COVID-19 and Mental Health: Framing Emotional Concerns and Identifying Coping Mechanisms

Tyler Kachulak

Department of Sociology, MacEwan University

Abstract

This content analysis examined 653 Twitter tweets from two threads in order to explore the ways in which emotional concerns are contextualized during the COVID-19 pandemic and sought to identify coping mechanisms mentioned in tweets following government-legislated lockdowns and social isolation measures. A purposive sampling method was employed to collect tweets possessing characteristics of interest to the present study. An open-coding procedure was utilized to examine any salient meanings or keywords, and the frequency of occurrence of contextualized emotional concerns and identified coping mechanisms was recorded. Results revealed 7 main ways within which emotional concerns were framed, including: COVID-19 Virus, School-Related, Groups/Individuals, Social Institutions, Financial/Work-Related, Mass Media, and Other. Results also revealed 10 themes in which coping mechanisms were identified: Hobbies/Interests, Social Media, Offering Resources, Substance Use, Connecting with Others, Eating, Raising Awareness/Promoting Compliance, Religion/Optimism, Humor/Sarcasm, and Other. Although previous literature has demonstrated that people exhibit psychological distress during a global health crisis, this study adds to the growing body of literature on COVID-19 and outlines the contexts in which emotional concerns arise during a pandemic and how people are coping through these unprecedented times. These findings provide insight into how individuals are sharing concerns about their mental health with others via Twitter during the COVID-19 pandemic, and points to the need for psychological interventions specifically oriented towards global health crises in the midst of government mandated lockdown measures.

Introduction

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic. This declaration inevitably caused a worldwide frenzy and brought myriad emotions with it at the micro-level as individuals struggled to process what was occurring around them; from shock and disbelief, to fear and uncertainty, passivity, heightened anxiety, and even anger. However, the significant impacts of COVID-19 have extended beyond individuals. At the macro level, social structures in society were challenged as they sought to adapt and endure the new realities afforded by the coronavirus which led to nationwide lockdowns and the closure of businesses; thus, exacerbating already high unemployment rates. The healthcare system was impacted by staffing shortages and continues to be challenged by surges in waves of positive Covid-19 admissions. Educational institutions were forced to quickly shift to the delivery of online curriculums and continue to transition into alternate forms of teaching and learning such as the use of hybrid modalities. Families have had to make difficult choices with respect to who to include or exclude within the parameters of social isolation measures and how to perform caregiving functions within the context of other disruptions (such as school and daycare closures and restrictions to long-term care facilities).

Such unprecedented large-scale shifts and impacts on institutional structures pose a substantial 'threat' to society as we know it. Ulrich Beck's (1992) early notion of a modern "risk society" appears to have come to fruition, where in this era of post-industrialization and globalization, a virus (COVID-19) has the capacity to pose dire consequences for the world, as a whole and hence, the present focus on how best to manage this risk. We see evidence of risk management in the decisions made by health officials and politicians, where the goal of imposed lockdowns and social distancing measures has been to limit the spread of the disease and to minimize the potential for extreme outcomes, including death (particularly among highly vulnerable groups such as the elderly and those with underlying health implications). Of particular interest to sociologists, is the social impact of these decisions for individuals whose 'normal' social roles were drastically altered in the preceding year through the inability to access friends and family members in person, attend church services, be present at events such as weddings or funerals, go to school with classmates, engage in extra-curricular activities, partake in social outings, or even eat out in restaurants. As social beings, this inability to be social (or even readily access in-person social support systems) poses short term implications for everyone's health and well-being, may exacerbate existing underlying conditions, and it may even foster longer-term issues that will continue to adversely affect society well beyond the pandemic. Earlier outbreaks of Ebola, SARS, and H1N1 provide us with insight into ways in which prior health crises impacted the well-being of individuals and groups in society.

Severe Acute Respiratory Syndrome (SARS) is an example of an earlier 2003 coronavirus disease outbreak that started in China and significantly impacted the mental health of individuals across multiple countries (World Health Organization. 2021). Sim, Chan, Chong, Chua, and Soon (2010) found prevalent levels of psychological and posttraumatic morbidities among respondents in Singapore, while identifying the transmission of SARS as a leading concern. Ko, Yen, Yen, and Yang's (2006) study on the impact of SARS in Taiwan identified higher levels of depression among individuals who experienced or were directly impacted by SARS, and Mak, Chu, Pan, Yiu, and Chan's (2009) study on the psychological impact of SARS for survivors in Hong Kong found that more

than a third of those surveyed reported having a psychiatric disorder. These studies on SARS outline the demonstrable effect that SARS had on the mental well-being of individuals during and after the outbreak.

H1N1 was another historical influenza outbreak in 2009 that started in Mexico and claimed the lives of thousands, and subsequently impacted the mental health of many individuals across the globe (Gibbs, Armstrong, & Downie, 2009). For example, widespread levels of anxiety were identified among the general populations of Hong Kong and the Netherlands (Liao, Cowling, Lam, Ng, and Fielding, 2014; Bults et al. 2011). Furthermore, Rubin, Amlôt, Page, and Wessely (2009) reported finding anxiety over H1N1 in close to a quarter of those surveyed in England, Scotland, and Wales while demonstrating that poor social well-being (i.e. unemployment, poverty, lack of education) can exacerbate the psychological and emotional impacts of pandemics. These H1N1 studies outline the mental health impacts that H1N1 inflicted upon individuals.

More recently, an Ebola outbreak between 2014 - 2016 deeply impacted West Africa, especially Sierra Leone, as mortality and morbidity rates created numerous mental health challenges. Jalloh et al.'s (2017) study on residents in Sierra Leone found high levels of anxiety, depression, and PTSD, while Kamara et al. (2017) also notes that psychological distress and social problems were common among Sierra Leone residents during the Ebola outbreak. Similarly, Schultz, Baingana, and Neria (2015) reported heightened psychological disorders (i.e. anxiety, depression, PTSD) among those exposed to trauma and perceived life threats, while Ji et al. (2017) found extremely high levels of psychological distress (i.e. obsessive-compulsive, anxiety, paranoia) among Ebola survivors. Overall, past literature has explored the ways in which SARS, H1N1, and Ebola have significantly impacted the mental health and well-being of groups in particular parts of the world. While Covid-19 still looms at the time of writing, with vaccinations in their infancy, there is already research to suggest that the pandemic has had and will continue to leave psychological impacts in its wake.

For example, Wang et al. (2020) found that over half of respondents among the general population in China rated the psychological and emotional impacts of

COVID-19 as moderate to severe; with much of the emotional stress tied to concerns over family health. Similarly, Skapinakis et al. (2020) found high levels of anxiety and depressive symptoms among respondents in Greece, while Gawrych, Cichoń, and Kiejna (2020) reported high levels of anxiety in Poland tied to individual concerns (their own death, death of loved ones, pre-existing illness, finances, health), societal concerns (healthcare failure, economy), and general concerns (availability of resources, food, masks, helplessness, quarantine/isolation).

The psychological and emotional impacts of COVID-19 may also be implicated by social isolation and mandated quarantines. Singh et al. (2020) identified prevalent levels of sadness and psychological distress among those institutionally quarantined in India, while Bierman and Schieman (2020) found a direct relationship between feelings of isolation and levels of psychological distress. These studies demonstrate that quarantine and isolation measures create a lack of social connectedness and feelings of social isolation, thus posing negative implications towards the mental health and well-being of individuals. While existing literature has explored how COVID-19 has impacted the mental health and well-being of individuals more broadly, critical perspectives, such as those highlighting the work of Karl Marx's (1967) notion of the exploitation of workers under capitalism, or Kimberle Crenshaw's (1989) views on the intersection of sex and race, emphasize how COVID-19 disproportionately impacts the mental health and well-being of particular social groups.

For instance, front-line health care workers constitute a subgroup within the context of COVID-19 who continue to risk their lives daily. Almost three-quarters of healthcare workers in India were identified as exhibiting fear over contracting and transmitting COVID-19 (Rathore et al., 2020). Moreover, Shechter et al. (2020) and Du et al. (2020) found significant levels of psychological distress (i.e. anxiety and depression) towards COVID-19 among healthcare workers in New York and Wuhan, China, respectively. Similarily, in Egypt, high levels of stress, depression, and anxiety were evident among healthcare workers (Youssef, Mostafa, Ezzat, Yosef, & Kassas, 2020). All around the world, healthcare workers continue to be

challenged and negatively impacted by the psychological impacts of COVID-19.

Sex and race are other important determinants in the disproportionate impact COVID-19 has had on mental well-being. Ausín, González-Sanguino, Castellanos, and Muñoz (2020) found that women in Spain were more likely to suffer from increased levels of psychological distress compared to men as a result of lockdown measures, while heightened levels of psychological distress were also reported for women (as compared to men) in Israel and Australia during the COVID-19 pandemic (Kimhi, Marciano, Eshel, Emeritus, & Adini, 2020; Rahmen et al., 2020).

Within the context of race, the Centers for Disease and Control Prevention notes the mental health disparities disproportionately experienced by Black populations, with the addition of COVID-19 putting them at a higher risk for mental health challenges (Lipscomb & Ashley, 2020). Czeisler et al. (2020) also found that suicide ideation was significantly higher among respondents who were from minority racial/ethnic groups. Furthermore, COVID-19 developed in Wuhan, China. As such, Asians have suffered much discrimination and stigmatization during the pandemic, with Lee (2020) identifying a strong link between racial discrimination and psychological distress among Asians. This negative relationship between race and mental health outlines that racial minorities are at heightened risks for mental health challenges.

Different age groups, such as the elderly and youth, comprises especially vulnerable groups within the context of COVID-19. The probability of dying of COVID-19 among those aged 55+ is 30x higher compared to the younger generation (Centers for Disease Control and Prevention, 2020), and Kim and Jung (2020) discovered that social isolation strongly predicted poor mental health in older adults (55+) – with higher COVID-related deaths corresponding to higher levels of psychological distress. Additionally, Santini et al. (2020) also found that social disconnectedness correlated to heightened anxiety and depressive symptoms among older Americans – outlining that those in long-term care facilities, feelings of isolation and disconnectedness among the elderly were exacerbated during the COVID-19 pandemic. However, youth are anything but immune to the

disproportionate impact of COVID-19. Hawke et al. (2020) discovered a drastic decline in mental health among youth in Toronto, with many turning to substance use as a coping mechanism. Similarly, Mohammadzadeh et al.'s (2020) study on the psychological effects of COVID-19 on Iranian youth found significant levels of moderate to severe anxiety. These studies demonstrate that youth are also heavily impacted by COVID-19 in terms of mental health – especially in the case of school closures and lockdown measures which resulted in less social connectedness (Jaio et al., 2020)

In addition, other vulnerable social groups, including the LGBTQ2S+ community and students, are disproportionately impacted by the COVID-19 pandemic. According to the American Psychological Association (APA) and CDC, psychological morbidities and other pre-existing mental health conditions have increased among the LGBTQ2S+ community during the COVID-19 pandemic – with substance use increasing as a coping mechanism (Wallach et al., 2020). Meanwhile, Baloran (2020) examined the mental health impact on students in the Philippines and prevalent levels of anxiety and emotional concerns tied to food and financial resources. Zhao, An, Tan, and Li (2020) also found prevalent rates of psychological and posttraumatic morbidities among self-isolating college students in China - demonstrating the negative impact that pandemics have on the mental health of students.

Taken together, these studies highlight how groups in society have or are being impacted by global health threats. Although previous literature has explored the psychological impacts of pandemics on different groups in society, the present study adds to the growing body of literature on COVID-19 by exploring what people share publicly about their mental health on social media via Twitter during the pandemic. More specifically, this study examines how emotional concerns and coping strategies are contextualized within tweets following government-legislated lockdowns including the suspension of non-essential travel, school closures, and temporary business shutdowns. The current study explores both emotional concerns and coping mechanisms identified by Twitter users to capture both the ongoing struggles and

resilience of social beings during periods of mandated isolation.

Method

Sample

The sample for this study was based on a combined total of 653 tweets from two Twitter threads posted from March 13, 2020 through March 13, 2021 (1-year). The first thread includes 196 tweets obtained through the search terms "covid," "stress," and "concerns," while the second thread includes 457 tweets obtained using the phrase #CopingWithCovid.

Sample Selection

Twitter is one of the most widely used social media networking sites around the globe, with around 330 million active users every month expressing their thoughts, feelings, and experiences about daily life (Tankovska, 2021). As such, Twitter was selected due to its global popularity and usage. To obtain a large sample of tweets possessing the characteristics of interest to the present study, purposive sampling was employed (Symbaluk, 2019). Two threads were utilized: The first thread entailed the advanced search option for tweets containing the keywords "covid," "stress," and "concerns" – therefore, each individual tweet within this thread contains all three of the terms "covid," "stress," and "concerns" to maximize the number of tweets focused on the mental health impact and contextualized emotional concerns identified by individual users within the context of COVID-19. The second thread was obtained through an advanced search option for tweets containing the phrase #CopingWithCovid. As with the initial thread, every tweet contains the phrase #CopingWithCovid to pinpoint the coping mechanisms identified by individual users during the COVID-19 pandemic.

Inclusion and Exclusion Criteria

Under the first Twitter thread, all tweets containing the words "covid," "stress," and "concerns," while either explicitly or implicitly expressing emotional concerns about COVID-19 impacting a context or realm of their life, someone else's life, or a combination of the two, were included in the analysis. Within the second thread, all tweets containing the phrase #CopingWithCovid,

which explicitly or implicitly focused on a strategy by the tweeter, or recommended for others to use by the tweeter, were included in the analysis. Tweets in languages other than English were translated into English using Google Translate. Replies were excluded as they reflect discussions among Twitter users outside of the research objectives. Moreover, links to mental health resources were excluded as they generally originate with organizations and advocacy groups as opposed to individual Twitter users. Also, all tweets from both threads were extracted from the "latest" section so that they were organized chronologically during data collection and analysis. Lastly, any tweets that failed to mention a contextualized emotional concern or failed to identify a coping mechanism were excluded.

Coding Procedure

An open-coding scheme was utilized as each of the 653 tweets were individually examined for any salient meanings or keywords. Once these initial codes were established, the tweets were re-evaluated to identify categories related to contextualized emotional concerns and coping strategies identified by users during the COVID-19 pandemic.

Design

A content analysis is suitable for managing large amounts of data while providing the ability to extract themes and patterns from original data (Symbaluk, 2019). As such, the design is a content analysis of the themes and patterns in 653 tweets from two Twitter threads to examine how emotional concerns are contextualized and framed, and any coping mechanisms identified by users during the COVID-19 pandemic.

Results

Emotional Concerns

Results revealed 7 main contexts in which emotional concerns were expressed during the COVID-19 pandemic in order of prevalence: 1) COVID-19 Virus, 2) School-Related, 3) Groups/Individuals, 4) Social Institutions, 5) Financial/Work-Related, 6) Mass Media, and 7) Other (see figure 1). Further, a majority of Twitter posts (85%) described an emotional concern

within the framework of 1 of the 7 main contexts while twenty-two tweets (15%) identified an emotional concern within multiple (2 or more) contexts within the same tweet.
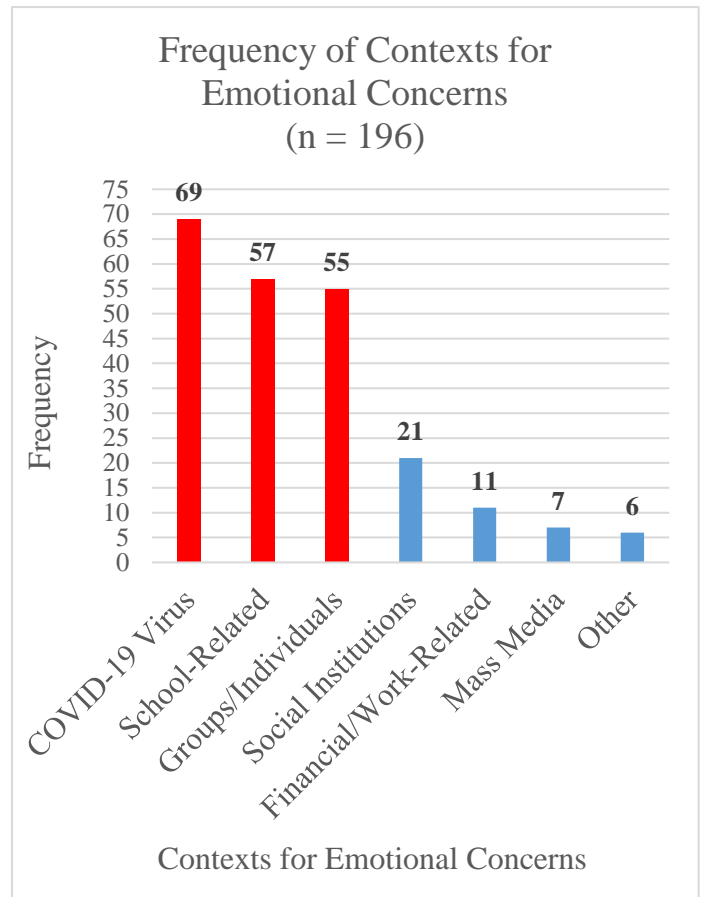

Figure 1: Frequency of Contexts for Emotional Concerns

COVID-19 Virus

Most tweets that mentioned emotional concerns of any kind occurred within the context of COVID-19 itself. For example, psychological concerns were often couched within the experience of the pandemic as exemplified by the tweets: *"Late night thoughts: I've realized this extended quarantine and stress of covid concerns has caused my insomnia to come back with vengeance,"* and, *"Hey remember the concern when America hit 100,000 cases of Covid? Now we're getting 100,000 a day. I know you're tired and stressed. But please wear a mask, distance from others, and limit your exposure."*

School Related

Emotional concerns were also identified within the realm of schooling where tweets expressed emotional concerns related to completing assignments/exams, having to attend class in person, and/or difficulties related to remote learning and technology issues within the broader education system. Examples of tweets within this category include: *"Respected sir In concern with the rising cases of covid-19 we the students of India are in very stressed and tensed situation we are in a situation were we are seeing our death due to exam Pls postpone jee 2020 nd neet 2020 #PostponeNEETandJEE,"* and, *"Teacher training this past week for Covid in my elem school. Concerns: door handles, bathroom cleaning, Keeping masks on for 8 hrs, Add to stress of staying healthy: learning while being 3 ft apart. No partners, no small groups, no private feedback. Way too much."*

Groups/Individuals

The next most prevalent context in which mental health concerns were raised came about within a tweet that emphasized the identification of a group or individuals impacted by COVID-19. Specifically, tweets within this context included emotional concerns towards others including vulnerable groups (students, teachers, children, elderly, youth, LGBTQ2S+, racial/religious minorities, females), the general public, family and/or friends, employers/employees, and personal/own (i.e. themselves) (as shown in figure 2). An example acknowledging the stress directed towards students was: *"I have emailed many TDs and Senator's in relation to my growing concern for the lack of guidance and clarity for 3rd level during this time in particular re to housing, finance, Covid testing & so forth. I will keep all you stressed students updated,"* while one directed at the well-being of employees included: *"Today marks the biggest easing of COVID-19 restrictions since the pandemic began #IrelandUnlocks and latest research shows 45% of employees have raised physical and mental health & wellbeing concerns #coaching can support resilience and stress in the workplace."*
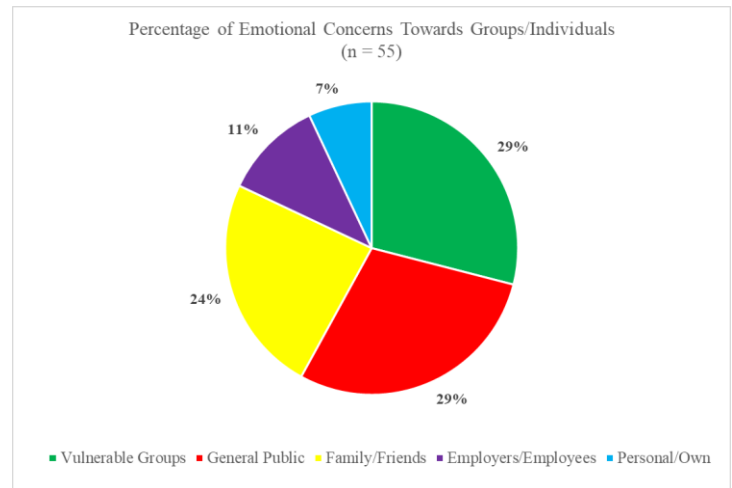

Figure 2: Percentage of Emotional Concerns Towards Groups/Individuals

Social Institutions

Another context in which emotional concerns were evident was within broader discussions regarding social institutions, including politics, the economy, and the healthcare system. For example, two tweets said: *"Spent last night in the ER, not with COVID 19 symptoms, I thought I was having a heart attack! The Stress of this situation…has taken it's toll. TRUMPS concern is NOT for the people, it's for his re-election…"* and, *"While COVID-19 is top of list of concerns, remember, people still have babies, get cancer, have heart attacks, break bones, etc. The health system is stressed!"*

Financial/Work-Related

Emotional issues/stressors were also mentioned as tied into the overall context of financial (personal or business-related) and/or workplace concerns. For instance, one tweet related to financial concerns said, *"I live in Amanora Park Town, Pune. PMC's erroneous tax bills is adding to our concerns and stress when we dealing with COVID. Please do something and get rid of the same."* In addition, workplace concerns often included fears of becoming infected through transmission, as evident in: *"One more day to get through, and I'm stressed out about it. Head office decides to come inspect things (again) during the pandemic. It concerns me about COVID-19 spread. This weekend, I'm going to do some much needed self-care…"*

Mass Media

Mental health concerns were also raised within a variety of contexts that related to use of major forms of mass media. For instance, music tended to be used as a method to cope with stress: *"I just had to put on the usual 'feel good' pop songs that I listened to prior to this COVID crisis, just to keep my mental health."* However, news outlets could enhance stress via the potential for misinformation or inaccurate information: *"The daily news is just creating so much emotional stress right now,"* and, *"The New Scientist has stressed that we are at a very early stage in understanding the features of the new Covid 'variant' and has queried whether government should have announced it in a way which caused public concern. That's why I suspect it is being used as a smokescreen."*

Other

Lastly, emotional concerns were identified within other contexts, including concerns related to the fostering of racism: *"To staff and management at hospitality venues - the new strain of COVID in the UK is certainly alarming and a cause for concern. However, there's no excuse for taking out your stress, fear, anger, or frustration on clientele that identify as or present as East Asian,"* and for the uncertainty surrounding vaccinations: *"There is a lot of concern that the AZ/Oxford vaccine is only 10% effective against the South African strain Please don't stress & refuse the vaccine because there is not a lot of this strain in this country & being protected against the vast majority of COVID is better than none."* Refer to Table 1 for additional examples of the tweets by context.

Table 1: Examples of Tweets (Emotional Concerns) by Context

1. **COVID-19 Virus**	*"These bloody "COVID CONCERNS" all the time is giving me stress!!"* *"Stressed and confused about why quarantine ended in NC while COVID cases continue to rise. I'm seeing way too many Instagram stories of people at bars with no concern about it... The world feels so out of control in so many ways currently."* *"Why is crime up? 1) People aren't working/anxious over economic concerns 2) Stress/tension from Covid 3) Idleness (unnatural for many & leads to problems) 4) Career criminals finding new opportunity targets."*
2. **School-Related**	*"Sir, We are not scared of the exam. We are scared of being Covid positive. We waited whole year for neet but now we're scared & stressed. Pls Understand our concerns."* *"Can't stop chuckling at how my adviser asked me for the first time yesterday how I was handling the isolation and stress of dissertation + covid and like ....bro, I don't know what to tell ya, but your concern is some 4 months too late to be useful to me?"*

	"Raised concerns of parents and teachers at Covid Committee this morning (again) about schools being open until 23rd Dec. Increased stress and infection risk, for no academic benefit. England shutting, now Wales why not Scotland?"		*a lot of stress, mental health concerns going on."* *"Mental Heath problems arising due to stress of Covid-19 is a concern which* @PunjabGovtIndia *should address. A case of suicide by a couple in Amrtsr is shocking. Plz address this issue because many are not so fortunate to tackle it."*
3. **Groups/Individuals**			
a) Vulnerable Groups	*"i love how when grocery store workers express their concerns for covid and the rising fear and stress it's causing it's met with understanding. but with teachers it's like "nobody else is complaining, you're being dramatic."* *"Go to your children. Hug them. Tell them how much you love them. All around me adults are full of worry, concern, stress, and anxiety. Our kids KNOW. They might be bottling it up but they can feel it. Go now, and give them a hug."*	c) Friends/Family	*"I thought living in the Trump Presidency would be stress-inducing madness, but Covid-19 has surpassed even that. My concern for friends and family along with my own mortality are pushing me hard."* *"Dad was stressed out last night talking about family and close friends that have Covid and aren't doing so well. Seeing as how it almost killed him, I understand his concern. All we can do is pray they make it through."*
b) General Public	*"It's been over six months since we're dealing with COVID-19. Other than the disease it has caused, there is*	d) Employers/Employees	*"Risk assessment for COVID-19 is straightforward enough but is there no HSE concern for vulnerable stressed*

	up bosses with one hand tied behind their back. It's as if staff are sick puppets and the boss is the invincible very healthy puppet master." *"Helping returning workers after COVID-19 with stress: 1. Advise staff of safety measures. 2. Mirror a positive attitude. 3. Allow staff to address concerns with management. 4. Remind staff of the support available. 5. Allow some open discussion to occur. 6. Set realistic goals."*	4. **Social Institutions**	*"Maybe look at #Cuomo. Solve Covid-19 concerns & make everyone feel less stressed by hiding the toll on New Yorkers lives using a nursing home dodge. Now that's better than creating panic. Right."* *"Some downplayers of the gas leak suggest the gas isn't very poisonous. But the concern here is the stress the 800+ patients add to the already burden health care system of Andhra Pradesh which is one of the top contenders for CoViD cases."* *"American Feds now limiting big banks spending. This is showing their concern with their stress tests. What would a new American depression look like? Covid cases are at a new high? What's the tipping point?"*
e) Personal/Own	*"A quadrupling of reports of alcohol excesses in the last four months has raised concerns among substance-abuse experts that stress and anxiety caused by COVID-19 may be driving more people to the bottle." [sweats profusely].* *"This last year has been terrible for more reasons than the obvious…this year has broken me, I asked for help, for my kids sake, for my family's sake. I'm still struggling every single day."*	5. **Financial/Work-Related**	*"Hiya. Just checkin back in. Still hoping to put out 3 reviews a week, but I had a busy few last weeks. My job is fully gone now (left due to COVID concerns and no mask mandate), so I'm hunting for a*

	new one. Having to do stuff on the side to get backup funds.” *“Dear Friends, Last year due to covid stress n pandamic we hv lost our 45% client as business shutdown or non payment long dues, if u have any CA related assignment or any service u required for your business n financial purpose, give us opportunity to serve you.”* *“Seriously stressed at work. I just started at a new dental office & multiple staff members have expressed 0 concern for COVID safety. One Dr thinks quarantining & shut downs aren't the answer or that this virus “isn't going away.”*
6. **Mass Media**	*“The media is a concern! I have turned off the constant news about COVID…”* *“Currently muting some friends from my timeline because I found their retweets or likes are toxic for my health. I'm asthmatic and my stamina lately is*

	dropping due to stress and anxiety related to COVID-19 news. I know you have growing concern on our government action & policy.” *“I'm waiting for a brutally honest update on COVID-19. "I understand people have concerns on this new variant, AND RIGHTLY FOOKIN SO. IT'S A GOTDAM NIGHTMARE DYSTOPIA HOLY SHIT I'M STRESSED. EVERYONE SHOULD BE SHITTING BRICKS ABOUT THIS"- dr Hinshaw probably.”*
7. **Other**	*“BREAKING!!! The Houston #Rockets season opener against the Oklahoma City Thunder was postponed due to COVID concerns.”* *“If you have contact with your family this holiday…please stress the importance of getting the COVID-19 vaccine…”* *“After all the booking cancellation requests, only now have you received*

	the concern again to create a new booking. And guest in the lobby. Prior COVID I don't like this issue because it's stressful especially when there is no allotment but now it's fun. Hopefully the travel industry will recover."

Coping Mechanisms

Results also revealed 10 coping mechanisms used to manage emotional concerns and stressors brought on by facets of COVID-19, in order of prevalence: 1) Hobbies/Interests, 2) Mass Media, 3) Offering Resources, 4) Substance Use, 5) Connecting with Others, 6) Eating, 7) Raising Awareness/Promoting Compliance, 8) Religion/Optimism, 9) Humor/Sarcasm, and 10) Other (see figure 3). The majority of Twitter posts included in this sample (87%) mentioned at least 1 of the 10 coping mechanisms while sixty-one tweets (13%) included mention of multiple (2 or more) coping mechanisms within the same tweet.
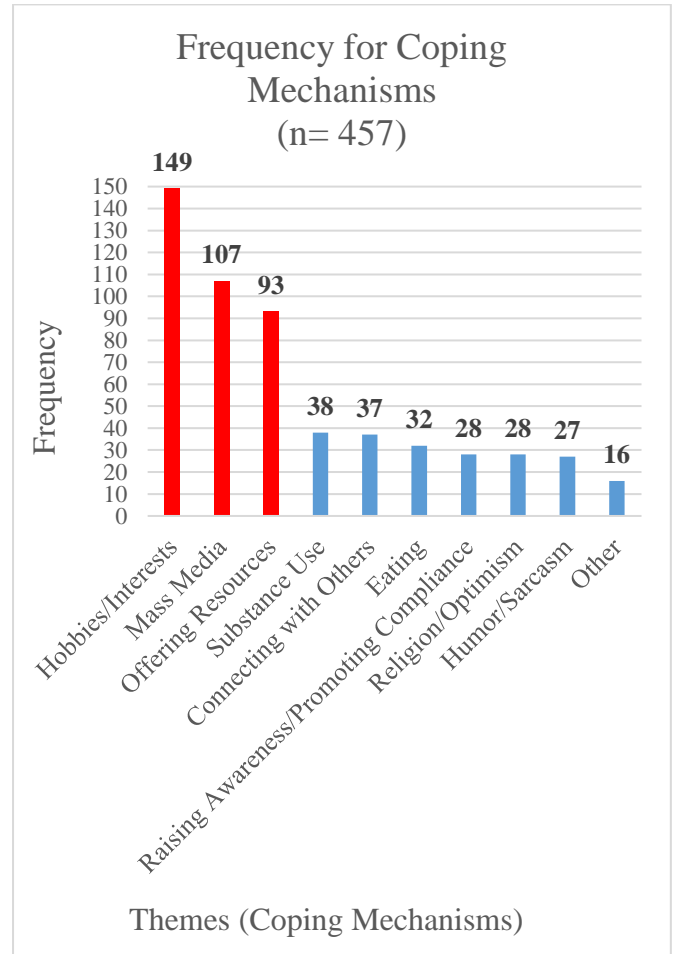

Figure 3: Frequency for Coping Mechanisms by Theme

Hobbies/Interests

Almost 1 in every 3 tweets mentioning a coping mechanisms referred to a hobby or personal interests undertaken in order to cope during the pandemic; such as engaging in literature (i.e. reading or writing) or shared writing (i.e. poetry, sending cards, academic or philosophical quotes), comforting/relaxing activities, yoga/meditation, exercise, cleaning, cooking at home, nature/outdoors, shopping, board/card games, to-do lists/routines, learning, daydreaming/reminiscing, dancing, and enjoying pets/animals. Two tweets within this category include: *"I meditate every morning for 10 minutes anyway, but the addition of 45 minutes yoga, seems to be what I need during lockdown,"* and, *"Yesterday, I sanitized my entire purse including all the contents with Clorox wipes."*

Mass Media

Almost one-fourth of the tweets mentioned engaging with a media source as a coping mechanism, such as tv/movies, social media, music, video games, creating/posting content, and attending online resources. For example, two tweets stated: *"Can't stop rewatching Supernatural <3 besides that supposed Series Finale,"* and, *"I just put an album on entitled 'restaurant music' – yes. It's got to that point of lockdown…"*

Offering Resources

Offering Resources referred to any tweets indicating that the Twitter user either offered coping mechanisms as recommendations for others to use or offered their support as a coping mechanism. Two tweets include: *"Are you struggling w/ stress eating? That desire for carbs when we feel low is an attempt to increase serotonin & dopamine. Be sure you're getting enough sunlight, exercise, starchy vegs, sleep, & social interaction to feed those emotional and hormonal needs,"* and, *"Too busy to exercise for an hour...even 5 minutes of exercise can be beneficial…"*

Substance Use

Substance Use referred to any tweets indicating that the individual user engaged in substances (i.e. alcohol, drugs, or tobacco) as a coping mechanism during the pandemic. Tweets in this category include: *"If depression didn't turn me into an alcoholic, then quarantine will,"* and, *"I think I'll eat some mushrooms today."*

Connecting With Others

Connecting with Others was another evident coping mechanism identified – these tweets indicate that the Twitter user engaged in socializing activities with either their friends, family, or in general as a coping mechanism. Two tweets within this theme are: *"I'm so happy to have friends to brighten up my day! It's rough out here but hearing from friends is PRICELESS! Love you guys!"* and, *"Had a chat with my son, concerned how he's coping with lockdown on his 16th birthday. Informs me that his philosophy on life is one of Optimistic Nihilism and not to worry about him. My*

coping mechanism is late night Zoom/G&Ts until I pass out. Same thing?"

Eating

Eating referred to tweets indicating that the individual user turned eating (healthy or unhealthy) as a coping mechanism. For example, two tweets include: *"Just ordered a shit ton of pizza and chicken alfredo…for myself. This quarantine is my own personal vacation,"* and, *"Homemade keto Kalhua is greeeeeeaaaaattttttt!"*

Raising Awareness/Promoting Compliance

Raising Awareness/Promoting Compliance referred to any tweets indicating that raising awareness or promoting compliance with government-legislated lockdown and social isolation measures was being expressed as a coping mechanism. Two tweets include: *"Freshly 50 (#quinquagenarian) and married 5 yrs now to a #70something / #septuagenarian… #masksmatter in my world FOR REAL!"* and, *"Vaccines are coming…stay safe until they're here…"*

Religion/Optimism

Religion/Optimism referred to any tweets indicating that the individual user turned to religion/faith or is remaining optimistic as a coping mechanism. For example, two tweets include: *"I miss #nyc so much, the sights, the sounds, hell even the #nycsubway. But I do believe #ThisTooShallPass #NYStrong #CopingWithCOVID,"* and, *"We are bigger than corona! The Lord is GREATER than this virus!"*

Humour/Sarcasm

Humour/Sarcasm referred to any tweets indicating that the individual user expressed humour/sarcasm by telling jokes or laughing as a coping mechanism. Two tweets included: *"This is how I ask my friends if they're okay now: "Where are we on this scale of juice box to shots of straight liquor?"* and, *"It feels like Educational Decree number Twenty-Four has been imposed. Umbridge has taken over and Dumbledore is no where to be found."*

Other

Lastly, "other" referred to any tweets indicating that the individual user engaged in some other form of coping beyond any main category identified: *"Today I've been in my little work bubble so could pretend the world isn't falling apart. For 6 hours it's been fun."* However, another tweet said: *"Is it bad if I've begun real-time talking to myself…like having actual out loud conversations with myself. Try it, - it seems to help, lol."* Refer to Table 2 for additional examples of tweets by coping mechanisms.

Table 2: Examples of Tweets (Coping Mechanisms) by Theme

1. **Hobbies/Interests**	*"Shopping in isolation.... it's like a nightclub. Aldi had a 1 out 1 in policy but I was limited to buying only 2 belt sanders and 2 pairs of yoga pants."* *"Everyday I cook a new recipe & send @gabrielkersten pictures & my feedback."* *"Decided to learn another language for something to do when I get anxious. I should be able to speak German in no time!"*
2. **Mass Media**	*"Today, I kept the panic at bay by laying on my couch all afternoon and watching episode after episode of #CallTheMidwife."* *"I signed up for Tik Tok 20 minutes ago and all I've done is fall down the #PatatakChallenge black hole…is this how you do it?"*
3. **Offering Resources**	*"Looking at a longer timeframe of isolation... so I bought an Xbox one s as Jake and I have run out of couch co ops to play."* *"Hot tip: embroidery tutorial videos are very soothing."* *"Wondering how to stay fit, sane & healthy while working from home? I teach and train 1 on 1 health, nutrition & fitness lifestyle w/ the added bonus of D/s controls tailored to you! See website to apply! All online!"* *"Spending time with your pets can decrease your blood pressure and help manage feelings of loneliness or depression…"*
4. **Substance Use**	*"If I don't come out the other side of this thing as a serious alcoholic it will NOT be for a lack of trying."* *"Discovered the most effective coping mechanism for the current 2020 woes is to get baked…"* *"Tonight, I'm going to treat myself to a pharmaceutical intervention…"*
5. **Connecting with Others**	*"Mental Sanity Hour - Every evening 6PM - 7PM virtual friend date. 3 different time zones & we've put aside video*

	insecurities and found comfort in seeing each other! Set up a regular schedule. Don't be afraid to ask. They need it too." *"Listening to my kids talking to and laughing with their friends on their devices is giving me all the social-distance feels right now."* *"Good chat with Dad & step-Mammy who are cheerfully getting on with a sort of hybrid Aussie lockdown. Although, given Dad was extolling the joys of the 'it's great it's just across the road, so I can walk there' Liquor Barn, I'm not surprised they're so cheerful!"*	7. **Raising Awareness/Promoting Compliance**	*"My phone has been ringing like crazy and emails have been piling up. Kids are really really struggling. #COVID is bigger than #wearingamask and #Election2020 !! Please, tend to the #mentalhealth of our children! Get it together!"* *"Mask wearing is about showing respect for the health of others…it deserves enforcement with teeth."* *"2 meters distance, determines our existence…pass it on…"*
6. **Eating**	*"Do I need to order a cake, a dozen French macarons, a pastry 6 pack of croissants, and 7" round Breton shortbread from my local French bakery for the weekend? For just myself?"* *"Chili-cornbread and Easter eggs for lunch. A very satisfactory day."* *"I ate leftover pizza for breakfast and I don't care who knows it…winning the stay at home game."*	8. **Religion/Optimism**	*"I'm remaining positive in #lockdownuk and thinking that the amazing sunshine is nature's way of making up for my 2 cancelled holidays and spending the last 72 days 24/7 with a 5 yr old."* *"It's time like these that remind us of the importance of faith…"* *"Gratitude <3 I'm grateful for supportive family and friends who reach out. I'm grateful for morning coffee."*
		9. **Humour/Sarcasm**	*"Social isolation with your family is a bit like #coffee: it's great in small amounts. But too much really gets on your nerves!"*

	"Craig's List in the time of COVID-19: "You can put cash in the garage and we will be 6 ft away and you can take the piece." *"Encountered my first wave of PMS on quarantine – wow. Next time I'll have to shelter in place within the shelter in place."*
10. **Other**	*"Yesterday, I roasted a squash for my mental health. I had no intention of eating it, but roasting it completely turned my day around."* *"My co-worker has a massive 5th wheel camper…he and his wife move into it on weekends for a change of pace."* *"I find myself blowing bubbles long after my 2yo son has lost interest."*

Discussion

The present study highlights people's everyday concerns both with COVID-19 and their mental health. Many tweets mentioned mental health concerns linked directly to the coronavirus, including fears of contracting deadly forms of the disease or the transmission of it. These prevalent fear responses demonstrate a need for community responses specifically related to infectious disease outbreaks (Sim et al., 2010). However, COVID-19-related fears were also evident within the context of mass media, suggesting that the media uses fear-mongering tactics to frame COVID-19 information in a way that instills fear among individuals and groups and subsequently

promotes compliance with public health measures. Therefore, these results suggest that providing the public with clear and consistent information that focuses on practical behaviors that individuals and groups can do to lower their risk of contracting the virus while providing sufficient knowledge, preparation, and resources to combat the virus (Rubin et al., 2009). Rubin et al. (2009) also notes how emphasizing the efficacy of recommended actions can actually improve compliance of public health measures and government-legislated lockdown and social isolation measures. This could explain how offering resources and raising awareness/promoting compliance came to be prevalent coping mechanisms identified within this current study.

School-related concerns, such as completing exams/assignments, schools being open during the pandemic, and difficulties tied to remote learning/teaching were also evident. Baloran (2020) notes the mental health of students depletes with the implementation of online modalities and creates high levels of anxiety. Unsurprisingly, while school-related concerns were largely raised by students and teachers, the findings suggest the need for additional support and training centered on the application of online-blended learning approaches to alleviate the psychological distress experienced by both students and teachers during pandemics (Baloran, 2020). Furthermore, a large portion of students expressing school-related concerns were youth. Hawke et al. (2020) identified self-distraction, optimism, and humor as prevalent coping mechanisms among youth during the COVID-19 pandemic. These previous findings remain consistent with current findings in that hobbies/interests, optimism, and humor are evident coping mechanisms identified; however, the prevalence of coping mechanisms also reflect the psychological distress experienced by students and/or youth during the pandemic and raise implications for future services and programs specifically tailored to them during these times (Hawke et al., 2020).

Twitter users frequently mentioned mental health concerns regarding themselves and other vulnerable social groups in relation to the current pandemic on social media, suggesting that people are experiencing anxiety and psychological distress highlighted in research on earlier pandemics. For example, concerns

were raised in relation to mental well-being of healthcare workers. Du et al. (2020) suggests that healthcare workers should be closely monitored for depression/anxiety, given training on COVID-19 knowledge, stress management, and self-care, provided with adequate protective equipment, and provided with additional psychological interventions to tackle the negative impacts of COVID-19 on mental health. Furthermore, emotional concerns were also directed towards children. Previous literature has outlined the demonstrable and damaging effects of psychological stress due to negative events and social isolation in children, and therefore, calls for the development and fostering of resiliency within children in order to mitigate these adverse psychological effects during pandemics (Jiao et al., 2020).

The prevalence and varying number of coping mechanisms identified by users in tweets allude to the stress and anxiety experienced by individuals and groups during the COVID-19 pandemic. However, findings also suggest that people are adopting positive coping mechanisms, such as partaking in hobbies or renewing interests, engaging in a variety of mass media networks, and offering resources, support, and recommendations to others for how to cope, more often than identifying negative coping mechanisms, such as turning to substance use. Despite the varying range of contextual concerns and coping mechanisms raised in tweets that formed the basis of this sample, the use of positive coping mechanisms highlights the ability of members of society to adapt during pandemics, which in turn, may have a positive effect on individuals' mental health and well-being (Skapinakis et al., 2020). Therefore, this points to a need for resources tailored towards teaching resiliency and positive coping mechanisms during such unprecedented times in order to mitigate the negative psychological impacts created by pandemics.

Furthermore, an overwhelming majority of Twitter users expressing concerns and identifying coping mechanisms were female and/or part of racial minorities. Previous literature has demonstrated that females, racial minorities, and youth are at significantly higher risks of being disproportionately impacted by the COVID-19 pandemic and are more likely to turn to substance use as a coping mechanism (Rahman et al., 2020; Czeisler et al., 2020; Hawke et al., 2020).

Substance use is also increasing among the LGBTQ2S+ community during the pandemic (Wallach et al., 2020), and given that substance use was identified as a coping mechanism in this current study, this poses the need for services and programs that are specifically tailored towards the already marginalized and vulnerable groups in society in order to mitigate the pre-existing and disproportionate psychological impacts of pandemics. Moreover, COVID-19 survivors can also be subject to prolonged psychological distress after the pandemic has passed and this important consideration should not be overlooked (Mak et al., 2009) – thus calling for support systems tailored towards those who have contracted the virus and survived the global health crises.

Lastly, connecting with others was another prevalent coping mechanism identified by Twitter users in the present study. Bierman and Schieman (2020) and Singh et al. (2020) previously demonstrated that social isolation leads to social disconnectedness, and in turn, heightened psychological distress. This highlights the need for services and programs to keep people connected with one while quarantined or isolated during the pandemic, or in general for people living through government-legislated lockdown and social isolation measures. Since connecting with others was the top coping mechanism identified in Singh et al.'s (2020) study, current findings of connecting with others as a prominent coping mechanism is consistent with previous literature and demonstrates that staying connected during lockdown and social isolation measures is important to people and their mental health as social beings. Consistent with its prominence as an agent of socialization in today's society, the mass media was found to be a primary venue in which emotional concerns were couched in the present study and a prevailing coping mechanism for staying connected with others during the pandemic.

Limitations

Although this study provides rich information regarding contextualized emotional concerns and coping mechanisms of Twitter users during the COVID-19 pandemic, this study is not without its shortcomings. First, the sample collected for this study was based on 653 tweets. This is a relatively small sample size given the global impact of COVID-19;

therefore, external validity is weak. Furthermore, there are other threads on Twitter that can be used to identify contextualized emotional concerns and coping mechanisms of Twitter users. For practical purposes, only two threads were included in this analysis.

Finally, the sample overrepresented certain vulnerable groups while excluding others. For example, an overwhelming number of Twitter users were either female, a racial minority, a combination of the two, or students. In contrast, other vulnerable groups, such as the elderly, children, and LGBTQ2S+ community, were not evident (at least from the material included in the tweet or provided on the site). This uneven representation of vulnerable groups not only holds negative implications for the generalizability of results, but also limits the conclusions that can be drawn for the underrepresented vulnerable groups. However, this may be due to the fact that Twitter attracts particular social groups compared to others.

Future research examining the emotional concerns and coping mechanisms stemming from the pandemic would benefit from a larger sample size, the use of multiple threads, and/or additional forms of social media, such as Facebook, Tik Tok, Reddit, and Instagram, in order to capture a larger and more diversified sample.

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