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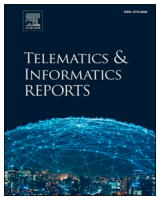

Public emotion and response immediately following the death of George Floyd: A sentiment analysis of social media comments

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ABSTRACT

Social media use has become a critical form of social interaction connecting people of all ages, and across geographic regions, political, and philosophical persuasions. The results of these interactions are massive amounts of data which, through exploratory methods like sentiment analysis, can provide insight into overall public emotion and response to public and key sociopolitical events. The present study explores the sentiment surrounding the Black Lives Matter Facebook page by analyzing the comments under the video of the killing of George Floyd, posted on May 25, 2020. This examination of sentiment uses assumptions of selective exposure theory. We employed a three-pronged sentiment analysis approach and topic modeling and found an overall negative polarity in public sentiment among 7,137 Facebook comments on the video of George Floyd's death. The findings reveal a divisive response to the video which captured the death of George Floyd, which more generally suggests negative emotion in response to the Black Lives Matter movement. A sentiment test also returned a noticeably high happiness score, which might imply the widely unavoidable effects of trolls in internet discourse in the current racial context.

1. Introduction

On 25th May 2020, the world witnessed the horrific death of George Floyd while in police custody [1]. The video sparked global outrage [2] which led to widespread protests against police brutality throughout the United States and the world. Some experts believe this was the largest global protest in U.S. history [3]. The culpable police officers were charged and tried, and the courts eventually ruled George Floyd's killing as a murder. The current study leveraged big data to examine digital citizen agency with the underlying assumptions derived from selective exposure theory [4,5] and digital citizen empowerment [6] to better understand general sentiment on the Black Lives Matter (BLM) social media page, in relation to the killing of George Floyd. We treat this recent social reaction as a demonstration of the underlying power of digital citizen empowerment and the nuances of involvement in digital activism.

Information and communication technologies (ICT) or social media platforms (e.g., Facebook, Instagram, TikTok) represent avenues through which individuals and groups engage in discourse about political and social change [6–9]. Digital citizenship empowerment creates space for digital activism which is a critical support for healthy democracies. This empowers citizens to monitor the performance of governments and their representatives, enforcing accountability, and transparency [8,10]. BLM and similar pages exist on ICTs in response to real or perceived injustices and as a way for ordinary citizens to be informed and to catalyze action. While the individual citizens who congregate online for discourse may not always interpret their actions as activism, the content of their postings may demonstrate more clearly their digital activism and highlight their citizen empowerment.

George Floyd's murder is one of many examples of the unlawful killing of people of color in police custody, spotlighting race relations in the US. Tamir Rice, Sandra Bland, and Trayvon Martin are some recent victims of tragic encounters with law enforcement officers in the United States. The death of Trayvon Martin and subsequent acquittal of George Zimmerman sparked demonstrations and public outrage, including digitally, which ultimately led to the creation of the (BLM) movement [11]. According to the official website, BLM ". . . is an ideological and political intervention in a world where Black lives are systematically and

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intentionally targeted for demise. It is an affirmation of Black folks' humanity, our contributions to this society, and our resilience in the face of deadly oppression".

While the death of Trayvon formalized the creation of BLM arguably, the George Floyd incident took it worldwide, against the backdrop of the global COVID 19 pandemic. The killing of George Floyd spurred a worldwide protest with BLM leading protests stretching as far as Argentina, Japan, South Korea, Norway, Turkey, and Australia. Prominent companies like Nike, Amazon and Google also joined by sharing posts and statements in solidarity with the BLM movement, expressing outrage for the murder. According to Amnesty International [12,13] 1 in every 1000 Black men can expect to be killed by police in their lifetime, by that metric it is safe to assume that the death of Black men by police is not unusual. Some research suggests major mental health impacts of the murder of George Floyd. Those reports indicate that anger and sadness increased to over 35 % across all demographic and socio-economic backgrounds compared to the four weeks preceding the killing of George Floyd - "the largest spike—by far—ever observed in US Gallup phone-survey data" [14]. Various other publications also noted an increase in anxiety and stress most notably in Black Americans in the days and weeks after the murder [15,16]. The Pew Research Center reports that during the period of May 26 to June 8 the blacklivesmatter hashtag was used 47.8 million times, an average of 3.7 million times a day [17]. While other reports state that the killing of George Floyd was mentioned more than 80 million times on Twitter, Facebook and others during the 30 days after his murder [18].

The murder of George Floyd also sparked significant legislative developments in the USA. The most prominent of these was the George Floyd Policing Act of 2021 which aims to establish a framework to prevent and remedy racial profiling by law enforcement at the federal, state, and local levels [19]. Other noteworthy bills/acts influenced or directly related to the George Floyd murder include Justice in Policing Act; George Floyd Law Enforcement Trust and Integrity Act; Ending Qualified Immunity Act; Executive Order on Safe Policing for Safe Communities to name a few. According to The Howard Center for Investigative Journalism, nearly 300 bills were approved by US states subsequent to the killing of George Floyd [20]. As of the writing for this paper, however, the US Congress has yet to pass the George Floyd Policing Act though they continue to receive increased scrutiny by civil right leaders.

Much of this legislative action was either directly or indirectly tied to the efforts of digital citizenship that emerged as active social media campaigns, calls for action, and a general discourse of widespread displeasure related to the murder of George Floyd. The personal response to the George Floyd murder, however, seemed to be a clear demonstration of citizen empowerment. This citizen empowerment may have quickly given rise to digital activism in this case. Citizen empowerment collided with the general sense of personal disempowerment felt around the world because of the COVID-19-related lockdowns and government mandates. In the end these uniquely volatile conditions produced one of the most widespread global demonstrations of citizen empowerment and activism in recent times and resulted in a sense of uneasiness at the highest levels of social and political power and organization.

The narrative about BLM would be incomplete without an investigation of social media as a public arena - a space where such ideas and movements find voice. Social media use and affiliation with specific groups may intersect to provide social interaction ties, social trust, and perceived homophily [4,21]; while creating an intricate and dynamic interplay between social groups or celebrities and their affiliates [22–24]. The attachments engendered through these interactions become key drivers of online representation, idea sharing, and the quality of social engagement in social media spaces [25,26].

Social media sites, like Facebook and Twitter, feed news sources, foster instant discussion, and rally public opinion and response [27]. As seen in the global and national response, public sentiment and engagement related to the killing of George Floyd, whether digitally or otherwise, had significant political impact [14,20]. As the internet and social media usage become indispensable to our daily lives, content managers emerge as a source of information in identifying and understanding the intent and sentiments of the user base [28]. However, communication overload like would have been experienced during the intersection of the COVID-19 pandemic and racial tensions in the US, are connected to problematic social media use [29–31], where individuals are exposed to much more information that they are equipped to process and consume. Still, social media websites provide data-rich environments for researchers to investigate emotions and attitudes of the public. BLM, like many other social justice organizations, has a strong social media presence [32], providing an ideal platform for internet users to interact, share information, and create various forms of media [33]. Users can interact freely with other users within their network. While the convenience and ease of sharing is a boon of information curation for all users, a subsection of users access the sites with malicious intent. Fraud, racism, hate group activities, grooming, and cyber bullying [34–35] are examples of some of the malicious activities on social media pages dedicated to historically divisive topics like race, sexuality, and gender. Though social media platforms afford greater diversity of interaction [36–38], individuals often exhibit selective exposure – a tendency to favor viewpoints that may value their own, over alternative ideas [39,40]. Driven by the human desire for simplicity even in processing information, we have neither the luxury of time nor do we have the cognitive ability to process all alternative arguments beyond what we think is an adequate amount of information for processing. However, this selection is often biased by our desire to avoid the negative emotional experience of interacting with information that does not confirm our beliefs or worldviews [39]. From the perspective of selective exposure, most cyberspace interactions are problematic insofar as they are an exercise in validation seeking, often leading to a form of ideological radicalization where the individual shields themselves from opinion-challenging information [41–44]. Trolling is one manifestation of this, and they are usually employed to generate hate, rage, and animosity since it provides individuals and organizations a proverbial cloak of anonymity from which to launch malicious attacks, while countering opinion-challenging information. The BLM movement, whose ideologies are rooted in race, are not immune to the turpitude of the internet, and thus face various degrees of hateful rhetoric under nearly every post.

In the present study, we explore public sentiment manifested on the Black Lives Matter Facebook page by analyzing the comments under the George Floyd murder video. The response to this horrific social and human rights event is treated here as a view into the world of digital citizen empowerment. In the following sections, we present the process, methodology, and results of leveraging multiple machine learning techniques to examine social media users' responses to BLM, as reflected in their comments about the video of George Floyd's death. We then discussed the findings. Given the limited psychological research on BLM [45], this study seeks to understand themes associated with the sentiment and hate speech related to BLM using the Black Lives Matter Facebook page as a microcosm of the many pro-Black social media pages and digital activism.

2. Method

2.1. Data collection

To capture the initial reactions to the George Floyd footage, and to glean users' most immediate and intuitive emotional responses, we collected the comments posted during the first five days following the video upload of the murder of George Floyd on the BLM Facebook page. We considered using Twitter for data collection but that would prove more problematic due Twitter's data sharing restrictions and application process. Facebook data collection was more readily available and provided more than enough material to perform the planned assessment. To

collect the desired comments, we used the Facepager application. Facepager enables users to fetch publicly available data from popular websites using APIs and web scraping. Facepager also allows users to retrieve data using custom date ranges which allows for the collection of only relevant comments. Due to the scope of this study, only textual data from comments and replies were retrieved.

A total of 7137 (total number of comments made in the first 5 days after the post) comments were collected anonymously from the BLM Facebook page. There is an unfortunate trend which usually follows reports of unlawful killings by law enforcement. The initial report is published stating the facts as detailed by the police then shortly after, more reports are published citing a checkered past or criminal history of the victim. This is particularly true to the media's handling of the deaths of people of color. For instance, shortly after their deaths, media coverage switched over to the narrative that Trayvon Martin used marijuana; Breonna Taylor was in a romantic relationship with a drug dealer. The George Floyd coverage was no different. Days after his murder, reports of his criminal past and run-ins with the police were headline news [46]. Knowing this, we attempted to collect "uncontaminated" data from users who were less likely to receive negative stories about his character and were only likely affected by the video and initial reports. This study received approval and oversight from the [Removed Blinded].

2.2. Data reduction

Raw data were processed in the following steps: 1) all words were transformed to lowercase text, then 2) text was broken into smaller segments and tokens, and 3) text data were filtered by removing punctuation, special characters, stop words, and URLs (see Fig. 1). We used Orange Text Miner's preprocess data widget for this stage of data analysis.

Accurate research is characterized by the balance between internal and external validity. In striving for this balance, the dataset was tested using three well known sentimental analysis processes namely Hiu Hu, VADER and Ekman analyses. Employing this multi-level testing structure ensures high internal validity as all three results would need to be comparable. The data was collected based on only a single condition or inclusion criteria - the comments had to have been made within the first five days after the posting of the footage of George Floyds death. This ensured that the data would be the truest reflection of the publics' view suggesting strong external validity given the nature of this study.

3. Data analysis

We conducted three types of sentiment analysis: 1) Liu Hu to generate an overall polarity score for the data, 2) VADER analysis to further interrogate the polarity by exploring sentiment through positive, negative, and compound scores, and 3) Ekman sentiment analysis to categorize and score sentiment polarity into six sub-categories that have meaning in human emotion and experience (i.e., disgust, anger, fear, sadness, surprise, and anger). Finally, topic modeling was employed to extract themes and ideas as a complement to the sentiment analysis.

4. Results

4.1. Liu Hu and Vader analysis

The Liu Hu analysis returned an average sentiment value of −1.41. The polarity score was calculated by dividing the total of the negative and positive scores, which was further divided by the number of comments (Table 1).

The VADER sentiment analysis categorized scores into three groups and provided a compound score for each record with scores falling within the 1 to −1 range. The compounded score of −0.099 indicates an overall negative sentiment in the data. Vader analyses computed a compound score by combining the negative, positive, and neutral sentiment scores. In the heat map, blue panels represent negative scores and green represents positive scores. There is also a hierarchical structure of negative and positive polarity, which is further grouped into smaller clusters using K-means clustering (see Fig. 2).

Both VADER and Liu Hu indicate that the general sentiment derived from the dataset was negative.

4.3. Ekman analysis

Unlike Liu Hu and VADER, the Ekman sentiment analysis extends beyond polarity scores and categorization of sentiment. Ekman analysis groups the results by polarity and proportionally assigns the results to six emotional sub-categories - anger, disgust, fear, happiness, sadness, and surprise (Table 2).

The Ekman sentiment analysis revealed that happiness (40.17 %) was the most common user sentiment on the BLM Facebook page in the days immediately following the posting of the death footage. Sadness was the second most common sentiment (26.63 %); surprise the third most common (16.17 %), with fear, anger, and disgust scoring under 15 % (see Table 3). Like the Liu Hu and VADER analyses, the Ekman process returned a negative valence score of 43.66 %. Positive valence (i.e. happiness) came in close to second. We classified surprise as neutral based on prior research that has theorized surprise as a feeling with no valence [47,48].

Table 1
Average VADER Sentiment Analysis score.

Negative	Positive	Neutral	Compound
−0.104	0.099	0.766	−0.099

Fig. 1. Word cloud representing preprocessed data (top) and processed data (bottom). The most used words are located centrally and appear largest in the diagram.

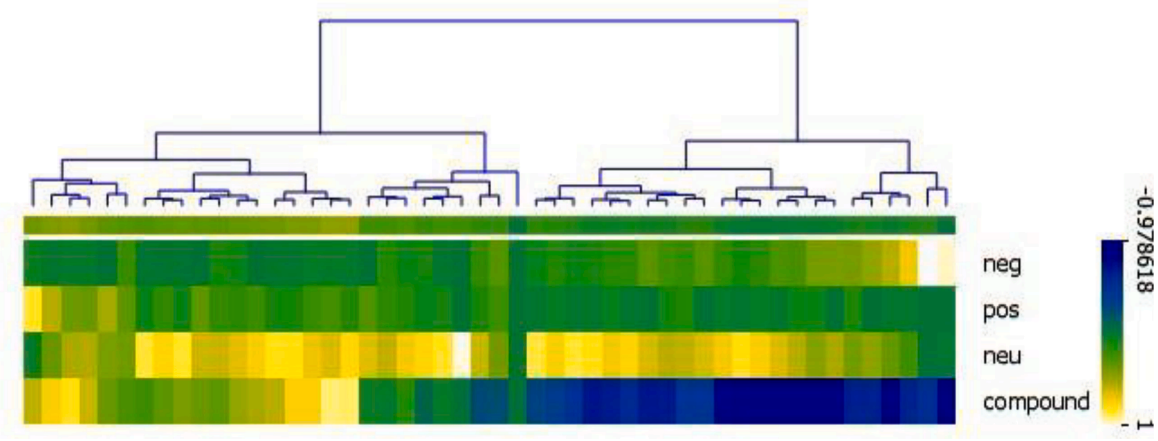

Fig. 2. Heat Map for VADER Sentiment Analysis Heat Map.
NB: *neg* represents negative scores, *pos* represents positive scores, *neu* represents neural scores, and *compound* represents compound scores.

Table 2
Ekman Sentiment Analysis showing category-based results.

Anger	Disgust	Fear	Happiness	Sadness	Surprise
1.99 %	1.48 %	13.5 %	40.17 %	26.63 %	16.17 %

Table 3
Total scores by emotion of Ekman Sentiment Analysis.

Polarity	Negative				Positive	Neutral
Emotion	*Anger*	*Disgust*	*Fear*	*Sadness*	*Happiness*	*Surprise*
Ekman Score	1.99 %	1.48 %	13.56 %	26.63 %	40.17 %	16.17 %
Total score	43.66 %				40.17 %	16.17 %

4.4. Latent Dirichlet Allocation (LDA) topic modeling

LDA attempts to discover hidden or underlying meanings within the data and present them in the form of main words and topics. Table 4 provides the top 10 results lists of the LDA topic modeling test. List one contains words like "please help, please sign, need help" which could be interpreted as possible commenter frustration with the abuse of power exhibited in the video, and hoping for some kind of preventive action, including legislation (i.e., ***policy and action)***, to end these deadly police interactions.

Table 4
Latent Dirichlet Allocation (LDA) Topic Modeling results for the most distinctive words in each topic. Distinctiveness is measured by the difference between a word's probability in each topic and its average probability across all topics.

Topic	Interpreted Topic label	Distinctive words
1	Policy and action	please, let, fight, texas, please sign, help, need help, cant, help TO win, ha large
2	Legality and prejudice	criminal, statue, white, family, man, criminal, blm, need, deserved
3	Precarious nature of Black life	one, life, need, black, racism, police, see, much, life, ha
4	George Floyd	george, floyd, black, get, blm, world, white, peace, people, blm
5	Opposition	blm, blm, ha, life, year, way, movement, violence, blm communist, people
6	Call to Action	make, need, get, communist, protest, going, need help, outreach policing, policing, policing live
7	Ambivalence	matter, white, life, life matter, white life, black, life, life, help, love
8	General	black, matter, matter, life, help, going, life matter, life matter, sad, help need
9	General	black, black, life, matter, black life, life matter, matter, organization, help, police
10	General	please, blm, stop, black, right, family, would, would, one, change

List 2 includes words like "criminal, statue, white, deserve" which suggests thoughts of the legality of the officers' actions, the racial undertones, and debates over the removal of confederate statues which was a divisive topic of discussion during that time. We can also infer conversations of ***legality and prejudice*** from the second list. The third list suggests that commenters were grappling with the unique and ***precarious nature of Black lives*** (e.g., one, life, need) and perceived threats to Black lives (e.g., racism, police).

The fourth list seemed most personal in relation to ***George Floyd***. Only in this list did his name appear, along with indications of the racial identity of victim and perpetrator, as well as words like peace and people. The words in list five may be interpreted as ***oppositional*** to BLM. Communists, for instance- is a pejorative title that has been politically assigned to BLM and appears in tandem with BLM in these comments. The word violence in that list, alongside repeated referencing of "BLM" suggests the oppositional messaging that BLM is a violent, communist group. List six seemed akin to a ***call to action*** and contained a list of counteractions to the public murder of George Floyd, and the actions that people can engage to cause change - community, protest, outreach policing. Opposition is also represented in this list through the label "communist", further supporting the interpretation of a call to action in the face of opposition to BLM. List seven reflects the possibly ***ambivalent*** and often divisive response to BLM. The list contains words like "white, black, matter, life" reflecting both the Black Lives Matter call and the White lives matter retort. The remaining lists are more ***general*** in that they reflect either the basic character of BLM or the George Floyd situation, by citing words like black, matter, life, family, and help. Noteworthy words and terms across the lists include BLM, ha, outreach policing, family, Texas, protect, racism.

5. Discussion

We applied NLP techniques and sentiment analysis to explore public emotion and response in comments under the BLM Facebook page video of the killing of George Floyd. Based on the increasingly crucial role of social media in information spread during crisis events [49], the current study explored a recent form of digital citizen empowerment, using the BLM Facebook page as a window into the collective emotional response patterns and societal discourse surrounding racial justice and equity.

The prevailing public sentiment toward the video of George Floyd's death was negative. This is consistent with previous sentiment analysis of BLM related posts on Twitter, which found that negative sentiment

was derived mainly from deaths and killings of Black people, while positive sentiment was focused on support for the BLM movement [32]. These results provide empirical evidence of the animus and emotion that fueled the national and international public unrest following the murder of George Floyd. The negative response to the video might have also been due, in part, to the innately tragic nature of the video's contents which triggered expressions of anger and disgust towards police brutality. Additionally, the negative response could be explained in the context of homophily where users may feel an affinity or attachment to BLM and thus respond with posts that confirm their attachment and support of BLM and causes to which BLM may be sympathetic [5]. This might be particularly true as emerging evidence suggests that in environments where social trust and homophily are high, users might be more inclined to share and engage with content that aligns with their beliefs, influencing the overall sentiment of the discussion [50]. In such social spaces, albeit digital, citizens may feel empowered to collectively challenge and hold institutions accountable.

Repulsion is a natural response to violence, so a video depicting a human being suffocated for 8 min and 46 s was sure to incite negative emotions. However, these negative sentiments may also be emblematic of general negative sentiments connected to the complex and brutal racial history, and the interconnected issue of negative police interactions with persons of color in the United States [51]. The Ekman analysis revealed that the main negative sentiments were fear and sadness. While this study did not have additional contextual data to better understand these feelings of fear and sadness, the overwhelming presence of these sentiments may explain the massive global protest - and the underlying efforts of digital activism derived from digital spaces like the BLM Facebook page.

These events occurred against the backdrop of the global COVID-19 pandemic, the resulting lockdowns, and feelings of uncertainty about life, safety, and future [52]. Recent evidence suggests compound impacts of the pandemic and the murder of George Floyd by which the two historical events intersected to influence public perception and sentiment. For example, some literature suggests that while there was a significant increase in victim reporting of domestic violence (DV) incidents during the pandemic, both victim and third-party reporting of DV to police decreased in the months following the murder of George Floyd [53]. Perhaps, public trust was undermined by the tragedy, leading to disappointment in, and even avoidance of, the police system. In this sense, it may be that the publicized murder of George Floyd, by agents of the state, may have tapped into prevailing fear and sadness already primed by the global COVID-19 pandemic.

Interestingly, the Ekman analysis also revealed a high proportion of happiness, only slightly lower than the total score for negative emotions. This unexpected result, which indicates positive responses to the killing of George Floyd, might be linked to recent increased reports of racism in the global environment - digital and otherwise [54]. While recent sentiment analysis of tweets have revealed positive emotions such as pride, hope, and optimism, under the pro-BLM hashtags [55], the themes revealed in the topic modeling analysis showed that this is unlikely to be the case for the comments under the Facebook video of Floyd's death. There were multiple uses of the exclamation "ha", which was interpreted as an expression of happiness. In normal human face to face interactions, such an exclamation in the context of such a graphic subject (i.e., the killing of George Floyd) would be socially unacceptable. However, these behaviors may be common in internet spaces, which are less monitored, and largely uncensored environments [56]. These kinds of reactions may also represent user response to the cognitive dissonance that is often experienced as part of selective exposure [39].

In recent years there has been an increase in extremist groups perpetuating acts of hate and violence in physical and cyberspaces. This has been observed through incidents like soccer fans pelting the pitch with bananas during matches, most recently in Paris [57], and random violent attacks on Asian Americans in the USA [58]. On the internet these behaviors translate to posting disparaging remarks, and a high incidence of racial harassment online, even directed at minors [59,60]. These negative online interactions are themselves a demonstration of citizen empowerment and social identity as individuals with divergent views seek to challenge - albeit in an antisocial way - the ideas and views of institutions and groups. Notwithstanding, negative online experiences have significant effects on mental health, especially for younger persons of color [60–62]. Trolling is another ubiquitous and negative social media behavior [63], which, as a form of cyberbullying, has emerged in a seemingly symbiotic relationship with the proliferation of racial hate speech on the Internet [64]. Since trolling behaviors often reflect complex emotions and require insider knowledge based on the norms of particular social media platforms [65], further research is needed to investigate trolls in the context of race-based narratives by distinguishing between insincere/sincere or deceptive/genuine emotion responses in posts.

Other top results from the topic modeling analysis reflected themes consistent with "helping" which was likely because George Floyd received no help during his final minutes of life. This highlighted the public's perception of support or lack of support related to similar issues and events that are likely to be championed in spaces like the BLM Facebook page. Overall, the finding underscored a prevalent sense of frustration among commenters, reflecting their discontent with abuses of power. The expression of helplessness signified a recognition of the challenges in addressing such systemic issues, prompting a desire for reform. There was also an underlying awareness of the legal and racial dynamics at the core of the tragic incident, highlighting the need for accountability and a broader examination of societal norms and symbols.

The results suggest a diversity in public response to the same video content, however, we were still able to observe two main types of users - those who may have an affinity to BLM and BLM related content and causes; and on the other hand, a group of users who are more anti-BLM or similar groups - both empowered to tackle the idea of social change. Based on the themes that emerged in this study (e.g., policy and action; legality and prejudice) pro-BLM users seemed interested in idea sharing and change making, while the anti-BLM user themes (e.g., oppositional; communist) seemed interested in challenging opposing information and strengthening a worldview that they hold, but which is not validated on the BLM page. In both groups we can assume that while exposure to diverse ideas is apparent, based on selective exposure theory each group is seeking validation of their existing viewpoints; may be grappling with dissonance in their thinking; and seeking to avoid, and/or in some cases, dismiss alternative viewpoints [39].

The findings also suggest that commenters were struggling with the unique and precarious nature of Black lives - acknowledging the perceived threats faced by this community, the need for a deeper understanding of the systemic issues of racism and discrimination, and a related call to action. Some commenters listed specific methods for challenging these major social issues, while others appeared ambivalent about the ideology and need for BLM, and the remainder were overtly opposed to the existence of BLM, perceiving it as a threat. The results, however, aligned well with key issues involved in the long history of the death of Black Americans at the hands of police in the U.S.

6. Limitations

One well-known limitation of sentiment analysis is the misclassification of data. For example, a comment, *"Yes it would be nice to be on a level playing field in life,"* was initially misclassified under happiness. In another example we discovered that "Ha" was used for what seemed to be trolling and an expression of irony. "Ha' may have also contributed to the high happiness score from the Ekman analysis as it is linked to positive feelings.

Although the intended scope of the data collection process was to capture textual data for a specified period, this restricted the ability of the results to represent posters' emotions more fully. For Example, the

data did not allow for the evaluation of pictographic reactions. Emoticons or emotion icons, present greater depth of meaning when used for portraying ideas. Emoticons are less ambiguous than textual data as their existence is connected to the same basic human emotions being examined. Having emojis as part of the data analyses would help future studies further examine the emotions of posters. Finally, although the study used big data, a larger dataset of more users and inclusive of users' demographic data would further expand the reach of this study. Future research should explore the habits and background of users to give context to the sentiment discovered in these data. This would provide further insight into trolling behavior by age, gender, and ethnicity for instance. Although there are some limitations, the findings confirm the need for a deeper understanding of internet interactions and highlight the rapidly evolving climate of online spaces and the challenges faced by digital activists.

7. Conclusion

Social media is a critical tool for gauging public opinion and response to significant public events, and for understanding societal sentiment. Citizen empowerment may have the added benefit of strengthening one's social identity but could have the downside of leading groups and individuals down the path of selective exposure in their interactions and information consumption online. This may explain the growth of niche social groups and inclusionary spaces on the internet. However, these online spaces have also become breeding grounds for unfavorable interactions, including bullying, trolling, and the dissemination of dangerous sentiments and conspiracy theories.

The study identified prevalent social justice themes related to advancing racial justice and equality against the backdrop of deadly police interactions and the COVID-19 pandemic. This was accompanied with negative sentiment and hate speech towards BLM and their Facebook page - as reflective of the response to numerous pro-Black pages across various social media platforms. This serves as a microcosm to wider social issues and the onerous task faced by content moderators who are tasked with ensuring safe cyberspaces for digital citizen agency.

The findings spotlight the need for continued efforts in addressing hate speech and fostering more inclusive and respectful online interactions. By understanding the fine-grained themes associated with digital communities and hate speech, steps can be taken to develop strategies and policies that promote positive discourse and decorum and combat harmful interactions on social media platforms. Ultimately, this research contributes to broadening the understanding of the complex relationship between social media, public sentiment, and the challenges associated with maintaining a safe and inclusive online environment for digital citizen empowerment.

Finally, the study suggests that digital citizen empowerment by itself may not be sufficient to produce action or to move individuals to digital activism and critical action like what we saw following the death of George Floyd. Instead, our findings suggest that a confluence of emotional connection, anger or negative sentiment, identity, and empowerment together underlie digital activism. Although the existence of a space that empowers citizens is necessary, an emotional connection and common shared identity and purpose may be critical for digital citizen empowerment to rise to digital activism.

CRediT authorship contribution statement

Jesse Scotland: Writing – review & editing, Writing – original draft, Supervision, Software, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Alvin Thomas:** Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Investigation, Conceptualization. **Mengguo Jing:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Declaration of competing interest

The authors declare no financial or other interests, and that we have not submitted this manuscript to any other journal.

Data availability

The authors do not have permission to share data.

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