Twitter users exhibited coping behaviours during the COVID-19 lockdown: an analysis of tweets using mixed methods

Ruchi Mittal
Chitkara University Institute of Engineering and Technology, Chitkara University, Rajpura, India

Wasim Ahmed
Newcastle University Business School, Newcastle upon Tyne, UK

Amit Mittal
Chitkara Business School, Chitkara University, Rajpura, India, and

Ishan Aggarwal
Business Unit of Systems Support R&D, Ericsson India Global Services, Gurugram, India

Mittal, R., Ahmed, W., Mittal, A. and Aggarwal, I. (2021), "Twitter users' coping behaviors during the COVID-19 lockdown: an analysis of tweets using mixed methods", *Information Discovery and Delivery*, Vol. 49 No. 3, pp. 193-202.

Information Discovery and Delivery
https://doi.org/10.1108/IDD-08-2020-0102

Twitter Users Exhibited Coping Behaviours during the COVID-19 Lockdown: An Analysis of Tweets Using Mixed Methods

ABSTRACT

Purpose: Using data from Twitter, this study sought to assess the coping behaviour and reactions of social media users in response to the initial days of the COVID-19 related lockdown in different parts of the world.

Design: This study follows the quasi-inductive approach which allows the development of *pre*-categories from other theories *before* the sampling and coding processes begin, for use in those processes. Data were extracted using relevant keywords from Twitter and a sample was drawn from the Twitter dataset to ensure the data is more manageable from a qualitative research standpoint and that meaningful interpretations can be drawn from the data analysis results. The data analysis is discussed in two parts (1) extraction and classification of data from Twitter using automated sentiment analysis; and (2) qualitative data analysis of a smaller Twitter data sample.

Findings: This study found that during the lockdown the majority of users on Twitter shared positive opinions towards it because of its potential to halt the spread of COVID-19 and prevent further deaths. Our results also found that people were keeping themselves engaged and entertained. We also found several users who were expressing negative sentiments. Our results also found that several users on Twitter were fence-sitters and their opinions and emotions could swing either way depending on how the pandemic progresses and what action is taken by governments around the world.

Implications: We add to the body of literature that has examined Twitter discussions around H1N1 using in-depth qualitative methods and conspiracy theories around COVID-19. In the long run, the government can help citizens develop routines that help the community adapt to a new dangerous environment – this has very effectively been shown, for instance, in the context of wildfires in the context of disaster management. In the context of this research, the dominance of the positive themes within tweets is promising for policymakers and governments around the world. However, sentiments may wish to be monitored going forward as large-spikes in negative sentiment may highlight lockdown-fatigue.

***Keywords*: COVID-19; Pandemic; Coping; Twitter; Lockdown; Mixed-methods**

Introduction

Historically, evaluations of domestic government responses to crises such as epidemics, terrorist attacks, or natural disasters have mostly been critical. This applied to the response of some west African countries that were affected by the 2014 Ebola virus epidemic. Despite governments activating disaster management plans to tackle Ebola, the response fell short largely due to three reasons: (1) a weak healthcare infrastructure, (2) government inexperience, and (3) underestimation of the epidemic's potential to cause devastation(Fofana, 2014; Nossiter, 2014; Benton and Dionne, 2015). The COVID-19 pandemic threatens to expose the same three challenges on a global scale.

The COVID-19 pandemic can be seen as a crisis of epic proportions. How the crisis is handled from beginning to end is critical to the success of the outcome (Golt, 2019). However, the very fact that the disease has spread across the world and has killed several thousand people shows that the crisis response has been slow, staggered, and arbitrary, and this has been the case throughout history for earlier pandemics (Jones, 2020).

In the absence of a vaccine or any other proven form of treatment available, the most effective remedy against COVID-19 is social distancing and voluntary isolation (Mackenzie, 2020). To implement these measures, governments across the world have imposed full or partial lockdowns (Hamzelou, 2020; Mitjà, 2020; Ghosh et al, 2020; Vaughan, 2020) which initially began with a lockdown in Wuhan which was the original epicenter of COVID-19 (Lu, 2020). A lockdown as a crisis response towards an epidemic is not unprecedented, especially when the public needs to be isolated from the threat. An earlier example is the case of Sierra Leone during the Ebola outbreak of 2014 when the country was put into a three-day lockdown (Benton and Dionne, 2015).

Lockdowns, however, are more common in the event of a terrorist threat e.g. the Boston bombing in 2013. Lockdowns on American university campuses are even more frequent due to shooting incidents e.g.a campus lockdown that occurred during a shooting incident on Virginia Tech's campus (Rothaker, 2011), a bomb threat leading to a campus lockdown in Florida, US (Baer et al., 2014). In this era of global connectivity, lockdowns may be necessary given that COVID-19 has spread to almost all parts of the world within a couple of months and has infected almost two million people up to mid-April 2020.

The COVID-19 Lockdown, Coping and Social Media

The recent COVID-19 induced lockdown has led to increased discussions on social media platforms. Platforms such as Twitter and Facebook were originally designed to provide a way of communication between friends and family (Smailhodzic et al. 2016), however, they later gained wide acceptance for sharing feedback, ideas, feelings, and emotions even with strangers about almost anything and everything. Social media is now being seen as an integral part of people's lives (Hussain et al., 2020). Therefore, in times of disaster (Shen et al., 2017), pandemics, and disease outbreaks, it is important to develop an understanding of the content people are sharing on social media (Smith, 2006).

Furthermore, with very little information on how the general public reacts, responds, and copes with a lockdown which is induced by a highly infectious disease, it can be argued that researchers need to

understand the emotional dimension associated with this event. The emotional dimension is also likely to have behavioural consequences (Jin et al., 2010) and the current COVID-19 pandemic is known to increase depression and anxiety in many individuals (Fullana et al., 2020). Among all social media platforms, Twitter is considered to be the most effective when it comes to sharing real-time information (Merchant, Elmer, and Lurie 2011; Palen et al. 2009). Sentiments and emotions expressed on Twitter give an insight into how people are coping with the lockdown.

Lazarus (1991) defines coping as:

> *"an effort to manage and overcome demands and critical events that pose a challenge, threat, harm, loss, or benefit to a person".*

According to Lazarus and Folkman (1984), how one copes with stressful events has the potential to develop into a dominant coping approach throughout one's lifetime. Considering this, it is important to engage in behaviours that help individuals overcome the problem causing the distress. This is known as "problem-focussed coping". Another approach is to adapt oneself and regulate emotions through positive reframing. This is called "emotion-focussed coping".Alternatively, coping refers to stress management through cognitive and behavioral strategies either through a negative or a positive approach (Dempsey, 2002; Folkman and Lazarus, 1985; Berman et al., 1996). Human emotions can also be classified in terms of positive effective valence or negative affective valence (Jin and Cameron, 2007). Previous research also proves that coping is a mediator between stress and its outcome (Grant et al., 2000; Dempsey, 2002; Langford et al., 2017). In the era of positive psychology, there is an increasing focus on positive coping during a crisis where self-regulation and adaption are some of the various manifestations of this coping mechanism (Lopez et al., 2018). Even in the case of very negative or stressful events such as breast cancer (Taylor, 1983); violence (Richters and Martinez, 1993); military veterans (Boals and Lancaster, 2018); prior research has shown the ability of humans to overcome them and lead a positive life through positive coping.

The behavioral response characterized by coping strategies adopted by people specifically towards mass outbreaks of influenza or other infectious diseases can have a negative or a positive impact on public health (Teasdale et al., 2012). In an earlier study, Folkman and Moskowitz (2000) proposed three"meaning-related coping strategies" that lead to the formation of positive emotions amongst individuals namely, "positive reappraisal", "problem-focused coping", and "infusing ordinary events with positive meaning". Garnefski et al (2003) present four negative coping strategies and five positive coping strategies as a function of their cognitive emotion regulation (CER) framework.

The current COVID-19 induced lockdown is an effort by governments around the world to minimize the impact of this highly infectious disease and individuals may require coping strategies to deal with the crisis. This study aims to gain an in-depth qualitative overview into how users communicated on Twitter during the initial days of COVID-19 induced lockdown, and to use sentiment analysis to classify tweets based on polarity i.e. "positive", "negative", and "neutral".

Our research questions are as follows:

RQ1: How do people emotionally respond to a government-enforced lockdown through Twitter communications?

RQ2: Can emerging Twitter communications be classified in terms of a form of coping behaviour?

The biggest advantage of Twitter data is that the information available is free, voluntary, and reflects genuine "almost-real time" opinions or sentiments of users (Zhang et al., 2020). Additionally, data available on Twitter would otherwise be out of the reach of healthcare organizations and researchers (Bosley et al., 2013). Existing research during the COVID-19 pandemic highlighted how world-leaders were utilising the platform in response to the COVID-19 Pandemic (Rufai and Bunce, 2020). Moreover, during a period of a pandemic-induced lockdown, traditional research methods such as interviews and/or surveys may prove to be challenging to conduct due to social-distancing restrictions. An implication of this is that health authorities and/or governments around the world could use similar methods to gain real-time insights into public views and opinions. Our study is unique because it is the first mixed-method study on Twitter designed to develop an understanding of how citizens responded to government-enforced lockdowns. A benefit of using a mixed-method approach is that quantitative sentiment analysis provides insight into sentiments during the entire time-period studied and the qualitative method provides in-depth insights into users' views. These views can then, potentially, be used to inform policy and public health efforts.

We add to the body of literature that has examined Twitter discussions around H1N1 using in-depth qualitative methods and conspiracy theories around COVID-19. In the long run, the government can help citizens develop routines that help the community adapt to a new dangerous environment – this has very effectively been shown, for instance, in the context of wildfires in the context of disaster management. In the context of this research, the dominance of the positive themes within tweets is promising for policymakers and governments around the world. However, sentiments may wish to be monitored going forward as large-spikes in negative sentiment may highlight lockdown-fatigue.

Methods

This study follows the quasi-inductive approach which allows the development of *pre*-categories from other theories *before* the sampling and coding processes begin, for use in those processes (Perry and Jensen, 2001).

On the 21st of March 2020, due to the COVID-19 pandemic, the government of India announced a nationwide lockdown as a measure of enforced quarantine and social distancing. The United Kingdom went into lockdown on the 23rd of March, and many states in the United States began to enforce lockdowns during the end of March. Henceforth, this study retrieved data from March 22, 2020, to April 6, 2020, a 15-day time-period, which coincides with the lockdowns around the world.

For the analysis, data were extracted using relevant keywords from Twitter and a sample was drawn from the Twitter dataset to ensure the data is more manageable from a qualitative research standpoint and that meaningful interpretations can be drawn from the data analysis results. The data analysis is

discussed in two parts (1) extraction and classification of data from Twitter using automated sentiment analysis; and (2) qualitative data analysis of a smaller Twitter data sample.

(1) Extraction and classification of data from Twitter using automated sentiment analysis:

Twitter data from a Twitter development account was extracted and the keywords used to extract the data were: *"lockdown", "TakingOnCorona", "21daylockdown", "SocialDistancing", "StayHome", "StaySafe", "BreakTheChain", "Total Shutdown"*. Tweepy web service was used for data retrieval. Data were retrieved from Twitter's Search Application Programming Interface (API). This was followed by data pre-processing for which "**re**" python module for regular expression was applied. Tweets that do not represent any sentiments were eliminated performing the following functions: (a) removal of hashtags, mentions, URL's, (b) removal of invalid data with indefinite spaces, and (c) removal of duplicate records based on Tweet Id. This was followed by automated coding to help identify original tweets excluding retweets.

The next step was to classify the original tweets. Using the natural language processing (NLP) tool VADER, the entire dataset comprising original tweets was classified into positive, neutral, and negative opinions based on compound polarity scores. Here polarity score is of type float and ranges between [-1.0, +1.0]. VADER takes into consideration emojis, slangs, emoticons, degree modifiers, and capitalizations for score calculation (Hutto and Gilbert, 2014; Becken et al., 2019; Borg and Boldt, 2020; Moutidis and Williams, 2020). Only Tweets in the English language were captured. A total of 801,366tweets were extracted out of which 224,909 original tweets were identified (original tweets = total tweets minus retweets).

***(2)* Qualitative data analysis of a smaller Twitter data sample**

To draw meaningful inferences from the Twitter data, a sample of tweets was drawn from the 224,909 original tweets. The sample size was calculated at 384 (vide table 1).

Table 1: Sample Size Determination

This sample size n: $n = N*X / (X + N - 1)$,

where, n: sample size and $X = Z_{\alpha/2}^2 * p*(1-p) / MOE^2$, and $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error, p is the sample proportion, and N is the population size (224909 i.e. the total original tweets).

Using $X = Z_{\alpha/2}^2 * p*(1-p) / MOE^2$ where $Z_{\alpha/2}^2 = (1.96)^2$, p=50% i.e. 0.5, MOE=5%=0.05

X=384.16

Thus using $n = N*X / (X + N - 1)$

n=383.5066495 which is approximately equal to 384.

The next step was to distribute 384 tweets proportionately to each day within our sample and to each classification that was conducted earlier .i.e. positive, negative, and neutral. The stratified random sampling technique was utilised. The 384 sample tweets were distributed proportionately for each day and the recommended sample for each classification (positive, negative, and neutral) was further calculated to ensure proportionate representation. The "generate random number" formula in MS-Excel was used to ensure that only random tweets are assigned to each category. The relevant tweets corresponding to the random number assigned were extracted from a separate Excel sheet where all the 224,909 tweets were recorded day-wise and further classified as positive, negative, and neutral (figure 1).

The distribution of the 384 tweets was as follows: positive tweets – 154, negative tweets – 89, and neutral tweets – 141. The text of the tweets was segregated into three files (documents) and the data was further analyzed using the MAXQDA qualitative and mixed-methods data analysis software (Kuckartz and Rädiker, 2019). The three documents were named (1) Positive_154, (2) Negative_141, and (3) Neutral_89. In regards to the coding process, three pre-determined broad themes were *positive coping*, *negative coping,* and *neutral coping,* and further themes were generated based on the content being analysed using content analysis based on the inductive data-driven approach (Perry and Jensen, 2001). Some of the additional themes were classified as: "violence, theft, and abuse"; "humour"; "learning something new"; "economic impact"; "sarcasm"; "precautions"; "government and leadership"; "health and safety"; "motivation and adaption", "optimistic and happy" and so on. The detailed list of the themes and the corresponding frequency is given as per table 2. A total of eighteen themes were generated. 93% of all content in the three documents were coded and for the remaining 7% the language was ambiguous and not suitable for any type of coding.

Results

The results of our study are provided in two sections. Firstly, the results from our automated sentiment analysis will be presented and secondly, we will present results from our qualitative analysis.

Results of Automated Sentiment Analysis

Figure 1 below presents the polarity results from our automated sentiment analysis based on a total of 224,909 original tweets from 15 days 22nd of March to the 6th of April 2020.

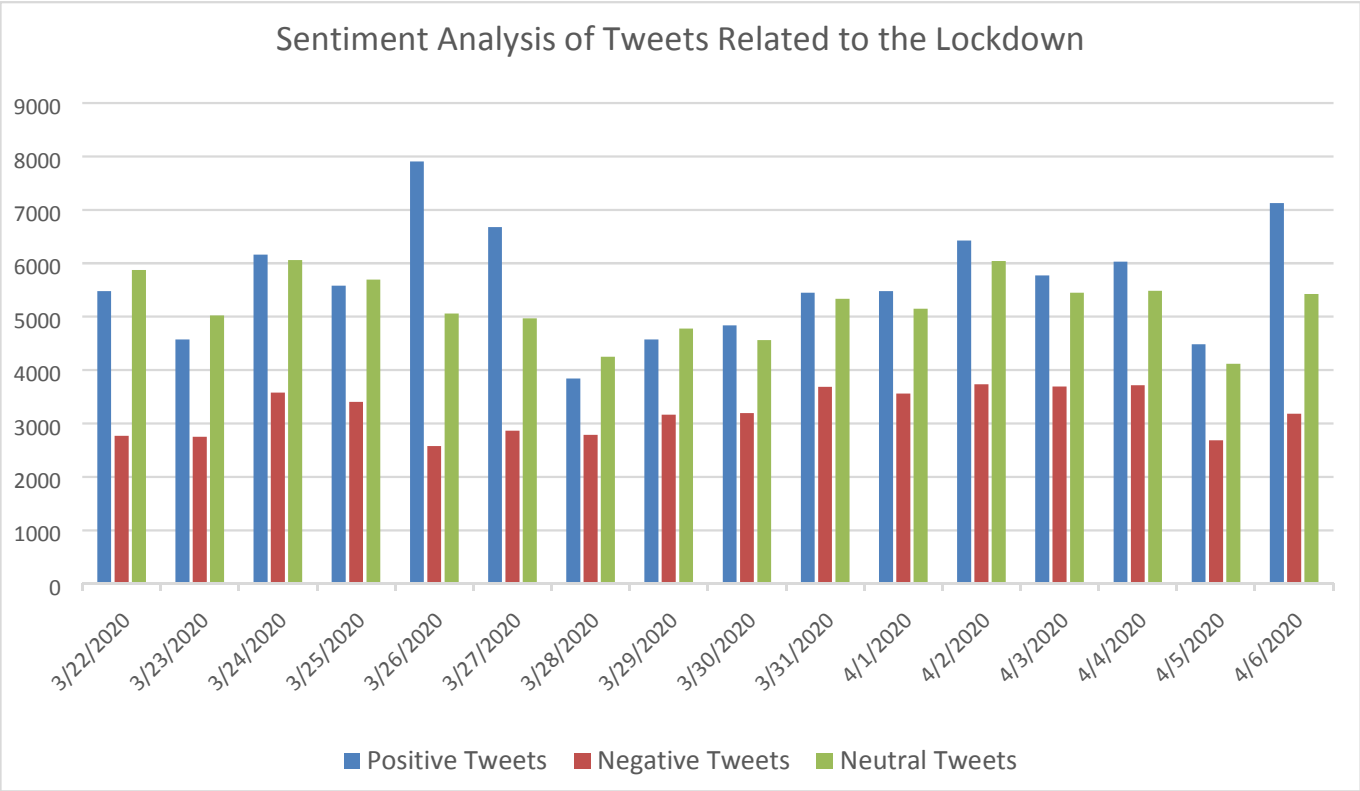

Figure 1. Results of Automated Sentiment Analysis

From figure(1) above, it can be seen that there were more positive tweets related to the lockdown as opposed to negative tweets. Positive tweets significantly outnumbered negative tweets on all of the days within our sample. It was also found that neutral tweets outnumbered negative tweets. This is a significant finding as public health authorities and governments may wish to monitor the rate of negative and positive sentiment as the lockdown progresses. If negative sentiment begins to increase at a dramatic rate this may have implications for the sustainability of the lockdown. In total there were 90,359/40.17% positive tweets, 51,329/22.8% negative tweets, and 83,221/37% neutral tweets.

Results of Qualitative Analysis

In our qualitative analysis, we conducted a manual sentiment analysis based on a sub-sample of data (384 tweets) from 15 days 22nd of March to 6th of April 2020. The results of this are provided in Figure 2 below.

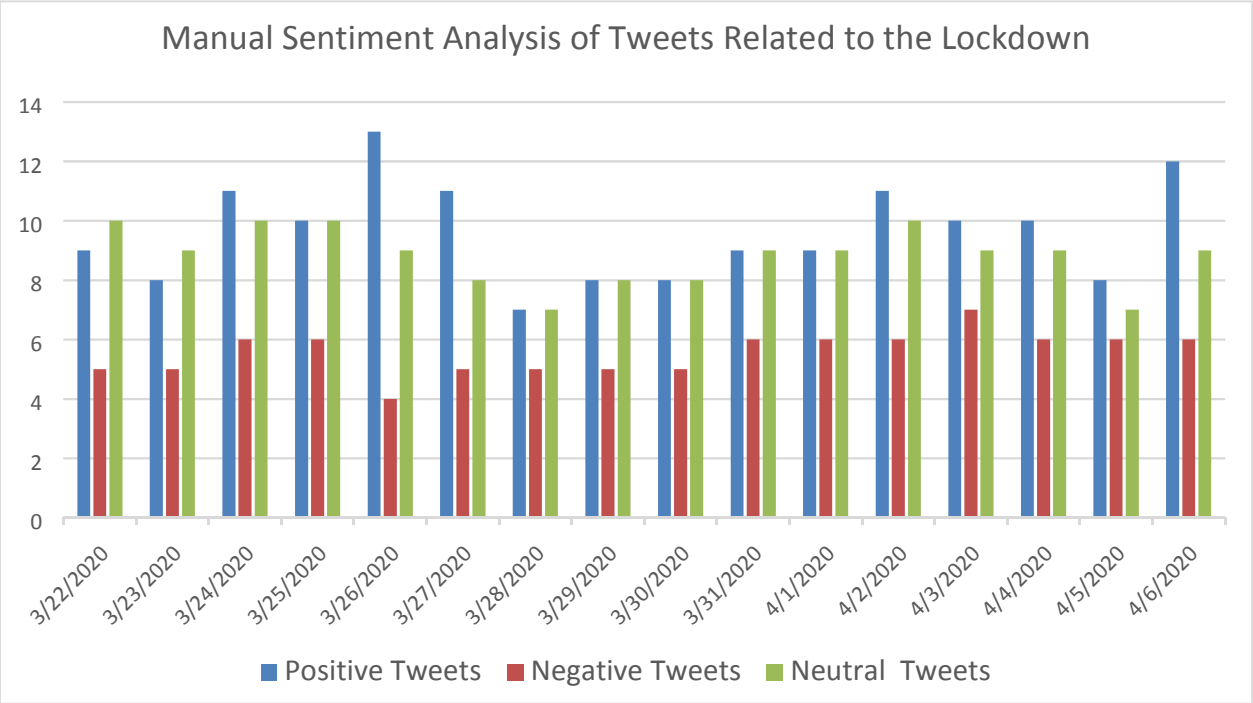

Figure 2. Results of Manual Sentiment Analysis

Our manual sentiment analysis distribution matches that of our automated analysis of the entire dataset (as shown in Figure 1) demonstrating the validity of our findings. Our qualitative analysis further categorized tweets which were positive, negative, and neutral tweets into 18 different themes. The detailed frequency count of different themes distributed across the three polarity or sentiment-based tweet categories (i.e. positive, negative, and neutral) is listed as per Table 2.

Table 2: Frequency Count of Themes within each sentiment-based category

S.No.	Theme	Negative Tweets Count	Positive Tweets Count	Neutral Tweets Count
1	*Emotional Distress*	18		
2	*Sarcasm*	15		
3	*Violence, Theft, and Abuse*	9		
4	*Poverty and Hunger*	7		
5	*Unemployment*	8		
6	*Economic impact*	5		3
7	*Precautions*	7		
8	*Healthcare Workers*	4		
9	*Government and Leadership*	30	35	30
10	*Entertainment*		33	
11	*Optimistic and Happy*		22	2
12	*Healthcare Workers*		15	3
13	*Health and Safety*		18	
14	*Motivation and Adaptation*		9	4
15	*Precautions*		12	6
16	*Learning something new*		5	
17	*Humour*		5	
18	*Sarcasm*			24

It can be seen that there was a wide variety of themes that emerged that contained negative sentiments (see Table 2). In the same context, one can observe that 30 tweets corresponded to the theme "government and leadership". This theme indicates a reference to a political leader, a government representative, a country, or a region. This code was found highly distributed among the three documents which show that people, in general, have any one of the following stands: (a) support the government's lockdown decision, or (b) have acquiesced to the government's decision, or (c) criticized the government either for delaying the decision or for not implementing the decision with proper planning – with this third option relevant to negative tweets. Other themes clustering around negative tweets were: "emotional distress" (feeling of negative emotions and a general sense of helplessness), "sarcasm" (negative or ambivalent humour) and, "violence, theft, and abuse" (this refers to the concern that the lockdown shall lead to an increase in crime and abuse of individuals), "unemployment" (this refers to the concern that the lockdown shall lead to people losing their jobs), "precautions" (this refers to a negative fallout of the lockdown with a warning for people to be cautious), "poverty and hunger" (this refers to the concern that the lockdown shall lead to an increase in poverty and hunger), and "economic impact" (negative economic fallout of the lockdown).

Examples of tweets (anonymized) corresponding to the themes identified in Table 2 are provided below in Table 3.

Table 3. Overview of Extracts for Negative Tweets

Theme	Tweet Extracts
Emotional distress	*"I am not sure if I had some mild form of covid-19 - just been home all the time in fear, and don't know what's going to happen next. Suffer from a breathing condition - even the common cold gets me ill. We need mass testing very quickly. That's how the lockdown can end."*
Sarcasm	*"I received my new guitar today in evening and I feel so nice about it. I want to play it and write my new song which I shall call – Lockdown"*
Violence, Theft and Abuse	*"We appeal to the Telangana state police (India) to provide safe and foolproof security to the mosque. There is a lot of material lying around which may be stolen. The local security is not very cooperative during this lockdown."*
Poverty and Hunger	*68 million people are likely to be homeless and starving in the brutal British winter six months from now due to this lockdown. The government can no longer ignore Brexit"*
Unemployment	*"This lockdown is very unfortunate for those who are daily wage earners and live hand to mouth. During this lockdown, these people do not have resources to buy supplies without a regular source of income."*
Economic impact	*"The Indian economy was already showing signs of a slow down before this lockdown happened. A very large finance company had already crashed showing the inherent weakness in the system. It is unlikely that the stock markets shall recover in the financial year 2020-21."*
Precautions	*You need to be very cautious. This lockdown is likely to witness an increase in phishing scams."*

A range of positive views and opinions were expressed by Twitter users including those related to learning a new skill, catching up on entertainment, praising healthcare workers, etc. which were captured in nine themes (see Table 2). In this category "Government and Leadership" (an appreciation of the government's decision to impose a lockdown which is seen as pro-active) was the most frequent (35) theme followed by "Entertainment" (33). The theme named Entertainment was observed as an opportunity to utilize free time in entertaining activities such as music, art, etc. Other important themes emerging here were "optimistic and happy" (discovering new ways to keep oneself happy and with a positive outlook towards the future), "healthcare workers"(praising and appreciating the efforts of healthcare workers during the difficult times), "motivation and adaptation" (keeping one's morale high during the lockdown and learning to adapt), "precautions" (considering the lockdown as a positive precautionary measure that needs cooperation and appreciation), "learning something new" (utilizing the lockdown as an opportunity to discover and learn a new skill), and "humour" (looking at the lighter side of the situation). We found that rather than focus on a negative state of mind that users would identify positives aspects of the lockdown. It appeared that users were positive towards the lockdown as they understood that it would save lives and that eventually, it may help overcome the pandemic. These tweets are summarised in Table 4 below.

Table 4. Overview of Extracts for Positive Tweets

Theme	Tweet Extracts
Entertainment	*"During this lockdown, I have been catching up on movies that I had not watched but had heard a lot about them earlier. I watched Captain Marvel recently and thoroughly enjoyed it"*
Optimistic and happy	*"Send some delicious cookies and biscuits to your staff and colleagues at home. A small treat during such times shall make them very happy"*
Healthcare workers	*"We are proud of and indebted to all healthcare workers and hope to witness happy days again soon. We offer them our full support in fighting this pandemic by continuing to stay indoors."*
Health and safety	*"I am proud of my father who is inspiring people to stay fit and healthy during this isolation. Let's pray for each one another."*
Motivation and adaptation	*"Spoke to the famous road racing cyclist Mark Cavendish. He is feeling very positive after his recovery from an earlier disease and is looking forward to his move to Bahrain-McLaren. Good to hear him so happy after a difficult period in his career"*
Precautions	*"We need to take this lockdown seriously as it can save lives. I lost a good friend to COVID-19 recently. We need to support the government and make sure we recover from this situation as soon as possible. I request: please be considerate!"*
Learning something new	*" Let's look at the positive side and try to learn something new. We are offering virtual classes on Yoga. Please contact..."*
Humour	*"Hmmm...I can now utilize my free lockdown time to plan for my wedding, blessing in disguise"*
Government and Leadership	*"Dominic Raab...Best wishes to England and speedy recovery to our PM. Best of luck for you also in guiding the country through this tough time. Please enforce stricter lockdown if required the U.K. will understand..."*

As demonstrated in Table 2, COVID-19 has led to many users having neutral views and opinions towards certain steps taken by governments, health and safety advice, and those related to the economic impact among many others that were identified. Table 5 below provides an overview of the tweet extracts for neutral tweets.

Table 5. Overview of Extracts for Neutral Tweets

Theme	Tweet Extracts
Government and leadership	*"Dear Irish government representatives, lockdown everything for 14 days and follow the Spanish model in their fight against COIVD-19"*
Economic Impact	*"Can we just talk about what qualifies as an essential business? Why is my local nursery which has very few edible plants or vegetables on the list? We should only provide economic relief where it is critical"*
Precautions	*"I am sorry for the people who may find the lockdown excessive, but this is necessary"*
Motivation and adaptation	*"We're learning about our planet earth, its structure, the atmosphere, the ozone layer and more on Class Time tomorrow. The show shall be repeated twice a day. Shall soon release the timings."*
Sarcasm	*"Can you believe the audacity of my dog dying just months before the country went on lockdown and I had to spend all my time at home."*

Discussions

This study addresses the need and method to explore and manage public opinion on social media. This is consistent with other studies that have been conducted using different social networks such as Sina Weibo (Wang et al., 2020). The two questions were posed in this study were (1) how do people emotionally respond to a government-enforced lockdown through Twitter? and (2) can emerging Twitter communications be classified in terms of coping behaviour?

In response to the first research question we found that, surprisingly, positive coping was most frequently exhibited by social media users. This shows that, in general, during the initial days of the pandemic, people have appraised the lockdown positively and feel confident about coping with it. Moreover, the public, in general, appreciates the need for the lockdown which has enforced social distancing and reduced the chances of getting infected. The high number of segments coded as "neutral coping" also reflects the acquiescence of the population towards the emerging COVID-19 situation.

We can consider potential factors for why citizens may have had positive views towards the lockdown based on the qualitative analysis of Twitter data. Users across the different themes noted that the lockdown was a necessary precaution in preventing the further spread of COVID-19 and may have harbored positive views because they knew their actions would help stop its spread. For instance, one user noted '*We need to take this lockdown seriously as it can save lives'* and similar sentiments were shared by others which highlight how citizens were aware of the benefits of taking part in the lockdown.

In the United Kingdom, for instance, it was widely reported (Easton, 2020) that the public was in support of the lockdown for this reason. In early May, Easton (2020), writing for the British Broadcasting Corporation, noted that *"The vast majority of people in the UK are obeying the lockdown rules - not because they have been ordered to by the government but because they don't want to catch or spread the virus"*. Henceforth, the results of this study support this view as users on Twitter may also have seen the positive outcome that the lockdown would lead to. This then may have led users to be more positive overall. Future research could seek to explore such factors in more depth by conducting interviews with citizens to ascertain their motives for positive views.

The positive coping exhibited in the tweets reflects the inherent strength of humans and the ability to regulate their emotions in the direction they would like them to be expressed (Gross, 1998). In times of distress or an upsetting scenario, people usually tend to look at the positive side or tend to shift attention to something more appealing (Boden and Baumeister, 1997; Machado andBachevalier, 2007; DeveneyandPizzagalli, 2008) and this also points to an inherent resilience of individuals (Bonanno, 2005). Emotions are an important antecedent to how people make sense of a situation, and positive sensemaking can potentially help convert the outlook of others from negative to a positive, given that it is possible for emotions and sensemaking to get converted into a group affective stance (Smith and Crandell, 1984; Steigenberger, 2015), this is also termed as "emotional contagion"(BartelandSaveedra, 2000). We found that positive coping was clustered alongside other themes namely: "government and leadership", "entertainment", "optimistic and happy", "healthcare workers", "health and safety", "motivation and adaptation", "learning something new", "humour", and "precautions".

Positive coping or negative coping can also be considered as manifestations of "sense-making", a term that portrays the social construction of perceived reality especially during times of crises and uncertainty. According to Hodgson (2007, p.234), "People seek cues from their environment, and interpret and structure information in conversations with others in their social system to construct "plausible" stories explaining what is happening and why". Furthermore, according to Maitlis (2005, p.21*)"...sense-making allows people to deal with uncertainty and ambiguity by creating rational accounts of the world that enable action"*. Influencing emotions during a crisis or a disaster can mitigate the associated negative portrayal and negative sentiments. This can potentially assist people in coping positively with the event. In the context of COVID-19, leaders across the world have been trying to positively engage with the population and trying to reason with them as to why this lockdown, social distancing and self-isolation are critical to (a) prevent new infections, (a) help manage existing infection by reducing the additional workload of the healthcare sector which is already stretched beyond its capacity, and (c) help in maintaining mental well-being alongside physical health. In the long run, the government can help citizens develop routines that help the community adapt to a new dangerous environment – this has very effectively been shown in the context of fires in the context of disaster management (Hodgson, 2007). In the context of this research, the dominance of positive themes within tweets is promising for policymakers and governments around the world. Furthermore, our study implies that policymakers, governments, and health authorities may wish to utilise platforms such as Twitter to analyse public views and opinions because large-spikes in negative sentiment may highlight lockdown-fatigue.

Conclusion

This study found that during the COVID-19 lockdown the majority of users on Twitter shared positive opinions towards the lockdown. We add to the body of literature which has examined winter discussions around H1N1 using in-depth qualitative methods (Ahmed et al.,2019) and conspiracy theories around COVID-19 (Ahmed et al., 2020). Our results also found that people are keeping themselves engaged and entertained through music, movies, gaming, and humorous videos. Governments around the world have also gained support from Twitter users. This is despite the hardships being faced by citizens. We also found many users expressing negative sentiments. Our results also found that several users on Twitter were fence-sitters and their opinions and emotions could swing either way depending on how the pandemic progresses and what action is taken by governments around the world. The psychology of humans during a pandemic can have a profound impact on how COVID-19 shapes up and this shall also include how people behave with other people and with the larger environment (Taylor, 2019).

Limitations and Future Scope

Regarding the limitations of this study only tweets that were in the English-language were analysed as part of this research. Future research could seek to conduct a similar analysis in other languages especially given that the COVID-19 disease has tremendous global ramifications. A further limitation is that the Twitter Search API was used which captures a sub-sample of tweets and only retrieves tweets from public accounts. Furthermore, the study utilised a keyword approach to retrieving data which means that it is possible Twitter users were using other hashtags or keywords which our study did not pick up. Future research could seek to explore factors for the positive views towards the lockdown via in-depth interviews and/or surveys. Our study is among the first to use mixed-methods to develop an understanding of public views during the first lockdown and was able to uncover in-depth insights from citizens on Twitter. Our study may be of interest to other scholars in this area as well as public health bodies and governments looking to better understand public views towards lockdowns. This may inform future policy around lockdown and the types of information governments may wish to disseminate in future periods of lockdown.

References

Ahmed, W., Bath, P. A., Sbaffi, L., and Demartini, G. (2019). Novel insights into views towards H1N1 during the 2009 Pandemic: a thematic analysis of Twitter data. *Health Information and Libraries Journal*, *36*(1), 60-72.

Ahmed, W., Vidal-Alaball, J., Downing, J., andSeguí, F. L. (2020). COVID-19 and the 5G conspiracy theory: social network analysis of Twitter data. *Journal of Medical Internet Research*, *22*(5), e19458.

Baer, R. D., Zarger, R. K., Ruiz, E., Noble, C., and Weller, S. C. (2014). Lockdown: Applied anthropology and the study of campus emergencies. *Human Organization*, 326-339.

Bartel, C.A. and Saavedra, R. (2000), "The collective construction of work group moods", Administrative Science Quarterly, 45(2), 197-231.

Becken, S., Alaei, A. R., & Wang, Y. (2019). Benefits and pitfalls of using tweets to assess destination sentiment. Journal of Hospitality and Tourism Technology, 11(1), 19-34

Benton, A., and Dionne, K. Y. (2015).International political economy and the 2014 West African Ebola outbreak. African Studies Review, 58(1), 223-236.

Berman, S. L., Kurtines, W. M., Silverman, W. K., andSerafini, L. T. (1996).The impact of exposure to crime and violence on urban youth.American Journal of Orthopsychiatry, 66(3), 329-336.

Boals, A., and Lancaster, S. (2018). Religious coping and mental health outcomes: The mediating roles of event centrality, negative affect, and social support for military veterans. Military Behavioral Health, 6(1), 22-29.

Boden, J. M., andBaumeister, R. F. (1997). Repressive coping: Distraction using pleasant thoughts and memories. Journal of personality and social psychology, 73(1), 45.

Bonanno, G. A. (2005). Resilience in the face of potential trauma. Current Directions in Psychological Science, 14, 135–138.

Borg, A., & Boldt, M. (2020). Using VADER sentiment and SVM for predicting customer response sentiment. Expert Systems with Applications, 162, 113746.

Bosley, J. C., Zhao, N. W., Hill, S., Shofer, F. S., Asch, D. A., Becker, L. B., and Merchant, R. M. (2013). Decoding Twitter: Surveillance and trends for cardiac arrest and resuscitation communication. Resuscitation, 84(2), 206-212.

Daniel, W. W. (1999). Biostatistics: A Foundation for Analysis in the Health Sciences. 7th edition. New York: John Wiley and Sons.

Dempsey, M. (2002). Negative coping as mediator in the relation between violence and outcomes: Inner-city African American youth. American journal of orthopsychiatry, 72(1), 102-109.

Deveney, C. M., andPizzagalli, D. A. (2008). The cognitive consequences of emotion regulation: an ERP investigation. Psychophysiology, 45(3), 435-444.

Easton, M., 2020. *Do British People Still Accept The Lockdown?*. [online] BBC News. Available at: <https://www.bbc.co.uk/news/uk-52495201> [Accessed 9 September 2020].

Fofana, Umaru (2014) "How to Ignore a Plague."Medium , July 11. https://medium.com .

Folkman, S., and Lazarus, R. S. (1985). If it changes it must be a process: study of emotion and coping during three stages of a college examination. Journal of personality and social psychology, 48(1), 150.

Folkman, S., and Moskowitz, J. T. (2000).Positive affect and the other side of coping.American psychologist, 55(6), 647.

Fullana, M. A., Hidalgo-Mazzei, D., Vieta, E., andRadua, J. (2020). Coping behaviors associated with decreased anxiety and depressive symptoms during the COVID-19 pandemic and lockdown. *Journal of Affective Disorders*, *275*, 80-81.

Garnefski, N., Boon, S., andKraaij, V. (2003).Relationships between cognitive strategies of adolescents and depressive symptomatology across different types of life event. Journal of Youth and Adolescence, 32(6), 401-408.

Ghosh, P., Basheer, S., Paul, S., Chakrabarti, P., and Sarkar, J. (2020). Increased Detection coupled with Social Distancing and Health Capacity Planning Reduce the Burden of COVID-19 Cases and Fatalities: A Proof of Concept Study using a Stochastic Computational Simulation Model. medRxiv.

Golt, S. G. (2019). Crisis Communication and Management: Are You Prepared?. In Assessing and Averting the Prevalence of Mass Violence (pp. 194-208). IGI Global.

Grant, D. M., Wingate, L. R., Rasmussen, K. A., Davidson, C. L., Slish, M. L., Rhoades-Kerswill, S., and Judah, M. R. (2013). An examination of the reciprocal relationship between avoidance coping and symptoms of anxiety and depression. Journal of Social and Clinical Psychology, 32(8), 878-896.

Gross, J. J. (1998). The emerging field of emotion regulation: an integrative review. Review of General Psychology, 2, 271–299.

Hamzelou, J. (2020). Does a cell protein explain covid-19 severity?.

Hodgson, R. W. (2007). Emotions and sense making in disturbance: community adaptation to dangerous environments. Human Ecology Review, 233-242.

Hussain, A., and Shabir, G. (2020). Use of social media for information discovery and delivery among information professionals in Pakistan. *Information Discovery and Delivery*.Vol. ahead-of-print No. ahead-of-print

Hutto, C. and Gilbert, E. (2014),"Vader: a parsimonious rule-based model for sentiment analysis of social media text", in Proceedings of the Eighth International AAAI Conference on Weblogs and Social Media

Jin, Y., and Cameron, G. T. (2007).The effects of threat type and duration on public relations practitioner's cognitive, affective, and conative responses in crisis situations. Journal of Public Relations Research, 19(3), 255-281.

Jin, Y., Pang, A., and Cameron, G. T. (2010). The role of emotions in crisis responses: Inaugural test of the integrated crisis mapping (ICM) model. Corporate Communications: An International Journal, 15(4), 428-452.

Jones, D. S. (2020). History in a Crisis—Lessons for Covid-19. New England Journal of Medicine.

Kuckartz, U., andRädiker, S. (2019). *Analyzing qualitative data with MAXQDA*. Springer International Publishing

Langford, D. J., Cooper, B., Paul, S., Humphreys, J., Keagy, C., Conley, Y. P., ...andMiaskowski, C. (2017). Evaluation of coping as a mediator of the relationship between stressful life events and cancer-related distress.Health Psychology, 36(12), 1147.

Lazarus, R. S. (1991). Cognition and motivation in emotion.American psychologist, 46(4), 352.

Lazarus, R. S., and Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer publishing company.

Lopez, S. J., Pedrotti, J. T., and Snyder, C. R. (2018). Positive psychology: The scientific and practical explorations of human strengths. Sage Publications.

Lu, D. (2020). Inside Wuhan's lockdown.NewScientist, 245(3268).

Machado, C. J., andBachevalier, J. (2007).The effects of selective amygdala, orbital frontal cortex or hippocampal formation lesions on reward assessment in nonhuman primates.European Journal of Neuroscience, 25(9), 2885-2904.

MacKenzie, D. (2020). Covid-19 goes global. NewScientist, 245(3271).

Maitlis, S. (2005). The social processes of organizational sensemaking. Academy of management journal, 48(1), 21-49.

Merchant, R. M., Elmer, S., and Lurie, N. (2011).Integrating social media into emergency-preparedness efforts. New England Journal of Medicine, 365(4), 289-291.

Mitjà, O., Arenas, À.,Rodó, X., Tobias, A., Brew, J., andBenlloch, J. M. (2020). Experts' request to the Spanish Government: move Spain towards complete lockdown. The Lancet.

Moutidis, I., & Williams, H. T. (2020). Good and bad events: combining network-based event detection with sentiment analysis. Social Network Analysis and Mining, 10(1), 1-12.

Nossiter, A. (2014). Lockdown begins in Sierra Leone to battle Ebola. The New York Times, 19.

Palen, L., Vieweg, S., Liu, S. B., and Hughes, A. L. (2009). Crisis in a networked world: Features of computer-mediated communication in the April 16, 2007, Virginia Tech event. Social Science Computer Review, 27(4), 467-480.

Perry, C., and Jensen, O. (2001, December).Approaches to combining induction and deduction in one research study.In Conference of the Australian and New Zealand Marketing Academy, Auckland, New Zealand.

Richters, J. E., and Martinez, P. E. (1993). Violent communities, family choices, and children's chances: An algorithm for improving the odds. Development and Psychopathology, 5(4), 609-627.

Rothaker, R. (2011). Police identify gunman in Virginia Tech murder-suicide. Reuters. Retrieved http://www.reuters.com

Rufai, S. R., and Bunce, C. (2020). World leaders' usage of Twitter in response to the COVID-19 pandemic: a content analysis. *Journal of Public Health*.

Shen, S., Murzintcev, N., Song, C., and Cheng, C. (2017). Information retrieval of a disaster event from cross-platform social media. *Information Discovery and Delivery*. 45(4), 220-226

Smailhodzic, E., Hooijsma, W., Boonstra, A., and Langley, D. J. (2016). Social media use in healthcare: a systematic review of effects on patients and on their relationship with healthcare professionals. *BMC health services research*, *16*(1), 442.

Smith, K.K. and Crandell, S.D. (1984), "Exploring collective emotion", American Behavioral Scientist, Vol. 27 No. 6, pp. 813-828.

Smith, R. D. (2006). Responding to global infectious disease outbreaks: lessons from SARS on the role of risk perception, communication and management.Social science and medicine, 63(12), 3113-3123.

Steigenberger, N. (2015). Emotions in sensemaking: a change management perspective. *Journal of Organizational Change Management*.

Taylor, S. (2019). *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease*. Cambridge Scholars Publishing.

Teasdale, E., Yardley, L., Schlotz, W., andMichie, S. (2012).The importance of coping appraisal in behavioural responses to pandemic flu.British journal of health psychology, 17(1), 44-59.

Vaughan, A. (2020). Covid-19 escalates.NewScientist, 245(3274).

Wang, X., Xing, Y., Wei, Y., Zheng, Q., and Xing, G. (2020). Public opinion information dissemination in mobile social networks–taking Sina Weibo as an example. *Information Discovery and Delivery*.

Zhang, W., Tian, X., and He, W. (2019). Information Seeking and Online Deal Seeking Behavior. *Journal of Global Information Management (JGIM)*, *27*(4), 147-160.