elevated rates of minority stress, which has been linked to higher rates of substance use. Unfortunately, most extant research on this disparity is predicated on cross-sectional or longitudinal research methods that are insensitive to the effects of daily *microaggression* experiences, or their possible relation to daily substance use risk. The aim of this study was to address this knowledge gap using ecological momentary assessment (EMA). Method: LGBTQ individuals ($N = 50$) were recruited from the University of Montana, attended a 90-minute orientation to complete baseline measures, and received instruction regarding the proper use of EMA devices. Each device prompted participants six times daily for 14 consecutive days. Each prompt included questions regarding recent microaggression and general mistreatment experiences, current mood, recent substance use, and motives for use. Data were analyzed using hierarchical linear and non-linear modeling. Results: Microaggression*s* experienced within the last two to three hours, or since individuals' last measurement prompt, were positively associated with higher event-based psychological distress, cravings for use, and recent general and coping-motivated substance use. These relationships were statistically significant after accounting for general mistreatment experienced contemporaneously, and were consistently larger in magnitude. Discussion: This study adds to existing minority stress research by highlighting the potential effects of daily microaggression experiences. These results also contribute to our understanding of daily stress processes and provide insight into ways we might mitigate these effects using real-time monitoring and intervention technology.

  Keywords: LGBT, minority stress, microaggression, substance use, ecological momentary assessment

Dedication

This manuscript is dedicated to the enduring spirit and progress of the affirmative

LGBTQ movement, and to the collective perseverance of the LGBTQ and allied community that

will hopefully one day render this work an artifact of historical relevance.

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Ecological momentary assessment of daily microaggressions and stigma-based substance use among lesbian, gay, and bisexual individuals

Rates of alcohol and illicit drug use remain national public health concerns in the United States (SAMHSA, 2012). Additionally, rates of use among lesbian, gay, bisexual and transgender (LGBTQ) individuals remain disproportionately high relative to the general population (Meyer, 2003; McCabe, Bostwick, Hughes, West, Boyd, 2010; Green & Feinstein, 2012; Marshal et al., 2008; Newcomb, Heinz, & Mustanski, 2012). This disparity affects millions of individuals across the country, and has been a target of clinical and public health research since its earliest empirical documentation over 30 years ago (Straussner, 1985). Adding to these concerns is the fact that substance use is strongly and positively associated with other problematic outcomes as well, such as sexual risk-taking behavior (Friedman et al., 2014), comorbid psychiatric disorder (Johnson et al., 2013), and elevated rates of suicide among LGBT individuals (Mereish, O'Cleirigh, & Bradford, 2014; Mustanski, Andrews, Herrick, Stall, & Schnarrs, 2014).

Numerous hypotheses have been advanced to explain the observed disparity. According to Meyer's (2003) sexual minority stress model (see Figure 1), these disparities are a function of "distal" and "proximal" minority stress processes that disproportionately disadvantage LGBTQ individuals. According to Meyer (2003), distal sexual minority stress factors are those occurring outside the individual, such as sexual minority-based discrimination (e.g., being denied employment) and victimization (e.g., physical assault), which elevate risk via proximal or internal stress processes. Proximal stress processes are internal in nature and include minority-based shame (e.g., internalized homophobia, internalized homonegativity, or internalized heterosexism; Szymanski, Kashubeck-West, & Meyer, 2008), expectations of rejection, and

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decisions regarding whether or not, or how, to conceal one's minority status. Within the sexual

minority stress model, Meyer (2003) also emphasizes the importance of sexual identity

characteristics including *valence* of one's identity, or positive versus negative self-evaluation;

prominence of the identity in relation to other aspects of self, such as one's identity as a woman,

sibling, or employee; and the extent to which one's identity has been integrated into the fabric of

other primary and ancillary identity statuses. Beyond psychosocial risk factors, greater social and

community support are modeled as potential protective factors in the minority stress-distress and

substance use association.
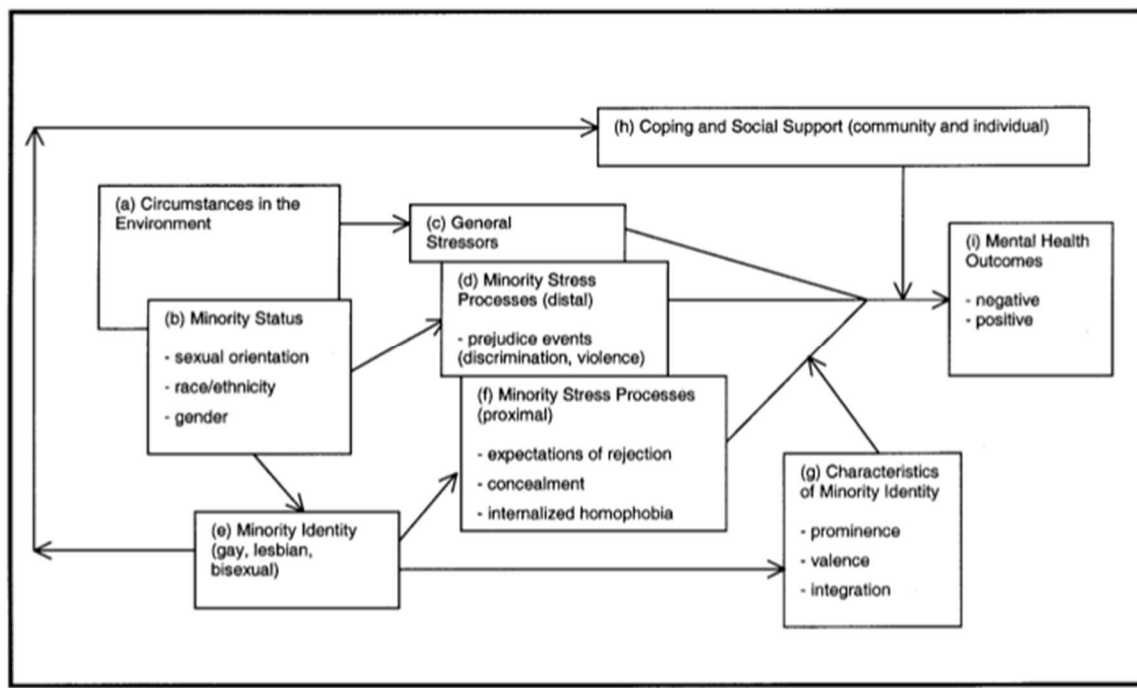
Figure 1. Meyer's Minority Stress Model. From "Prejudice, social stress, and mental health in
lesbian, gay, and bisexual populations," by I. Meyer, 2003, *Psychological Bulletin, 129*(5), p.
679.

  Non-LGBTQ-specific considerations, such as environmental circumstances, general

stressors (e.g., job loss, interpersonal conflict or daily hassles; see Keyes, Hatzenbuehler, &

Hasin, 2011), and intersectional identities (Meyer, 2003; Mereish & Bradford, 2014) also

contribute to risk beyond these identified LGBTQ-specific risk factors. Intersectionality refers to

the complex intersection of individual identity statuses, or social group memberships, such as ethnicity, socio-economic status, ability status, religious affiliation, sexual orientation, and gender (Crenshaw, 1996; Stirratt, Meyer, Ouellette, & Gara, 2008; Cole, 2009; Seng, Lopez, Sperlich, Hamama, & Meldrum, 2012). From an intersectional perspective, contextual factors are crucial to understanding individuals' experiences (Cole, 2009; Stirratt et al., 2008). Consistent with this notion, the experiences of an African American gay man will differ from those of a White woman who identifies as bisexual in meaningful ways. Further, the idiographic interplay between intersecting statuses predicts important outcomes, such as quality of life, mental health, and substance use behavior (Seng et al., 2012; Mereish & Bradford, 2014). Another important contextual factor is the discrepancy between perceived social norms both within and outside the LGBTQ community, which may drive some of the observed substance use disparity. For instance, Cochran and colleagues have shown that some LGBTQ individuals perceive greater drug availability and more permissive social norms around substance use within the LGBTQ community, relative to the general population (Cochran, Grella, & Mays, 2012).

Meyer's model (2003) is interactive and sociocultural. It places emphasis on the minority status of LGBTQ individuals, and primacy on the distal stress experiences that give rise to proximal stressors, identity characteristics, and negative health and substance use outcomes. Or, as others have put forth, LGBTQ individuals experience stress as a direct result of the social norms and ideologies that place them in the "minority" category (Riggs & Treharne, 2016). This is a function of one's unique configuration of intersecting identity statuses, as well as the layers of privilege that prevail among "majority" individuals within one's respective environment (Riggs & Treharne, 2016). According to this position, the pathology does not lie with the victim, but the system that created and upholds these social pressures. Nevertheless, while Meyer's

minority stress model (2003) represents the first attempt at modeling the sexual minority stress experience from a LGBTQ health perspective, and identifies important LGBTQ-specific risk and protective factors regarding substance use behavior, it remains a work in progress.

Substance use represents a highly complex and dynamic behavior that is influenced by numerous individual and contextual factors unaccounted for by Meyer's model (2003). For instance, less is currently known regarding the roles of development, adjustment, and general psychological processes conferring risk/resilience for substance use among LGBTQ individuals (Hatzenbuehler, 2009; Diamond, 2003; Savin-Williams, 2001), or the extent to which risk varies within a given day (Shiffman, 2009). Lack of understanding in these domains becomes an increasingly important theoretical and practical issue as researchers move beyond understanding between-person/group differences (i.e., LGBTQ versus the general population) to explaining the mechanisms through which distal stress experiences disrupt well-being at the within-person level, potentially elevating risk for substance use. Before modeling these dynamic, within-person effects, it is important for researchers to also acknowledge that their ability to model dynamic intra/interpersonal processes is contingent on the dynamic nature of the methods used to infer complexity (e.g., Livingston et al., 2015a). In other words, more dynamic and time-sensitive means of assessment and monitoring are needed to account for time-varying risk processes.

The task of understanding daily risk processes is a complicated one; substance use is a complex behavior that is driven by numerous social and intra-personal factors. A substantial body of literature on substance use in the general population could augment the existing models for understanding substance use among LGBTQ individuals. Social factors include interpersonal stress and conflict (Armeli, Dehart, Tennen, Todd, & Affleck, 2007) and social norms surrounding substance use (Cochran, Grella, & Mays, 2012). Intrapersonal factors include

biology and heredity (Vaillant & Milofsky, 1982), upbringing and family dynamics (Hayatbakhsh et al., 2008), biological and social development (Easow, Sethi, Sarkhel, & Luty, 2008; Horner, Tarter, Kirisci, & Clark, 2013), and personality (Kotov, Gamez, Schmidt, & Watson, 2010; Livingston, Oost, Heck, & Cochran, 2015b; Livingston, Christianson, & Cochran, 2016). However, potentially among the most important, and complex, are the intrapersonal factors acquired through interactions with the environment. These include learned substance use norms (Neighbors, Geisner, & Lee, 2008), outcome expectancies (Clark, Ringwalt, & Shamblen, 2011), and the manner in which substance use motives are expressed as individuals navigate daily experiences and interactions (Cooper, 1994; Simons, Correia, Carey, & Borsari, 1998).

Substance use norms include individuals' perspectives regarding others' attitudes, acceptability, and use of substances (Baer, 1994). Norms might change over time or across contexts, but are considered to remain somewhat stable day-to-day. Substance use expectancies represent the beliefs individuals hold about the consequences of use, ranging from positive to negative (Ham et al., 2005). These have been shown to predict substance using behavior in numerous studies (outlined below); however, this is usually only the case when the expected outcome is a desired one (e.g., Bandura, 1977). This brings the discussion to the role of substance use motives, which may can vary considerably over relatively short periods of time (e.g., Dvorak, Pearson, & Day, 2014; O'Hara, Armeli, & Tennen, 2014b; Shrier, Ross, & Blood, 2014).

Although a common trajectory for some LGBTQ individuals is the pathway linking minority stress to substance use through efforts to cope with psychological distress (Hatzenbuehler, Corbin, & Fromme, 2011; Weber, 2008), there are many reasons individuals choose to use substances. Common themes regarding substance use motives include

experience/mood enhancement, conformity, social/affiliation, expansion (e.g., experiential or spiritual; Simons et al., 1998), and coping (Cooper, 1994; Simons et al., 1998). Although many published studies focus on dispositional or global motives for use (Carney et al., 2000; O'Hara et al., 2014a; Todd, Armeli, Tennen, Carney, & Affleck, 2003), recent findings suggest that motives for use are more state- and context-dependent than fixed and dispositional (e.g., Dvorak, Pearson, & Day, 2014; O'Hara, Armeli, & Tennen, 2014b; Shrier, Ross, & Blood, 2014). Further, given the importance of situational motivations for use, and research documenting that motives change both within and across days, higher resolution research methods may be needed to capture these time-varying processes. Consistent with the sexual minority stress hypothesis, stating that use among LGBTQ individuals is elevated due to distressing minority stress experiences (Meyer, 2003; Hatzenbuehler, 2009), the current study allows for more dynamic within-day modeling of minority stress and substance use risk processes.

While Meyer's minority stress model (2003) offers important insight into the factors that confer risk among LGB individuals, it underemphasizes important mediating psychological factors linking minority stress to substance use outcomes. Hatzenbuehler's mediational model (see Figure 2), on the other hand, represents an initial attempt at constructing a dynamic model that includes specific mechanisms through which distal stress experiences have been shown to predict psychological distress and substance use. As discussed below, longitudinal and experience sampling data offer support for this model, making it the most dynamic to date in terms of outlining the minority stress-substance use relationship.
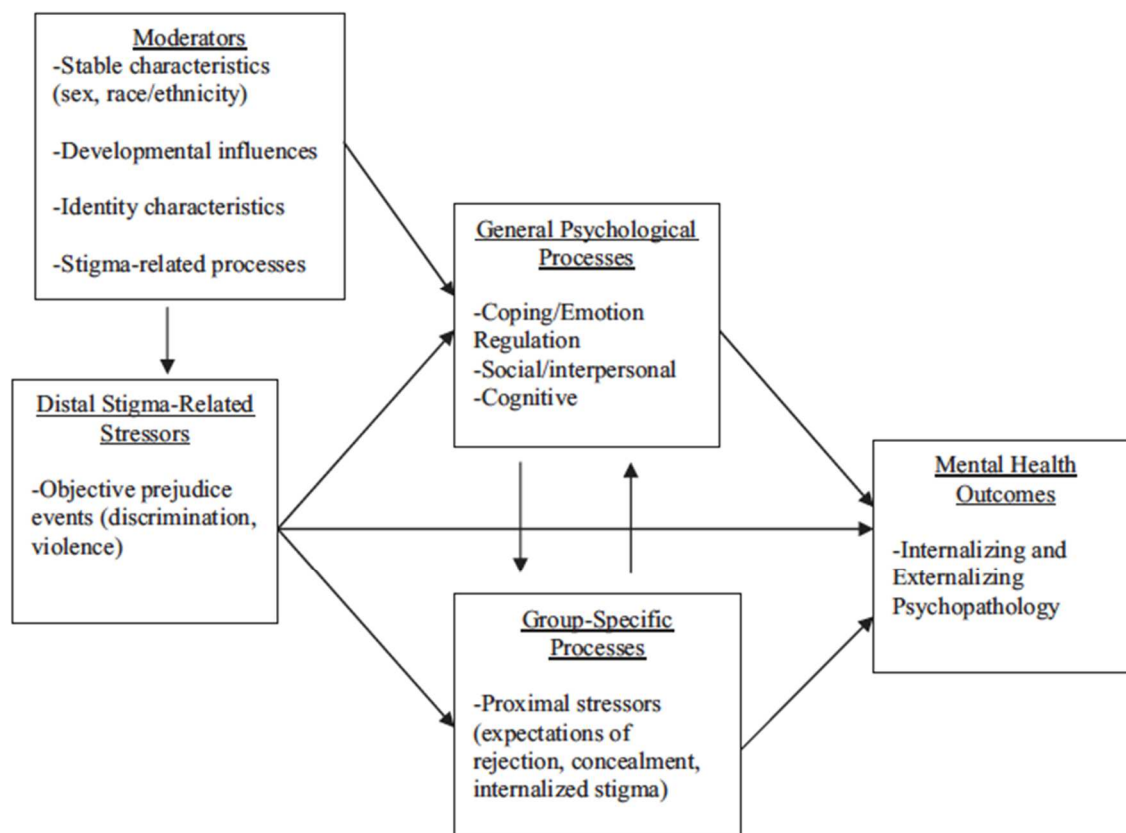
Figure 2. Hatzenbuehler's Mediational Model. From "How does sexual minority stigma 'get under the skin'? A psychological mediation framework," M. Hatzenbuehler, 2009, *Psychological Bulletin*, *135*(5), p. 724.

Building on the minority stress model (Meyer, 2003), Hatzenbuehler (2009) highlighted important psychological and behavioral mechanisms, such as *social isolation*, *emotion regulation* (e.g., coping, rumination), and *cognitive processes* that mediate the relationship between distal minority stress experiences and negative outcomes, such as drug and alcohol use. As depicted in Figure 2, Hatzenbuehler's mediational model outlines two distinct mediated pathways between distal stress experiences and mental health outcomes, including substance use. The first is LGBTQ-specific, while the other includes more general and crosscutting social and psychological mechanisms that predict negative outcomes, regardless of minority status.

The LGBTQ-specific path regards proximal stress processes as mediators in the relationship between distal stress experiences and psychological distress and substance use (e.g.,

McKirnan & Peterson, 1988; 1989). For example, felt pressure to conceal one's minority status, influenced by perceptions of disclosure danger, and anticipated rejection or hostility from others can increase hypervigilance, psychological distress (Pachankis, 2007; Hatzenbuehler, 2009; Meyer, 2003), and substance use risk (Meyer, 2003; Hatzenbuehler, 2009). This felt pressure may also decrease positive self-evaluations and self-efficacy (Pachankis, 2007). In a recent study, rejection sensitivity and internalized heterosexism partially mediated the relationship between discrimination and psychological distress (Feinstein, Goldfried, & Davila, 2012). Further research has linked internalized heterosexism, shame, and shame-proneness with problematic substance use among both sexual minority men and women (Hequembourg & Dearing, 2013; Brubaker et al., 2009).

Adjacent to the LGBTQ-specific indirect pathway are the indirect effects of general, non-LGBTQ-specific psychological processes. These include (a) coping and emotion regulation, (b) social and interpersonal factors, and (c) cognitive components that may become differentially activated in the context of experienced and/or prolonged LGBTQ-specific minority stress experiences (see Figure 3). Identified coping and emotion regulation factors include rumination, suppression, and substance use motives. Social and interpersonal factors include perceived and actual social norms surrounding substance use and social engagement versus isolation. Finally, cognitive influences include hopelessness, pessimism, negative self-schemas, and substance use expectancies. However, social norms, substance use expectancies, and coping motives for use are the three most commonly invoked to explain the relationship between minority stress and substance use, specifically, whereas the other mediating factors relate more to the prediction of depression and anxiety symptoms (Hatzenbuehler, 2009).
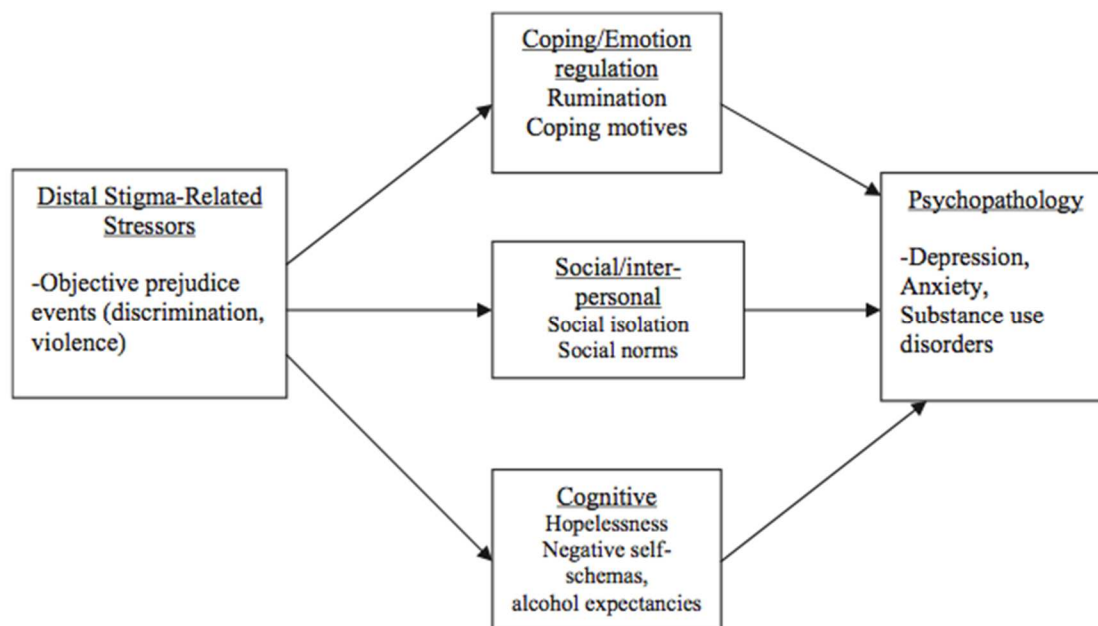
Figure 3. Hatzenbuehler's Non-LGB-Specific Path Model. From "How does sexual minority stigma 'get under the skin'? A psychological mediation framework," M. Hatzenbuehler, 2009, *Psychological Bulletin*, *135*(5), p. 712

In support of this indirect path, McLaughlin and colleagues found that *emotion dysregulation*—measured as an amalgam of heightened expression of anger and sadness, poor emotional awareness, and rumination (i.e., highly complex intrapersonal experiences/processes)—mediates the direct effect of victimization on psychological distress among adolescents (McLaughlin, Hatzenbuehler, & Hilt, 2009). The significance of this association is reinforced by findings linking discrimination to substance use directly, and indirectly through efforts to *cope* with distress (e.g., Hatzenbuehler, Corbin, & Fromme, 2011; Weber, 2008; Meyer, 2003; Lehavot & Simoni, 2011). Substance use coping motives have also been shown to predict negative alcohol use-related consequences among LGBTQ college students (Ebersole, Noble, & Madson, 2012; see also Armeli, Todd, & Mohr, 2005).

Another consequence of experienced discrimination and victimization for some is the internalization of heterosexist or anti-gay bias, leading to negative explicit (e.g., self-reported shame/internalized homophobia) and implicit self-directed attitudes and beliefs (Meyer, 2003),

which are positively associated with psychological distress and substance use (Meyer, 1995; Hequembourg & Dearing, 2013). Although the process through which distal stress leads to shame is more LGBTQ-specific, evidence gleaned from a 10-day daily diary study suggests that daily *rumination* and *suppression* mediate the prospective association between baseline implicit anti-gay attitudes and psychological distress (Hatzenbuehler, Dovidio, Nolen-Hoeksema, & Phills, 2009). In related research focusing on the distal stress experiences specifically, researchers found that *rumination* and *suppression* mediate the relationship between daily discrimination experiences and psychological distress among LGB individuals (Hatzenbuehler et al., 2009). These researchers also found that discrimination was associated with higher rates of *social isolation*, which, in turn, mediated the discrimination-psychological distress relationship (Hatzenbuehler et al., 2009).

According to Hatzenbuehler (2009), hopelessness, pessimism, and negative self-schemas relate more to the prediction of minority-based psychological distress (e.g., depression and anxiety; Hatzenbuehler, 2009) than substance use, *per se*. However, these factors may also relate to the likelihood of engaging in coping-motivated substance use among LGBTQ individuals. As mentioned, LGBTQ-based discrimination has been shown to activate psychological distress and substance use coping motives, both of which have been shown to predict binge drinking and alcohol-related negative consequences (Hatzenbueler et al., 2011). In addition, positive substance use outcome expectancies, or the degree to which individuals anticipate positive use-related outcomes, such as tension reduction, heightened sociability and courage, and heightened sexuality, predicted binge drinking and alcohol use-related problems through the indirect path of substance use coping motives (Hatzenbuehler et al., 2011). This work is consistent with that of McKirnan and Peterson, who found that not only do positive outcome expectancies predict use

(1988), but the relationship between discrimination and use was stronger among those who had higher positive use expectancies (1989). In related research conducted using a general population sample, those found to have high positive alcohol use outcome expectancies evidenced a stronger stress-alcohol consumption pattern, whereas low expectancy individuals tended to have *lower* consumption on higher stress days (Armeli, Todd, & Mohr, 2005).

It is important to note that the delineation between LGBTQ-specific and non-specific pathways is not to suggest a psychological division among LGBTQ individuals, or that minority stress experiences are processed in an LGBTQ-specific fashion; rather, this distinction is presented to acknowledge the important role of general and non-LGBTQ-specific psychological processes, and to highlight shared human processes associated with risk. Hatzenbuehler's integration of general psychological process and LGBTQ research highlights the shared experiences of people, irrespective of their sexual identity status. This integration also suggests that elevated risk for substance use among LGBTQ individuals is a consequence of heightened social, political, and institutional oppression. While each pathway in Hatzenbuehler's model (2009) is distinct, it is understood that each interact in a reciprocal fashion to predict psychological distress and substance use behavior. Research in this domain is in the nascent stages; further work is needed to determine the utility of dynamic process consideration in future LGBTQ prevention and intervention research. Thus, methodological refinement regarding the study of substance use among LGBTQ individuals is not only a timely advance, but an imperative given the technology at hand to address existing knowledge gaps.

In sum, numerous studies document support for Meyer's (2003) and Hatzenbuehler's (2009) models. Distal stress experiences confer risk for substance use among LGBTQ individuals through a series of intervening psychosocial variables that have been shown to

become differentially activated in response to minority stress experiences. Researchers have demonstrated through daily diary studies the utility of increasing measurement frequency as a means of capturing these between-day associations, though no known researchers have attempted to model within-day associations between minority stress and substance use risk. Therefore, further research is needed to measure within-day experiences of minority stress, and to examine the hypothesized associations between daily minority stress experiences and substance use risk among LGBTQ individuals.

The foregoing discussion regarding the effects of *social/interpersonal* factors, *emotion regulation* (e.g., coping, rumination), and *cognitive processes* is intended to shine light on the complexities of within-person processes that give rise to the observed substance use disparity. Though data on each of these factors were collected in this study, of interest in the current study is the role of momentary emotion regulatory processes (i.e., coping) that are associated with substance using behavior following microaggression experiences. Although Hatzenbuehler (2009) outlined the effects of *social norms*, *substance use expectancies,* and *coping motives* for use in his model, this study focuses on the more fluid processes within this model—momentary motives for use. That is, while social norms may moderate substance using behavior, it is arguably less intuitive to conceptualize norms as becoming "activated," in a mediational sense, by some external force. Rather, norms represent a form of social pressure that has the potential to influence one's decision to use or not. Substance use expectancies are a function of direct and social learning, wherein individuals come to expect certain, and sometimes desired, outcomes following substance use. For example, expecting positive vs. negative outcomes of drinking will likely predict greater alcohol use, on average. In contrast, motivation is variable and state- and context-dependent. Coping motives, specifically, are commonly activated following experiences

that evoke distress in the individual, which may include microaggression experiences. The current study design is ideal for capturing these daily experiences and potentially fleeting emotion regulation processes.

Microaggressions

Researchers who conduct LGBTQ health research typically emphasize the effects of *overt* discrimination and victimization experienced throughout life using retrospective self-report measures and cross-sectional methodology (e.g., Goldbach, Tanner-Smith, Bagwell, & Dunlap, 2014; McCabe et al., 2010; Keyes, Hatzenbuehler, & Hasin, 2011; Hughes, McCabe, Wilsnack, West, 2010; Newcomb, Heinz, & Mustanski, 2012, Livingston, et al., 2015b; Livingston, Heck, Flentje, Gleason, Oost, & Cochran, 2015c). *Overt* is used in the present context to characterize incidents that are easily retrievable from memory due to their obvious, salient and discrete nature—the experiences that lend themselves more readily to retrospective self-report. For instance, experiencing physical or sexual assault, or being denied a job promotion based on one's known or presumed sexual minority status constitute the form of *overt* or macro-aggression experiences that could be recalled with relative ease for most who experience them.

Measurement of discrete, *overt* events using retrospective self-report provides an estimate of lifetime prevalence and has been used to predict important mental health and substance use outcomes, but is limited in terms of finer-grained detection of *daily* experiences. Retrospective measures are less sensitive to *subtler* forms of mistreatment, which are more susceptible to retrospective recall bias (Sue, 2010). As a consequence of researchers' emphasis on *overt* historical/lifetime experiences, it is currently unclear to what extent *subtle* to *overt* and/or *daily* experiences of mistreatment might contribute meaningfully to the prediction of substance use risk.

First coined in the 1970s, the term *microaggression* was first defined as "subtle, stunning, often automatic, and nonverbal exchanges which are 'put-downs'" (Pierce, Carew, Pierce-Gonzalez, & Willis, 1978; p. 66). According to Nadal (2013), microaggression is defined as "brief and commonplace daily verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative slights and insults toward members of oppressed groups." (p. 36). Microaggressions are also regarded as "constant, continuing, and cumulative experience(s)" that disproportionately disadvantage minority groups (Sue, 2010; p. 52).

Although Sue (2010) wrote about microaggressions in general, he also put forth a taxonomy to characterize some of the more common forms of microaggression experiences. According to Sue (2010), microaggressions include *microinsults, microinvalidations*, and *microassaults*. *Microinsults* include rude, insensitive, disparaging communication or behavior, often fueled by unconscious stereotypes and attitudes (Sue, 2010). Common themes include ascription of lesser intelligence, assumption of abnormality and pathology, sexual objectification, and being considered a second-class citizen relative to the majority group (e.g., the heterosexual majority). *Microinvalidations* are often unconscious acts involving exclusion of minority individuals and/or invalidation of their reality, thoughts, and feelings. Common examples include ignoring or undermining the role of historical and institutional oppression, or the ability of minorities to reach their potential; denying individual bias ("I don't have anything against gay people, I work with one!"); or claiming, "sexual orientation blindness" ("I don't see you as a gay man, but as a person.") and obscuring diversity by failing to observe important differences (e.g., economic privilege). *Microassaults* are conscious acts that include subtle and explicit verbal/non-verbal assaults, such as name-calling and physical attacks intended to cause harm.

This form of microaggression is most like *overt* forms of mistreatment typically emphasized in research and media, but are typically exhibited under conditions of perceived anonymity, safety from repercussion or retaliation, or when the perpetrator's self-control is compromised (Sue, 2010).

Microaggressions may be perpetrated at the individual, group, or institutional level. Results of a recent qualitative study designed to identify common sources, contexts, and reactions to experienced microaggressions revealed that these experiences are felt from the media, government, religious, and educational institutions, and even from within the LGBTQ community (Nadal et al., 2011). Microaggressions can be experienced directly or indirectly (e.g., overheard), and can be committed by known or unknown individuals (Swim, Pearson, & Johnston, 2007). Qualitative research suggests that interpersonal microaggressions are most often experienced directly (53.8%) as opposed to being overheard or experienced indirectly (36.6%; Swim et al., 2007). Findings from this study also suggest that approximately 58% of daily experiences were verbal (e.g., verbalized stereotypes or insults), 22% were behavioral (e.g., being excluded or given poor service at restaurants), and 13% involved or elicited fear (i.e., of disclosure, fear of verbal comments or hostile behavior; Swim et al., 2007).

Unlike many other marginalized groups who often share their minority status with immediate family members and other close relatives, such as ethnic minority individuals, LGBTQ individuals often do not. Thus, LGBTQ individuals may experience marginalization within their own home. This is consistent with Nadal and colleagues' (2011) report that LGBTQ microaggressions are quite often experienced within the family context and perpetrated by close relatives. One illustration of this is the example of a gay man overhearing a family member denigrate another gay man depicted on television—with or without knowledge of their family

member's sexual minority status—or having family members ask, "When are you going to get a girlfriend?" (Swim et al., 2007). Experiences like these are often distressing. At the same time, it may be difficult for the person experiencing such mistreatment to secure needed social support or receive validation from those who have not had similar experiences, such as heterosexual individuals.

The Need for Methodological Refinement

A primary motivation behind the current investigation is to examine the lived experience of LGBTQ individuals, and to answer the question of whether the story of health disparities told by existing research remains true at the within-day level of analysis. This is a methodological question that relates to the temporal resolution of the cross-sectional and longitudinal methods most often utilized in LGBTQ health research. Temporal resolution, or measurement scale, refers to the sensitivity of a measure or research design to detect fluctuations of interest (Kamarck, Shiffman, & Wethington, 2011; Manson, 2008; Livingston et al., 2015a). For example, repeated sampling of individuals' daily experiences would have a far greater temporal resolution than a one-time cross-sectional assessment. Resolution varies considerably within LGBTQ research, ranging from cross-sectional measurement, to multi-year longitudinal studies, to daily diary methods. While the latter affords researchers the opportunity to capture dynamic, between-day effects, these methods are often less sensitive to within-day processes. Thus, less is currently known regarding the effects of *subtler* forms of *daily* microaggression experiences, and the *directional* relationships between microaggressions and event-based psychological distress and substance use at the within-day, process level of analysis. This knowledge gap is even more salient considering recent work suggesting that subtle and ambiguous forms of mistreatment

(microaggressions) have become more common (Nadal, 2013; Sue, 2010), though more easily forgotten than *overt* forms of mistreatment (Sue, 2010).

Although little is known regarding daily microaggressions, findings from LGBTQ, ethnic minority, and general population samples are beginning to emerge. For instance, a recent internet-based cross-sectional study found that past 30-day ethnic minority microaggression experiences were associated with current depression symptoms and number of binge drinking events (Blume, Lovato, Thyken, & Denny, 2012). In one unpublished study of ethnic minority individuals, researchers asked participants to self-report lifetime ethnic minority discrimination at baseline, followed by instruction to report on paper diaries their interactions and positive and negative mood states every 30 minutes for the rest of the day (Appel, 2004). After adjusting for cynicism, anxiety, defensiveness, and hostile attributions, the results indicated that higher rates of lifetime discrimination were associated with sad, angry, and nervous feelings experienced throughout the day, and greater perception of interpersonal mistreatment (e.g., treated unfairly, harassed; Appel, 2004; see also Brondolo et al., 2008). This suggests that not only do every-day mistreatment experiences matter, but (1) prior discrimination may influence perceptions of future interactions, and/or (2) individuals who have been mistreated historically may be more likely to experience daily mistreatment.

Existing microaggression research has also demonstrated both acute and delayed psychological effects of momentary and chronic microaggression experiences (Swim, Johnston, & Pearson, 2009; Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009; Sue, 2010). Identified negative consequences include feelings of rejection, anger, anxiety, sadness, depression, shame, and low self-esteem (Swim et al., 2009; Nadal et al., 2011; Hatzenbuehler et al., 2009; Sue, 2010). As previously mentioned, researchers have shown that discrimination is linked

prospectively with substance use through substance use outcome expectancies, psychological distress, and coping motives for use among LGBTQ individuals (Hatzenbuehler et al., 2011). Although longitudinal, these findings are based on data from two semi-annual measurement periods and, as such, provide a less compelling answer to the question regarding substance use risk at the daily or weekly process level. Answering such questions would require more sensitive data collection strategies that amplify resolution by adjusting the temporal scale of measurement; this could include experience-sampling methods, such as daily diary studies or ecological momentary assessment (EMA; Kamarck, Shiffman, & Wethington, 2011).

Support for daily microaggression process effects initially arose from a study utilizing daily diary sampling strategy. In this study, daily microaggressions were shown to predict end-of-day anger and anxiety, while general daily hassles predicted event-based depression and reduction in relaxed and positive mood states (relaxation, happiness, excitement); general daily hassles did not predict anxiety or anger (Swim et al., 2009). In related research, Hatzenbuehler and colleagues established a similar link between daily microaggressions and end-of-day psychological distress through the mediated paths of rumination and social isolation, both of which increased in response to experienced microaggressions (Hatzenbuehler et al., 2009). However, no known studies to date have linked daily microaggressions to daily risk for substance use among LGBTQ individuals. This is surprising given the vast amount of research demonstrating strong associations between daily stress, substance use triggers, and use in the general population (Armeli et al., 2005). For example, research in the general population has demonstrated a direct link between daily mistreatment (e.g., "treated with less respect than other people") and end-of-day alcohol consumption and binge drinking among college students (DeHart et al., 2014), while further research has linked negative "interpersonally oriented"

events with increases in desire to drink and daily alcohol consumption (Carney, Armeli, Tennen, Affleck, & O'Neil, 2000; Armeli et al., 2000).

Beyond these daily negative event-alcohol use correlates, and in the service of demonstrating the complex nature of these relationships, researchers have also investigated the mediating roles of positive and psychological distress, and the effects of substance use coping motives and expectancies regarding substance use behavior among general population samples. According to the work of Armeli and colleagues (2000), higher rates of negative and positive daily interpersonal events were associated with greater daily negative and positive affect, respectively. Positive and psychological distress both predicted daily desires to drink and number of drinks consumed on a given day. They further discovered a partial mediation effect in the direction of negative interpersonal events predicting daily desire to drink and actual use through daily psychological distress (Armeli, Tennen, Affleck, & Kranzler, 2000). These findings are supported by recent research documenting positive associations between momentary psychological distress and substance use cravings on subsequent relapse rates among individuals seeking substance use treatment (Moore et al., 2014). Individuals have also been shown to be more likely to engage in solitary use on days marked by greater negative interpersonal events (Mohr et al., 2001).

Using an ecological momentary assessment design, Dvorak and colleagues (2014) found that psychological distress and coping motives not only predict nightly drinking and acute alcohol use disorder symptoms, but that the affect-drinking/symptom path was mediated by coping motives for use for both men and women at the within-day level. Although most extant research focuses on alcohol use as the dependent variable, in one recent study, Shrier and colleagues (2014) found that daily negative, not positive, affect preceded marijuana use among

adolescents and young adults, particularly following a period of prolonged daily psychological distress (Shrier, Ross, & Blood, 2014). Thus, focusing on alcohol use exclusively runs the risk of omitting important substance using behaviors and preferences, as other substances may serve coping-related functions for many individuals.

In aggregate, these findings support the existence of consistent and meaningful links between negative interpersonal events, intervening psychological processes (e.g., psychological distress and coping motives), and substance use. As such, there is precedence for the expectation that daily microaggressions, which are associated with many of the same affective responses as other negative interpersonal events, would be prospectively linked to heightened substance use risk among LGBTQ individuals. An impressive body of LGBTQ research supports this, as well as the need to investigate this relationship in a manner consistent with its dynamic nature.

Ecological Momentary Assessment (EMA)

Ecological momentary assessment (EMA)—involving multiple daily measurements, commonly initiated through portable electronic data collection devices (Kamarck, Shiffman, & Wethington, 2011)—affords researchers the opportunity to gather participant data in real time. Ecological momentary assessment has been described as ideal for conducting substance use research, where questions often are intended to relate event-based changes with time-varying processes (Shiffman, 2009). Additional methods of EMA data collection include multiple daily paper-and-pencil assessments, text message or email data collection prompts with links to online survey platforms, and timers worn by participants that randomly signal data collection periods. Regardless of medium, EMA designs are regarded by some to be the gold standard in daily experience sampling methods, which is due to researchers' ability to gather meaningful between-

and within-person process data in real-time (Kahneman, Krueger, Shkade, Schwarz, & Stone, 2004).

Support for EMA methodology is accumulating as researchers move toward more dynamic modeling of intra-personal processes. To date, EMA has been used successfully to investigate alcohol and illicit drug use and relapse (e.g., Phillips et al., 2014; Buckner et al., 2011; Moore et al., 2014; Epstein et al., 2009), daily stress experiences (e.g., Shiffman & Waters, 2004; South & Miller, 2014), and general within-person psychological processes such as positive and psychological distress (e.g., Phillips et al., 2014; Trull et al., 2008; South & Miller, 2014). Additionally, EMA studies on momentary emotional experiences and appraisal (e.g., Tong et al., 2007), emotion regulation processes (e.g., Ebner-Priemer & Trull, 2009), and coping responses (e.g., O'Connell et al., 1998; Stone et al., 1998) have produced meaningful results with implications for LGBTQ health research, as well as prevention and intervention science.

Despite its advantages, two potential drawbacks of highly repeated within-person measurement are the increase in participant response burden and greater potential for missing data. While methods for analyzing EMA data are robust to missing data (Kamarck et al., 2011), the fact remains that missing responses may bias results and limit generalizability. One way to retain participants and increase response rates is to offer incentives for ongoing participation. Despite these concerns, researchers have documented the feasibility of conducting EMA research, in addition to reporting high compliance rates (e.g., Husky et al., 2014).

Another concern with EMA designs is the potential for reactance and/or iatrogenic effects of repeated measurement. Examples of how this might relate to the present study are that individuals asked to report on their daily negative experiences and substance use cravings and use might experience adverse effects, such as heightened awareness of microaggression

experiences and greater risk for engaging in substance use through repeated priming of substance use motives. These concerns have been largely put to rest by research documenting little to no reactivity effects in EMA research (Shiffman, Stone, & Hufford, 2008; Hufford, Shields, Shiffman, Paty, & Balabanis, 2002), including research examining daily risk for suicide among suicidal participants (Husky et al., 2014). Although some reactivity/intervention effects have been reported, participants engaged in studies lasting up to two weeks show minimal, if any, reactivity (Shrier et al., 2014). These effects have even been shown to generalize to substance-using individuals. In a recent EMA study on the effects of affect and cravings on relapse risk, Moore and colleagues (2014) found no evidence of reactivity, as measured by relapse risk among EMA participants, relative to control participants who did not participate in EMA (Moore et al., 2014).

One of the most important considerations regarding the development and analysis of EMA research is whether to utilize event- or time-based assessment schedules. The former is typically a participant-initiated design, where individuals under study may be asked to respond to a set of questions following an event or experience of interest, such as immediately following a microaggression experience, or a substance use craving (Kamarck, Shiffman, Wethington, 2011; Bolger & Laurenceau, 2013). On the other hand, time-based assessment schedules are not triggered by discrete events but are aimed more toward broad coverage of daily life. Time-based assessment schedules may be either fixed or random, as set by the researcher, and are designed to capture experiences as they unfold throughout a given measurement period (Kamarck et al., 2011; Bolger & Laurenceau, 2013). Event-based measurement schedules are often recommended for research questions related to events themselves, such as social interactions or substance use episodes, whereas time-based assessment schedules are often recommended when broad

coverage is preferred and less emphasis is placed on studying discrete events (Kamarck et al., 2011). However, researchers interested in studying events and contextual factors surrounding the events themselves may opt for a combined time-/event-based approach in order to measure the event(s) of interest, as well as important antecedents and consequences following the event(s) (Kamarck et al., 2011). That being said, the present study employed a pseudo-random—i.e., "random" based on the capabilities of available software—time-based measurement design in order to achieve broad coverage and limit response burden associated with requesting additional event-based recordings. It was also designed such that discrete events could be recorded when participants were prompted to provide information throughout the day.

Rationale for the Current Study

Despite the numerous findings linking both discrete and chronic *overt* mistreatment experiences to substance use risk, additional data are needed to understand minority stress effects at the daily process level. Researchers have yet to examine whether everyday microaggressions are associated with elevated risk for substance use directly, and no known attempts have been made to capture these experiences in real-time using EMA. This study was conducted to address these knowledge gaps by concurrently investigating daily, *in situ*, processes conferring risk for substance use among LGBTQ individuals. Since much of what is known about LGBTQ health and minority stress is predicated on cross-sectional data, or longitudinal research insensitive to momentary fluctuations in daily minority stress experiences, it is expected that EMA will yield meaningful insight into the daily minority stress experience.

Finally, although *overt* discrimination and victimization experiences remain prevalent among members of the LGBTQ community (Nadal, 2013), subtle and pervasive forms of mistreatment are far more common and, relative to discrete *overt* experiences, are more difficult

to capture using retrospective recall methods (Sue, 2010). The inherent challenge of studying microaggressions stems from their subtle and insidious nature. One reason for this is that details surrounding such experiences may fade from memory unless recalled shortly after the event occurs (Sue, 2010). Retrospective recall can also be influenced by personal memory heuristics (i.e., encoding and recall of events that are more personally relevant), recency of the events recalled, salience and novelty of the event, and mood-dependent response sets (Trull & Ebner-Priemer, 2009). For instance, researchers have demonstrated over-reporting biases on retrospective recall surveys compared to real-time assessment of sexual activity among men who have sex with men (i.e. sexual activity; Horvath, Beadnell, & Bowen, 2007). It has also been shown that retrospective recall of substance use episodes is less tenable, and that individuals may have difficulty recalling motives and attributions surrounding periods of use (Armeli, Todd, & Mohr, 2005; O'Hara et al., 2014a). Thus, retrospective recall methods may lack necessary sensitivity. Recent innovations in experience sampling techniques offer useful remedies for retrospective recall bias, the latest of which is EMA.

Hypotheses

The primary aim of this study was to evaluate the extent to which daily microaggression experiences contribute meaningfully to the prediction of psychological distress and substance use risk among LGBTQ individuals generally, and coping-motivated use specifically. First, it was expected that recent microaggression experiences (reported throughout the day) would be positively associated with psychological distress ratings and cravings for use, measured contemporaneously. Next, it was expected that recent microaggressions would be associated with greater reporting of general and coping-motivated substance use, even after accounting for

general mistreatment occurring around the same time, and daily and weekly temporal use patterns (e.g., substance use throughout the day and on weekdays vs. weekends).

Due to the need for methodological refinement in LGBTQ health research, and considering results from the aforementioned studies, this study also sought to evaluate the experience of individuals who participate in this type of research design. The aim here was to assess for the presence of instrumentation effects, and, more importantly, evaluate the feasibility of this research design for future research. Analysis of data collected for the secondary aim was exploratory, as there are no known studies to inform hypotheses *a priori.*

Method

Participants. Individuals were recruited from the University of Montana undergraduate psychology research pool and broader campus via SONA (a cloud-based participant recruiting software) and hardcopy recruitment flyers posted across campus. Flyers were distributed throughout student housing and across campus on public-use bulletin boards between February 2016 and May 2016 (See Appendix A & B for general and LGBTQ-specific recruitment flyers). The rationale for recruiting a university-based sample was to sample individuals nearby, since all were required to attend an in-person orientation session prior to completing the EMA portion of the study. The inclusion criteria for this study was that individuals were at least 18 years of age or older, and currently identifies as LGBTQ. The operational definition of "LGBTQ" in the current study was inclusive of lesbian, gay, bisexual, pansexual, queer, questioning, fluid identities, as well as non-heterosexual identities reported in the open-response "other" category. Participants who identified as heterosexual were also included so long as they denied being exclusively heterosexual currently. Individuals who identified their gender as transgender (i.e., transman, transwoman), gender queer, agender, gender fluid, or who entered an open-response

identity in the "other" box were also included in the study, regardless of their sexual orientation. The only individuals not invited to participate in the EMA study were those who were not at least 18, and cisgender men and women who reported that they are exclusively heterosexual.

Recruitment began in October 2015 and ended June 2016; the EMA portion of the study began in February 2016 and concluded in June 2016. A total of 722 completed the prescreening survey; 165 prescreening participants screened eligible and 140 expressed interest learning about the EMA study. Participants screened starting in February were contacted by the PI via phone or email in the order in which they participated in the prescreening survey. If reached, participants were provided additional information about the EMA study and, if interested, invited to attend 90-minute orientation and measurement session. Two individuals indicated they were no longer interested in participating and another two indicated that they would be unable to participate due to leaving town for the summer. Twenty-two individuals did not respond to these calls and were subsequently removed from the call list. The remainder of the eligible participant pool either elected to participate ($N = 50$) or were never contacted due to reaching the target sample size (see Figure 4).

Most participants were students; however, given that we did not collect data regarding student status, and student status was not considered an inclusion or exclusion criterion, it is not possible to know for sure whether non-student employees at the University of Montana or other community members also participated in the EMA study. Ages of participants in the EMA study ranged from 18 to 45 ($Mage = 21.82$, $SD = 4.70$). Ten identified as male (20%), 32 as female (64%), one as a transman (2%), one as gender queer (2%), four as agender (8%), and two identified as gender fluid (4%). Three individuals identified as gay (6%), 10 as lesbian (20%), 14 as bisexual (28%), five as pansexual (10%), two as queer (4%), two as questioning (4%), two as

fluid (4%), six as other (e.g., demisexual, asexual; 12%), and six as heterosexual/straight (12%). However, it should be noted that each heterosexually-identified participant denied being exclusively heterosexual on a self-report measure at the time of measurement (see Appendix C). The breakdown in terms of ethnicity was as follows: 42 identified as White; one as Native American/Alaskan Native; and seven identified as having multiple ethnicities, having endorsed either Hispanic and White ($n = 4$), Black/African American and White ($n = 1$), Native American/Alaskan Native, Hispanic, and White ($n = 1$), or typing "mixed" in the open-response section ($n = 1$; Table 1).

Analogous studies have found statistically significant within-person effects with small samples ($N = 46$; Armeli et al., 2000), though most often in the range of 70 participants (e.g., Swim et al., 2009; Dvorak et al., 2014). To estimate the number of participants needed in this study, several simulations were performed with power ranging from .80 to .90, and α set at .05 and .01, respectively. Based on these criteria, and a variance explained effect size estimate of .15, it was estimated that 60 participants would be needed (Faul, Erdfelder, Buchner, & Lang, 2009). However, given the highly conservative approach taken to derive power estimates prior to executing this study, and the difficulty of recruiting in a finite community, a final sample size of 50 was obtained before ceasing recruitment.

Procedure. Individuals over the age of 18 and who either identified as LGBTQ or denied being exclusively heterosexual currently were eligible for this study. Thus, the LGBTQ acronym was operationalized in the current study as anyone who reported lesbian, gay, bisexual, pansexual, fluid, questioning, queer, or "other" for their sexual identity, or those who denied being exclusively heterosexual currently. Transgender, gender queer, agender, gender fluid, or "other" gender-identified individuals were also included. In other words, anyone 18 or older who

did not identify as exclusively heterosexual/straight and cisgender (i.e., people whose sex assigned at birth is consistent with their gender identity) was eligible to participate.

Eligible participants were identified through an online Qualtrics survey and asked to attend a planned 90-minute (actual average length: 75 minutes) orientation to complete baseline measures and receive instruction regarding the proper use of our Samsung Galaxy EMA devices. Once participants completed the tutorial and baseline measurement session, they were provided an EMA device, charger, and instruction packet to aid them in the completion of the EMA portion of the study. The instruction packet included contact information for the PI and research assistants, further instructions regarding the EMA questions, a copy of the informed consent document, and device return instructions. Participants were also informed that they would receive a text message reminding them when the EMA portion would begin (always on the Thursday following the orientation), another text the following day to ensure the device was working properly, and emails seven and 12 days after the EMA start date. These emails included encouragement for ongoing participation, contact information in the event of device malfunction, and, in the 12th day email, device return instructions. Upon device return, participants were asked to complete a final, 13-item exit survey. This survey was designed to gather additional information regarding their experience with the study, and to assess for reactance/instrumentation effects. All participants were provided research credit (if applicable) and compensated financially ($60) following the baseline/orientation session, and EMA portion of the study.

Prescreen. This portion was administered online for the purposes of establishing eligibility, participant interest, and to gather personality trait data using the Big Five Inventory (John & Srivastava, 1999). This survey was designed to take between five and 10 minutes to

complete. Psychology students earned research credit for participating and all were given the chance to enter their email into a drawing to win a $100 gift card for an online retailer. Eligible participants were routed to a separate survey where they were asked to provide contact information, if interested in learning more about and/or participating in the follow up study.

Prescreening measurement included demographic information (See Appendix C) and personality trait data (Appendix D). The Big Five Inventory (BFI) is a 44-item measure of the Five Factor Model of personality (i.e., extroversion, agreeableness, conscientiousness, neuroticism, and openness; John & Srivastava, 1999); it offers good convergent validity with the NEO-FFI ($r = .73$, or $r = .93$ after correcting for measurement error; John & Srivastava, 1999), and has demonstrated good internal consistency in prior research involving LGBT participants (Cronbach's α ranging from .78–.90; Livingston et al., 2015b). Cronbach's α for the analytic sample (i.e., the subset of participants who participated in the EMA portion of the study), and across each trait and the overall measure, ranged from .69 (full scale) to .91 (extraversion).

Baseline Procedures and Measures. Individuals who participated in the orientation session received approximately 50 minutes of instruction, followed by a question and answer session. Afterwards, participants were asked to complete baseline measures on a secure, password-protected computer. This baseline survey was designed to take between 10 and 20 minutes to complete. As with the prescreening personality trait data, baseline measurement data were collected for descriptive purposes only (see Table 2), and as covariates/variables of interest in future analyses. The following measures were included in the baseline measurement questionnaire:

Daily Substance Use. The Daily Drinking Questionnaire (DDQ; Collins, Parks, Marlatt, 1985) is a retrospective, self-report measure of *average* alcohol consumption frequency, volume,

and duration. This measure has been used widely, and is recommended for use in research where measures of average use are desired, as opposed to finer-grained analysis of individuals' drinking patterns (Collins, Kashdan, Koutsky, Morsheimer, & Vetter, 2008). This measure has also been adapted to include other substances, such as marijuana and specific stimulants and depressants; these adaptations were used in the current study to assess participants' use of substances in addition to alcohol. Next, though separate from the original and adapted DDQ items, participants were asked about regular use of nicotine/tobacco, personal and family history of substance use, and mental health diagnoses/concerns.

Social Norms. An eight-item scale modified from Baer (1994) was used in the current study to assess the degree to which alcohol/drug use is perceived as common among individuals in the LGBTQ and broader Missoula community, and to assess perceived attitudes of friends and family regarding daily use of substances. Cronbach's α for the current study was poor ($\alpha = .54$). This was likely a function of small sample size in the analytic sample, as well as possible heterogeneity regarding social norms between family, friends, and the general vs. LGBT community in Missoula (see Appendix E).

Use Expectancies. The Brief Comprehensive Effects of Alcohol questionnaire (B-CEOA) is a 15-item measure sensitive to the degree to which individuals expect positive and/or negative outcomes (beginning with the stem, "If I were under the influence from drinking alcohol…" [e.g., I would be sociable], rated on a 1 = disagree to 4 = agree, with higher scores suggesting stronger endorsement) in relation to alcohol consumption, and their subjective rating of whether or not the outcome is favorable (i.e., desirable vs. undesirable; 1 = bad, 3 = neutral, 5 = good; Ham et al., 2005). This measure compares favorably with the original 76-item measure developed by Fromme and colleagues (1993), sharing similar psychometric properties (Ham et

al., 2005). Positive subscales include sociability, tension reduction, liquid courage, and sexuality; negative outcome expectancies include cognitive and behavioral impairment, risk and aggression, and self-perception of moods. An additional item was added to the measure for this study. At the end of the B-CEOA participants were asked to respond to the prompt, "I would feel more comfortable as an LGBT individual." Cronbach's α for this baseline measurement for the analytic sample was .68.

Coping. The Brief Cope (Carver, 1997) is a 28-item common use measure of global coping tendencies. The Brief Cope is comprised of 14 subscales, including adaptive and maladaptive coping behaviors (e.g., substance use). Cronbach's α for each subscale has been shown to range from .50 ("venting") to .90 ("substance use"). Subscales of this measure were analyzed separately to arrive at a Cronbach's α range; the range for the analytic sample was between .11 (venting) and .93 (religious coping). Cronbach's α for the full scale was .73.

Discrimination. The Schedule for Heterosexist Events is a measure developed for use with sexual minority-specific samples (Selvidge, 2000). Internal consistency for the full measure is high (Cronbach's α = .92; Selvidge, Matthews, Bridges, 2012). Cronbach's α for the EMA subset was .95.

Victimization. Victimization was measured using a 10-item measure adapted from Herek and Berrill (1992). This measure asked respondents to indicate whether they have ever experienced any of the items listed during their lifetime (e.g., "In the past year have you…been threatened with physical violence?" or "been punched, hit, kicked, or beaten?"). This measure has been shown to have good internal consistency (Cronbach's α = .85; Livingston et al., 2015b). Cronbach's α for the analytic sample was .86.

Shame. The Revised Internalized Homophobia Scale (IHP-R) is a shortened (5-item) version of the original IHP (nine-item) with comparable psychometric properties (Cronbach's α = .82 versus .85, respectively; Herek, Gillis, & Cogan, 2009). Although originally structured after the DSM-III-R diagnostic criteria for ego-dystonic homosexuality (1997), it was used in the current study as a measure of negative self-perceptions, or shame, related to one's sexual identity status. Cronbach's α for the EMA subset was .82. This measure was also adapted for non-cisgender participants. This was accomplished by asking respondents to answer each item in regard to their transgender and/or gender nonconforming status. Cronbach's α for this measure was .87.

Outness. The Outness Inventory is an 11-item measure composed of three subscales inquiring about the extent to which individuals are out to the world (5 items; alpha = .79), their family (4 items; alpha = .74), and their religion (2 items; alpha = .97) (Mohr & Fassinger, 2000). For the current study, two additional items were added to the measure to assess outness to "my school peers" and "school staff and professors." Cronbach's α for the EMA subset was .91.

Prominence, Integration, and Valence. Prominence of one's LGBTQ status was measured by asking, "How central, or important to you, is your sexual orientation/gender identity compared to other major aspects of your identity?" Responses to this question ranged from 1 (Not at all important) to 5 (Extremely important). Integration was measured via single item to assess the degree to which participants' sexual identity has been integrated within the fabric of other important identities, such as parental, familial, and occupational identities. Responses ranged from 1 ("Not at all a part of your core identity") to 5 ("An extreme part of your core identity"). Finally, valence was measured using the item, "How do you feel about yourself as an

LGBT individual?" Participants rated this item using a 1 (Extremely negative) to 7 (Extremely positive) scale.

Social and Community Support. Perceived social and community support regarding the respondents' LGBTQ status was measured using four questions developed for the current study. Domains assessed included perceived support from family, friends, work or school associates, and the broader Missoula community. Cronbach's α for the analytic sample was .50. This was expected considering the small sample and the fact that each domain assessed often vary from one another in terms of support.

EMA Measures

Ten devices, which had been used successfully in previous research, were used in the current study. The application used on each device was programed using Basic for Android (B4A), an inexpensive app development software for Android and iOS operating systems. Consistent with prior EMA studies, participants were prompted randomly within two-hour intervals, six times daily (between 10am and 10pm), for 14 days, to provide sufficient power and response variability. When prompted, participants were given the chance to respond or "snooze" the prompt up to two times, for 10 minutes each time. This provided respondents a 20-minute window to respond between their first and final prompt for a single survey. Data were coded as missing following failure to respond by the third prompt (i.e., final reminder following second "snooze"). If a prompt was missed or skipped, participants were not prompted again until the next two-hour measurement window.

When prompted, participants were asked to report whether they had experienced any from a list of possible daily upsets (see Figure 5) since their last prompt (adapted from Williams et al., 1997; Swim et al. 2007; Wright & Wegener, 2012; Nadal, 2013). Participants could select

any/all that applied. "Yes" responses were followed up with a question regarding whether participants attributed the experience to any aspect of their identities, from a list of common statuses (see Figure 6). Next, participants were asked to answer seven *current* mood/affect items (see Appendix F). Participants were then asked to rate their current cravings ("Rate how much you want to use substances currently"), and indicate any use of the following substances since their last *prompt* (i.e., or within the last two to three hours if they missed their last prompt): alcohol (see Figure 7) nicotine/tobacco, marijuana, prescription medication (pain pills, Adderall, etc.), club drugs (MDMA/ecstasy/"molly", GHB), hallucinogens (mushrooms, LSD), cocaine, opiates (heroin, morphine), methamphetamine (adapted from Lee, Neighbors, & Woods, 2007 and Patrick, Schulenberg, O'Malley, Johnston, & Bachman, 2011), and "other," which was followed up with an open-ended response option (see Figure 8). Endorsing use of any substance initiated follow up questions regarding the reasons/motivations for using the substance(s) selected (see Figure 9 and Appendix F).
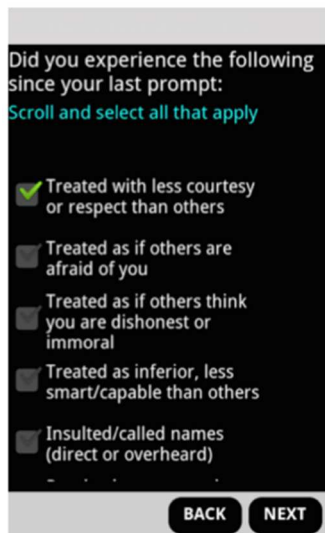
Between the 12pm and 2pm prompt each day, participants received the following questions: "If you used substances yesterday, how intoxicated, high, silly, or impaired did you get?" Response options for this question ranged from 0 (I didn't use/not applicable)
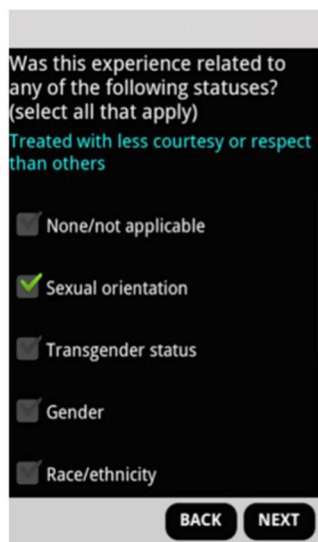
Figure 5.

Figure 6.

to 1 (Not at all) to 5 (Extremely). During the 8pm to 10pm block, individuals who reported experiencing any negative experiences throughout the day due to their "sexual orientation," "transgender status," or gender nonconforming behavior (option added verbally during training

Figure 7.

orientations) were asked five additional questions. The first was an assessment of *rumination* about prior LGBTQ experiences (i.e., "In response to any negative experiences that I had on the basis of being LGBT today I… have been preoccupied by them or repeatedly thinking about how negative they were."). The next question was related to *emotional suppression* (i.e., "Have been keeping my emotions to myself, or controlling my emotions by not expressing them"), followed by social support seeking vs. isolation: "Reached out for support, or talked with others about my feelings," and "Chose to be alone and away from others." Each of these was measured on a 5-item Likert scale ranging from "not at all" to "extremely." Participants then responded to "rate your overall satisfaction with the social support you received today" on a -3 (Very dissatisfied) to 0 (Neutral) to 3 (Very satisfied) scale. Lastly, participants were given the opportunity to provide any additional information they chose using an open-ended response option.
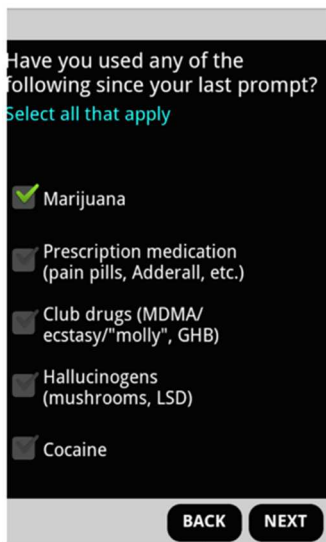
Figure 8.

On the final prompt of the EMA study, participants were notified that the study was over. They were also reminded to check their email for a message that included device return instructions. During the device exchange, participants were asked to complete a final exit survey (see Appendix G), were compensated, and provided a list of local, national, and campus-based resources designed to help LGBTQ individuals (e.g., The Trevor Project, a national call/text/chat line). The exit survey was designed to assess individuals' experience participating in the EMA study, the degree to which they felt support

was available if needed, and to assess possible reactance/instrumentation effects related to the highly-repeated measurement design. These surveys were administered in such a way to allow
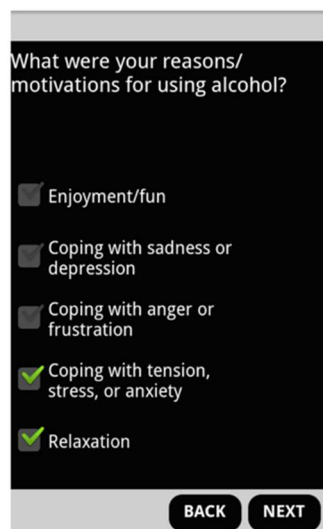
participants to respond privately and anonymously; therefore, there was no built-in mechanism for following up with individuals once they completed the survey.

Participant Incentives. Prescreened participants were given the chance to enter their email into a drawing for a $100 electronic gift card. Individuals who participated in the baseline/orientation session earned four research credits and $10. Individuals who followed through with the EMA portion received additional research

Figure 9.

credit and $50 upon return of their device. Although financial compensation was consistent across all participants, students enrolled in psychology courses were offered research credit for classes in addition to the $60.

Data Handling and Analytic Strategy.

Data collected via Samsung Galaxy devices were written and stored as .txt files on individuals' respective devices. Once returned, these files were converted into SPSS files. Each SPSS file was then scanned for accuracy; this step ensured that all prompts were accounted for and that each prompt was ordered correctly in the file (i.e., prompt order corresponded to correct time and date stamp). Once each participant's data were obtained and, if needed, cleaned, they were merged into a larger data set and stored as a long format file. Each participant had 84 rows of data corresponding with each prompt over the 14-day period. Finally, these data were merged with the baseline and prescreening measures using a unique participant identifier. This step destroyed the link between participants' data and identifying information.

Data cleaning, variable computation, and descriptive statistics were carried out in SPSS Version 22 (IBM Corporation, 2015). Primary analyses were carried out in SAS, University Edition. The decision to use SAS for primary analyses was based on the fact that these models required manual specification of degrees of freedom and a more complex autocorrelation structure than is offered in any other statistical program (see Bolger & Laurenceau, 2013). Plots displayed in Figures 10-13 were produced using SAS, University Edition. Plots displayed in Figures 14-17, depicting reports of general mistreatment vs. microaggressions and general and coping-motivated substance use, for a selected participant over the two-week study period, were produced in R (version 3.3.0).

With any repeated measurement design, time (i.e., time of day and day of week) is a factor that should be taken into consideration within a given statistical model (Bolger & Laurenceau, 2013). This is particularly true in substance use research, as the key variables of interest vary considerably within-day and across days of the week (e.g., weekday vs. weekend use; O'Hara et al., 2014a; Dvorak et al., 2014; differential weekend/weekday use motives; Studer et al., 2014). Adjusting for time of day and day of week has also been used to account for autocorrelation (Mohr et al., 2001; Dvorak & Simons, 2014), which works to the extent that correlated residuals are fully accounted for by time. Regardless, within-day variables included five dummy variables (coded zero or one) corresponding to periods two through six, with the first measurement period of the day serving as a reference. These five "period" variables were used in each model to account for within-day variability regarding each dependent variable. Each model was also adjusted for differences across days using a weekday/weekend variable. This was created by coding prompts occurring between Monday and Thursday as zero, and Friday through Sunday as one. This coding scheme was empirically-based—rates of use were similar on

Fridays, Saturdays, and Sundays, while use on remaining days of the week was significantly lower, on average. This method has also been used in related research (Piasecki et al., 2014), but was also chosen to maintain model parsimony.

Mistreatment experiences that were attributed to gender, race/ethnicity, disability, mental health, physical health, "other", or none/not applicable (to either of the previous statuses) were aggregated and coded as zero (in the event of no mistreatment) or 1 (any endorsement of mistreatment attributed to "general" reasons). This "general mistreatment" variable was entered to adjust for the effects of daily mistreatment that were presumably unrelated to participants' known or assumed sexual orientation, transgender status, or gender nonconforming behavior. Microaggressions were coded as zero (no microaggression experience) or one; responses coded as one included instances of mistreatment attributed to one's known or assumed sexual orientation, transgender status, or gender nonconforming behavior.

In a repeated measurement design, scores on repeated measures can be broken into two components: between subject differences and within-person deviations (Bolger & Laurenceau, 2013). As such, the next step in computing microaggression and general mistreatment variables included partitioning these variables into their between and within-subject components—that is, into between subject means and within-subject deviations around these means. This was accomplished by first aggregating individuals' deviations around the grand mean to arrive at a group mean centered variable (i.e., individuals' average deviation from grand mean of overall sample). These variables were later used to account for between subject differences in mistreatment reporting over the 14-day study period (i.e., between-person differences regarding general mistreatment and LGBTQ microaggressions over the 14-day span), and as controls for between subject differences that might otherwise confound within-subject effects. Next, person

mean-centered variables were created by subtracting individuals' grand mean centered variables from their group-centered scores (i.e., deviations of individuals' two-week aggregate scores relative to the mean of all individuals) across all prompts. This resulted in a within-person-centered variable, where zero represented individuals' average within-person general mistreatment and microaggression scores, and deviations around this value represented within-person fluctuation over time during their 14-day study period. These person-centered variables were used as the within-subject mistreatment variables of interest in each model.

Dependent variables for this study included a psychological distress and self-appraisal variable (henceforth, psychological distress), cravings (single item, log transformed), overall substance use, and coping-motivated use. The psychological distress variable was an aggregate of momentary anxiety, depression, fear, anger, and dissatisfaction with self-ratings. Each single item was log transformed, base e, prior to aggregating to reduce the observed positive skew of these single items. Overall substance use included endorsement of alcohol, marijuana, cocaine or "crack" cocaine, methamphetamine, club drugs (e.g., GHB, MDMA), hallucinogens, opiates, recreational use of prescription medications, or "other." These raw scores were combined and then binary coded into zero (no use) or one (any use). Coping-motivated use was also a binary variable. This variable included use corresponding with endorsement of one or more of the following motivations or reasons for using: Coping with sadness or depression; coping with anger or frustration; coping with tension, stress, or anxiety; or to feel more comfortable as an LGBT individual. For nonlinear mixed models, the DV was not modeled directly, but, as is true for logistic regression, indirectly through its probability using a logit link function.

Preliminary data analyses. This step included running descriptives regarding age, gender, sexual orientation, and other demographic variables of interest. Next were a series of

analyses to determine whether these demographic characteristics were significant predictors of any outcome of interest. None of these tests indicated significant differences based on age, gender, sexual orientation, or race/ethnicity in the current sample. These demographic characteristics were omitted from further analysis. Also provided are descriptives regarding variables of interest, including frequency of general mistreatment and microaggression experiences, and substance use over the study period. Descriptives were also run for compliance rates regarding prompt completion. Results for a paired samples *t*-test, comparing rates of compliance from week one to week two of the study, are also provided.

Hierarchical Linear and Non-linear Modeling Strategy. Given the nested nature of these data (repeated within-person measurements), powerful mixed effects multi-level modeling (MLM) procedures were used to estimate parameters in tests of hypotheses one and two. A structural equation modeling strategy might have also been appropriate, given its ability to model covariance structures and measurement error variance. However, MLM was the preferred approach due to its robust estimating capabilities in the presence of missing data and unevenly spaced measurements (e.g., unbalanced data panels; Mroczek, 2007; Kamarck et al., 2011; Bolger & Laureneau, 2013). This modeling strategy, with maximum or restricted maximum likelihood estimation, is also the recommended approach to analyzing EMA data due to its ability to estimate and account for autocorrelation, and when between-person differences might confound within-person effects; for example, when within-person processes may vary depending on between-person differences (Fleeson, 2007). This might occur in the case where an effect of daily microaggressions on psychological distress is positive and statistically significant, but the effect is different, or perhaps better accounted for by between-person differences in reported mistreatment over the study duration.

Models for this study were estimated using fixed effects. Decisions regarding fixed vs. random effects models specification are usually based on theoretical interest, but should also be evaluated statistically. The Hausman test is one that evaluates the degree to which specification of a random effects model would result in biased parameter estimates. A non-significant result indicates a fixed vs. random effect specification is equivalent and, thus, either would be defensible. A significant Hausman test, on the other hand, favors a fixed effect specification (Wooldridge, 2002). Given the current interest in fixed effect specification, a Hausman test was deemed unnecessary.

Primary Analyses.

Hypothesis 1. Two separate models were constructed to test hypothesis one. The first was constructed to account for variance in momentary psychological distress; the second accounted for variability in momentary cravings. The null hypothesis for each model was that reported microaggressions would not be associated with momentary psychological distress or cravings. As outlined previously, these hypotheses were tested using MLM (i.e., psychological distress and cravings, both log transformed). The variable of interest was within-person microaggression experiences reported within the same prompt as the associated DV rating. Covariates included between-person microaggressions and general mistreatment scores, a within-person general mistreatment deviation term, and controls for time of day and day of week (i.e., weekday vs. weekend).

Autocorrelation was assumed and accounted for to correctly specify models, and to reduce Type 1 error inflation (i.e., correlated residuals leading to underestimation of standard errors and inflated test statistics; Bolger & Laurenceau, 2013). That is, it is a reasonable assumption with cross-sectional data that residual errors are normally distributed with a mean of

zero (Bolger & Laurenceau, 2013). However, with longitudinal data, error associated with measurements taken at time one are generally associated with time two measurement errors; this is even more the case with EMA data, where measurements occur closer together in time. Ignoring this autocorrelation in practice can lead to inflated Type I error regarding tests of fixed effects (Bolger & Laurenceau, 2013). With time series data such as these, a common autocorrelation specification is the AR(1) specification, which adjusts for the fact that residuals are most correlated among observations taken closer together in time, and less correlated among observations taken farther apart (Bolger & Laurenceau, 2013). However, an AR(1) specification assumes evenly spaced measurements, which includes the assumption that there are no missing observations or that they are missing at random. For this reason, models in the current study were fitted with a spatial power term (i.e., "sp(pow)"), which is the recommended specification for unevenly spaced measurement designs (Wolfinger, 1993; Bolger & Laurenceau, 2013). The way this adjustment works conceptually is that if a person's first prompt occurred at 10:50am, the second at 12:00pm, and the third at 3:45pm, these available data will be used to estimate what the autocorrelation would be if measurements were evenly spaced. In other words, these available data points are used to derive a single continuous time estimate, *rho*, to adjust for unequal interval measurements, and to accurately account for the autoregressive structure of the data (Bolger & Laurenceau, 2013).

For the primary models, fixed effect estimates were specified for each variable, and a random variance component for individual intercepts (see Bolger & Laurenceau, 2013). Decisions regarding fixed vs. random effect specification were based on theoretical interest and the fact that fixed effect models are always a defensible option (Wooldridge, 2002). To correctly specify conservative degrees of freedom, based on $N = 50$, and the appropriate autocorrelation

term (i.e., spatial power function; Wolfinger, 1993; Bolger & Laurenceau, 2013), these models were specified and executed in SAS, University Edition, SAS Institute Inc.

Hypothesis 2. Hierarchical logistic models were used to test the degree to which microaggressions predict substance use, and to test for mediation between experienced microaggressions and coping-motivated use. A formal test of within-person mediation was deemed unnecessary since participants could directly attribute their use of each substance to their choice of reasons/motivations. The DV for these models included the binary substance use variable (i.e., no use = 0, any use = 1) and a binary coping motives variable. The latter was created by aggregating use of any substances (except for nicotine/tobacco) for the following reasons: to cope with (1) depression, (2) anxiety, (3) anger or frustration, or (4) to feel more comfortable as an LGBT individual. These reasons were combined because they are each related to attempts to manage negative emotions or self-perceptions regarding one's sexual and/or gender minority status. Each item was coded zero to indicate "no," one for "yes." The final DV was computed as a binary variable representing no coping-motivated use (equal to zero) or any coping-motivated use (coded one); a score of one could include endorsement of one or more of the coping motives. Model specification and covariates were identical to those detailed for hypothesis one. Odds ratio estimates were derived manually by exponentiating these coefficients, base e (e^x).

Results

There was a total of 93 microaggression experiences and 210 general mistreatment experiences reported across the 50 participants in the EMA study. Though some participants reported more than others, and still more reported no mistreatment experiences throughout their study period, these numbers equate to an average of 1.86 microaggression experiences and 4.20

general mistreatment experiences throughout individuals' respective two-week study period. There was no reported use of opiates, methamphetamine, or "other" drugs, which included an open-response option. Thus, the substance use variable was comprised of participants' use of alcohol, marijuana, (non-prescribed) prescription medication, "club drugs" (e.g., ecstasy, GHB), hallucinogens, and cocaine. Substance use was more common on Fridays, Saturdays, and Sundays, accounting for 49.52% substance use reports; conversely, the remaining 50.48% substance use reports occurred during the remaining four days of the week. It is also worth noting that certain substances seemed to drive this pattern, with alcohol consumption and use of pills, hallucinogens, and cocaine occurring more often on weekends. Marijuana use was consistent across days. There were 69 reports of coping-motivated use across the four weekdays ($M = 17.25$) and 51 such reports on the three weekend days ($M = 17.00$). On the other hand, there were only two reports of "club drug" use, which occurred during weekdays. Within-day substance use, cravings, and psychological distress patterns are featured in Tables 3-6. However, it is worth noting that except for alcohol and marijuana, which were reported most often in the first and last two prompts of the day, the remaining substances endorsed were evenly distributed throughout the day in the current study. The only exception was hallucinogenic drugs, which were only reported twice and only in the 8pm to 10pm window.

Participants in this study completed between 25 (29.76%) and 79 (94.04%) out of 84 prompts. The average number of prompts completed across participants was 57.17 (68.02%; $SD = 14.99$). Rates of compliance regarding prompt completion were lower during the second week of the study relative to the first ($M = 30.52$ vs. $M = 26.62$ out of 42 prompts delivered each week). This difference was statistically significant, $t(49) = 5.38$, $p < .001$.

Hypothesis 1. Results of these analyses provide support for the first hypothesis that recent microaggression experiences (in the last two to three hours, or since their last measurement prompt) would be positively associated with higher reports of psychological distress and substance use cravings, measured contemporaneously.

Psychological distress. As displayed in Table 3, and featured in Figures 10 and 11, recent microaggression experiences were positively associated with momentary psychological distress ratings. The coefficient of 1.17 indicates that the contrast between experiencing at least one microaggression in the last two to three hours, or since their last measurement prompt, relative to not experiencing one, is a 1.17-point increase in the log of individuals' momentary psychological distress ratings. (Since this dependent variable was log-transformed to reduce its positive skew, the coefficient is interpreted in terms of log-units.) This effect was statistically significant ($p < .001$) and is of higher magnitude relative to the observed effect of within-person general mistreatment experiences (compare individuals' slopes featured in Figures 10 and 11). Between-subject mistreatment variables were non-significant, though effects were observed among the within- and across-day covariates. Specifically, psychological distress ratings where higher during the first measurement period of the day (between 10am and 12pm), on average, relative to measurements occurring between 2pm and 10pm. Individuals also reported higher psychological distress on weekdays relative to weekends. Finally, each random effect was also significant, indicating statistically significant variability regarding individual intercepts (i.e., average psychological distress between 10am and 12pm on weekdays), and significant effects attributable to autocorrelation and unexplained variance (i.e., level 1/within-person residual).

Craving. Recent microaggression experiences were also positively associated with *in situ* craving ratings (Table 3). The coefficient of .17 ($p = .002$) indicates that the contrast between

experiencing at least one microaggression in the last two to three hours, or since their last measurement prompt, relative to not experiencing one is a .17-point increase in the log of individuals' *in situ* craving ratings. The between-subject microaggression variable was positively associated with cravings, but only approached statistical significance ($p = .073$); between-person general mistreatment was non-significant. Regarding within- and across-day patterns, cravings appeared to increase throughout the day, relative to the first measurement period. There was no observed difference in reported cravings between weekdays and weekends.

Hypothesis 2. These results provide support for the second hypothesis that recent microaggression experiences (in the last two to three hours, or since their last measurement prompt) would be positively associated with higher reports of general and coping-motivated substance use.

Substance Use. Table 5 displays parameter estimates for the logistic multilevel model output, wherein substance use reported in the last two to three hours, or since the last measurement prompt, was modeled as the dependent variable. The estimates displayed represent log-odds, or the linearized parameter estimates. As displayed, the contrast between experiencing and not experiencing a microaggression in the last two to three hours, or since their last measurement prompt, is a relative increase in risk for use for those who reported at least one microaggression experience. Specifically, experiencing at least one microaggression in the last two to three hours, or since the last measurement prompt, was associated with an average 359% ($_{adj}OR = 3.59$; $p < .001$) increase in the likelihood of engaging in some form of substance use within the same measurement window. Given the other covariates in the model, this relationship is adjusted for time of day, day of week, general mistreatment (within and between), and

between person averages regarding microaggressions experienced throughout the study period; thus, the observed relationship cannot be attributable to these factors.

These results also indicate that individuals reported less substance use between 12pm and 6pm relative to the first measurement period. As one might expect, this trend reverses after 6pm such that by the last measurement period (between 8pm and 10pm), individuals are reporting a 195% ($_{adj}OR = 1.95$; $p < .001$) greater likelihood of using relative to the first period of the day. Lastly, substance use was 164% ($_{adj}OR = 1.64$; $p < .001$) more likely on weekends than weekdays, on average.

Coping-motivated Substance Use. The parameter estimate for momentary microaggressions was statistically significant (Table 5). Its value indicates that microaggressions experienced since the last measurement prompt, or approximately within the last two to three hours, are associated with a 389% ($_{adj}OR = 3.89$; $p < .001$) increase in the odds of reporting coping-motivated use in the same measurement window. General mistreatment reported during the same period was not a significant predictor of coping-motivated use. (This model was also run excluding "to feel more comfortable as an LGBT individual" from the DV; each effect remained statistically significant and of similar magnitude.) As was the case with general use, there was a trend in the direction of coping-motivated use occurring less between 12pm and 6pm (relative to the first measurement window), and an increase in coping motivated use after 6pm. The contrast between weekday and weekend coping-motivated use was non-significant. Comparative plots displaying the relationship between recent microaggressions and general mistreatment and coping-motivated substance use are displayed in Figures 12 and 13. To further aid with visualization, Figures 14-17 highlight reports of general mistreatment vs.

microaggressions and general vs. coping-motivated use reports over the two-week study period for select participants in the study.

Secondary Aim. An ancillary aim of this study was to also evaluate the experiences of LGBTQ individuals regarding their participation in this study. As mentioned, participants were asked to complete an exit survey upon completion of the EMA portion. When asked whether their thoughts or feelings about themselves changed as a result of participating in the study, 36% selected "no change," 42% selected "slightly," 20% selected "moderately," and 2% ($n = 1$) selected "very much." When asked whether this change was for the better or worse, all reported either "no change/not sure," "a little better," or "much better." Fifty-two percent of individuals reported becoming "a little more" or "much more" aware of others' negative LGBT attitudes; the remainder reported no change. One individual reported that this change was for the worse ("a little worse"). However, this person did not report any changes regarding their thoughts about themselves, their mood, or substance use during the study period. The remaining 98% reported no change or that the change was for the better. Finally, one person indicated that their overall mood was "a little worse" as a result of participating in the study. However, this person also indicated that their thoughts about themselves were "a little better." One person reported greater use of substances as a result of participating in the study, but attributed this to turning 21 during the study period. Otherwise, no significant adverse effects were reported. Notably, 47 participants indicated they would participate in this study again, three indicated "maybe;" no one selected "no" in response to this question. None of the individuals who selected "maybe" were among those who reported negative mood changes or awareness of others' negative LGBT attitudes.

Discussion

The aims of the current study were to (1) evaluate the degree to which momentary microaggression experiences predict subsequent psychological distress and craving ratings, and recent general and coping-motivated substance use, and (2) to demonstrate an application of the EMA research method with LGBTQ populations. The results of this study support the overarching hypothesis that microaggressions experienced throughout a given day matter in terms of predicting momentary and, potentially, delayed risk for psychological distress and substance use. As demonstrated in this study, microaggression experiences are positively associated with higher ratings of momentary psychological distress—including depression, anxiety, anger, fear, and self-dissatisfaction ratings—as well as risk for general and coping-motivated substance use within the same measurement window. These effects persisted even after accounting for time, both within and across days of the week, general mistreatment, and between person differences in both forms of mistreatment throughout the study period. It is also worth noting again that these models were adjusted for autocorrelation effects, and represent conservative estimates given the degrees of freedom specified.

Given prior studies on daily mistreatment and microaggressions (e.g., Swim et al., 2007; 2009), it was surprising to only observe 93 microaggression experiences across all subjects. In a similar daily diary study, Swim and colleagues (2009) reported that their participants experienced an average of 2.03 microaggressions ("heterosexist hassles") and 8.47 general mistreatment experiences during the one-week study period. The current study took place over a two-week period. Thus, the frequency of LGBTQ-specific mistreatment experiences reported here was about half that reported in the study by Swim and colleagues, and their estimate of

general mistreatment was about four times higher than what was reported by participants in the current study.

There are several potential explanations for this. First, the nature of the current research design did not allow for as much retrospective recall as the Swim et al. (2009) study. Participants in the current study were specifically instructed to only report events and behaviors from their morning during the first measurement prompt of the day, but not experiences or behaviors following their last measurement prompt the night before. While this helped to keep the reporting lags relatively consistent, this might have resulted in missing microaggression and substance use data. A second possible explanation is that the individuals in this study might not have been as aware of others' intentions or motivations for mistreating them. (Researchers were careful during the orientation to not educate participants in detail about the nature of microaggression experiences, how or when one might experience them, or to have any influence over participants' perspectives or reports throughout the study period.) For example, one participant noted on their exit survey that she was not always sure whether a mistreatment event was related to gender (e.g., sexism), which was not included in the computation of the microaggression measure, or her sexual orientation. She noted that she most often assumed that these were sexist acts, but was not entirely sure. It is unclear how many other participants experienced similar uncertainty. Transgender or gender non-conforming individuals might have experienced gender-based mistreatment and attributed it to "gender" rather than "transgender" status on a given EMA prompt. Individuals were instructed on the training to select "gender" to correspond to sexist events, and "transgender status" to characterize instances related to transgender status or gender nonconforming behaviors. Nevertheless, it remains a possibility that misattribution and/or lack of awareness regarding the nature of LGBTQ-based microaggression

experiences might have resulted in under-reporting. A third explanation for the lower frequency of reported microaggressions relates to the social and political environment in Missoula, MT, and on the University of Montana campus. These spaces are understood to be, on average, far more affirming of sexual and gender diversity than Montana at large. Many of the participants in this study might normally experience a higher degree of acceptance than is typical in other regions.

The fact that individuals seemed to use substances less between 12pm and 6pm, relative to the first measurement period of the day, was also surprising. This effect might be due to this sample using more during the morning hours; however, this might also be an artifact of individuals recording use from the night before during their first prompt of each day. Although each participant was specifically trained on what to record during their morning prompt (i.e., experiences and behaviors since the morning, NOT from the night before), it is possible that some did so anyway. Another possibility is that individuals reported prescribed use of drugs in the morning, such as medication prescribed to treat anxiety or Attention Deficit-Hyperactivity Disorder, despite being trained to only report non-prescribed use, not prescribed use, of such substances. Either case of misreporting could have resulted in seemingly higher rates of use in the morning. It is also possible that participants were taking more than their prescribed doses of medication, and reporting accordingly.

The secondary aim of this study was to demonstrate both an integration of mobile technology into LGBTQ health research, and an application of EMA to study minority stress processes. The results from participants' exit survey data support the overall acceptability of this methodology as it was executed in the current study. The clear majority ($n = 47$) indicated they would participate in this study again, or refer a friend; the remaining three participants reported

"maybe." There were no significant adverse reactions reported, and each reported change that participants reported experiencing was associated with, or balanced by, positive changes. That is, individuals who reported feeling differently about themselves either reported that this change made no difference, or that the change was for the better. Just over half noticed becoming more aware of others' negative LGBTQ attitudes. Only one of these individuals indicated that this change was for the worse, but denied any noticeable changes to their thoughts about themselves, mood, or substance use over the two-week period. Nevertheless, the possibility that individuals might become more aware of negative LGBTQ biases is something for researchers to remain mindful of when conducting similar research in the future. Another person reported that their overall mood changed for the worse (i.e., "a little worse"), but that their thoughts about themselves improved. Finally, each of these individuals reported that they would participate in this study again.

These results are encouraging and suggest that our procedures were within acceptable limits for the participants of this study. This is consistent with other reports indicating little to no adverse reactivity among EMA participants (e.g., Shiffman, Stone, & Hufford, 2008; Hufford, Shields, Shiffman, Paty, & Balabanis, 2002; Husky et al., 2014; Moore et al., 2014), especially in studies lasting two weeks or less (e.g., Shrier et al., 2014). However, it is recommended that post measures be included in similar research in the future, particularly adaptations involving monitoring of other risk behaviors, such as non-suicidal self-injury, suicidality, and sexual risk-taking.

Given the apparent acceptability of this method, researchers are also encouraged to incorporate experience sampling methods in future LGBTQ health research. In addition, researchers should remain mindful of response burden, as well as methods of increasing

participant engagement. Though modern statistical techniques are robust to missing data, statistical adjustments are, at best, approximations of an otherwise full data set. One way to increase engagement is to relate the study to participants in a meaningful way. For instance, each participant was made aware that this was a study focused on the experiences of LGBTQ individuals, and that the results would be disseminated and shared with individuals that might directly benefit and/or use the results to contribute to future LGBTQ health research. Other obvious incentives include course credit and money, though we did not necessarily find these to be the most reinforcing aspects of participants' experience. Indeed, many were highly intrigued by the study content, methodology, and were excited to contribute to research. This was both apparent in person and supported by the number of individuals referred by previous participants.

Implications for Minority Stress Research

The results of this study support existing minority stress models (Meyer, 2003; Hatzenbuehler, 2009) and extend their application to the within-day level of analysis. These results also support existing daily process research linking daily stress, psychological distress, coping motives, and substance use. Though models presented here were arranged in somewhat of a side-by-side or step-wise fashion, in aggregate, they support the general pathway linking daily general and minority-based mistreatment to subsequent psychological distress and risk for event-based substance use, as measured by cravings as well as general and coping-motivated substance use.

In a related and recent 30-day daily diary study of gay and bisexual men, Eldahan and colleagues (2016) demonstrated that daily stress or insecurity about one's sexual minority status—representing *proximal* minority stressors—predicted lower positive affect and greater psychological distress both within and across days. Eldahan and colleagues (2016) did not report

whether these negative self-appraisals were related to experiences of LGBTQ-based mistreatment, though it is plausible that such experiences would be related to stress and insecurity about one's sexual orientation and, potentially, gender minority status. To this extent, a possible mechanism through which microaggression experiences, which represent *distal* minority stressors, elevate risk is by evoking feelings of shame and personal dissatisfaction. Our findings support this pathway, as our computed psychological distress variable included momentary personal dissatisfaction ratings, in addition to other aspects of psychological distress.

Admittedly, the way these constructs were measured precludes direct attributions of psychological distress and substance use to particular minority stress experiences. Given the spacing of measurement prompts, there was likely a delay between microaggression experiences and *in situ* reporting of cravings and psychological distress. To avoid retrospective recall bias, participants were asked to report on their affect in the moment, rather than their feelings following specific instances. It is believed that by not asking respondents to link *in situ* affect and cravings ratings, or use to specific mistreatment experiences, there was less of a chance of picking up extraneous influences or introducing instrumentation effects. Thus, the fact that there was a statistically significant relationship between recent microaggression experiences and *in situ* distress and craving ratings supports a prospective relationship between microaggressions and these outcomes. Given the nature of this research design, it is reasonable to assume that some psychological distress and craving reports were collected shortly or immediately following a microaggression experience. Alternatively, it is possible that these reports were recorded up to approximately three hours prior. This range of possibilities supports the possibility of both immediate and potentially delayed effects of microaggression experiences. Previous research has shown that that stressful events experienced throughout the day are associated with subsequent

substance use risk (Grzywacz & Almeida, 2008). This suggests that the negative effects of microaggressions might persist as well. Future studies could evaluate the presence of delayed effects by creating time lag variables to test whether a microaggression experience reported in a prior measurement window is associated with a subsequent affect, craving, and/or substance use report.

Though no formal tests for mediation were performed, the design of this study was such that participants would attribute the reasons for their use immediately following reports of substance use since their last prompt. Thus, it is reasonable to infer, based on the design, that motives reported preceded use and, therefore, served a mediating role in the relationship between microaggression experiences and substance use. This is consistent with Meyer's (2003) hypothesis that minority stress experiences elevate risk for psychological distress and substance use, as well as Hatzenbuehler's mediational model of health disparity (2009).

Hatzenbueler's model (2009), as well as supporting research contained within his report, already supports these prospective associations. However, the current study adds support for Hatzenbuehler's (2009) mediational framework—specifically regarding the "general psychological" pathway linking minority stress experiences to substance use through the mediated path of psychological distress and coping motives for use. Hatzenbuehler also emphasized the roles of social norms and substance use expectancies in his model. These factors were measured but not modeled in the current analysis. This decision was based on a desire to maintain model parsimony, and to perform a finer-grained analysis of the momentary emotional regulation processes that confer risk for substance use. The final justification is that norms and expectancies were measured cross-sectionally, whereas microaggressions, coping motives, and use were measured repeatedly. It is reasonable to hypothesize that the relationship between

microaggressions and substance use/coping-motivated use would be stronger among individuals with higher positive expectancies and perceived social acceptability of use. Testing this hypothesis was beyond the scope of the current study and might have served to distract from the finding that, on average, microaggression experiences are associated with negative outcomes.

The current results add temporal specificity and sensitivity to existing minority stress models, specifically regarding the relationship between recent minority stress and momentary risk. The results of this study also hold promise for intensive longitudinal methods and their application in LGBTQ health research. Granted, researchers have already used daily diary methods to measure the frequency and effects of daily microaggression experiences regarding daily positive and psychological distress ratings (Swim et al., 2009; Hatzenbuehler et al., 2009). The results of this study replicate but also extend their findings by highlighting the within-day associations between microaggression experiences and momentary psychological distress.

Clinical Implications

Attitudes and behaviors that denigrate sexual and gender minority individuals are themselves potential targets of clinical intervention; providers and others also have a responsibility to reduce the frequency and severity of discrimination and victimization that LGBTQ individuals face. However, the focus of the current investigation was to better understand the daily experiences of LGBTQ individuals through the lens of minority stress experiences. This focus was intended to provide insight into ways that researchers and providers might augment existing services, or develop new ones in the service of decreasing risk for psychological distress and substance use among LGBTQ individuals. This is not to suggest the need for LGBTQ individuals to adjust to these negative social attitudes, or infer the presence of heightened pathology among them. Rather, as social attitudes continue to evolve, and hopefully

for the better, understanding and addressing the needs of LGBTQ individuals remains a priority.

The individuals in this study were sampled from a non-clinical population; however, their results highlight factors of potential clinical significance. To start, LGBTQ individuals have also been shown to seek substance use treatment more frequently than heterosexual individuals (McCabe, West, Hughes, & Boyd, 2013), and are more likely to present with comorbid physical or mental health conditions (Flentje, Livingston, Roley, & Sorensen, 2016 Cochran & Cauce, 2006). LGBTQ individuals have also been shown to receive less adequate health care coverage (Buchmueller & Carpenter, 2010; Dilley et al., 2010), and to have fewer options for securing LGBTQ-specific substance use treatment services (Cochran, Peavy, & Robohm, 2007). Fortunately, researchers have begun to address these added disparities and potential unmet need. These efforts include highlighting the need for, or creating, more inclusive treatment settings (Flentje, Livingston, & Sorensen, 2016); advocating for the inclusion of LGBTQ individuals in randomized clinical trials (Flentje, Bacca, & Cochran, 2015; Heck, Mirabito, LaMaire, Livingston, & Flentje, 2016); and developing LGBTQ-specific interventions (Pachankis, Hatzenbuehler, Rendina, Safren, & Parsons, 2015; Maguen, Shipherd, & Harris, 2005; Heck, 2015; Heck, Croot, & Robohm, 2015). These interventions are primarily cognitive-behavioral in nature and are designed help LGBTQ individuals address the cognitive, affective, behavioral, and minority stress-related mechanisms that are associated with mental health problems and high-risk behaviors (Pachankis et al., 2015).

Based on the results of our study, creating space for individuals to discuss microaggression experiences, and their reactions to them, may prove beneficial. At the very least, inviting individuals to discuss these experiences can communicate care, concern, and provide validation to LGBTQ individuals who experience minority stress. Granted, there are

some for whom microaggression experiences either do not occur or confer less risk. For others, these experiences may be far more common and have negative health implications. It may be useful to ask clients whether these events occur and, if so, whether they feel discussion of these experiences would be helpful therapeutically. If therapeutically indicated, possible adjustments to existing treatment might include simply providing psychoeducation about the relationship between microaggression experiences and psychological distress and substance use risk. The goal of this would be to eventually discuss with clients some of the ways that they might practice alternative emotion regulation strategies, and avoid or manage high-risk situations.

The results of this study also have implications for the integration of technology into clinical care. Many existing therapies already seek to monitor client progress between sessions via weekly self-report, phone consultation, or daily diary cards (e.g., Dialectical Behavior Therapy; Linehan, 1993). Daily diary cards are designed in part to help clients to develop insight and identify risk markers that lead to problematic outcomes. Monitoring could be accomplished using electronic devices like those used in the current study, or by downloading a similar application onto individuals' existing smart phone devices. Such monitoring could accomplish the goal of helping individuals to identify the cognitive, affective, and behavioral consequences of minority stress experiences, as well as factors associated with substance use risk throughout a given day or week.

Researchers have already begun developing web-based monitoring and intervention strategies to assist individuals with monitoring and/or reducing problematic alcohol use (Brief et al., 2013). Although the current research design was used to gather data for research, similar methods could be adapted and further developed for use in therapeutic settings. For example, rather than providing data via paper-and-pencil diary cards, LGBTQ individuals in treatment

could provide between-session data using a mobile application. After a period of symptom monitoring, the therapist and client could work collaboratively to develop techniques for planning or coping with the client's specific high risk situations, such as experiencing microaggressions in one's office environment. Therapists and clients could also tailor applications to assist with managing distressing experiences or thoughts that might otherwise lead to substance use. Practically speaking, if a client were to experience and report cravings that are outside of an acceptable window, the application could present the client with tailored emotion regulation strategies (e.g., deep breathing, distraction, mindfulness), encouragement to reach out to specific supports (e.g., friend, sponsor, relative), or reminders for why abstaining from high risk behaviors is important (e.g., improving relationships, work performance, or health). Technology of this sort could be used as either a self-directed, stand-alone intervention, or as an adjunctive to treatment with a mental health professional.

Repeated documentation of disparity and unmet need among LGBTQ individuals supports the need for such innovation. This need is even more salient in the context of substance use disorder, which has been characterized as a chronic, relapsing disorder associated with compulsive use patterns (National Institute on Drug Abuse, 2012). For some, the difference between staying sober and succumbing to an urge might come down to split-second decision making. For example, in a recent EMA study of individuals in substance abuse treatment, Moore and colleagues (2014) found that individuals who reported an increase in cravings in a given measurement period were 14 times more likely to relapse by the following measurement period. This finding demonstrates that (1) momentary cravings confer significant risk, and (2) that real-time emotion regulation and decision support technology might prove beneficial in terms of preventing high-risk behaviors such as a lapse or relapse.

To date, researchers have already developed technologies to reduce and prevent substance use (Witkiewitz et al., 2014; Champion, Newton, Barrett, & Teesson, 2013; Neighbors, Lee, Lewis, Fossos, & Walter, 2009; Haug, Schaub, Venzin, Meyer, John, & Gmel, 2013) and smoking (Park & Drake, 2015; Hall, Cole-Lewis, & Bernhardt, 2015). In addition, researchers have also begun developing technologies to reduce HIV risk (Swendeman & Rotheram-Borus, 2010; Kok, Harterink, Vriens, de Zwart, & Hospers, 2006); stress, anxiety (Clarke et al., 2014), depression (Kauer et al., 2012); and suicide risk (de Beurs, Kirtley, Kerkhof, Portzky, & O'Connor, 2015). Coupled with the results of this study, it may be time to adapt mobile intervention technology to augment and improve existing treatment approaches for LGBTQ individuals.

Limitations

The reliance on convenience sampling may limit the generalizability of these results. That is, sampling from a university campus resulted in a sample that may underrepresent certain demographics, such as individuals from diverse ethnic backgrounds. Given the highly-repeated nature of measurement in this study, response burden has the potential to alter these findings by influencing individuals to respond in a hurried, random fashion, or to miss scheduled prompts. Along these lines, while EMA offers researchers the ability to gather a lot of data from individuals in a short time, the highly-repeated nature of the study can result in a lot of missing data. These skip patterns can introduce bias that may or may not be random across participants. Another limitation relates to the particular analyses performed in the current investigation. Each DV was regressed on general and LGBTQ-specific mistreatment measured contemporaneously. While there is justification for these analyses given the manner in which questions were asked at each prompt (i.e., *recent* mistreatment and *current* psychological distress), there is still the

possibility that substance use in a given prompt preceded a microaggression experience. This seems less likely given the significant results found regarding *recent* microaggression experiences and coping-motivated use; however, bi-directionality remains a possibility. Future analyses will incorporate time lagged variables to evaluate the degree to which microaggression experienced earlier in the day predict reports of psychological distress, cravings, and use in subsequent measurement periods.

Another limitation relates to the omission of additional explanatory variables, such as attributional style (Lindquist, Livingston, Heck, & Machek, 2017; Peterson & Seligman, 1984). According to Peterson & Seligman (1984), broad attributional dimensions include global vs. specific ("everyone is against LGBTQ people" vs. "that person clearly has a problem with LGBTQ people"), stable vs. unstable ("this is how things will always be for me" vs. "things might be different in a new environment"), and internal vs. external ("there must be something wrong with *me* for them to treat me this way" vs. "that person is clearly having a bad day!") attributional styles. Different attributional styles might have a countervailing influence on the relationship between microaggressions and subsequent psychological distress, cravings, and actual use. Individuals may also differ regarding what events and experiences they classify as being motivated by negative LGBTQ attitudes. As noted earlier, some individuals had difficulty distinguishing between sexist and heterosexist events, which might have resulted in misclassification. Unlike attributional style, which could be measured in future research, it is difficult-impossible to reduce misclassification of events without also educating participants on the nature of heterosexism. Doing so might produce iatrogenic effects.

An ancillary objective of this study was to examine reactivity to the instrumentation over the two-week study period. Overall, there is some evidence of instrumentation effects, as

indicated on participants' self-report exit surveys. However, these effects should be seen in light of positive scores on other self-report items in the same survey, and the fact that the two individuals who reported negative effects also indicated that they would participate in this, or a similar, study again in the future. However, the current study should be viewed in light of these potential influences, though it should be noted that these effects were for the better for the majority of individuals (i.e., slight to moderate increases in mood, thoughts and feelings about self, and substance usage). That is, the results of this study still support a detrimental link between daily microaggression experiences regarding momentary affect and substance use risk, despite the fact that participation in this study was positive for most.

Another potential measurement issue relates to the apparent spike in substance use in the initial prompt of the day. It is possible that participants in this study were using between the time they awoke and answered their first prompt of the day. Another possibility is that despite training participants to only report experiences and behaviors from the morning on their initial survey, participants might have reported use of substances since their last prompt the night before. Although it was stressed during the orientation to only account for morning experiences and substance use, this possibility remains a potential explanation for elevated use reports during the morning hours.

Another limitation of this study was our choice to use separate EMA devices to collect data, rather than allowing participants to use their own personal devices. This decision was based on the fact that devices were available for use in this study, considered to be convenient, and the fact that not all participants in this study had devices with Android-based operating systems—a requirement for the application we created. All participants were willing to carry an extra device with them, but some expressed that they would have preferred downloading the application onto

their personal phones. This is a possibility in the future, but one we did not feel was optimal for this particular study. We were also limited in that it is impossible to verify the truth of participants' substance use reports, or the degree to which repeatedly asking participants to report on their experiences and substance inadvertently primed participants to respond in a certain way.

Finally, the current study was designed to be inclusive of individuals across the sexual orientation and gender diversity spectrum. The current sample was diverse in some regards but not others. The individuals in this study were diverse in terms of sexual orientation and gender identity and expression, but relatively few individuals from diverse ethnic backgrounds were represented in the study. Coupled with the relatively small sample size, this fact limited our ability to analyze demographic differences, or to approach analyses from a more intersectional perspective. Future research would benefit from more diverse recruitment methods, and should aim to recruit a larger sample.

Conclusion

Individuals who identify as LGBTQ continue to experience elevated rates of minority stress, psychological distress, and substance use relative to their heterosexual and cisgender peers. The results of this study support that microaggressions represent daily experiences for some, and that these experiences are positively and prospectively linked to psychological distress ratings. Microaggressions also predict general as well as coping-motivated substance use within three hours of the experience. This effect remained even after accounting for general mistreatment experiences. Thus, it seems that mistreatment perpetrated on the basis of one's known or assumed LGBTQ status is particularly disruptive.

LGBTQ-based mistreatment, ranging from subtle to overt experiences, confers

significant risk to LGBTQ individuals in terms of their daily wellbeing and risk for substance use. It is important to continue challenging the negative attitudes that give rise to intolerance and lack of acceptance. At the same time, mental health professionals must continue to improve outreach and intervention efforts designed at mitigating harm to LGBTQ individuals who experience minority stress.

Recent technological advances, as well as statistical modeling techniques (Laurenceau & Bolger, 2013), provide numerous avenues for future LGBTQ health research. While barriers to conducting such research exist (e.g., respondent burden, cost, and statistical and technological road blocks), the benefits of shifting toward more ecologically valid data collection include the ability to study the effects of even subtle and fleeting minority stress and risk process in real-time. This is not only consistent with efforts toward more dynamic modeling of LGBTQ risk and resiliency processes (Hatzenbuehler, 2009), but may produce meaningful insights into real-time risk management for LGBTQ individuals who experience minority stress.

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Tables

Table 1

Demographic characteristics of the analytic sample

	M	SD
Age	21.82	4.70
	n	*%*
Gender		
Male	10	20
Female	32	64
Transgender	1	2
Gender queer	1	2
Agender	4	8
Gender fluid	2	4
Sexual Orientation		
Gay	3	6
Lesbian	10	20
Bisexual	14	28
Pansexual	5	10
Queer	2	4
Questioning	2	4
Fluid	2	4
Heterosexual/straight	6	12
Other (e.g., demisexual, asexual)	6	12
Ethnicity		
White/Caucasian	42	84
African American	0	0
Asian	0	0
Hispanic	0	0
Native American/Alaskan Native	1	2
Multiple ethnicities	7	14
Relationship Status		
Married/domestic partner	3	6
Committed relationship	20	40
Separated/divorced	0	0
Single, currently dating	9	18
Single, not currently dating	15	30
Other	3	6
Education		
Middle school, some high school	0	0
High school degree or equivalent	5	10
Some college, no degree	37	74
Associate's degree	1	2
Bachelor's degree	6	12
Graduate or professional degree (M.S./M.A., Ph.D., M.D., J.D.)	1	2

Table 2

Characteristics of the analytic sample regarding minority stressors, expectancies, coping, perceived substance use norms, and recent drug and alcohol use from baseline questionnaire

	M	*SD*
Minority Stressors		
Victimization	1.62	.79
Discrimination	2.06	.85
Shame re: LGB Identity	1.99	.89
Shame re: Trans Identity (*n* = 8)	2.20	1.30
Outness	3.20	1.33
Prominence	3.10	1.34
Valence	4.93	1.49
Integration	3.06	1.33
Perceived LGBT Support	5.47	1.00
Substance Use Expectancies		
Tension Reduction	2.94	.80
More Social	3.52	.66
Better Sex	2.19	.98
Liquid Courage	2.73	1.00
More Risky or Aggressive	2.64	.76
Cognitive and Behavioral Impairment	3.03	.86
Negative Self Impression	2.37	.96
Feel Comfortable as LGBT Person (added item)	3.22	1.18
Brief Cope		
Active Coping	2.93	.72
Planning	2.91	.69
Positive Reframing	2.65	.78
Acceptance	2.95	.74
Humor	2.55	.93
Religious Coping	1.73	1.00
Emotional Support Seeking	2.69	.85
Instrumental Support	2.71	.87
Distraction	3.07	.74
Denial	1.48	.68
Venting	1.92	.95
Behavioral Disengagement	1.66	.55
Self-Blame	2.90	.99
Substance Use Norms		
Alcohol Use Among Same-aged Peers	4.54	.76
Alcohol Use Among Same-aged LGBT Individuals	4.38	.75
Perceptions of Friends re: Daily Drinking	2.56	1.10
Perceptions of Family re: Daily Drinking	1.56	.86
Drug Use Among Same-aged Peers	4.30	1.05
Drug Use Among Same-aged LGBT Individuals	4.40	.94
Perceptions of Friends re: Daily Drug Use	2.56	1.38
Perceptions of Family re: Daily Drug Use	1.50	.95
Estimates of Recent Substance Use (DDQ)		
Estimated Frequency of Drinking	3.16	1.51
Estimated Frequency of Drinking to Intoxication	2.36	1.36
Estimated Frequency of Drug Use	2.63	2.07
Number of Drinks/Week (Past 30 Days)	7.13	7.24
Hours Spent Drinking/Week (Past 30 Days)	6.30	6.16
Drug Use Frequency/Week (Past 30 Days)	4.82	9.87
Hours Spent Using Drugs/Week (Past 30 Days)	8.78	15.19

Table 3

Fixed and random effect parameter estimates regarding momentary psychological distress ratings

Fixed Effects	*Estimate*	*SE*	*t*	*p*[a]	[95% CI]
Intercept	1.73***	0.19	8.87	<.001	[1.34, 2.12]
Within-person effects					
LGBTQ microaggressions	1.17***	.14	8.09	<.001	[.88, 1.46]
General mistreatment	.66***	.09	7.34	<.001	[.48, .84]
Between-person covariates					
LGBTQ microaggressions	3.02	3.11	.97	.337	[-3.24, 9.28]
General mistreatment	2.18	3.30	.66	.511	[-4.46, 8.83]
Time					
Period 1 (reference)	-	-	-	-	-
Period 2	-.02	.05	-.35	.73	[.13, .09]
Period 3	-.20**	.06	-3.12	.003	[-.33, -.07]
Period 4	-.16*	.06	-2.38	.021	[-.30, -.02]
Period 5	-.15*	.06	-2.29	.026	[-.28, -.01]
Period 6	-.13*	.05	-2.24	.029	[-.25, -.01]
Weekend	-.14*	.05	-2.36	.022	[-.26, -.02]
Random effects	*Estimate*	*SE*	*z*	*p*	[95% CI]
Level 2					
Intercept	1.73***	.37	4.68	<.001	[1.19, 2.77]
Level 1					
Autocorrelation[b]	.46***	.01	25.12	<.001	[.42, .50]
Residual	1.36***	.04	30.47	<.001	[1.28, 1.46]

Note: Period lags were dummy coded with Period 1 (10am-12pm) serving as the reference. *SE* = standard error of the estimate; *DF* = degrees of freedom; *t* = t-test statistic; *z* = z test statistic; *p* = probability of the *t* or *z* test statistic under the null hypothesis; *OR* = Odds Ratio; 95% CI = 95% Confidence Interval. Autocorrelation = correlated within-person residual resulting from highly repeated within-person measurement.

[a] I used a conservative approach to testing statistical significance by specifying degrees of freedom based on the number of subjects ($N = 50$) rather than number of observations (2,817) (Bolger & Laurenceau, 2013).

[b] I specified a spatial power structure to account for unevenly spaced measurements (Wolfinger, 1993; Bolger & Laurenceau, 2013).

†*p* < .10, *p < .05, **p < .01, ***p < .001

Table 4

Fixed and random effect parameter estimates regarding momentary cravings

Fixed Effects	Estimate	SE	t	p^a	[95% CI]
Intercept	.32***	0.05	5.54	<.001	[.20, .44]
Within-person effects					
LGBTQ microaggressions	.17**	.05	3.27	.002	[.06, .27]
General mistreatment	.11**	.03	3.40	.001	[.45, .17]
Between-person covariates					
LGBTQ microaggressions	1.71†	.93	1.83	.073	[-0.16, 3.58]
General mistreatment	1.59	.99	1.61	.115	[-0.40, 3.58]
Time					
Period 1 (reference)	-	-	-	-	-
Period 2	.05*	.02	2.57	.013	[.01, .10]
Period 3	.07**	.02	3.23	.002	[.02, .12]
Period 4	.15***	.02	6.44	<.001	[.10, .20]
Period 5	.21***	.02	8.85	<.001	[.16, .26]
Period 6	.24***	.02	11.20	<.001	[.20, .29]
Weekend	.01	.01	.76	.451	[-.02, .04]

Random effects	Estimate	SE	z	p	[95% CI]
Level 2					
Intercept	.15***	.03	4.72	<.001	[.10, .24]
Level 1					
Autocorrelation[b]	.26***	.02	12.66	<.001	[.22, .30]
Residual	.14***	.00	34.76	<.001	[.13, .15]

Note: Period lags were dummy coded with Period 1 (10am-12pm) serving as the reference. *SE* = standard error of the estimate; *DF* = degrees of freedom; *t* = t-test statistic; *z* = z test statistic; *p* = probability of the *t* or *z* test statistic under the null hypothesis; 95% CI = 95% Confidence Interval. Autocorrelation = correlated within-person residual resulting from highly repeated within-person measurement.

[a] I used a conservative approach to testing statistical significance by specifying degrees of freedom based on the number of subjects (*N* = 50) rather than number of observations (2,811) (Bolger & Laurenceau, 2013).

[b] I specified a spatial power structure to account for unevenly spaced measurements (Wolfinger, 1993; Bolger & Laurenceau, 2013).

†*p* < .10, **p* < .05, ***p* < .01, ****p* < .001

Table 5

Fixed and random effect parameter estimates regarding momentary substance use

Fixed Effects	*Estimate*	*SE*	*t*	*p^a*	*OR*	[95% CI]
Intercept	-2.60***	0.29	-8.71	<.001	.07	[-3.21, -2.00]
Within-person effects						
LGBTQ microaggressions	1.28***	.30	4.14	<.001	3.59	[.65, 1.90]
General mistreatment	.49*	.22	2.14	.037	1.63	[.03, .95]
Between-person covariates						
LGBTQ microaggressions	4.42	4.20	1.05	.298	83.09	[-4.03, 12.87]
General mistreatment	7.48	4.61	1.62	.111	1,772.24	[-1.79, 16.76]
Time						
Period 1 (reference)	-	-	-	-	-	-
Period 2	-.93***	.20	-4.56	<.001	.39	[-1.34, -.52]
Period 3	-.78***	.20	-3.82	<.001	.45	[-1.19, -.37]
Period 4	-.73***	.20	-3.53	<.001	.48	[-1.15, -.31]
Period 5	.30†	.18	1.69	.098	1.34	[-.05, .66]
Period 6	.67***	.16	3.98	<.001	1.95	[.33, 1.01]
Weekend	.50***	.12	4.20	<.001	1.64	[.26, .75]

Random effects	*Estimate*	*SE*	*z*	*p*	-	[95% CI]
Level 2						
Intercept	3.10***	.76	4.07	<.001	-	[1.61, 4.58]
Level 1						
Autocorrelation[b]	.10***	.02	5.00	<.001	-	[.06, .13]
Residual	.75***	.02	37.50	<.001	-	[.71, .78]

Note: Period lags were dummy coded with Period 1 (10am-12pm) serving as the reference. *SE* = standard error of the estimate; *DF* = degrees of freedom; *t* = t-test statistic; *z* = z test statistic; *p* = probability of the *t* or *z* test statistic under the null hypothesis; *OR* = Odds Ratio; 95% CI = 95% Confidence Interval. Autocorrelation = correlated within-person residual resulting from highly repeated within-person measurement.

[a] I used a conservative approach to testing statistical significance by specifying degrees of freedom based on the number of subjects ($N = 50$) rather than number of observations (2,806) (Bolger & Laurenceau, 2013).

[b] I specified a spatial power structure to account for unevenly spaced measurements (Wolfinger, 1993; Bolger & Laurenceau, 2013).

†*p* < .10, *p* < .05, ***p* < .01, ****p* < .001

Table 6

Fixed and random effect parameter estimates regarding momentary coping-motivated substance use

Fixed Effects	*Estimate*	*SE*	*t*	*p[a]*	*OR*	[95% CI]
Intercept	-4.32***	.35	-12.24	<.001	.01	[-5.03, -3.61]
Within-person effects						
LGBTQ microaggressions	1.36**	.38	3.50	.001	3.89	[.58, 2.14]
General mistreatment	-.16	.33	-.49	.626	.85	[-.84, .51]
Between-person covariates						
LGBTQ microaggressions	5.66	4.21	1.34	.185	287.14	[-2.81, 14.13]
General mistreatment	5.69	4.95	1.15	.256	295.89	[-4.27, 15.66]
Time						
Period 1 (reference)	-	-	-	-	-	-
Period 2	-.54[†]	.30	-1.83	.073	.58	[-1.15, .05]
Period 3	-.72*	.32	-2.26	.028	.48	[-1.36, -.08]
Period 4	-.10	.28	-.35	.724	.90	[-.67, .47]
Period 5	.45[†]	.26	1.74	.088	1.56	[-.07, .98]
Period 6	.90***	.24	3.77	<.001	2.45	[.42, 1.39]
Weekend	-.01	.17	-.06	.952	.99	[-.35, .33]
Random effects	*Estimate*	*SE*	*z*	*p*	-	[95% CI]
Level 2						
Intercept	2.97***	.81	3.66	<.001	-	[1.38, 4.55]
Level 1						
Autocorrelation[b]	.10***	.02	5.00	<.001	-	[.06, .13]
Residual	.57	.01	57.00	<.001	-	[.55, .58]

Note: Period lags were dummy coded with Period 1 (10am-12pm) serving as the reference. *SE* = standard error of the estimate; *DF* = degrees of freedom; *t* = t-test statistic; *z* = z test statistic; *p* = probability of the *t* or *z* test statistic under the null hypothesis; *OR* = Odds Ratio; 95% CI = 95% Confidence Interval. Autocorrelation = correlated within-person residual resulting from highly repeated within-person measurement.

[a] I used a conservative approach to testing statistical significance by specifying degrees of freedom based on the number of subjects (*N* = 50) rather than number of observations (2,805) (Bolger & Laurenceau, 2013).

[b] I specified a spatial power structure to account for unevenly spaced measurements (Wolfinger, 1993; Bolger & Laurenceau, 2013).

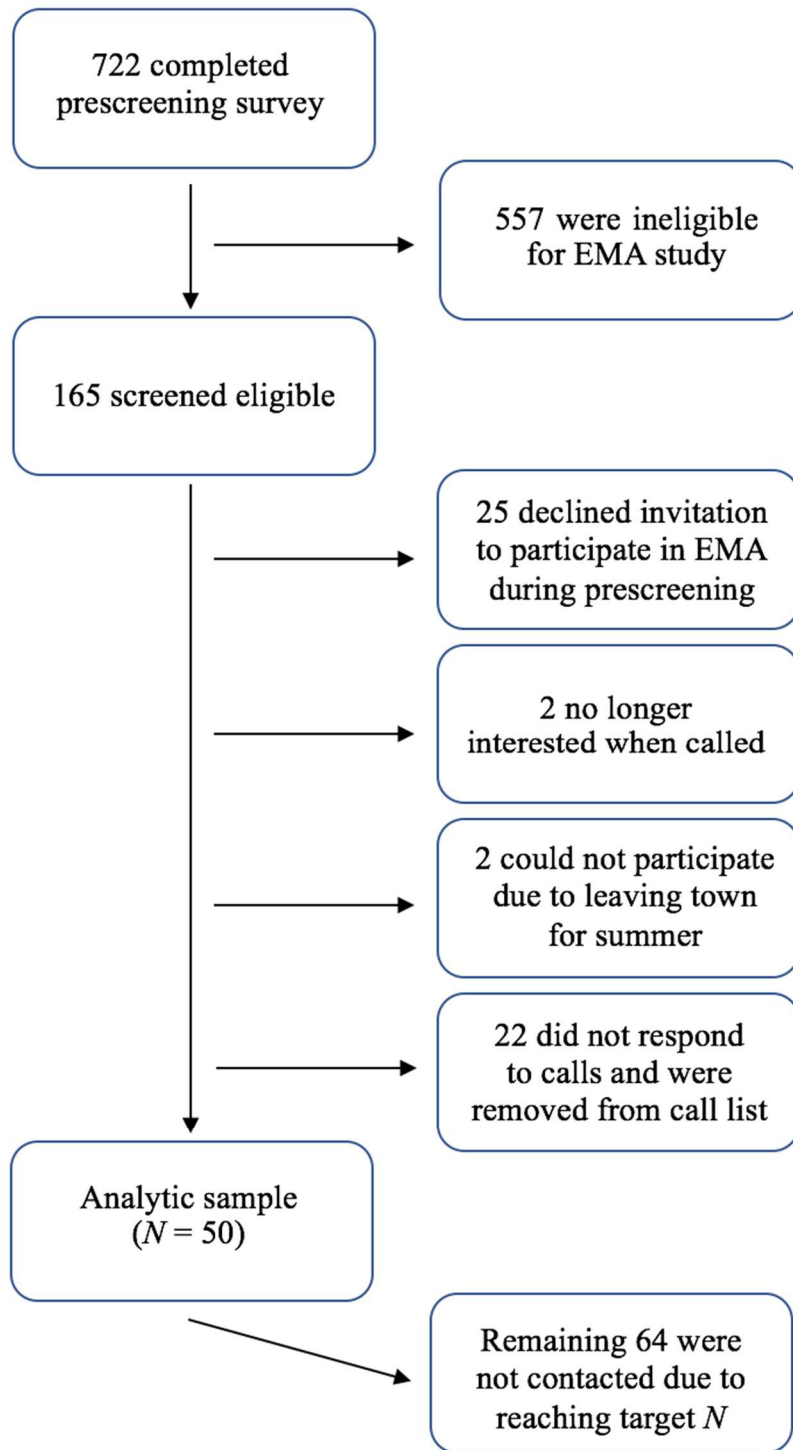†*p* < .10, **p* < .05, ***p* < .01, ****p* < .001

Figure 4. Flow chart of participants across waves of recruitment.
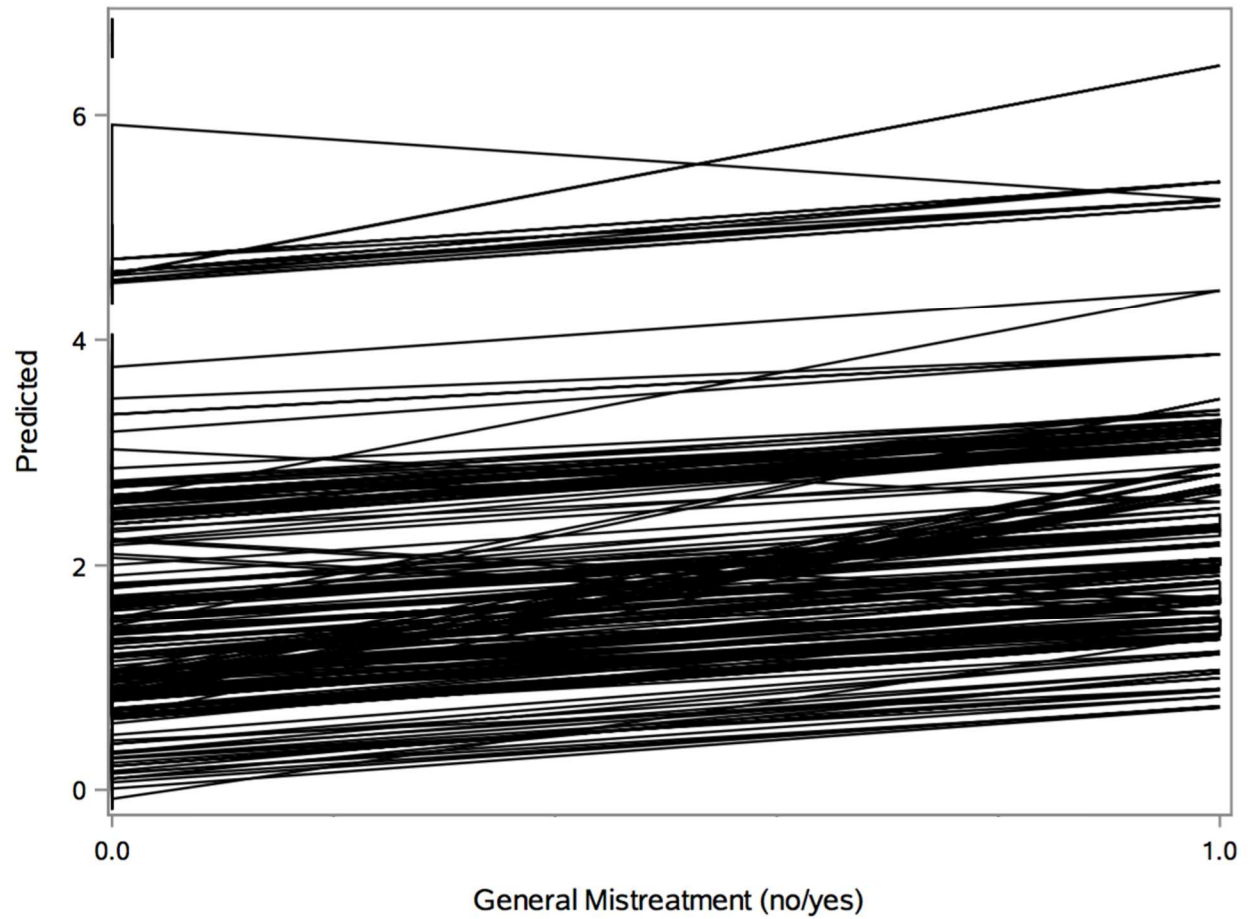
Figure 10. Simple slopes for each participant depicting the predicted relationship between general mistreatment and momentary psychological distress ratings.
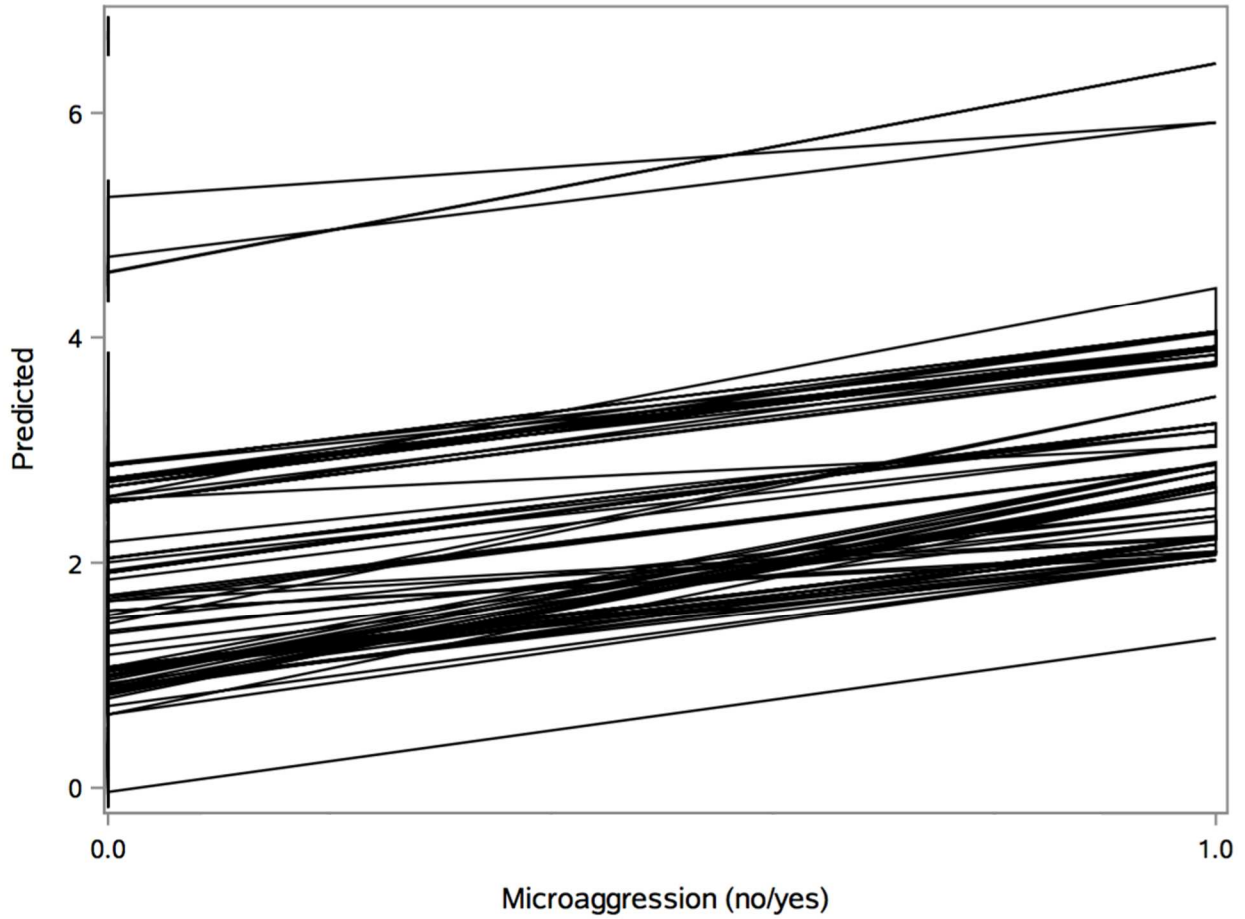
Figure 11. Simple slopes for each participant depicting the predicted relationship between microaggression experiences and momentary psychological distress ratings.
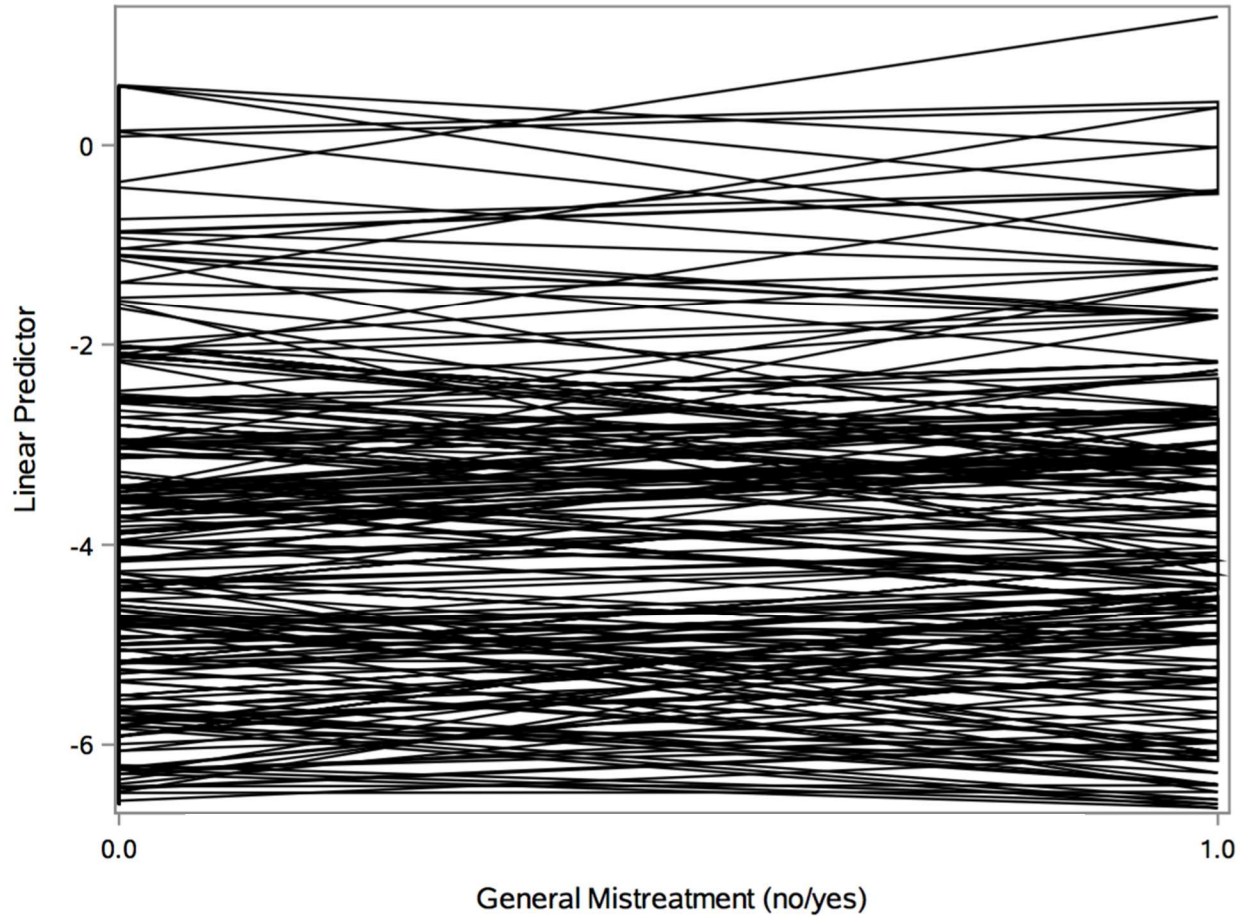
Figure 12. Simple slopes for each participant depicting the predicted relationship between general mistreatment and coping-motivated substance use reported within the same measurement period.
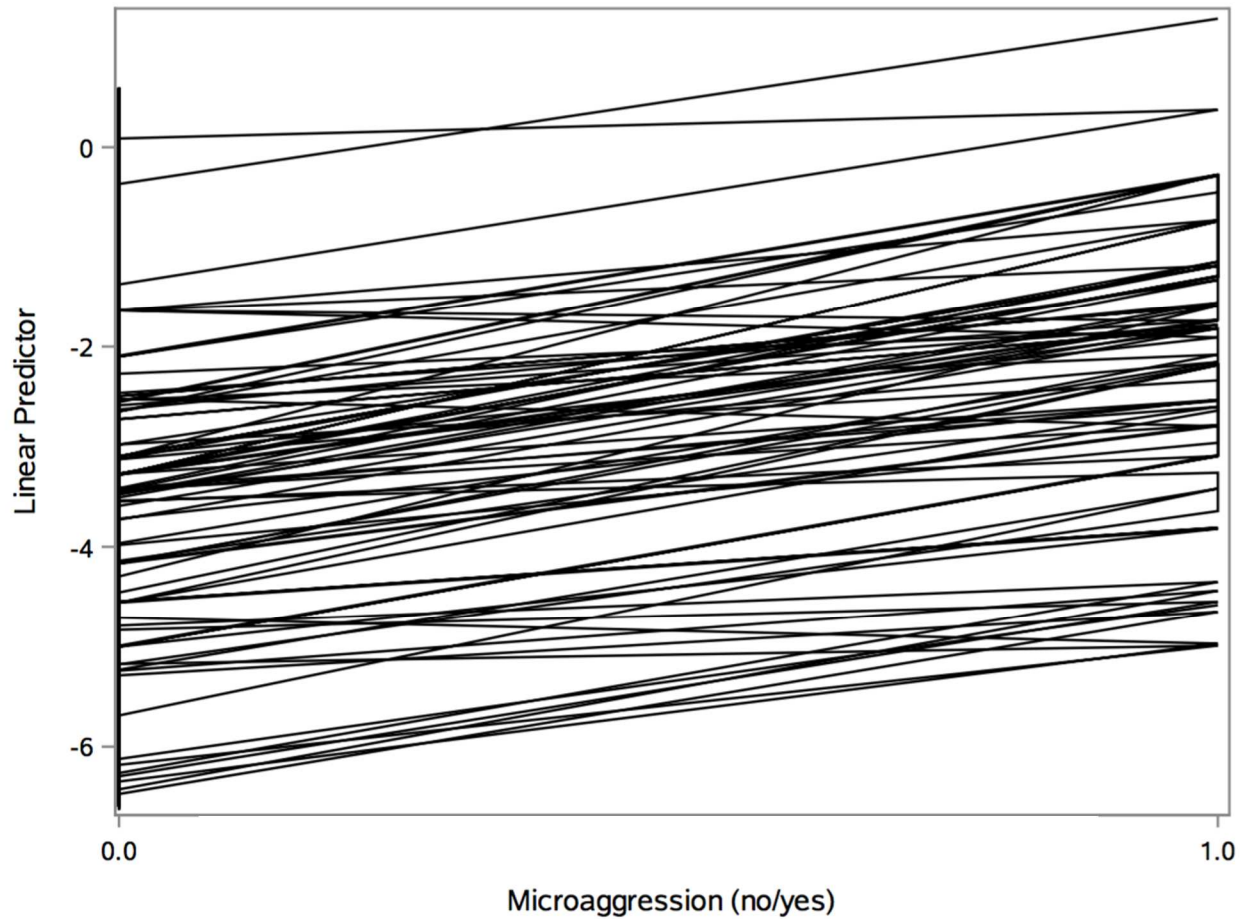
Figure 13. Simple slopes for each participant depicting the predicted relationship between microaggression experiences and coping-motivated substance use reported within the same measurement period.
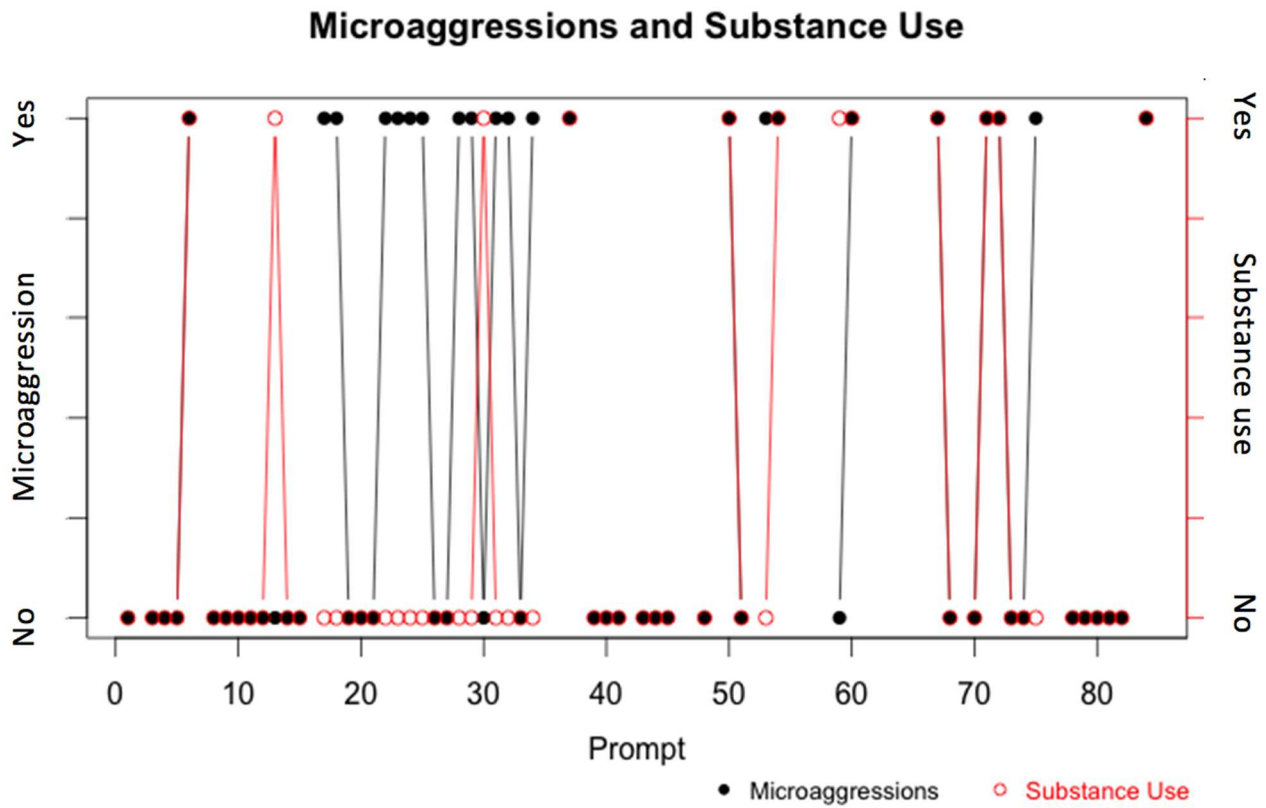
Figure 14. Graph depicting reports of microaggression(s) and instances of substance use across the 2-week study period for "Participant 37." (Nine reports of substance use coincide with reported microaggressions.)

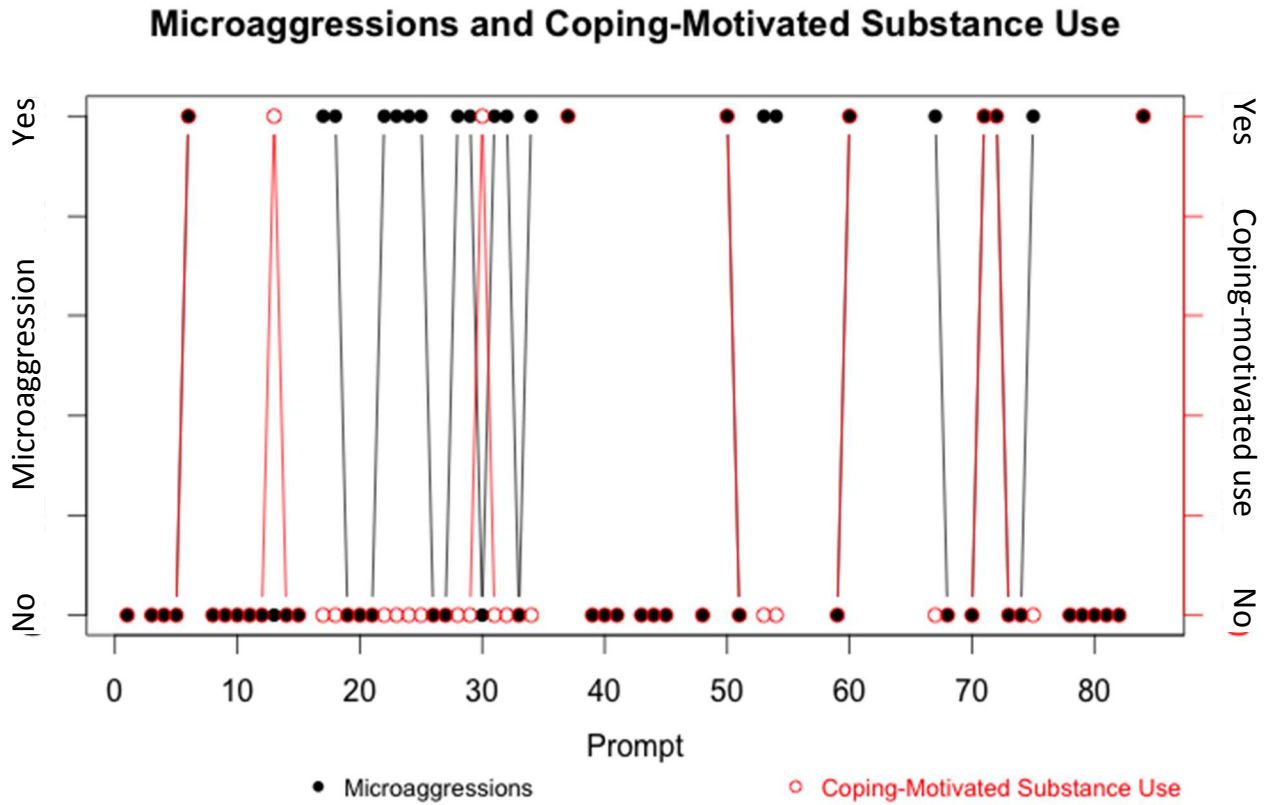**Microaggressions and Coping-Motivated Substance Use**

Figure 15. Graph depicting reports of microaggression(s) and instances of coping-motivated substance use across the 2-week study period for "Participant 37." (Seven reports of coping-motivated use coincide with reported microaggressions.)
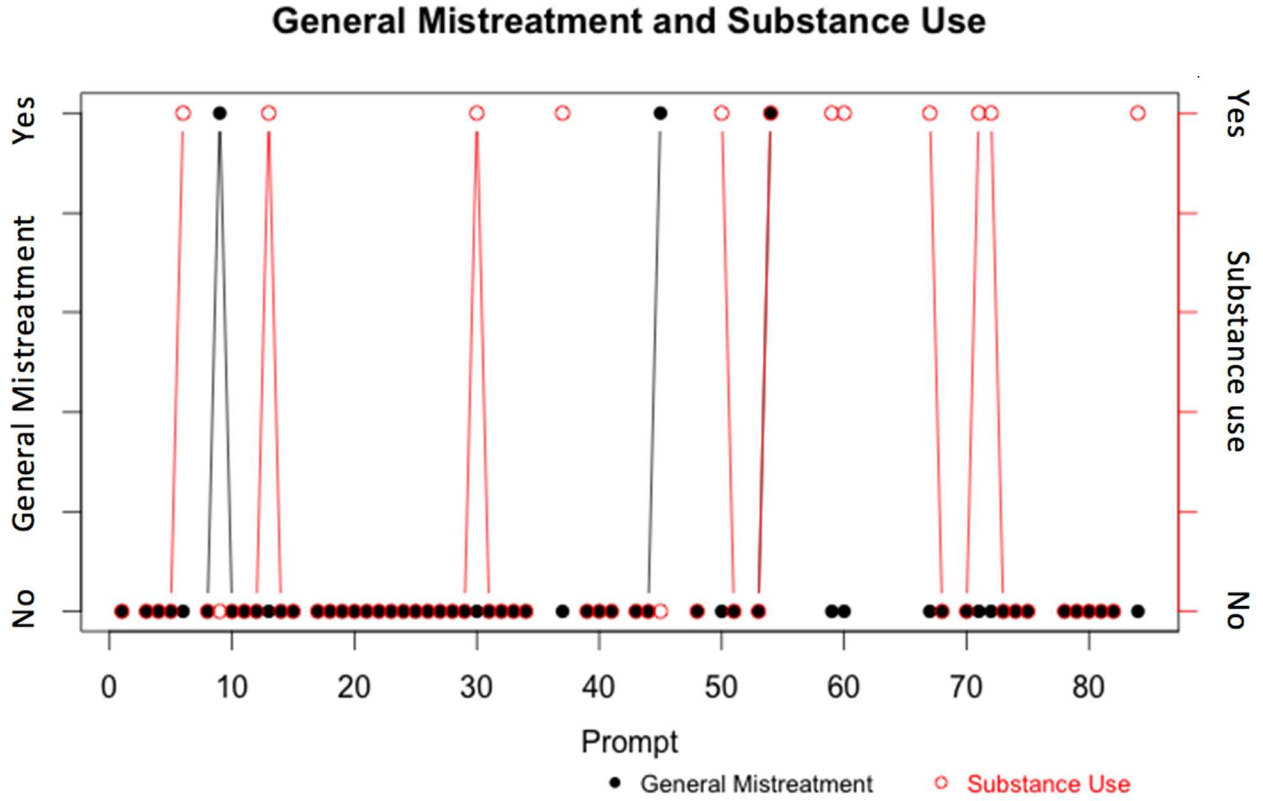
General Mistreatment and Substance Use

Figure 16. Graph depicting reports of general mistreatment and instances of substance use across the 2-week study period for "Participant 37." (One report of use coincides with reports of general mistreatment.)
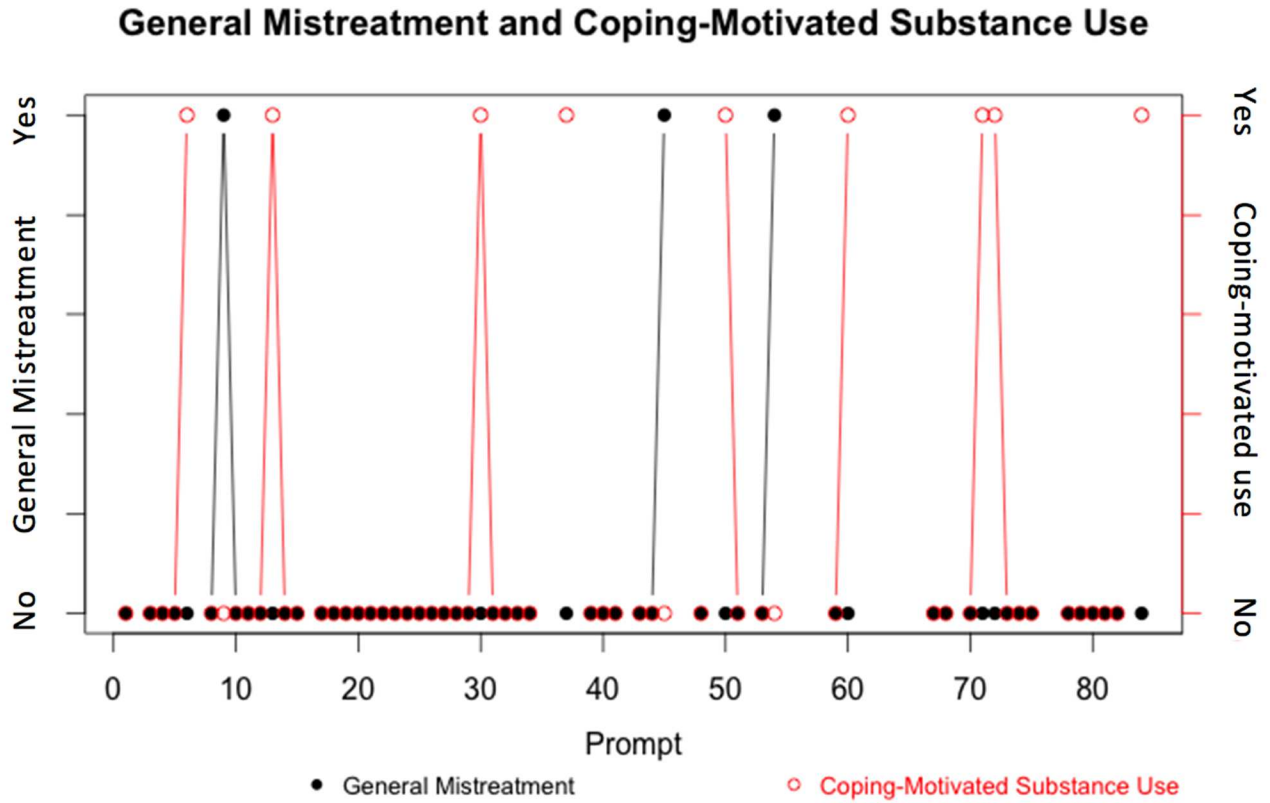
Figure 17. Graph depicting reports of general mistreatment and instances of coping-motivated substance use across the 2-week study period for "Participant 37." (No reports of use coincide with reports of general mistreatment.)

Appendices

Appendix A

Appendix B

Appendix C

Demographics Questionnaire

1. What is your exact age, in years? _____

2. What is your highest level of education that you have completed?
    a. Middle school, some high school.
    b. High school degree, or equivalent (i.e., GED)
    c. Some college, no degree
    d. Associate's
    e. Bachelor's
    f. Graduate degree/professional degree (M.S./M.A., Ph.D., M.D., J.D., etc.)

3. What is your ethnicity? (Select all that apply)
    a. African American/Black
    b. American Indian/Native American
    c. Hispanic/Chicano/Mexican American
    d. Asian American
    e. Caucasian/European American
    f. Other. Please specify _____

4. What is your current relationship status?
    a. Married/domestic partner
    b. In a committed relationship
    c. Separated/divorced
    d. Single but currently dating
    e. Single but NOT currently dating
    f. Other. Please specify _____

5. Understanding that gender can be complex, please select one of the following that <u>best</u> represents your gender identity:
    a. Male
    b. Female
    c. Transgender male to female; transwoman
    d. Transgender female to male; transman
    e. Gender queer
    f. Agender
    g. Gender fluid
    h. Other. Please specify _____

6. Understanding that sexual orientation can be complex, please select one of the following that <u>best</u> represents your sexual orientation:
    a. Straight/heterosexual
    b. Gay
    c. Lesbian
    d. Bisexual

e. Pansexual
f. Queer
g. Questioning
h. Fluid
i. Other. Please specify _____

>If Straight/heterosexual, then:
    6.1. Are you exclusively straight/heterosexual?
        a. Yes, I am exclusively straight/heterosexual
        b. No, I am not exclusively straight/heterosexual

(Eligible participants were then given the chance to enter their names, email, and telephone number if interested in learning about or participating in the follow up EMA study.)

Appendix D

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

I see Myself as Someone Who...

1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

___1. Is talkative
___2. Tends to find fault with others

___3. Does a thorough job
___4. Is depressed, blue
___5. Is original, comes up with new ideas
___6. Is reserved
___7. Is helpful and unselfish with others
___8. Can be somewhat careless
___9. Is relaxed, handles stress well
___10. Is curious about many different things

___11. Is full of energy
___12. Starts quarrels with others
___13. Is a reliable worker
___14. Can be tense
___15. Is ingenious, a deep thinker
___16. Generates a lot of enthusiasm

___17. Has a forgiving nature
___18. Tends to be disorganized
___19. Worries a lot
___20. Has an active imagination
___21. Tends to be quiet
___22. Is generally trusting

___23. Tends to be lazy
___24. Is emotionally stable, not easily upset
___25. Is inventive
___26. Has an assertive personality
___27. Can be cold and aloof
___28. Perseveres until the task is finished
___29. Can be moody
___30. Values artistic, aesthetic experiences
___31. Is sometimes shy, inhibited
___32. Is considerate and kind to almost everyone
___33. Does things efficiently
___34. Remains calm in tense situations
___35. Prefers work that is routine
___36. Is outgoing, sociable
___37. Is sometimes rude to others
___38. Makes plans and follows through with them
___39. Gets nervous easily
___40. Likes to reflect, play with ideas
___41. Has few artistic interests
___42. Likes to cooperate with others
___43. Is easily distracted
___44. Is sophisticated in art, music, or literature

Appendix E

Baseline Measures

Demographic Questionnaire

1. What is today's date? _____

2. What is your first and last name? _____

3. What is a valid phone number that we can use to reach you for device return purposes? (please include area code first) _____

4. What is your exact age in years? _____

5. What gender were you assigned at birth (i.e., your "biological sex" at birth)?
      a. Male
      b. Female
      c. Intersex

6. Understanding that gender identity can be complex, please select one of the following that best represents your current gender identity:
      a. Male
      b. Female
      c. Transgender male to female; transwoman
      d. Transgender female to male; transman
      e. Gender queer
      f. Agender
      g. Gender fluid
      h. Other. Please specify _____

7. Understanding that sexual orientation can be complex, please select one of the following that best represents your sexual orientation currently:
      a. Gay
      b. Lesbian
      c. Bisexual
      d. Pansexual
      e. Queer
      f. Questioning
      g. Fluid
      h. Straight/heterosexual
      i. Other. Please specify _____

8. Which of the following best describes the way you view your sexual orientation currently?
      a. Exclusively heterosexual
      b. Predominantly heterosexual, only incidentally homosexual

    c. Predominantly heterosexual, but more than incidentally homosexual
    d. Equally heterosexual and homosexual
    e. Predominantly homosexual, but more than incidentally heterosexual
    f. Predominantly homosexual, only incidentally heterosexual
    g. Exclusively homosexual
    h. Other. _____

9. What is your highest level of education that you have completed?
    a. Middle school, some high school.
    b. High school degree, or equivalent (i.e., GED)
    c. Some college, no degree
    d. Associate's
    e. Bachelor's
    f. Graduate degree/professional degree (M.S./M.A., Ph.D., M.D., J.D., etc.)

10. What is your ethnicity? (Select all that apply)
    a. African American/Black
    b. American Indian/Native American
    c. Hispanic/Chicano/Mexican American
    d. Asian American
    e. Caucasian/European American
    f. Other _____

11. Understanding that relationship status can be complex, which of the following <u>best</u> characterizes your current relationship status? (Including monogamous and polyamorous/plural relationship status).
    a. Married/domestic partner(s)
    b. Committed relationship(s)
    c. Separated/divorced
    d. Single but currently dating
    e. Single but NOT currently dating
    e. Other (e.g., committed and "open" relationship, etc.). Please specify _____

12. What is the gender of the person(s) you are dating or partnered with? (Select all that apply)
    a. Not applicable: No partner(s)/not currently dating
    b. Male
    c. Female
    d. Transgender male to female; transwoman
    e. Transgender female to male; transman
    f. Gender queer
    g. Agender
    h. Gender fluid
    i. Other. Please specify _____

Drug and alcohol use questions (Collins, Parks, & Marlatt, 1985)

13. How often do you have a drink containing alcohol, on average?
       0. Never/almost never
       1. About once a month
       2. 2-3 times a month
       3. 1-2 times a week
       4. 3-4 times a week
       5. Nearly every day
       6. Once a day or more

14. How often do you drink to the point of intoxication (to get drunk), on average?
       0. Never/almost never
       1. About once a month
       2. 2-3 times a month
       3. 1-2 times a month
       4. 3-4 times per week
       5. Nearly every day
       6. Once a day or more

15. How often do you use drugs (e.g., marijuana, non-prescribed medication, etc.), on average?
       0. Never/almost never
       1. About once a month
       2. 2-3 times a month
       3. 1-2 times a month
       4. 3-4 times per week
       5. Nearly every day
       6. Once a day or more

16. How many days you used any of the following in the last 30 days? (If none, enter "0")
       1. Alcohol (# of <u>standard </u>drinks*) _____
       2. Marijuana _____
       3. Cocaine or "crack" cocaine _____
       4. Methamphetamine _____
       5. Club drugs (e.g., GHB; MDMA/ecstasy/"molly") _____
       6. Hallucinogens (mushrooms, LSD) _____
       7. Opiates (e.g., opium, heroin, morphine) _____
       8. Non-prescribed or "recreational use" of PAIN medication (e.g., Oxycontin, Percocet, Lortab) _____
       9. Non-prescribed or "recreational use" of ANXIETY medication (e.g., Xanax ,Valium, Klonopin) _____
       10. Non-prescribed or "recreational use" of ADHD/ADD medication (e.g., Adderall, Concerta, Ritalin, Vyvanse) _____

11. Non-prescribed or "recreational use" of SLEEP medication (e.g., Ambien, Trazodone) _____

17. Think about your use of alcohol over the <u>last 30 days</u>. Please indicate how many <u>drinks</u> you would have <u>on average</u> for each of the following days of the week: (consider one drink to equal one-<u>12 ounce can/bottle</u> of beer/wine cooler, one <u>five-ounce</u> glass of wine, or <u>one shot</u> of liquor).
    1. Monday
    2. Tuesday
    3. Wednesday
    4. Thursday
    5. Friday
    6. Saturday
    7. Sunday

18. Think about your use of alcohol over the <u>last 30 days</u>. Please indicate how many <u>hours</u> you spend <u>drinking or intoxicated</u> (tipsy or drunk) <u>on average</u> for each of the following days of the week.
    1. Monday
    2. Tuesday
    3. Wednesday
    4. Thursday
    5. Friday
    6. Saturday
    7. Sunday

19. Think about your use of drugs over the <u>last 30 days</u>. Please indicate <u>how many times</u>, on average, you have used any drugs during each of the following days of the week (don't include alcohol):
    1. Monday
    2. Tuesday
    3. Wednesday
    4. Thursday
    5. Friday
    6. Saturday
    7. Sunday

20. Think about your use of drugs over the <u>last 30 days</u>. Please indicate how many <u>hours</u> you spend using or intoxicated or "high" on average during each of the following days of the week:
    1. Monday
    2. Tuesday
    3. Wednesday
    4. Thursday
    5. Friday
    6. Saturday

7. Sunday

Nicotine/tobacco use, personal/family mental health/substance use history questions

21. How often to you use the following, <u>on average</u>:

21.1. Cigarettes, cigars, e-cigarettes, or hookah
0. Never used/not applicable
1. Rarely/once every couple of months
2. Occasionally/once a month
3. Few times a month
4. Few times a week
5. Daily/multiple times daily

21.2. Chewing tobacco or pouches
0. Never used/not applicable
1. Rarely/once every couple of months
2. Occasionally/once a month
3. Few times a month
4. Few times a week
5. Daily/multiple times daily

22. Do you have a family history of alcohol or drug use concerns or problems? (e.g., relationship strain, health complications, work difficulty, legal trouble, substance use diagnosis, etc.)
0. No
1. Yes, extended family only (e.g., relatives)
2. Yes, immediate family only (e.g., parents, siblings)
3. Yes, immediate AND extended family
4. Not sure/don't know

23. Do you have a family history of mental health difficulties? (e.g., depression, anxiety, etc.)
0. No
1. Yes, extended family only (e.g., relatives)
2. Yes, immediate family only (e.g., parents, siblings)
3. Yes, immediate AND extended family
4. Not sure/don't know

24. Do you have a personal history of alcohol or drug use concerns or problems? (e.g., relationship strain, health complications, work difficulty, legal trouble, substance use diagnosis, etc.)
0. No
1. Yes

25. Do you have a personal history of mental health difficulties? (e.g., depression, anxiety, etc.)
>0. No
>1. Yes

Perceived Social Norms (adapted from Baer, 1994)

26. In your opinion, how often do people around your age in Missoula drink alcohol in general?
>0. Less than once a month
>1. About once a month
>2. 2-3 times a month
>3. 1-2 times a week
>4. 3-4 times a week
>5. Daily/Nearly every day

27. In your opinion, how often do people around your age drink alcohol in Missoula's LGBT community?
>0. Less than once a month
>1. About once a month
>2. 2-3 times a month
>3. 1-2 times a week
>4. 3-4 times a week
>5. Daily/Nearly every day

28. How would your friends respond if they knew or suspected that you drank every day?
>1. Strong disapproval
>2. Moderate disapproval
>3. Mild disapproval
>4. Neutral/wouldn't care
>5. Mild approval
>6. Moderate approval
>7. Strong approval

29. How would your family respond if they know or suspected that you drank every day?
>1. Strong disapproval
>2. Moderate disapproval
>3. Mild disapproval
>4. Neutral/wouldn't care
>5. Mild approval
>6. Moderate approval
>7. Strong approval

30. In your opinion, how often do people around your age in Missoula use drugs in general?

0. Less than once a month
1. About once a month
2. 2-3 times a month
3. 1-2 times a week
4. 3-4 times a week
5. Daily/Nearly every day

31. In your opinion, how often do people around your age use drugs in Missoula's LGBT community?

0. Less than once a month
1. About once a month
2. 2-3 times a month
3. 1-2 times a week
4. 3-4 times a week
5. Daily/Nearly every day

32. How would your friends respond if they knew or suspected that you used drugs every day?

1. Strong disapproval
2. Moderate disapproval
3. Mild disapproval
4. Neutral/wouldn't care
5. Mild approval
6. Moderate approval
7. Strong approval

33. How would your family respond if they knew or suspected that you used drugs every day?

1. Strong disapproval
2. Moderate disapproval
3. Mild disapproval
4. Neutral/wouldn't care
5. Mild approval
6. Moderate approval
7. Strong approval

Substance use expectancies (Ham, Stewart, Norton, & Hope, 2005)

If I were under the influence of from drinking alcohol or using drugs…

1. Disagree
2. Disagree slightly
3. Agree slightly
4. Agree
5. Not applicable—I haven't used drugs or alcohol

34. I would be sociable

35. It would be easier to talk to people

36. I would be calm

37. I would be a better lover

38. I would be peaceful

39. I would enjoy sex more

40. I would take risks

41. I would be aggressive

42. I would be brave and daring

43. I would be courageous

44. I would be moody

45. I would be/feel guilty

46. I would be clumsy

47. I would be dizzy

48. I would be loud, boisterous, noisy

49. I would feel more comfortable as an LGBT individual

Brief Cope (Carver, 1997)

There are many ways people try to deal with problems. Answer each question based on the extent that you do what the item says <u>in</u> general when you are dealing with problems. Don't answer on the basis of whether it seems to work or not—just whether or not you do it. Try to rate each item separately in your mind from the others. Make your answer as true for you as you can using the provided response options.

In general, when I'm dealing with problems, I…

1. Not at all
2. A little bit
3. A medium amount
4. A lot

50. Turn to work or other activities to take my mind off things

51. Concentrate my efforts on doing something about the situation I'm in

52. Say to myself "this isn't real"

53. Use alcohol or other drugs to make myself feel better

54. Get emotional support from others

55. Give up trying to deal with it

56. Take action to try to make the situation better

57. Refuse to believe that it has happened

58. Say things to let my unpleasant feelings escape

59. Get help and advice from other people

60. Use alcohol or other drugs to help me get through it

61. Try to see it in a different light, to make it seem more positive

62. Criticize myself

63. Try to come up with a strategy about what to do

64. Get comfort and understanding from someone

65. Give up the attempt to cope

66. Look for something good in what is happening

67. Make jokes about it

68. Do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping

69. Accept the reality of the fact that it has happened

70. Express my negative feelings

71. Try to find comfort in my religion or spiritual believes

72. Try to get advice or help from other people about what to do

73. Learn to live with it

74. Think hard about what steps to take

75. Blame myself for things that happened

76. Pray or meditate

77. Make fun of the situation

Schedule for Heterosexist Events (Selvidge, 2000)

      The questions below ask about experiences you might have had with discrimination and prejudice. Read each question carefully, and mark how often these things have happened to you using the following scale:

      In your lifetime, how often have you…

0. Never
1. Almost never
2. Sometimes
3. Fairly Often
4. Very often

78. Been treated unfairly by your employer, boss or supervisors because of your LGBT status?

79. Been treated unfairly by your co-workers, fellow students, or colleagues because of your LGBT status?

80. Been treated unfairly by people in service jobs (by store clerks, waiters, bartenders, waitresses, bank tellers, mechanics, and others) because of your LGBT status?

81. Been treated unfairly by strangers because of your LGBT status?

82. Been treated unfairly by people in helping jobs (by doctors, nurses, psychiatrics, case workers, dentists, school counselors, therapists, school principals, and others) because of your LGBT status?

83. Been treated unfairly by neighbors because of your LGBT status?

84. Been treated unfairly by institutions (schools, universities, law firms, the police, the courts, the department of social services, the unemployment office, and another) because of your LGBT status?

85. Been treated unfairly or rejected by people who you thought were you friends because of your LGBT status.

86. Been called a derogatory name (for example: "fag or "sissy, "dyke")?

87. Been made fun of or picked on because of your LGBT status?

88. Been pushed, shoved, hit, or threated with harm because of your LGBT status?

89. Heard people making prejudiced jokes about LGBT people?

90. Been denied a raise, a promotion, tenure, a good assignment, a job, or other such thing at work what you deserved, because of your LGBT status?

91. Been treated unfairly or rejected by your family because of your LGBT status?

Lifetime Victimization (Herek & Berrill, 2009)

How often have you experience the following kinds of incidents because someone knew you were, or assumed you to be, LGBT? Please tell us how often you have experience each incident during your lifetime.

0. Never/not applicable
1. Once
2. 2-4 times
3. 5-10 times
4. 11-20 times
5. More than 20 times

92. Had verbal insults directed at you?

93. Been threatened with physical violence?

94. Had your personal property damaged or destroyed?

95. Had objects thrown at you?

96. Been chased or followed?

97. Been spat upon?

98. Been punched, hit, kicked, or beaten?

99. Been assaulted or wounded with a weapon?

100. Been sexually harassed (without assault)?

101. Been sexually assaulted?

Internalized Homophobia Scale (Herek, Gillis, & Cogan, 2009)

Consider the following questions. For each question, select the most appropriate response.

1. Strongly disagree
2. Disagree
3. Neither agree or disagree
4. Agree
5. Strongly agree

102. I wish I weren't lesbian/bisexual/gay

103. I have tried to stop being attracted to members of the same sex in general

104. If someone offered me the chance to be completely heterosexual, I would accept the chance

105. I feel that being lesbian/bisexual/gay is a personal shortcoming for me

106. I would like to get professional help in order to change my sexual orientation from lesbian/bisexual/gay to straight

Adapted transgender-based shame scale (adapted from Herek, Gillis, & Cogan, 2009)

Consider the following questions. For each question, select the most appropriate response.

1. Strongly disagree
2. Disagree
3. Neither agree or disagree
4. Agree
5. Strongly agree

107. I wish I weren't gender non-conforming or transgender

108. In general, I try to behave in a more gender conforming manner, or try not to express my transgender identify

109. If someone offered me the chance to be more gender conforming, or not transgender, I would accept the chance

110. I feel that being gender non-conforming or transgender is a personal shortcoming for me

111. I would like to get professional help in order to become less gender non-conforming, or transgender

Outness Inventory (adapted from Mohr & Fassinger, 2000)

Use the following rating scales to indicate how open you are about your sexual orientation or gender identity to the people listed below.

1 = person definitely does NOT know about your sexual orientation status
2 = person might know about your sexual orientation status, but it is NEVER talked about
3 = person probably knows about your sexual orientation status, but it is NEVER talked about
4 = person probably knows about your sexual orientation status, but it is RARELY talked about
5 = person definitely knows about your sexual orientation status, but it is RARELY talked about
6 = person definitely knows about your sexual orientation status, and it is SOMETIMES talked about
7 = person definitely knows about your sexual orientation status, and it is OPENLY talked about
0 = not applicable to your situation; there is no such person or group of people in your life

112. Mother

113. Father

114. Siblings (sisters, brothers)

115. Extended family/relatives

116. My work peers

117. My work supervisor(s)

118. My school peers

119. School staff and professors

120. Members of my religious community (e.g., church, temple)

121. Leaders of my religious community (e.g., church, temple)

122. Strangers, new acquaintances

123. My new heterosexual/straight/cisgender friends

124. My old heterosexual/straight/cisgender friends

Questions regarding characteristics of sexual and/or gender identity

125. How central, or important to you, is your LGBT identity compared to other major aspects of your identity (for example, compared to your role as an employee, student, parent, sibling, friend, etc., or identities related to your religious affiliation, recreational interests, community memberships, personality, or health conditions)?
    1. Not at all important
    2. Somewhat unimportant
    3. Neutral
    4. Somewhat important
    5. Extremely important

126. How do you feel about yourself as an LGBT individual?
    1. Extremely negative
    2. Moderately negative
    3. Slightly negative
    4. Neutral
    5. Slightly positive
    6. Moderately positive
    7. Extremely positive

127. How much do you consider your LGBT identity a part of your core identity?
    1. Not at all a part of your core identity
    2. A relatively insignificant part of your core identity
    3. Neutral
    4. A relatively significant part of your core identity
    5. An extreme part of your core identity

Perceived social support

    1. Very unsupportive

2. Moderately unsupportive
3. Mildly unsupportive
4. Neutral
5. Mildly supportive
6. Moderately supportive
7. Very supportive

128. In general, how affirming and supportive do you feel your family is of LGBT individuals?

129. In general, how affirming and supportive do you feel your friends are of LGBT individuals?

130. In general, how affirming and supportive do you feel your work or school associates are of LGBT individuals?

131. In general, how affirming and supportive do you feel the Missoula community is of LGBT individuals?

Appendix F

EMA Measures

<u>Everyday Discrimination Scale (adapted from Williams et al., 1997)</u>

1. Did you experience any of the following since your last prompt:
scroll and select all that apply

1.
1.1. Treated with less courtesy or respect than others
1.2. Treated as if others are afraid of you
1.3. Treated as if others think you are dishonest or immoral
1.4. Treated as inferior, less smart/capable than others
1.5. Insulted/called names (direct or overheard)
1.6. Received poorer service than others (restaurants, stores, etc.)
1.7. Stereotyped or negatively labeled
1.8. Threatened or harassed
1.9. Avoided, excluded, or ignored
1.10. Had your perspective/feelings overlooked or misunderstood
1.11. Physically or sexually assaulted
1.12. Other
1.13. None/not applicable

1.14. >(If yes to "other") Please describe Other experience: _____

>If "yes" to any of the previous "select all that apply" items:

1.1.1-1.12.1. Was this experience related to any of the following statuses? (Select all that apply)
0. None/Not applicable
1. Sexual orientation
2. Transgender status
3. Gender
4. Race/ethnicity
5. Disability
6. Mental health
7. Physical health
8. Other: _____

>(If yes to "other") Please describe Other: _____

<u>Momentary mood/affect questions (adapted from McNair, Lorr, & Droppleman, 1971; Larsen & Diener, 1992; Watson & Clark, 1999)</u>

2. Rate the following according to how you are feeling currently

2.1. Happy or cheerful
    0. Not at all
    1. A little
    2. Moderately
    3. Quite a bit
    4. Extremely

2.2. Relaxed or content
    0. Not at all
    1. A little
    2. Moderately
    3. Quite a bit
    4. Extremely

2.3. Dissatisfied with self
    0. Not at all
    1. A little
    2. Moderately
    3. Quite a bit
    4. Extremely

2.4. Angry, annoyed, or resentful
    0. Not at all
    1. A little
    2. Moderately
    3. Quite a bit
    4. Extremely

2.5. Anxious (nervous, uneasy, or on edge)
    0. Not at all
    1. A little
    2. Moderately
    3. Quite a bit
    4. Extremely

2.6. Depressed (sad, hopeless, or discouraged)
    0. Not at all
    1. A little
    2. Moderately
    3. Quite a bit
    4. Extremely

2.7. Fearful or afraid
    0. Not at all

      1. A little
      2. Moderately
      3. Quite a bit
      4. Extremely

<u>Current craving question</u>

3. Rate how much you want to use substances currently
      0. Not at all
      1. A little
      2. Moderately
      3. Quite a bit
      4. Extremely

<u>Drug, alcohol, and nicotine/tobacco use questions (Motives: Lee, Neighbors, & Woods, 2007 and Patrick, Schulenberg, O'Malley, Johnston, & Bachman, 2011)</u>

4. Since your last prompt:
  How much alcohol (#of standard drinks*)?
  *One 12oz. beer/wine cooler, 5oz. glass of wine, one cocktail, or a shot (1.25oz.) of hard
   liquor

  (scroll bar 0-10)

  > If more than "0," What were your reasons/motivations for using alcohol?
      4.1. Enjoyment/fun
      4.2. Coping with sadness or depression
      4.3. Coping with anger or frustration
      4.5. Coping with tension, stress, or anxiety
      4.6. Relaxation
      4.7. Social enhancement, to socialize
      4.8. Sexual reasons
      4.9. It's a habit/compulsive use reasons
      4.10. It's what was available/easier to get
      4.11. To feel more comfortable as an LGBT individual
      4.12. Boredom
      4.13. Seeking excitement or experience enhancement
      4.14. Conformity
      4.15. To manage physical pain
      4.16. To experiment
      4.17. Other _____

      >(If yes to "other") Please describe Other: _____

5. Since your last prompt:

How many cigarettes/cigars?

(scroll bar 0-10)

> If more than "0," What were your reasons/motivations for using cigarettes/cigars?
      4.1. Enjoyment/fun
      4.2. Coping with sadness or depression
      4.3. Coping with anger or frustration
      4.5. Coping with tension, stress, or anxiety
      4.6. Relaxation
      4.7. Social enhancement, to socialize
      4.8. Sexual reasons
      4.9. It's a habit/compulsive use reasons
      4.10. It's what was available/easier to get
      4.11. To feel more comfortable as an LGBT individual
      4.12. Boredom
      4.13. Seeking excitement or experience enhancement
      4.14. Conformity
      4.15. To manage physical pain
      4.16. To experiment
      4.17. Other _____

          >(If yes to "other") Please describe Other: _____

5. Since your last prompt:
   E-cigarettes, hookah, or chew (# of times):

(scroll bar 0-10)

> If more than "0," What were your reasons/motivations for using e-cigarettes, hookah, or chew?
      5.1. Enjoyment/fun
      5.2. Coping with sadness or depression
      5.3. Coping with anger or frustration
      5.5. Coping with tension, stress, or anxiety
      5.6. Relaxation
      5.7. Social enhancement, to socialize
      5.8. Sexual reasons
      5.9. It's a habit/compulsive use reasons
      5.10. It's what was available/easier to get
      5.11. To feel more comfortable as an LGBT individual
      5.12. Boredom
      5.13. Seeking excitement or experience enhancement
      5.14. Conformity

       5.15. To manage physical pain
       5.16. To experiment
       5.17. Other _____

          >(If yes to "other") Please describe Other: _____

6. Have you used any of the following since your last prompt?
   Select all that apply
       6.1. Marijuana
       6.2. Prescription medication (pain pills, Adderall, etc.)
       6.3. Club drugs (MDMA/ecstasy/"molly", GHB)
       6.4. Hallucinogens (mushrooms, LSD)
       6.5. Cocaine
       6.6. Opiates (heroin, morphine)
       6.7. Methamphetamine
       6.8. Other _____
       6.9. None/Not applicable

          >(If yes to "other") Please describe Other: _____

   > If "yes" to any of the previous items 6.1.1-6.8.1: What were your
   reasons/motivations for using _____?
       5.1. Enjoyment/fun
       5.2. Coping with sadness or depression
       5.3. Coping with anger or frustration
       5.5. Coping with tension, stress, or anxiety
       5.6. Relaxation
       5.7. Social enhancement, to socialize
       5.8. Sexual reasons
       5.9. It's a habit/compulsive use reasons
       5.10. It's what was available/easier to get
       5.11. To feel more comfortable as an LGBT individual
       5.12. Boredom
       5.13. Seeking excitement or experience enhancement
       5.14. Conformity
       5.15. To manage physical pain
       5.16. To experiment
       5.17. Other _____

          >(If yes to "other") Please describe Other: _____

__Additional Prompts delivered throughout the day:__

Second prompt of the day (between 12pm and 2pm):

7. If you used substances yesterday, how intoxicated, high, silly, or impaired did you get?
>   0. I didn't use/Not applicable
>   1. Not at all
>   2. A little
>   3. Moderately
>   4. Quite a bit
>   5. Extremely

Last prompt of the day (between 8pm and 10pm):

8. In response to any negative experiences that I had on the basis of being LGBT today I … Have been preoccupied by them, or repeatedly thinking about how negative they were
>   0. Not at all
>   1. A little bit
>   2. Moderately
>   3. Quite a bit
>   4. Extremely

9. In response to any negative experiences that I had on the basis of being LGBT today I … Have been keeping my emotions to myself, or controlling my emotions by not expressing them
>   0. Not at all
>   1. A little bit
>   2. Moderately
>   3. Quite a bit
>   4. Extremely

10. In response to any negative experiences that I had on the basis of being LGBT today I … Reached out for support, or talked with others about my feelings
>   0. Not at all
>   1. A little bit
>   2. Moderately
>   3. Quite a bit
>   4. Extremely

11. In response to any negative experiences that I had on the basis of being LGBT today I … Chose to be alone and away from others
>   0. Not at all
>   1. A little bit
>   2. Moderately
>   3. Quite a bit
>   4. Extremely

12. Rate your overall satisfaction with the social support you received today
   Scroll and select one

-3. Very dissatisfied
-2. Moderately dissatisfied
-1. Slightly dissatisfied
0. Neutral
1. Slightly satisfied
2. Moderately satisfied
3. Very satisfied

13. Is there anything else you would like us to know about your experiences, feelings, or behaviors today?

0. No
1. Yes

>If "yes", 13.1 Please describe: _____

Appendix G

<u>Post-EMA survey (partially adapted from Ravesloot et al., unpublished data)</u>

Study Follow-up Questions

Congratulations on completing the study! We have just 13 brief questions for you to answer to help us understand how it went for you.

1. Did you have trouble with the device?

☐ None ☐ A little ☐ Some ☐ A lot

2. Can you tell us more about your experience answering questions on the device?
_____

_____

_____

3. How long did it take you to answer the questions once you were familiar with them?

☐ 1 minute or less ☐ 2 minutes ☐ 3 minutes ☐ 4 minutes ☐ 5 or more minutes

4. How much did the training prepare you for answering the questions and participating in this study?

☐ None ☐ A little ☐ Some ☐ A lot

5. Do you feel like general or technical support was available if you needed it?

☐ Always
☐ Mostly
☐ Sometimes
☐ Seldom/rarely
☐ Never

6. How was your overall experience participating in this study?

☐ Very positive
☐ Moderately positive
☐ Mildly positive
☐ Neutral
☐ Mildly negative
☐ Moderately negative
☐ Very negative

7. Would you participate in a study like this again, or refer a friend to participate in this or a similar study?

☐ Yes
☐ Maybe
☐ No

8. Do you feel that your thoughts and feelings about yourself have changed <u>as a result of participating in this study?</u>

☐ No change   ☐ Slightly   ☐ Moderately   ☐ Very much

➤ *If you selected <u>Slightly</u>, <u>Moderately</u>, or <u>Very much</u>:* **Do you feel that this change was for the better or worse in terms of your overall wellbeing?**

☐ Much worse   ☐ A little worse   ☐ No change/not sure   ☐ A little better   ☐ Much better

9. Do you feel that you have become more or less AWARE of others' negative LGBT* attitudes <u>as a result of participating in this study?</u>

☐ Much less   ☐ A little less   ☐ No change/not sure   ☐ A little more   ☐ Much more

➤ *If you selected <u>Much less</u>, <u>A little less</u>, <u>A little more</u>, or <u>Much more</u>:* **Do you feel that this change was for the better or worse in terms of your overall wellbeing?**

☐ Much worse   ☐ A little worse   ☐ No change/not sure   ☐ A little better   ☐ Much better

10. Do you feel that your overall mood has changed at all <u>as a result of participating in this study?</u> Overall my mood now is…

☐ Much worse   ☐ A little worse   ☐ No change/not sure   ☐ A little better   ☐ Much better

11. Do you feel that your substance use has changed at all <u>as a result of participating in this study</u>? Overall my substance use now is…

☐ Much better/less use
☐ A little better/less use
☐ No change/not sure
☐ A little worse/more use
☐ Much worse/more use

12. Are there any other experiences in the last 2 weeks that you didn't have a chance to report that might have influenced your experience(s), mood or substance use?

_____

_____

_____

13. Do you have any additional comments or concerns you would like us to be aware of?

_____

_____

_____