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Associations with LGBTQ+ mental health disparities during the COVID-19 pandemic

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ABSTRACT

The COVID-19 pandemic has created tremendous, and unequal, burdens on mental and physical health throughout the United States. Prior work suggests that LGBTQ+ individuals have experienced disproportionate harms during the COVID-19 pandemic, but potential mechanisms underlying these disparities remain unclear. In a large (N = 893) sample of US LGBTQ+ adults, we examined four theoretically derived risk factors as potential contributors to depression, anxiety, and suicidal ideation during the summer of 2020. Stressors and disruptions due to the COVID-19 pandemic were common, with over 25% of participants experiencing changes in their living situation, 40% reporting interruptions in health care access, and high levels of stress due to social isolation, financial concerns, and increased mental health symptoms. We found that social disconnection, disruptions in health care, financial strain, and efforts to avoid disclosing one's sexual orientation or gender identity at home were each associated with poorer mental health, with the largest effects evident for identity disclosure avoidance. Transgender and non-binary adults reported poorer mental health overall, but gender identity did not moderate the effects of other tested risk factors. Results highlight the importance of considering LGBTQ+ mental health in the context of minority stressors, in addition to more general social determinants of health.

The COVID-19 (novel coronavirus) pandemic has contributed to worsening mental health globally, including increased depression, anxiety, and suicidal ideation (Bueno-Notivol et al., 2021; Kwong et al., 2021; Raifman et al., 2020). These mental health consequences, however, are not equally distributed, with greater burden placed on historically marginalised communities. Recent work suggests that lesbian, gay, bisexual, queer, transgender, and other sexual and gender minority individuals (hereafter referred to as LGBTQ+ people) have experienced worsening mental health, relative to cisgender and heterosexual people, during the COVID-19 pandemic (Rodriguez-Seijas et al., 2020). Although frequently discussed and studied as a single group, members of the LGBTQ+ community vary in myriad ways that may impact pandemic-related health disparities. For example, compared to gay and lesbian individuals, bisexual people and other sexual minorities typically experience poorer mental health outcomes (Gonzales & Henning-Smith, 2017) and greater risk of suicidal thoughts and behaviours (Di Giacomo et al., 2018). Transgender people also, on average, report poorer mental health than cisgender sexual minorities (Su et al., 2016). Given these

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differences, in this manuscript we will differentiate research findings that are specific to cisgender sexual minority people (LGBQ individuals), those that reflect the experiences of transgender and non-binary people (TNB individuals), and those that include anyone who reports a minoritized sexual orientation and/or gender identity (LGBTQ+ individuals).

During the COVID-19 pandemic, longitudinal studies have shown worsening mental health among LGBQ respondents, with the most significant difficulties among bisexual individuals (Fish et al., 2021). LGBTQ+ youth and emerging adults have also been more likely to report negative impacts on their mental health due to the COVID-19 pandemic, relative to cisgender and heterosexual people (Mitchell et al., 2022), with transgender and non-binary (TNB) youth and emerging adults in particular reporting disconnection, lack of safety in the home environment, and decreased access to mental health supports, as potential mechanisms of risk (Hawke et al., 2021). These findings highlight the disproportionate toll that the COVID-19 pandemic has had on LGBTQ+ individuals; however, the mechanisms underlying these associations, and potential differences in impact across cisgender LGBQ and TNB populations, have been infrequently tested. In this study, we will examine four possible contributors to disparities: social disconnection, reduced health care access, decreased self-disclosure of minoritized sexual orientation or gender identity, and financial/economic stressors.

Social Disconnection and LGBTQ+ Mental Health

Qualitative research with LGBTQ+ youth and emerging adults (ages 13–19) suggests that school shutdowns and social distancing reduced access to supportive friends and school staff, as well as LGBTQ+-focused community organisations (Fish et al., 2020). Among LGBTQ+ adults, the COVID-19 pandemic has been associated with reduced social contact with friends, reduced feelings of LGBTQ+ community connection (Suen et al., 2020), reduced LGBTQ+ community pride (Scroggs et al., 2020), and increased loneliness and isolation (Ruprecht et al., 2021). Among TNB people, longitudinal research has demonstrated pandemic-related reductions in community support predict worsening psychological distress (Kidd et al., 2021). LGBTQ+ adults have characterised community building and support provision as crucial to resilience during the pandemic (Gonzalez et al., 2021), which may be more challenging in the context of social distancing; this decreased resilience may remove a potential buffer between other COVID-19 pandemic concerns and negative mental health outcomes (Goldbach et al., 2021). The negative impact of COVID-related social disconnection on the mental health of LGBTQ+ people is consistent with minority stress theory, which posits that connectedness to other individuals and the LGBTQ+ community, should serve to promote resilience in the face of minority stressors (Meyer, 2015; Testa et al., 2015).

LGBTQ+ Access to Health Care

Accessibility of mental and physical health care has been dramatically impacted by the COVID-19 pandemic (Patel et al., 2021), especially among those with barriers to telehealth services (Lin et al., 2018). In a diverse sample of Chicago-area adults, LGBQ participants were more likely to have a mental health provider than heterosexual participants, but were less likely to have access to telehealth mental health care during the pandemic (Ruprecht et al., 2021). In recent studies, TNB youth and emerging adult participants (ages 14–28) were more likely to report pandemic-related disruptions in mental health and substance use treatment than cisgender participants (Hawke et al., 2021). TNB adults have also reported high rates of disruptions in mental health care and gender-affirming treatment (Jarrett et al., 2021; Kidd et al., 2021; Radusky et al., 2021). In two cross-sectional studies, LGBTQ+ college students (Gonzales et al., 2020) and TNB adults (Jarrett et al., 2021) whose access to mental health care and gender-affirming care was reduced reported increased distress, depression, anxiety, and suicidal ideation (SI) compared to those without care disruptions. In contrast, a longitudinal study of TNB adults failed to find an association between interruptions in gender-affirming care and increased psychological distress (Kidd et al., 2021). Although access to

gender-affirming care is hypothesised to help reduce experienced minority stressors for TNB people (Xavier et al., 2013), overall access to both mental and physical health care has not been consistently investigated as a theoretically derived driver of minority health disparities for LGBTQ+ people.

Identity Disclosure and LGBTQ+ Mental Health

Sexual orientation and gender identity disclosure have been frequently considered as potential mechanisms of risk and resilience for LGBTQ+ individuals. Non-disclosure of one's sexual orientation or gender identity has been conceptualised as an internal minority stressor associated with psychological distress and depression (Szymanski, 2006; Szymanski et al., 2008; Testa et al., 2015). Identity concealment may also impede support-seeking, particularly from others in the LGBTQ+ community (Balsam & Mohr, 2007; Meidlinger & Hope, 2014). However, openness about one's sexual orientation or gender identity is also associated with exposure to external minority stressors, such as discrimination and prejudice (DiPlacido, 1998), which may motivate individuals to avoid identity disclosures in environments that are, or may be, unsafe (Dewaele et al., 2013).

Abrupt changes in living environments due to the COVID-19 pandemic may have influenced LGBTQ+ people's desire for and willingness to communicate their sexual orientation or gender identity to people in their social networks (e.g. younger LGBTQ+ people who may be spending more time with unsupportive family members due to remote learning transitions; Fish et al., 2020; Gonzales et al., 2020). Among LGBQ adults, family conflict related to sexual orientation was relatively uncommon (4%) during the pandemic, but this type of conflict was a significant predictor of depressive symptoms in multivariate models and was particularly pernicious for participants who reported financial concerns (Suen et al., 2020). Finally, in a large sample of TNB adults, a significant percentage reported reduced time living according to their gender during the COVID-19 pandemic, which predicted increased anxiety (but not depression or suicidal thoughts; Jarrett et al., 2021).

Economic Precarity and LGBTQ+ Mental Health

In a large survey of US adults during the pandemic, LGBTQ+ respondents were more likely to report being laid off or furloughed, and to have trouble paying for basic goods and rent/mortgage costs, than cisgender/heterosexual respondents (Sears et al., 2021). Furthermore, other studies examining TNB adults found evidence of significant negative economic consequences of the pandemic, such as barriers to basic services and reduced income (Jarrett et al., 2021; Radusky et al., 2021). Several studies have demonstrated that economic concerns contribute to poorer mental health (Kwong et al., 2021; McGinty et al., 2020; Raifman et al., 2020), although this has not been directly compared between LGBTQ+ and heterosexual/cisgender individuals. Given that LGBTQ+ people may be more likely to lose a job due to discrimination (Kattari et al., 2016), and have fewer financial resources to buffer against acute economic stressors (Badgett, 2018), the impact of the COVID-19 pandemic on financial security may disproportionately impact LGBTQ+ people. This is consistent with literature suggesting that states of economic precarity increase risk of minority stress exposures for LGBTQ+ people (Frost et al., 2019).

LGBTQ+ Subgroup Health Disparities

Most of the pandemic-related research in this area has lacked the statistical power to compare subgroups of LGBTQ+ individuals, but what has been examined supports the possibility of intragroup heterogeneity in the COVID-19 pandemic's impacts. For instance, gay/lesbian individuals report lower distress and depression symptoms during the pandemic when compared to bisexual or other sexual minority identified individuals (Gonzales et al., 2020; Suen et al., 2020); longitudinal research has shown a similar pattern when examining within-person changes from pre- to post-pandemic onset (Fish et al., 2021). Among TNB adults, non-binary individuals are more likely to

report suicidal thoughts during the COVID-19 pandemic when compared to binary transgender individuals (i.e. transfeminine and transmasculine individuals; Radusky et al., 2021).

Although research highlights the disproportionate social, psychological, and economic impacts of the COVID-19 pandemic on members of minoritized ethnoracial groups (Elbogen et al., 2021; Ruprecht et al., 2021), studies examining this pattern of effects specifically within LGBTQ+ samples have been less clear (e.g. Kidd et al., 2021; Sears et al., 2021), raising questions about the intersectional nature of disparities experienced by LGBTQ+ people of colour.

The Present Study Aims and Hypotheses

Prior studies have been limited both by small sample sizes of LGBTQ+ individuals and an inability to examine potential contributors to observed mental health disparities in response to the COVID-19 pandemic. Further, most research to date has either examined LGBTQ+ people as a homogenous group compared to cisgender/heterosexual individuals, or focused exclusively on an LGBQ or TNB sample, limiting the possibility to examine within- and between-group differences in relation to minoritized sexual orientations and gender identities. The current study examines data from a large (N = 893) cross-sectional study of US LGBTQ+ adults collected from August to October 2020, several months into the COVID-19 pandemic in the United States. The nature of the sample allows for comparisons between cisgender LGBQ (n = 590) and TNB (n = 303) participants, and within the cisgender LGBQ sample, between those reporting gay/lesbian (n = 199) and other (n = 391) sexual orientations (i.e. bisexual, queer, pansexual, questioning, asexual, or another sexual orientation other than heterosexual). Participants completed measures assessing demographic characteristics, impacts of the COVID-19 pandemic, anxiety, depression, and suicidal ideation (SI). In addition to providing descriptive data on the presence and impact of a variety of stressors related to COVID-19 in this population, we tested the following hypotheses:

Hypothesis 1. Social disconnection due to the COVID-19 pandemic will be positively associated with depression, anxiety, and SI.

Hypothesis 2. Disruptions in physical or mental health care due to the COVID-19 pandemic will be positively associated with depression, anxiety, and SI.

Hypothesis 3. Avoidance of LGBTQ+ identity disclosure to others in the home environment will be positively associated with depression, anxiety, and SI.

Hypothesis 4. Financial and economic strain due to the COVID-19 pandemic will be positively associated with depression, anxiety, and SI.

Exploratory Aims. Examine whether relationships tested above differ between cisgender and TNB participants, as well as between cisgender gay/lesbian and other cisgender sexual minority participants.

Although our examined predictors of poor mental health are consistent with constructs that fall within minority stress theory, predictors were chosen based upon extant literature on drivers of negative outcomes during the COVID-19 pandemic, and were limited based upon available data, prohibiting a comprehensive examination of theoretically derived risk factors.

Methods

Participants and Procedures

These data were drawn from a larger cross-sectional study examining minority stress, outness, thwarted interpersonal needs, and SI in LGBTQ+ adults, with a specific interest in the role that

outness regarding sexual orientation or gender identity plays in moderating the association between minority stress and SI. The larger study aims, recruitment strategy, methods, and hypotheses were preregistered (https://osf.io/6b3z8); however, the analyses reported here were secondary and not preregistered. Eligible participants were at least 18 years old, identified as LGBTQ+, resided within the US, held US citizenship (for payment purposes), and were able to complete study measures in English. The study was open to enrolment from 13 August 2020 through 6 October 2020. Advertisements targeting LGBTQ+ adults were posted on social media (Facebook, Twitter, Instagram), on relevant forums (Reddit), and emails to LGBTQ+ listservs. Advertisements were also shared via a campus email listserv for the authors' university, as well as in local settings surrounding campus where flyers were permissible (e.g. coffee shops). ZIP code data indicate that approximately 6% of the sample resided in the local area, with the remainder of the sample recruited from throughout the US. Advertisements used a variety of terms to draw a sample with diverse gender identities and sexual orientations, including 'LGBTQ+', 'sex and gender minority (SGM)', 'queer', 'gender diverse', and 'transgender and non-binary'.

Individuals interested in participating were directed to a survey hosted on Qualtrics, which first displayed the study consent form. After providing informed consent, they were then directed to complete a series of surveys. Participants had the option to enter a draw for one of several $50 Amazon gift cards; 1 gift card was awarded per 100 participants. Participants could stop participation at any time and were provided with a list of mental health and crisis resources on each page of the survey. Participation was entirely anonymous, and the contact information provided for the draw was kept separate from the survey responses themselves. All study procedures were approved by the Institutional Review Board at the authors' university (Texas Tech University Institutional Review Board #IRB2020-549).

In total, 998 individuals consented to participate in the study, and 905 of these completed at least part of the measure assessing COVID-19 pandemic-related stressors. Given our interest in identity disclosure avoidance, participants were excluded from analyses if they did not report a minoritized gender identity or sexual orientation, regardless of reported sexual behaviour (e.g. identified as heterosexual and cisgender, $n = 12$), leaving 893 participants with usable data.

Measures

Demographic Characteristics
Gender identity was assessed by a single item which included six response options, as well as an option to self-report a gender identity not listed. Sexual orientation was assessed by a single item which included seven response options, as well as an option to self-report a sexual orientation not listed. Specific response options for both items are listed in Table 1. Participants also provided self-reported age (in years), ethnicity (Hispanic/Latino/a/x or not Hispanic/Latino/a/x), and racial identity (five response options, plus an option to self-report a racial identity not listed, multiple response options permitted). Responses to the questions about ethnic and racial identities were combined as ethnoracial identity, which was operationalised as the proportion of participants identifying as non-Hispanic/Latino/a/x White relative to other ethnoracial identities.

Disruptions in Health Care
Participants responded to a single item which asked, 'Have you experienced an interruption in your medical care due to the coronavirus outbreak?' Participants could mark more than one response to indicate disruptions in medical care related to their sexuality and/or gender, related to mental health care, related to another health condition, or no interruptions.

Sexual Orientation and Gender Identity Disclosure
Participants who did not report living alone ($n = 744$) were asked, 'Are the people you are primarily living with/social distancing with aware of your sexual identity and gender identity (meaning they

Table 1. Descriptive Characteristics.

Demographic Characteristic	*n* (%)
Gender Identity	
Cisgender woman	479 (53.64)
Nonbinary, gender non-conforming, gender fluid, or genderqueer	163 (18.25)
Cisgender man	111 (12.43)
Transgender man	51 (3.47)
Questioning	45 (5.04)
Transgender woman	31 (3.47)
Other	13 (1.46)
Sexual Orientation	
Bisexual	291 (32.59)
Gay or lesbian	252 (28.22)
Queer	142 (15.90)
Pansexual	85 (9.52)
Asexual	69 (7.73)
Other	31 (3.47)
Questioning	18 (2.02)
Heterosexual	5 (0.56)
Ethnoracial Identity	
Non-Hispanic/Latinx White	664 (75.89)
Other, Biracial, Multiracial	57 (6.51)
Hispanic/Latinx White	68 (7.77)
Asian/Asian-American	54 (6.17)
Black/African-American	26 (2.97)
Native American/Alaska Native	5 (0.57)
Native Hawaiian/Pacific Islander	1 (0.11)

Note. Responses for 'other' gender identity and sexual orientation were typically unique to an individual respondent. Those listed at least twice include 'female', 'agender', and 'demisexual'.

are aware of whether you consider yourself LGBTQ+)?' Response options ranged from 1 (*not at all aware*) to 5 (*extremely aware*).

Participants living with others were also asked about their avoidance of topics related to sexual orientation and/or gender identity. Participants who did not identify as heterosexual (i.e. LGBQ) were asked, 'During the coronavirus outbreak, how often do you avoid talking about topics related to or otherwise indicating your sexual identity (e.g. not talking about your significant other, changing your mannerisms, avoiding partner's pronouns) when interacting with the person/people you have you primarily been living/social distancing with?' Participants who did not identify as cisgender (i.e. TNB) were asked, 'During the coronavirus outbreak, how often do you avoid talking about topics related to or otherwise indicating your gender identity (e.g. not talking about your significant other, changing your mannerisms, avoiding pronouns when you otherwise would not do so) when interacting with the person/people you have you primarily been living/social distancing with?' These items were adapted from the Nebraska Outness Scale concealment subscale (Meidlinger & Hope, 2014) and used the scoring range from the original measure. Specifically, each item was rated on a scale from 0 (*never*) to 10 (*always*), with the midpoint value of 5 (*half of the time*). Participants could respond to both items as applicable (i.e. who identified as LGBQ and TNB); if so, the maximum value was used for analysis.

COVID-19 Stressors and Impacts

The COVID-19 Family Stress Screener (Huth-Bocks, 2021) was used to assess the impact of COVID-19 on a variety of domains. Participants were asked, 'Because of COVID-19 related events and changes, I have felt increased stress about' for 10 domains, each of which were rated from 1 (*strongly disagree*) to 5 (*strongly agree*). An additional item was added for this specific study to assess stress related to interruptions in medical care, and descriptive items were added to assess changes to one's living situation due to COVID-19.

Financial/economic strain was measured as the average of three items, which assessed stress related to housing or utilities, food running out or becoming unavailable, and losing a job or decrease in family income; these items showed adequate scale score reliability (Cronbach's α = .76, 95% CI = [.74, .79]). Social disconnection was assessed using a single item on stress related to loss of social connections or social isolation.

Depression and Anxiety

Depression and anxiety were assessed using the Depression, Anxiety, Stress Scales 21-item version (DASS-21; S. H. Lovibond & Lovibond, 1995a). The DASS-21 is a well-validated and commonly used measure of past week depression and anxiety symptoms (Lee, 2019; Scholten et al., 2017), and has stronger differentiation between depression and anxiety symptoms than other well-known scales (P. F. Lovibond & Lovibond, 1995b). Items are scored on a scale from 0 (*not at all*) to 3 (*very much*), with subscale scores multiplied by two to match norms derived from the full-length (42-item) version. Scale score reliability in this sample was excellent for depression (Cronbach's α = .91, 95% CI = [.91, .92]) and good for anxiety (Cronbach's α = .84, 95% CI = [.83, .86]) subscales.

Suicidal Ideation

SI in the past two weeks was assessed using the Negative SI subscale of the Positive and Negative Suicide Ideation scale (PANSI; Osman et al., 1998). Items are scored from 1 (*none of the time*) to 5 (*most of the time*) and summed to create a composite score. The Negative SI subscale taps explicit suicidal thoughts and showed excellent scale score reliability in this sample (Cronbach's α = .96, 95% CI = [.96, .97]).

Analytic Plan

All analyses were conducted in SPSS version 28. First, we examined descriptive data on COVID-19 related changes and stressors using means and standard deviations for interval variables and percentages for binary or categorical variables. Second, we examined whether our outcomes of interest (depression, anxiety, SI) varied with age, gender identity, sexual orientation, or ethnoracial identity using independent-samples *t*-tests (for binary variables) or Pearson's correlation coefficients (for interval variables); results are presented using Cohen's *d* as a standardised measure of effect size with 95% confidence intervals. Demographic characteristics associated with outcomes of interest were included as covariates in later analyses.

Primary analyses were conducted using linear regression: depression, anxiety, or SI were the outcomes of interest, covariates were entered as predictors in block one, and predictors of interest were entered in block two. Tests of interactions between gender identity status (TNB versus cisgender) or sexual orientation status (cisgender gay/lesbian versus other cisgender sexual minority) were considered as predictors and moderators in models where we found group differences in the outcome of interest. Although the possibility of an interaction between ethnoracial identity and predictors of interest in relation to mental health outcomes was considered, consistent with intersectionality theories, sample size limited examination of these models. All results are presented using standardised regression coefficients.

Missing data were relatively sparse. Across 893 participants, three or fewer were missing data on COVID-19 related stressors and avoidance of LGBTQ+ identity disclosure. SI outcome data were missing for 47 participants (5.26%), and DASS-21 scores were missing for 54 participants (6.05%). Missing data were handled using pairwise deletion for specific analyses.

Results

Participant Characteristics

Participants ranged in age from 18 to 76 (*M* = 27.6, *SD* = 9.0), with a median age of 25.5, and a majority were non-Hispanic/Latinx White. Of the participants, 590 (66.07%) were cisgender LGBQ,

298 (33.37%) endorsed both a minoritized gender identity (TNB) and sexual orientation (LGBQ), and 5 (0.56%) identified as TNB and heterosexual. Of the cisgender LGBQ participants, one-third identified as gay or lesbian ($n = 199$, 33.73%), with most identifying with another sexual orientation (bisexual, queer, pansexual, questioning, asexual, or another sexual orientation; see, Table 1). The majority of participants ($n = 479$, 53.64%) identified as cisgender women.

TNB participants were, on average, younger than cisgender participants ($t(890) = 2.50$, $p = .01$, $d = 0.18$, 95% CI = [0.04, 0.32]); among cisgender participants, those who identified as gay/lesbian were older than participants with other minoritized sexual identities ($t(299.93) = 4.11$, $p < .001$, $d = 0.40$, 95% CI = [0.23, 0.57]). There was no relationship between ethnoracial identity and TNB gender identity ($\chi^2(1) = 0.89$, $p = .35$, $d = 0.09$, 95% CI = [−0.09, 0.26]) or identification as gay/lesbian relative to other sexual orientations ($\chi^2(1) = 3.28$, $p = .07$, $d = 0.22$, 95% CI = [−0.02, 0.45]).

TNB participants exhibited higher levels of depression ($t(837) = 6.15$, $p < .001$, $d = 0.45$, 95% CI = [0.30, 0.59]), anxiety ($t(512.48) = 4.92$, $p < .001$, $d = 0.37$, 95% CI = [0.23, 0.52]), and SI ($t(491.30) = 4.17$, $p < .001$, $d = 0.32$, 95% CI = [0.18, 0.46]) when compared to cisgender LGBQ participants.

Cisgender gay/lesbian participants reported lower anxiety ($t(554) = 2.57$, $p = .01$, $d = 0.23$, 95% CI = [0.05, 0.41]) relative to other sexual minority participants, but did not differ in reported depression ($t(554) = 1.91$, $p = .06$, $d = 0.17$, 95% CI = [−0.01, 0.35]) or SI ($t(560) = 0.16$, $p = .87$, $d = 0.02$, 95% CI = [−0.16, 0.19]).

Non-Hispanic/Latinx White participants did not differ from participants of minoritized ethnoracial identities in depression ($t(822) = 0.47$, $p = .64$, $d = 0.04$, 95% CI = [−0.12, 0.20]) or anxiety ($t(822) = 0.72$, $p = .47$, $d = 0.06$, 95% CI = [−0.10, 0.22]), but did report lower SI ($t(321.18) = 2.94$, $p = .004$, $d = 0.26$, 95% CI = [0.10, 0.42]) than members of minoritized ethnoracial groups. Further, non-Hispanic/Latinx White participants living with others reported lower levels of disclosure avoidance related to their sexual orientation and/or gender identity when compared to ethnoracial minorities ($t(724) = 3.89$, $p < .001$, $d = 0.33$, 95% CI = [0.17, 0.50]). Thus, ethnoracial identity was included as a covariate in models with SI as the outcome and/or disclosure avoidance as a predictor.

Age was negatively correlated with depression ($r = −0.17$, $p < .001$), anxiety ($r = −0.19$, $p < .001$), and SI ($r = −0.17$, $p < .001$), and was included as a covariate in all models.

Prevalence of COVID-19 Pandemic-Related Stressors and Impacts

Disruptions and stressors related to the COVID-19 pandemic were common in this sample (see, Table 2). Over one-quarter reported their living situation had changed due to COVID-19. Among those living with others, non-heterosexual TNB and cisgender LGBQ participants did not differ in avoidance of sexual orientation disclosure at home ($t(735) = 0.51$, $p = .61$, $d = 0.04$, 95% CI = [−0.11, 0.19]), but TNB participants' avoidance of gender identity disclosure was higher than cisgender LGBQ participants' avoidance of sexual orientation disclosure ($t(480.41) = 3.84$, $p < .001$, $d = 0.31$, 95% CI = [0.16, 0.46]). This pattern was replicated on a within-person basis among non-heterosexual TNB participants, who rated their avoidance of gender identity disclosure significantly higher than their avoidance of sexual orientation disclosure ($t(255) = 6.46$, $p < .001$, $d = 0.40$, 95% CI = [0.28, 0.53]). Among cisgender LGBQ participants, there was no difference in sexual orientation disclosure avoidance between gay/lesbian and other sexual minority participants ($t(586) = 1.16$, $p = .25$, $d = 0.10$, 95% CI = [−0.07, 0.27]).

A large proportion of participants reported experiencing COVID-19-related disruptions in health care, most commonly mental health care. Health care disruptions were more common in TNB, relative to cisgender LGBQ participants ($\chi^2(1) = 12.11$, $p = .001$, $d = 0.27$, 95% CI = [0.12, 0.43]), and this remained true after removing participants who reported disruptions only in medical care related to sexual/gender identity ($\chi^2(1) = 7.58$, $p = .006$, $d = 0.22$, 95% CI = [0.06, 0.38]). Gay/lesbian cisgender participants did not differ medical care disruptions from other cisgender sexual minority participants ($t(414.88) = 1.75$, $p = .08$, $d = 0.15$, 95% CI = [−0.02, 0.32]).

Table 2. COVID-19 Related Stressors and Consequences.

	n (%)	M (SD)
Living situation changed	237 (26.54)	
Housemates aware of LGBTQ+ identity (n = 744)		
Not at all	67 (9.01)	
Slightly	93 (12.50)	
Moderately	78 (10.48)	
Very	98 (13.17)	
Extremely	366 (49.19)	
Other	42 (5.65)	
Avoid indicating sexual orientation to housemates (n = 737)		3.43 (3.82)
Avoid indicating gender identity to housemates (n = 261)		4.59 (4.26)
Experienced health care disruptions (n = 890)	362 (40.54)	
Related to sexuality or gender	58 (6.49)	
Related to mental health	237 (26.54)	
Related to a health condition	122 (13.66)	
Related to something else	48 (5.38)	
No interruptions	534 (59.80)	
COVID-19 Family Stress Screener		
Food running out or being unavailable		2.40 (1.40)
Losing a job or decreased family income		3.28 (1.49)
Housing or utilities		2.62 (1.42)
Loss of or limited childcare		1.73 (1.12)
Taking care of children, including those normally in school		1.88 (1.25)
Tension or conflict between household members (n = 744)		3.51 (1.33)
Physical health concerns for me or a family member		3.82 (1.26)
Increased anxiety or depression		4.34 (0.99)
Reminders of past stressful/traumatic events		3.37 (1.43)
Loss of social connections or social isolation		4.22 (1.01)
Interruption in medical care		2.81 (1.40)

Note. Items pertaining to living with others are drawn from the sample of individuals who did not indicate that they lived alone (n = 744). The term 'housemates' is used above to refer to anyone that the person is living with at the time, which could include parents, children, partners, siblings, friends, roommates, or others. Other items are drawn from the entire sample (N = 893) unless otherwise specified.

Anxiety/depression and loss of social connections/social isolation were reported as the greatest stressors included in the COVID-19 Family Stress Screener. Concerns about children had the lowest levels of endorsement; as no items were administered to assess parenting or caregiving, this may be due to inclusion of responses from individuals without caregiving responsibilities, rather than low levels of stress related to childrearing. Of the three items assessing financial strain, highest endorsement was found for stress related to job security and/or family income, followed by housing/utilities stress and food scarcity. TNB participants did not differ from cisgender LGBQ participants in social disconnection stress ($t(551.65) = 0.19$, $p = .85$, $d = 0.01$, 95% CI = [−0.13, 0.15]), but did report higher levels of stress related to financial strain ($t(891) = 3.64$, $p < .001$, $d = 0.26$, 95% CI = [0.12, 0.40]). There were no differences in social disconnection stress or financial stress between cisgender gay/lesbian and other sexual minority participants (social $t(587) = 0.93$, $p = .35$, $d = 0.08$, 95% CI = [−0.09, 0.25]; financial $t(588) = 1.43$, $p = .15$, $d = 0.13$, 95% CI = [−0.05, 0.30]).

Pandemic-Related Impacts and Mental Health Outcomes

We tested our four specific hypotheses regarding the predictors outlined above (social disconnection, health care disruptions, disclosure avoidance, and financial strain) in association with depression, anxiety, and suicidal ideation (SI) in separate models. Age was included as a covariate in all models; ethnoracial identity was included as a covariate in models predicting SI and in models with disclosure avoidance as a predictor. Covariates were selected on the basis of statistically significant associations with the outcome of interest for each specific model (see methods section above).

In summary, all hypotheses were supported (see Supplemental Tables 1–4). In separate models, social disconnection, health care disruption, and financial strain were each significant predictors of

depression, anxiety, and SI, controlling for age and, as relevant, ethnoracial identity. The impact of disclosure avoidance was assessed only in the subsample that reported they did not live alone. Results were consistent with those found for other hypotheses: controlling for relevant covariates, greater disclosure avoidance was positively associated with depression, anxiety, and SI.

Exploratory Analyses: Gender Identity and Patterns of Risk

Given the associations between gender identity and our predictors and outcomes of interest, the models above were expanded to include TNB identity (TNB versus cisgender LGBQ) as a predictor and as a moderator (interacting with each predictor of interest). In all cases, adding TNB identity as a predictor significantly increased the proportion of variance explained by the full model, and TNB status was a significant predictor of each outcome. However, there were no significant interactions between predictors of interest and TNB status, meaning, the pattern of relationships between each predictor and each outcome did not differ between TNB and cisgender LGBQ respondents. Model results with TNB status included, but without interaction terms can be found in Table 3; full results for all models testing TNB interactions can be found in Supplemental Tables 1–4.

Exploratory Analyses: Sexual Orientation and Patterns of Risk

Cisgender gay/lesbian participants reported lower anxiety (but not depression or SI) compared to other cisgender sexual minority participants. Further, we found no evidence of differences between these two subgroups in our predictors of interest (social disconnection, medical disruptions, financial strain, disclosure avoidance). Thus, to simplify presentation of results, we examined sexual orientation among cisgender participants (gay/lesbian or other sexual minority) as a potential predictor and moderator (interacting with other predictors of interest) for anxiety only, following parallel procedures for testing of TNB identity. In all cases, inclusion of these predictors and interaction terms did not significantly improve the proportion of variance explained in each outcome, nor were the individual variables significantly associated with outcomes at any level. Results of these models are presented in Supplemental Tables 1–4.

Table 3. Primary Single-Predictor Model Results.

Model	Predictor	Depression			Anxiety			Suicidal Ideation		
		β	t	p	β	t	p	β	t	p
1	Age	−0.13	−3.94	< .001	−0.16	−4.79	< .001	−0.13	−3.80	< .001
	Ethnoracial Identity	–	–	–	–	–	–	0.09	2.54	.01
	Social Disconnection	0.19	5.84	< .001	0.14	4.17	< .001	0.08	2.37	.02
	Gender Identity	−0.20	−5.95	< .001	−0.16	−4.79	< .001	−0.14	−4.01	< .001
2	Age	−0.16	−4.67	< .001	−0.18	−5.46	< .001	−0.14	−4.21	< .001
	Ethnoracial Identity	–	–	–	–	–	–	0.08	2.34	.02
	Health Care Disruptions	0.14	4.06	< .001	0.17	5.04	< .001	0.09	2.77	.001
	Gender Identity	−0.18	−5.35	< .001	−0.14	−4.17	< .001	−0.12	−3.65	< .001
3	Age	−0.09	−2.33	.02	−0.10	−2.78	.01	−0.10	−2.62	.01
	Ethnoracial Identity	−0.05	−1.41	.16	−0.05	−1.32	.19	0.02	0.41	.68
	Disclosure Avoidance	0.24	6.20	< .001	0.19	4.70	< .001	0.21	5.27	< .001
	Gender Identity	−0.18	−4.93	< .001	−0.13	−3.44	.001	−0.10	−2.75	.01
4	Age	−0.15	−4.55	< .001	−0.17	−5.41	< .001	−0.14	−4.13	< .001
	Ethnoracial Identity	–	–	–	–	–	–	0.08	2.32	.02
	Financial Strain	0.24	7.25	< .001	0.32	10.13	< .001	0.20	5.85	< .001
	Gender Identity	−0.17	−5.09	< .001	−0.12	−3.76	< .001	−0.11	−3.34	.001

Note. Gender identity: 0 = transgender or non-binary, 1 = cisgender; ethnoracial identity: 0 = non-Hispanic/Latinx White, 1 = ethnoracial minorities; – = variable not included in model.

Omnibus Models

As all four tested predictors were significantly related to our outcomes of interest in separate models, an omnibus model for each outcome was constructed in which covariates were entered in block one, followed by all predictors simultaneously examined in block two. Age and gender identity (TNB status) were included as covariates in all models. Ethnoracial identity was examined as a covariate, given its association with disclosure avoidance, but was not significantly related to depression or anxiety when tested in a preliminary model with age, ethnoracial identity, and TNB status; as a result, ethnoracial identity was only included as a covariate in the SI model. Full results for all omnibus models are available in Table 4.

Across all omnibus models, significant variance was explained by the set of predictors, and inclusion of the four predictors of interest yielded significant improvements in variance explained relative to a covariate-only model. Further, gender identity (TNB status) retained a significant association with each outcome of interest, controlling for other predictors.

With respect to specific predictors, all four hypothesised risk factors (disclosure avoidance, financial strain, social disconnection, and health care disruptions) retained significant associations with depression symptoms and anxiety symptoms in omnibus models. With respect to SI, disclosure avoidance and financial strain showed significant predictive value, whereas social disconnection and health care disruptions did not.

Discussion

The COVID-19 pandemic has placed marginalised individuals at greater risk of significant negative consequences with respect to physical and emotional health (Kwong et al., 2021; McGinty et al., 2020; Raifman et al., 2020). In particular, LGBTQ+ individuals are likely to experience greater

Table 4. Omnibus Multiple-Predictor Model Results.

Depression	β	t	p	R	R^2	F (df1, df2)	p F	FΔ (df1, df2)	p FΔ
Block 1				0.26	0.07	24.31 (2, 690)	< .001	24.31 (2,690)	< .001
Age	−0.06	−1.51	.13						
Gender Identity	−0.13	−3.60	< .001						
Block 2				0.45	0.21	29.49 (6, 686)	< .001	30.03 (4, 686)	< .001
Social Disconnection	0.15	4.25	< .001						
Health Care Disruptions	0.08	2.05	.04						
Disclosure Avoidance	0.26	6.99	< .001						
Financial Strain	0.20	5.70	< .001						
Anxiety									
Block 1				0.25	0.06	22.31 (2, 690)	< .001	22.31 (2, 690)	< .001
Age	−0.11	−2.97	.003						
Gender Identity	−0.09	−2.43	.02						
Block 2				0.46	0.21	30.46 (6, 686)	< .001	32.49 (4, 686)	< .001
Social Disconnection	0.07	2.05	.04						
Health Care Disruptions	0.10	2.71	.007						
Disclosure Avoidance	0.19	5.26	< .001						
Financial Strain	0.30	8.37	< .001						
Suicidal Ideation									
Block 1				0.23	0.05	12.82 (3, 694)	< .001	12.82 (3, 694)	< .001
Age	−0.07	−1.85	.07						
Ethnoracial Identity	0.06	1.64	.10						
Gender Identity	−0.08	−2.10	.04						
Block 2				0.37	0.14	15.50 (7, 690)	< .001	16.64 (4, 690)	< .001
Social Disconnection	0.04	1.11	.27						
Health Care Disruptions	0.05	1.30	.20						
Disclosure Avoidance	0.22	5.75	< .001						
Financial Strain	0.19	5.08	< .001						

Note. Gender identity: 0 = transgender or non-binary, 1 = cisgender; ethnoracial identity: 0 = non-Hispanic/Latinx White, 1 = ethnoracial minorities.

difficulties as a result of sociopolitical changes that follow from the COVID-19 pandemic, such as unemployment, economic and housing instability, health care inequities, and limited social support, relative to their heterosexual/cisgender peers Lopez et al., 2021; Rosa et al., 2020). The aim of the current study was to test specific COVID-19 pandemic-related changes and stressors (i.e. social disconnection, disruption in physical or mental health care, sexual orientation or gender identity disclosure avoidance, and financial and economic strain) as potential mechanisms contributing to depression, anxiety, and suicidal ideation (SI) among LGBTQ+ individuals.

An exploratory aim was to examine how multiply minoritized individuals within the LGBTQ+ community were differentially impacted by these changes, particularly with respect to gender identity and sexual orientation. Although prior research has demonstrated health disparities relevant to LGBTQ+ people during the COVID-19 pandemic (Gonzales et al., 2020; Rodriguez-Seijas et al., 2020; Sanchez et al., 2020; Suez et al., 2020), studies have been limited by examination only of a subset of the LGBTQ+ community (e.g. cisgender LGBQ only, TNB only, college students) and/or by an inability to test possible mechanisms underlying these disparities.

Consistent with prior research, distress related to social disconnection was high in our sample (Ruprecht et al., 2021; Suen et al., 2020). Although prior research has suggested pandemic-related social disconnection was more common among TNB, relative to cisgender sexual minority, youth (Mitchell et al., 2022), no differences between cisgender and TNB adults were found related to social disconnection in these data. Further, social disconnection was significantly associated with greater depression, anxiety, and SI across cisgender and TNB participants. We also found that disruptions in medical care were common among LGBTQ+ people, particularly for TNB individuals, and these challenges were, consistent with prior research, associated with increased depression, anxiety, and SI (Gonzales et al., 2020; Jarrett et al., 2021). Indicators of financial and economic strain were also associated with poorer mental health outcomes, a novel finding previously only examined in large studies of predominantly heterosexual and cisgender adults (Kwong et al., 2021; McGinty et al., 2020; Raifman et al., 2020). Finally, our study is the first known examination of disclosure avoidance as a potential correlate of poor mental health outcomes in LGBTQ+ adults, with results indicating that greater sexual orientation and gender identity disclosure avoidance predicted poorer mental health outcomes across multiple domains.

In models examining all predictors simultaneously, an overall consistent pattern emerged across mental health outcomes. Disclosure avoidance and financial strain retained significant associations with all outcomes and showed the largest effects across models. The influences of health care disruptions and social disconnection were smaller, and no longer statistically significant when predicting SI.

Financial difficulties may have exacerbated social disconnection through reduced access to the technological resources necessary to maintain contacts during the pandemic, such as cellular data service, high-speed internet, and videoconferencing equipment. It is also plausible that financial strain itself exacerbated health care disruptions, insofar as limited financial means may reduce LGBTQ+ individuals' ability to access telehealth care (Lame et al., 2021). Although rates of health insurance coverage for LGBTQ+ individuals have increased in the past decade (Gonzales et al., 2021), LGBTQ+ people are more likely to have coverage through Medicaid than cisgender/heterosexual individuals (Durso et al., 2013), which is associated with reduced access to telehealth services (Ramsey et al., 2021; Rivera et al., 2021).

Interestingly, disclosure avoidance was not significantly associated with other examined predictors ($rs = -.01$ to .03, $ps > .31$), suggesting that disclosure avoidance may be tapping a unique element of minority stress of particular relevance during the COVID-19 pandemic. In general, sexual orientation outness has been associated with increased exposure to external minority stressors, such as discrimination, as well as improved mental well-being, which may be due to increased social support (Chang et al., 2021). Disclosure avoidance during the COVID-19 pandemic may thus reflect an intentional strategy to avoid harmful interactions with unsupportive family or housemates around one's sexual orientation or gender identity, particularly when other domains of external social or

community support may be lacking. Further, research suggests that concealing one's sexual orientation or gender identity predicts a variety of negative mental health outcomes (Jackson & Mohr, 2016; Pachankis, Mahon et al., 2020), and thus may explain the associations found in these data. Our assessment of disclosure avoidance is most consistent with the construct of behavioural concealment and did not consider the affective and cognitive components of concealment, which may differ across LGBTQ+ subgroups and show distinct relationships with mental health outcomes (Brennan et al., 2021). This pattern highlights the necessity of understanding concealment of sexual orientation and gender identity as complex phenomena that vary across time and context when attempting to ameliorate mental health symptoms among LGBTQ+ people.

With respect to exploratory analyses, TNB individuals experienced more significant COVID-19 pandemic-related stressors than cisgender LGBQ participants in all domains. Consistent with prior research, TNB people also reported worse mental health outcomes for depression, anxiety, and SI (Borgogna et al., 2019; Fredriksen-Goldsen et al., 2011; Irwin et al., 2014). However, the lack of significant interactions between TNB identity and other predictors indicates that other, unexplored psychosocial and environmental experiences that occur more commonly among TNB individuals may be driving disparities in mental health outcomes. Although cisgender gay/lesbian participants reported lower anxiety compared to other cisgender sexual minorities, we did not observe any other disparities on the basis of sexual orientation among our cisgender subsample.

This study had several notable strengths. First, data collection occurred online throughout the United States, yielding a broader range of ages, sexual orientations, gender identities, and ethnoracial identities when compared to studies restricted to a specific geographic location or recruitment site within the US (although still not as diverse as a truly representative sample of US LGBTQ+ adults). Second, the study was adequately powered to examine differences in relevant outcomes across different subgroups within the LGBTQ+ community; for instance, many prior studies have been focused on primarily cisgender *or* TNB people, without the ability to examine differences between the two populations. Third, the survey instrument included well-validated measures of a breadth of mental health concerns (depression, anxiety, SI), as well as a novel, COVID-19 pandemic-specific measure of recent stressors, increasing our confidence in the specificity of these findings relative to the COVID-19 pandemic.

As with any study, however, this project had several important limitations that require consideration. Although the sample had a large age range (18 to 76), age was highly skewed, with 90% of respondents under the age of 40; as a result, further research is needed to ensure these results are replicable amongst older LGBTQ+ adults, who were likely under-sampled given our recruitment strategy (e.g. primarily social media advertisements). Second, over three-quarters of participants were non-Hispanic/Latinx White; although adequately powered to differentiate this group from LGBTQ+ individuals from ethnoracial minorities, we were not able to examine differences across (nor within) these groups, whose experiences of disparities during the COVID-19 pandemic likely differed in notable ways (Chen et al., 2020; Hathaway, 2021; Lopez et al., 2021; Macias Gil et al., 2020; Qeadan et al., 2021). Further, we were unable to test the possibility of an interactive effect between ethnoracial identity and pandemic-related stressors in prediction of mental health outcomes, which would have been informative in understanding how the intersection of marginalised identities influences health disparities. Further, the majority of respondents were cisgender women, highlighting the importance of replicating these results in larger samples of sexual minority cisgender men. Data were not collected to assess income, meaning we cannot know how diverse the sample was socioeconomically, nor can we examine whether associations between tested predictors and mental health outcomes vary on the basis of economic status. Third, examined predictors of poor mental health outcomes were derived from the empirical literature and limited by constructs assessed in this dataset; thus, our results cannot speak to the relevance of broad theoretical models, such as minority stress theory, during the COVID-19 pandemic, nor were we able to assess broader socio-ecological constructs that may influence LGBTQ+ well-being (such as local or state-level discriminatory policies and/or legal

protections related to discrimination and health care access). Finally, our measures of disclosure avoidance and medical care disruptions were developed specifically for this study and may not have adequately captured the nuances within these constructs as they differentially relate to cisgender LGBQ and TNB individuals, for instance, due to the combined response option assessing disruptions related to 'sexuality and/or gender', which could include both gender-affirming care as well as other domains of care such as access to contraceptives.

Most critically, the results presented here are drawn from cross-sectional data; as a result, it is impossible to rule out alternative patterns of causality beyond those hypothesised above. For instance, it is possible that depression, anxiety, and SI may contribute to disclosure avoidance, rather than vice versa. In prior research, primarily with cisgender individuals with minoritized sexual orientations, lower levels of outness have been associated with elevated internalised homonegativity and rejection sensitivity (Meidlinger & Hope, 2014), both of which are associated with depression and anxiety (Feinstein et al., 2012; Slimowicz et al., 2020) as well as suicide risk (D'Augelli et al., 2001; Mereish et al., 2019).

Implications and Recommendations

Results from this study have clear and significant implications for future research, clinical care, and policy interventions to improve LGBTQ+ well-being. With respect to intervention and prevention efforts, our results are consistent with the broader literature on social determinants of health, which highlight the role of factors outside of the individual, such as characteristics of families, communities, and public policies, in influencing mental health and generating related disparities (Alegría et al., 2018). Thus, results may inform both individual- and community-level approaches to remediate these disparities. At the individual level, results also provide valuable future directions for interventions with at-risk LGBTQ+ people and others in their social environments; for instance, two brief web-based writing interventions yielded improvements in mental health outcomes among LGBTQ+ young adults in low resource settings reporting high LGBTQ+ minority stress (Pachankis, Williams et al., 2020). Recent development of affirmative dialectical behaviour therapy has shown promising results for sexual minority veterans by facilitating skill development and behavioural change in the context of invalidating and potentially unsafe environments (Cohen et al., 2021). At the contextual and societal level, programmes and policies associated with improved LGBTQ+ well-being relevant to our examined drivers of disparities include online support communities (Devito et al., 2019), expansion of health insurance coverage, such as Medicaid (Kim et al., 2020), and federal anti-discrimination legislation to promote LGBTQ+ access to employment (Pizer et al., 2012).

With respect to future research, our results should be replicated amongst older LGBTQ+ adults, who were underrepresented in these data, and among members of minoritized ethnoracial groups. The use of purposive sampling to increase the ethnoracial diversity of LGBTQ+ samples in research is critically important to expanding our understanding of intersecting health disparities relevant to LGBTQ+ people of colour (Croom, 2000; Harper et al., 2004). Future studies should also aim to examine a broader range of individual, family, community, and policy level factors that may influence LGBTQ+ mental health to identify the most critical domains in need of intervention. Clinically relevant research is needed to identify best practices to improve social and familial support for LGBTQ+ individuals to improve mental health outcomes (Newcomb et al., 2019). Longitudinal research is also critical to better understand the temporal processes that contribute to changes in mental health outcomes for LGBTQ+ individuals. As continued emphasis is placed on the need to understand and examine mechanisms of health disparities, future research should ensure that adequate data are collected to fully understand not only the presence of health disparities related to sexual orientation and gender identity, but also the potential drivers of these disparities to develop effective prevention and intervention efforts.

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