The Internet Frontline: How Narratives of the Russia-Ukraine Conflict Compete on Social Media

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Abstract

Many believe the media serves as a channel for elites to disseminate their political messages to a wide audience in the mass media era. With few alternative political information sources, citizens are often exposed to information modification and manipulation.

However, recent social movements have successfully leveraged social media platforms to construct their grassroots stories before the traditional news media paid attention. Some, then, argue that social media serves as an alternative media for citizens to challenge the narrative established by mainstream media. Despite successful cases, alternative news and narratives are not always found. Meanwhile, the accelerated information flow on social media reduces the opportunity for fact-checking, forcing users to embrace information shortcuts for rapid information processing. It increases users' vulnerability to certain communication strategies and further limits access to diverse narratives. This observation raises the question of generalization over the findings.

Based on this ongoing debate, this thesis examines to what extent social media users can construct and challenge the narratives built by the mainstream media on issues of war and foreign policy. This dissertation first investigates elements that determine the content popularity and the preference of content type to analyse the change in communication strategies. Then, semantic networks will be employed to explore the narratives presented by traditional media and other media accounts.

This dissertation finds discrete emotional cues (anger and fear) and sentimental-rich content are more popular, which shows a similar trend with the observation in the mass communication model. Both mainstream media and alternative media accounts present unified narratives with only slight differences in language choice. Those findings further support the claim that the arguments on alternative narratives built on social media face generalization issues. It also adds practical implications by utilizing emotion and other elements as information shortcuts to quickly promote narratives and political ideologies.

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Author's declaration

I declare that this thesis is a presentation of original work, and I am the sole author. This work has not previously been presented for a degree or other qualification at this University or elsewhere. All sources are acknowledged as references.

1 Introduction

Introduction

Although politics is not the most popular topic in everyday conversation, it is an essential part of the democratic process that influences citizens' daily lives. From TV shows to political debates, citizens actively or passively receive political information from the media (e.g., Abramowitz, 1978; Delli Carpini& Keeter, 1996). By exposing themselves to more political information, citizens are able to connect their interests with political ideas and issue positions from political parties and candidates (Goldstein & Freedman, 2000; Prior, 2007). However, the information presented in the media often emphasizes some aspects of the event that favour the view of political elites, especially regarding international crises and foreign policy (Maxey, 2022). Audiences usually receive partial information that promotes values aligned with information producers and fail to form a comprehensive picture of an issue (Charron & Annoni, 2021). Communication and political science scholars, thus, argue that the information received from media can shape public opinions and further influence citizens' political decisions due to the lack of exposure to alternative narratives.

Due to technological limitations, communication in the early mass media era followed a broadcast model (one-to-many). This model, as defined in several political communication works (e.g., Metzger, 2018), delivered media content to broad audiences but prevented direct access to information sources. Political actors, interest groups, and

other entities use media as the information carrier to promote views that support their issue positions (e.g., Cobb & Elder, 1971). Media became the information broker connecting information producers to their targeted consumers while controlling what and how information is presented. On issues such as international crises or foreign policy, government officials are often the sole information sources available (Entman, 2004; Robinson et al., 2010).

Yet, with social media emerging as one of the primary information sources, the dominance of mainstream media in the information market is challenged. Anyone with internet access can produce content online. Social media users often hold the dual role of information producers and consumers and have opportunities to interact with other users directly. This blurred line of authorship allows individual experts and citizen journalists to rival the established authorities in influence, as social media popularity does not always correlate with real-world authorities (Lotan et al., 2011). Meanwhile, information producers such as witnesses and social movement participants who previously relied on media to spread messages now access social media platforms. Many disaster management and emergency updates accounts allow users physically nearby to upload and report the current situation to warn others (e.g., Chauhan & Hughes, 2017). More minor disasters and local crises that are usually less newsworthy get attention on social media quickly (e.g., Kryvasheyeu et al., 2016; Reuter, Heger, & Pipek, 2013). Similarly, the 2011 Occupy movement and the Climate change movement, for example, set up social media accounts that post stories and ideas created by participants (Bennett & Sederberg, 2012). Without the information brokers, users build news stories from bottom-up perspectives

and confront the narrative presented by the mainstream media (e.g., Bennett & Sederberg, 2012; 2013).

Although more and more cases of alternative narratives are found and built by social media users, it is unclear whether this observed pattern applies to other political issues, particularly war and foreign policy. Given social media's dynamic and uncertain environment, traditional communication strategies like framing may need adaptation. The competition in the information market is found in both traditional media firms and among social media users. This dissertation, thus, asks: to what extent can social media users build influential alternative narratives that challenge the mainstream media regarding international crisis and foreign policy? While the main focus is the potential differences in perceptions and public discourse, this dissertation also seeks to explore factors that determine sharing behaviour in the social media environment and people's discussion and reactions. The proposed sub-research question for the first individual study is: what factors influence sharing behaviour on Twitter? The second individual study will focus on the possible shifts in public discourse and emotional reactions over time. Finally, individual study 3 will directly investigate the main research question on the basis of the first two studies' findings.

This dissertation aims to explore the communication strategy utilized on social media platforms and its impact on public perception of war and foreign policy. The dissertation focuses on a singular case study to analyse the effect of the strategies, isolating specific influences from broader social media dynamics. This approach ensures a detailed analysis

of various communication strategies from the text, such as the differences in language use and emotional expression, that might otherwise be ignored due to the complexities of social media environments. The analysis primarily focuses on language use and emotional expression, as these two elements influence how people recognize and understand the information delivered. Specifically, this dissertation examines how the select case is defined and described. The terms used to define the case change how people perceive the involved individual or groups (e.g., Pearson, 2010). Emotional expression triggers physiological responses that influence how people react and respond to the issue (e.g., Marcus, Neuman, & MacKuen, 2000). The detailed theoretical background is discussed in a later section.

Before turning to the literature review and individual studies that construct this dissertation, this introductory chapter also contains a brief discussion on the research rationale, theoretical framework, and research design to provide insights into the underlying rationale and assumptions of the project. This discussion starts with introducing the research rationale, which explains how delivered information influences people's political decisions and why it focuses on language use and emotional expression. It also addresses the changing media environment and explains how individual studies connect to the central research question of the dissertation. Following the research rationale, this dissertation introduces critical theories and case studies on communication strategies and their impacts to clarify the concept and focus of the individual studies. Lastly, this chapter discusses the research design, why this approach suits the project, and the selected case for individual studies.

Research rationale

Before diving into the main argument of this dissertation, it is necessary to know how information influences people's understanding of the issue and decision-making. Although politics is a fundamental aspect of modern democratic society, it remains a complex subject that demands sufficient knowledge and resources to fully comprehend. Therefore, understanding how people generally process information is beneficial for analysing their political decisions. Information processing is a complex mental process in the human brain. As the control centre of the human body, the brain performs multiple tasks at a time. Each task requires sufficient resources to maintain performance, but the brain has its capacity. The Cognitive Load Theory (CLT) introduced cognitive load, which refers to the amount of working memory resources used (Sweller, 1988). Information processing demands such resources, and this cognitive load influences task performance, particularly complex thinking tasks (Mcgregor et al., 2023; Sweller, 1988). Both learning new political information and searching for tasks demand more cognitive resources. When people encounter new information, the brain will first store it as short-term memory and working memories to solve the current issue (Xu et al., 2023). Less information is sorted into long-term memory, requiring rehearsal and review to prevent the memory from decaying (Atkinson & Shiffrin, 1968). Learning and searching tasks essentially incorporate new information into the current situation or the existing memories. During this process, the brain needs to retrieve existing memories from long-term memories and match new information to produce solutions. For example, the cognitive load is higher when the searcher views the search result content as it requires the brain to process new

external information and see if the search result is satisfying (Gwizdka, 2010). Yet, working memory is limited in capacity and duration (Xu et al., 2023). The complexity of the task decides the amount of cognitive resources required. People find memorizing and understanding complex concepts and functions challenging compared to simpler ones (Xu et al., 2023). The human brain cannot take every piece of new information and repeat the process each time people encounter a problem. The brain will rely on heuristics or mental shortcuts to reduce this cognitive cost.

Heuristics refers to mental shortcuts that ease the cognitive load when performing tasks (Gigerenzer & Gaissmaier, 2011). A complex task such as making political decisions requires sufficient knowledge of political processes and the issue. And how well do people know about politics? Not very much, according to works that examine citizen's accuracy of factual political knowledge (e.g., Delli Carpini & Keeter, 1996). There are several different types of heuristics involved in political decision-making. Earlier work in voting behaviour and political participation points out that voters are often affirmative with their party membership or the ideology attached to their supported candidates when reviewing political issues and making voting decisions (e.g., Conover & Feldman, 1986; Lodge & Hamill, 1986; Lau & Redlawsk, 2001; Lupia, 1994). Party and supporter membership becomes a label that people identify and align with. In other words, how parties or candidates describe the issue defines how their followers perceive it. People with less political knowledge and interests are more likely to rely on various labels to shorten the information processing on political issues (Lau & Redlawsk, 2001; see also Shephard & Johns, 2011 for experiments on various cues in judging politicians).

However, labelling often results in a biased perception of the issue and involved groups because of the added context and presence of stereotypes. For example, when the media presents ethnic minority groups with news related to crime and violence, it signals viewers to create a stereotypical impression of the involved ethnic group and encourage intergroup comparison (Mastro, Behm-Morawitz, & Kopacz, 2008; Mastro, 2015). Biased impression of issues and groups leads to misperceptions and false beliefs. Once the misperceptions are built, people will have difficulty updating their false and unsupported beliefs about politics (Thorson, 2016). Therefore, it is crucial to investigate what information spreads and how it spreads after an event or crisis. As earlier examples show, the impression is formed when the media presents the subject from a specific angle. For the main focus of the dissertation, the established impression is reflected in public discourse, especially the highly shared ones. Whether social media can serve as a tool to construct alternative narratives depends on the differences in terms and phrases used to describe both sides. Thus, this dissertation proposes two ways to examine the impression created. One examines public discourse on related topics to identify the main topics surrounding the event and what impression is built. The other is to analyse the popular content to investigate how the impression is built.

Aside from labelling, emotion also impacts information-seeking and evaluation of the event. The Affective Intelligence Theory connects emotion to decision-making processes from a psychological and physiological perspective. Marcus and colleagues (2000) theorized that two systems influence emotion and behaviour. The Disposition System

compares the situation people face and the completeness of the set goal to determine the level of anxiety (Marcus et al., 2000). People with higher anxiety levels are more engaged in politics than calm ones (Marcus et al., 2011). It suggests that emotional-rich content is more likely to attract people's attention. For political issues with less attention, incorporating emotional expression can be a potential communication strategy to raise awareness and promote values matching the information producers' preferences. The Surveillance system, conversely, detects potential threats and sends warnings to the body (Marcus et al., 2000). Those with the Surveillance system activated will be more alert and focused on the current situation rather than the habitual choice (Marcus et al., 2011). However, when other emotions, such as anger, are triggered, people tend to rely on existing experiences and decrease information-seeking behaviour (MacKuen et al., 2010; Valentino et al., 2008). Given that emotion and affective behaviours can be triggered when reading messages online (e.g., Ferrara & Yang, 2015; Wheaton, Prikhidko, & Messner, 2021), specific emotional expressions in the online content may trigger similar reactions from readers. For instance, anxiety level and obsessive-compulsive disorder (OCD) symptoms are positively correlated with perceiving anxious COVID-19 messages on media (Wheaton et al., 2021). The triggered emotion will then change the audience's information behaviours and other behaviour tendencies and their perception of the political issue. This dissertation, thus, considers a strategic use of emotion and investigates whether emotional expression and emotionally rich content are adapted as communication strategies on social media to form narratives with precise issue positions.

Apart from the heuristics and other information processing shortcuts, the changed media

environment and how people access information influence how an issue is perceived. Compared to the mass media era, the background and profession of the information producer are much more diverse. The time and information cost to find the "right" one is much higher in the information age. Most people only look at the top few results or the first page when performing a web search (Dean, 2023; Rieger, 2009). Users typically have limited time and attention relative to the vast amount of online information; thus, they are likely to be influenced by the first few messages appearing when they search on social media. Social media platforms usually rank the search results by the popularity of the content. The popularity is calculated by combining various factors influencing user interaction, especially sharing behaviour (e.g., Twitter, 2023). Examine elements that influence the sharing behaviour helps understand the communication strategy adopted by social media users

Theoretical framework

The communication strategies mentioned in the dissertation refer to framing and related techniques, especially labelling and emphasizing narratives. Information producers selectively present the information to reflect particular arguments or emphasize specific angles. This information processing technique is often called "framing" (Entman, 1993; Chong & Druckman, 2007). The specific concept of framing depends on the context of the term, but it can be seen as a communicative technique that influences how people make decisions. In the experiment by Kahneman and Tversky (1979), researchers found that people change their decisions about the same event based on the perspective of the information presented. For example, people are given the option of gaining for a risk and

gaining for sure and find participants value options differently when the risk increases (Kahneman & Tversky, 1979). With minor perspective modifications, people change their decisions although given the same overall information. Opinion and judgment are, therefore, vulnerable to persuasive manipulation. That said, the media and information environment as technology developed, whether the same techniques apply remains unclear. Therefore, individual study 1 will first investigate factors that influence sharing behaviour, a metric that determines content popularity and visibility, in social media environments and observe for any changes. Meanwhile, to address the main research question on establishing narratives and impressions, this dissertation will focus on labelling and emphasis framing.

Label framing is focused on how the information is communicated between the sender and their audience to reflect the attitude (Liu & Scheufele, 2016). As discussed in the Research Rationale section, labels are mental shortcuts that ease cognitive loads when processing information and forming judgements. For example, using term "undocumented" or "illegal immigrants" generate a more threatening attitude than "undocumented" or "illegal workers" (Pearson, 2010), while "undocumented immigrants" is perceived more positively than "illegal immigrants" (Ommundsen, Van der Veer, Larsen, & Eilertsen, 2014). The label and its lexicon create implications for how people want to perceive the topic, as people will automatically match the existing impression of the label to the topic. By assigning labels to involved entities, the information producer embedded their value in the information spread and caused audiences to automatically match the existing impression the label associated with to the subject. This

communication strategy will directly answer the central research question. Individual Study 3 in Chapter 5 will dive into the terms used to describe the involved entities.

Emphasis framing, on the other hand, isolates or highlights a selected aspect or element of the issue so that the chosen parts are shown under the spotlight (Nelson, 2019). In the world of politics, a policy usually has its pros and cons. Those exposed to frames that emphasize the advantages of a certain policy have higher support rates than those exposed to frames that emphasize the cons of the same policy (Druckman, Peterson, & Slothuus, 2013). By manipulating how information is presented, the information producers can influence how people assess the situation and guide their opinions to match the point of view of the information producers. Individual studies 2 and 3 both analyse the top social media content and investigate how the event is described. Study 2 in Chapter 4 focuses on the topics found in public discussion. The extract topics represent how people perceive the event and allow researchers to deduct how information producers wish the consumer to understand.

Strategic use of emotion

Both CLT and AIT, as presented in the Research Rationale section, have suggested that emotion is both a mental shortcut and a mechanism that influences how people evaluate current situations and make decisions. If emotional cues or expressions are strategically embedded in the social media content, information producers may manipulate the messages and lead the public opinion on an event in their desired direction. Given the dynamic of the social media environment, the competition between communication strategies decides which content becomes viral and eventually creates the impression of

an event. Content with emotional expression is generally more popular than those without (Stieglitz & Dang-Xuan, 2013; Trilling et al., 2017). Discrete emotions also influence how people make their political judgments. For example, people tend to search and learn new information when fear or anxiety is triggered, but such behaviour decreases when they feel angry (Valentino et al., 2008; Vasilopoulos, 2018; see also Vasilopoulos, Marcus, Valentino, & Foucault, 2019). Those who feel fear and anxiety will shift attention to issues that trigger emotion. Incorporating fear cues into the message may increase the content's visibility, but incorporating anger cues will encourage the audience to rely on existing experiences. The former allows content to compete with others for the audience's attention. The latter sets guidelines for their audiences to judge the target. Generally, people exposed to positive framing reflect positively on the issue but negatively when presented with native framing (Lecheler et al., 2015). When candidates express hope as emotional cues within their statement, the audience is more likely to trigger enthusiasm and respond positively to the issue position (Hutchings, Valentino, Philpot, & White, 2006). In this way, the information producers promote their values and gain supporters of their view.

Emotional cues are also commonly seen in moral judgment, especially in negative frames. People prefer news stories with moral conflicts to those with only factual statements (Trilling et al., 2017). When people feel disgusted, they are more likely to make harsher moral assessments (Schnall, Haidt, Clore, & Jordan, 2008). This tendency is due to the mechanism of disgust as it is feedback from the disease-avoidance system (Curtis, de Barra, & Aunger, 2011). The feeling of disgust is also used as a metaphor sometimes to represent an attitude and moral evaluation of a topic. Moral judgement and conflict bring

virality to the content. Individual study 1 looks at moral emotions, anger, and disgust cues to test whether this emotional element contributes to content virality in social media. Meanwhile, studies 2 and 3 also consider moral cues and judgement as part of the impression that social media content builds.

Methodology

This dissertation is divided into three individual studies to address the central research question, each focusing on different aspects of the research question. As mentioned in the research rationale section, analysis of elements determining popularities, public discourses, and emotional expression is essential before directly answering the central research question. This section will briefly introduce the selected case studies for the dissertation and the logic of the chosen methodology.

The Case of the Russia-Ukraine Conflict

The focus of the dissertation is the Russia-Ukraine Conflict, explicitly examining the development after the "special military action" declaration on 24th February 2022. This conflict is one of the few active military engagements occurring near developed regions (European Union) since World War II. Unlike other military confrontations, the Russia-Ukraine Conflict involves nations that are not only physically nearby but also ideologically opposed. This proximity and ideological challenge attract media attention and online discussion. Furthermore, Russia's role as a common political rival in many Western countries raises this conflict's relevance. Those factors make the Russia-Ukraine Conflict an ideal case to explore the possibility of building alternative narratives and

testing whether public opinion aligns with mainstream reporting.

This dissertation collects Twitter data for individual studies as Twitter has become one of the primary sources for news and political discussion (Duggan & Smith, 2016). Studies indicate a preference for Twitter over Facebook for political discussion and expression due to user interaction systems' structure and characteristics (Settle, 2018). Facebook promotes connections based on real-life interaction and encourages the sharing of personal life, while Twitter is almost completely anonymous. This anonymity is crucial for users engaging in sensitive topics like politics, where discussion often leads to conflict and argumentation (Thorson, 2014a; 2014b). Yet, Twitter does not require prior interactions or an established network to initiate or participate in the discussion. In a way, Facebook is the extension of real life, while Twitter is another persona. This unique aspect of Twitter potentially encourages diverse political discourse, making it a suitable platform for studying the dynamics of political communication.

Content popularity

The changed media environment may potentially bring new elements to make the content viral compared to the established literature on news-sharing behaviours. This dissertation aims to investigate the elements that determine the popularity of content based on previously tested elements from communication studies and journalism combined with relatively new elements that theoretically grab people's attention, such as emotional expressions. This dissertation employs the Zero-Inflated Negative Binomial (ZINB) model to measure the possibility an element influences the number of shares on social

media, as sharing behaviour is one of the indicators for recommended content (e.g., Twitter, 2023). The ZINB model is a two-part model designed to handle count data with excessive zero values (Zuur & Ieno, 2022). In simpler terms, the model processes data with countable quantities, such as the number of sharing, with additional mechanisms to handle large amounts of data with zero number of sharing. A more detailed explanation of model interpretation and analysis can be found in Individual Study 1, chapter 3. This model calculates the possibility of an element making the content viral or not, making it a fitting methodology to address the changing media environment and set the foundation for the later individual studies in the dissertation.

Emotional expression

Instead of looking at the valence of sentiment, this dissertation focuses on discrete emotions and emotional cues that appear in the messages. The lexicon-based approach is one of the most common approaches for emotion detection from the text in Affective Computing (Calvo & Mac Kim, 2013). This approach searches and matches emotional lexicons from the text with the built-in dictionary containing specific emotions. The lexicon dictionary is a collection of lexicons studied and labelled with specific emotions the lexicon reflects. This dissertation uses the R package "sentimentr," which is designed to extract emotions from short text messages for all individual studies to ensure the consistency of the result. The package is based on the works of Hu and Liu (2004), in which the authors break down sentences into parts, identify opinion sentences, and assign sentiment scores based on the orientation of the valence. On top of that, the package authors introduced augmented algorithms further to classify amplifiers, de-amplifiers,

and adversative conjunctions to assign better the extracted terms (Rinker & Spinu, 2016). Meanwhile, this augmented algorithm also considers the processing speed due to the amount of data for social media studies. It balances the accuracy of the emotional extraction and the processing speed, which makes the package a good fit for the purpose of this dissertation.

Public discussion and semantic analysis

This dissertation analyses impressions built by social media content from two directions: the impression formed among the public and the terminology used in the top content. The former examines the topics and themes people generally pay attention to. It helps readers understand the demands of the information market for social media users. This dissertation employs topic modelling techniques that reveal the "hidden" topic, which refers to a collection of correlated words by their co-occurrence within a large number of documents. The result will show phrases and terms that constantly appear. For example, suppose people discuss "sweet" in a collection of documents related to apple fruit. In that case, the paper can conclude that the flavours and sweetness are the important elements people pay attention to when picking apples.

The dissertation uses semantic networks to analyse the terminology used to describe the involved entities. This method aims to find how each involved entity is portrayed and what impression is associated with the entity. The semantic network is a graphic presentation of knowledge extracted from the source documents to form a network by the relationship between extracted knowledge (Segev, 2021). This methodology can extract

terms that co-occurred with targeted words, revealing how the involved entities are described in top contents. By analysing the extracted terms, this dissertation can study what impression is built and what terms lead to the impression. It can also compare the network from mainstream media and the rest of the social media users to directly address the central research question: whether social media users can build a challenging alternative narrative.

Outline of the Dissertation

The dissertation contains a total of three individual studies, a literature review, and one synthesis chapter that examines factors that influence public opinion on social media platforms regarding foreign affairs. The literature review introduces related works in the fields and fundamental theories related to the three studies in the thesis. The three studies investigate the influence of communication strategies and sentimental elements, including framing and discrete emotion cues within the text. Each study focuses on specific aspects of shaping public opinion online. Although all studies are logically interconnected through their alignment with the theme of the dissertation, each was conducted individually.

The first chapter presents the literature review, which discusses the existing literature related to the dissertation's overall research question and highlights research gaps. The chapter begins by discussing the theoretical framework of political knowledge and participation. It reveals how citizens access political information and make decisions during the political process. However, the received information is not without bias.

Communication strategies, as well as emotional cues, shape how people perceive individual issues and the involved groups. Social media, on the other hand, brings new communication modes where alternative information sources and styles are available to the audience. The chapter illuminates the research gap regarding the impact of social media usage on public opinion about war and foreign policy, which is the central focus of this dissertation.

The second chapter presents the first article using statistical models to examine possible factors influencing people's online sharing behaviour. The article collects Twitter data and uses retweet count as the metric to measure the popularity of a tweet. The study uses sentiment analysis to obtain the sentiment score and the presence of discrete emotional cues. The study determines whether the intensity of sentiment and specific emotional cues—including anger, fear, and disgust—influence online sharing behaviour. Common factors, such as the number of followers and readability score, are used as the control to reflect the actual information environment more accurately. The result shows that the presence of anger and fear cues in the text increases the likelihood of sharing but not disgust. Surprisingly, the article also finds that some common factors do not align with previous research on similar topics.

The second article, Chapter 3, explores how the trending theme and emotion reflected in the text evolves as time progresses. The article groups datasets according to the dates various countries simultaneously announced their decision to send military aid. The central focus of this study is to observe how reactions and discussions evolve in response

to the event's progression. The article employs topic modelling to uncover possible topics people discuss during each wave of military aid and manually categorize similar topics to see what people prefer. Meanwhile, a sentiment analysis is undertaken for each wave of data to compare the intensity and presence of emotional expression in the text. The study finds people pay almost equal attention to informative content and emotional-expressive content, and the preference changes over time, which suggests a mixed information behaviour rather than a constant behaviour pattern. Furthermore, the intensity of sentiment ceases as time progresses, suggesting that people no longer react to the event with more emotional expression.

Chapter 4 presents the third article investigating how people describe the story and related groups in the event and whether the word choice reflects a distinctive position. Moreover, the article compares the word choice and narratives built by mainstream media and alternative information sources on social media. This article directly addresses one of the central debates of this dissertation: whether the alternative information sources on social media break the control of public opinion by elites on war and foreign policy. The article builds a word co-occurrence matrix and visualizes using a semantic network to explore terms used within the same sentence as target words and analyse how each type of media generally describes target words. The comparison reveals no apparent differences between mainstream and alternative media positions, although the specific wording differs. In other words, other media on social media platforms do not provide an alternative narrative of the event.

Finally, chapter 5 presents the synthesis chapter that concludes the main findings from the three studies conducted and how they logically connect. This chapter will also answer the dissertation's main research questions and explain the result. Meanwhile, this chapter addresses the research limitations and outlines the future directions the results suggest.

Summary

In conclusion, this chapter introduces the central research question: Does social media serve as a tool for establishing alternative narratives in foreign policy and international crises, challenging the dominance of Western mainstream media? Social media platforms allow individuals from diverse backgrounds to express opinions alongside professionals, providing the environment for creating diverse narratives. The unique communication styles on those platforms also enable general users to engage in informal political discussions, often before major media firms pay attention to the issue. However, traditional communication strategies, especially those that use emotional cues and labels, continue to shape public understanding of the events. Given the limited knowledge most citizens have regarding foreign policy and international crises, the effectiveness of social media is questioned.

The concern about communication style and strategies is rooted in the cognitive processes by which people generally process information. With limited capacity, people often rely on mental shortcuts, such as emotions and labels, to quickly process information in high-stakes situations. Political actors and other professionals utilize these mechanisms to influence how people evaluate the current situation and eventually persuade people to

support it. Similarly, preferences for specific types of content have remained across different media eras. Despite those consistent patterns, social media as a complex information environment with assorted users poses a challenge to the conclusion of existing literature. With shifts in both operation logic and information landscape, will the observed patterns of public reaction and preferences continue to hold? This dissertation will address those research questions from the perspective of both the communication style and strategy in social media. It aims to explore whether factors determine popular content and people's reaction changes since the development of social media while investigating the political discourse that describes the event.

2 Literature review

Introduction

In recent years, social media has rapidly overtaken printing presses and mass media technologies as the primary information source (Duggan & Smith, 2016). With internet access reducing participation costs significantly compared to earlier eras (Bertot, Jaeger, & Hansen, 2011; Nurmandi, Almarez, Roengtam, Jovita, Suluh, & Dewi, 2018), it has empowered citizens to actively engage in political discussion online. Social media incorporates user interaction metrics, such as sharing and commenting, for a more personalized and customized communication style. This attribution allows users to shape narratives and information markets by posting stories and interacting directly with information sources. Several social movements, such as Occupy Wall Street and Friday for Future, utilise this characteristic to establish stories from their perspective and challenge the dominance of mainstream media in news coverage (Boulianne, Lalancette, & Ilkiw, 2020).

Consequently, many believe that social media is the tool for the general public to break the dominance of mainstream media's news coverage and narratives. Additionally, social media changes how people communicate and interact during crisis times. Journalists and those who live nearby report the event as soon as it happens (e.g., Veil, Buehner, & Palenchar, 2011). Experts provide advice and additional information for both locals and the concerned. Humanitarian organizations and emergency practitioners connect with volunteers to offer help to locals (Smith, 2010). Furthermore, citizens contact friends and families to ensure safety.

Despite these advantages, literature has yet to reach a unified theoretical framework regarding the impact of social media on international crisis and war communication, as well as the related communication strategies. Other factors, such as social networks and emotional elements, still play a crucial role in shaping crisis perceptions. The influence of emotions on decision-making and action remains constant regardless of technological advancements. Emotion is the underlying mechanism that directs one's decisions and actions (Brader & Marcus, 2013; Corr, 2013; Gray, 1975; Gray, 1990; Lazarus, 1991; Smith & Ellsworth, 1985; Roseman, 1996). Specific emotions, triggered by particular situations, lead to diverse reactions (Iyer, Schmader, & Lickel, 2007; MacKuen, Wolak, Keele, & Marcus, 2010; Tangney, Stuewig, & Mashek, 2007). For instance, anger and fear are more likely to boost participation rate, although the specific actions motivated by each emotion differ (e.g., Valentino, Brader, Groenendyk, Gregorowicz, & Hutchings, 2011; Groenendyk & Banks, 2014; Scheller, 2019). However, disgust triggers avoidance, resulting in less participation or a change of attitude (e.g., Georgarakis, 2022). By incorporating specific emotional cues into the message, practitioners can develop new communication strategies to effectively leverage social media platforms during crisis time.

The value of this chapter is to point out the different characteristics of social media and their influence on the change of communication modes and styles. The development of social media not only changes how citizens communicate with each other but also the communication mode between citizens and political actors, journalists, and other institutions (e.g., Bruns & Nuernbergk, 2019; Kalsnes et al., 2017). Compared to

traditional media, social media emphasizes the interaction between users (Van Dijck & Poell, 2013). The role and guidelines for news editors and journalists also change in this new media environment (e.g., Hermida, 2012; Lischka, 2018). Many argue that such environments provide an opportunity for general users to shape the information market with relatively less effort and potentially challenge the dominance of the established media firm. Yet, successful cases often focus on online social movements and disaster updates, lacking generalization to other cases such as international crises and war. Additionally, the blurred line between professional journalists and citizen journalists during crisis time is often not addressed in crisis communication research. As the role of journalists shifts from information disseminator to information producer, journalists compete with citizen journalists or other users for faster news coverage and narrative construction. This chapter will discuss the literature on communication modes and strategies from the mass media era to the social media era while addressing the gaps listed above.

This chapter will first focus on the literature on media, social networks, and emotion as the foundation of social media research, especially in the mass media era. This first section will start with the difficulties citizens face when participating formally in politics, such as the lack of political information. Media, including the printing press and other mass media technologies, are one of the primary political information distribution centres for politicians to communicate with others before social media reaches citizens. It will discuss the conclusion from previous literature on how political messages influence people's opinions on candidates and issue positions during elections and crises. The

second section will discuss how social networks, as an information shortcut, provide

political information and participation opportunities when limited information sources are

available. Members within the same social networks are more reliable information

sources than strangers on media channels. The daily conversation exchange and social

interaction build trust and enable political discussions on common concerns. Then, the

following section will discuss how psychological factors, namely emotions, as the basic

mechanism, naturally influence how people act. The strategic use of emotion can control

how people perceive the government or political opponent and eventually engage or

disengage citizens' political participation. Finally, the chapter will analyse new findings

in the social media era. It will discuss citizens' creative ideas using social media platforms

to personalize political issues and participation, exploring the influence of social on

narrative building and information dissemination.

Mass media and political information

Citizens generally lack sufficient knowledge of the political process and specific political

issues (Brady et al., 1995; Delli Carpini & Keeter, 1996), which prevents them from

effectively communicating with politicians and setting up agendas. Media, in this case,

often acts as the information source to provide political information and connect citizens

to related issues and candidates. However, objectivity and fairness are not always ensured

during the information dissemination process. The opposing view contends that media

also have the potential to influence people's opinions by manipulating the message

delivered (Eberl, Boomgaarden, & Wagner, 2017; Mander, 1980; see also Prior, 2007),

especially during crises such as wartime (e.g., Aday, 2019; Boin, 't Hart, & McConnell,

2009). Professional editors and journalists form the "gate" and obstruct citizens from engaging with informants directly (Shoemaker, Vos, & Reese, 2009). Literature on communication and public opinion suggests that media influence public perceptions, particularly through elite cues (Zaller, 1992) and media framing (Entman, 2004). Media messages shape how people interpret and heed political issues, especially for people with less knowledge or interest in politics (e.g., Zaller, 1992; Iyengar & Kinder, 1987) and when there are limited alternative information sources available. This section will discuss the role of media and journalists from the mass media era and the communication strategies employed by the elites to dominate the narrative of political events.

Television debate (Abramowitz, 1978), political advertisement (Goldstein & Freedman, 2000) and talk shows or interviews with candidates (Delli Carpini& Keeter, 1996) are common sources of political information. The messages from political actors and other interest groups are broadcast to a wide range of audiences through mass media technology. For example, the percentage of candidates' issue position awareness increased by up to 20 percent on average, which shows that the information delivered by television debate successfully reaches the audience, and the audience also pays attention to such information (Abramowitz, 1978). Many scholars report a higher participation rate or increased willingness to participate after exposure to political information via media (Neuman et al., 2017), especially for those with less knowledge about the topic (Iyengar & Simon, 1993; Zucker, 1978). Although the media serve as a crucial medium for political information, they do not always present equal, objective, and factual statements (Cohen,1963; Lang & Lang, 1953; Neuman et al., 2017; Semetko & Valkenburg, 2000).

The media coverage of an issue depends on the viewer's interests and the predisposition of the channel. Not all political actors or issues receive equal attention from the media. Many media channels primarily focus on national politics and candidates from larger political parties but ignore political actors from smaller parties (Eberl et al., 2017). This unfair coverage makes political figures and interest groups compete for media visibility to grab the audience's attention and convince them to vote (Cobb & Elder, 1971). Meanwhile, it raises the concern that the media and news coverage tend to favour the view of the elites (Zaller, 1992; Entman, 2004).

Based on the original work from Charles Wright (1986), early mass communication theories suggest that the communication mode for the mass media era, especially when the print press is the main firm, follows a one-way communication flow from the information source to the audience, leaves little space for the audience to interact with the source directly (see also van Ruler, 2018). The idea that "media control what people see" is widely believed and observed (e.g., Dovbysh & Somfalvy, 2021). However, the term "media" is a broad category that includes a wide range of professionals, such as journalists, editors, broadcasters, and content creators. As mentioned in the previous paragraph, news coverage does not cover all news but with preference over the audiences' interests, the information provided by sources, and visibilities. There is a choice gap between the interests of the audience and the journalists, in which audiences prefer "soft" news, including crime, technologies, and sport, while the journalists favour "hard" news, such as politics and economics (Boczkowski & Peer, 2011). Yet, under the one-way communication model, the news is essentially what the sources state and is mediated by

the media firm (Sigal, 1986) rather than reflecting the view of journalists or the preferences of audiences. It also restricts the access to news sources for individual and non-professional journalists. Consequently, professional editors and journalists are theorized to act as gatekeepers, selecting and filtering the news topics delivered to the audience (Shoemaker et al., 2009).

Meanwhile, the news content is often modified to trigger reactions from the audiences that align with the expectations of the sources. This message modification process usually refers to "framing." The specific definition of framing depends on the context. The most common notion of framing across different theories is to interpret a complicated social concept into something more understandable (Entman, 1993; Chong & Druckman, 2007; Nelson, 2019). Such a concept or issue can usually be viewed from multiple perspectives and includes multiple values (Chong & Druckman, 2007). Public affairs and political news usually involve multiple actors with different predispositions, creating various perspectives when interpreting the event. For example, a political ideology or event has people in different positions, and each position is meaningful in its context. By introducing a specific perspective, framing allows people to interpret or reconsider an issue in a particular way (Chong & Druckman, 2007). In press firms, news outlets can encourage a selected point of view and lead their audience to a similar conclusion by selectively activating ideas, feelings, and values over others (Price, Tewksbury, & Powers, 1997). Evidence of voting preference and attitude change among citizens are observed by many scholars (e.g., Eberl et al., 2017; Lecheler & de Vreese, 2012; Binder, Childers, & Johnson, 2015), but the way attitude changes vary depends on the framing type and the

perspective the media presents.

The modified news may create a persuasive effect to influence citizens' impression of an issue, policy, or candidate (McCombs, Llamas, Lopez-Escobar, & Rey, 1997). Selective reporting and media exposure can potentially create opinions (Berganza, 2009; Rhee, 1997) or persuade citizens to change their preferences (Bullock & Vedlitz, 2017; Chong & Druckman, 2010). Multiple studies have found that citizens are more likely to feel optimistic about the candidate or policy if exposed to positive framing about the subject (Lecheler, S. & de Vreese, 2012). The experiments conducted by Lecheler and de Vreese (2012), for instance, show that participants who receive the news script that emphasizes the potential opportunity and increased economic growth by the upcoming investment plan are more approving this investment plan than those who receive the script discusses the risks and difficulties of the plan. A positive image in the media could help the current government to stay in office and gain the upper hand in the upcoming election. In contrast, if citizens are exposed to negative framing, they start to feel uncertain about the topic and are less likely to approve of it (Binder et al., 2015; Boukes, Boomgaarden, Moorman, & de Vreese, 2015; Schuldt & Roh, 2014). Binder and his colleague (2015) found that citizens are less likely to support the proposed policy when the campaign ballot indicates that the policy will result in a loss of funding. Similarly, Ramasubramanian and Martinez (2017) report a decline in supporting Obama when participants receive negative frames, such as Obama desperately appearing in TV shows to gain visibility and avoid being removed from office. A decline in policy/candidate support would result in changes in voting preference. Citizens will then turn to other candidates or parties and seek the one

that matches their preference.

Aside from the modified content, news dissemination and communication models in the mass media era heavily rely on selected or limited information sources. Unlike the media coverage of elections and policy within the state, where the information and comments come from various sources, the initial information source of foreign policy and international crisis are often solely from the government (e.g., Entman, 2004; Hallin, 1986; Robinson, Goddard, Parry, & Murray, with Taylor, 2010). The government leader becomes the centre of attention as everyone waits for related information. It creates the upper hand for the current government to build the narrative favouring their decisions and immediately broadcast the message to the whole country through media. Even the elites with different predispositions require more time and information to question that initial decision (Zaller, 1992; see also Iyengar & Kinder, 1987). Without sufficient knowledge and alternative information sources to assess the information about the crisis, it is also hard for general citizens to question the government's decision in the early crisis period. Many scholars, then, argue that the war and crisis frame largely favours the elite of the current government (e.g., Hallin, 1986; Entman, 2004). The crisis, especially the one between the home country and foreign countries, could trigger the "rally round the flag" effect, which gives the government leaders a boost in short-term popularity regardless of partisanships (Baker& Oneal, 2001; Mueller, 1970; Simon & Ostrom, Jr., 1989). However, the rallying effect itself does not always guarantee an increase in leader popularity (Baker& Oneal, 2001; Simon & Ostrom, Jr., 1989). The positive expression of the leader comes from the patriotism triggered by the leader's message, the way the leader handles

the crisis, and to whom the blame belongs (Baker& Oneal, 2001; Hetherington & Nelson, 2003; Simon & Ostrom, Jr., 1989).

Crisis communication, on the other hand, follows a slightly different logic compared to general communication flow. After the initial shock of the crisis, the negative consequences shake the function of formal institutions and the order of society. The public, media, and political opponents are eager to know the misstep that caused the crisis and who should be blamed (Boin et al., 2009; Boin, 't Hart, McConnell, & Preston, 2010). Thus, post-crisis accountability is triggered to balance the emotional response of the public and the disturbed sociopolitical order (Kuipers & Brändström, 2020). The crisis becomes the battlefield between political actors for a change in the status quo (Boin et al., 2010). For example, Bush's "post-911" speech identifies the "Taliban regime" as the perpetrator who is "evil" and morally flawed and, thus, military action is required to defend the country and its people (eMediaMillWorks, 2001 September 20). With the clear identification of the perpetrator, the government diverts the emotional response to the misstep of the government to the selected target.

Moreover, this speech frames the selected target as morally flawed and emphasizes the moral justification of military actions. The government and media shift the blame (Thesen, 2013) and hold a moral high ground to justify related actions. It encourages citizens to judge the issue from a moral perspective (Nelson & Kinder, 1996; Voelkel et al., 2022; Zhou et al., 2024) rather than an objective or partisan perspective (Kangas, Niemela, & Varjonen, 2014). Once the moral perspective is established, the current government could

claim those who oppose the action "immoral" and suppress the voice from other sides. With matched moral standards, more citizens favour the current government's decision and continually support them in the upcoming election. Conversely, people with different perspectives can hardly find the opportunity to voice their concerns due to the lack of alternative information at the early stage of crises.

As the world enters a new era, new media and social media platforms become the primary information source for general citizens. The State Report of News Media 2016 reports that the loyal audience and revenue of both newspapers and television have declined in the last 20 years, but more US citizens have started gathering news information digitally (Mitchell, Holcomb, & Weisel, 2016). This shift in information-seeking preferences also influences how people receive and evaluate the acquired information. Social media platforms enjoy the benefit of user-generated content in particular. The low access cost of the internet allows all types of users to access social media platforms. Social media users are both producers and consumers at the same time. Traditionally, news firms were dominated by professional journalists and political actors as they were often the only source of information due to physical and technological limits in the early days. As discussed in previous paragraphs, it is also a barrier to preventing individual and non-professional journalists from entering the firm. In the early days, the channel's predisposition sets the story's narrative and the host and director control whom the camera focuses, especially for prerecording television or radio programs. With social media and other digital technology reaching general citizens, people can record information and construct stories free online. Those users become the content creators and compete for

visibility with other users on the same platform. No government, political parties, or organization can directly interfere with how people use social media or what information is posted unless the action violates the law. Although internet providers and technology companies could hold some authority in operation, they cannot make rules and ask people online to obey (McCauley, 2015). It forces media organizations and political actors to study and follow the social media logic, not the other way around.

Social media influence is not always determined by the real-world influence but the popularity of their content. It allows individual experts to gain their voice online to advise or comment on political or other issues. Citizens also prefer hearing advice from individual experts than politicians or elected representatives in the social media era (Hibbing & Theiss-Morse, 2002; Bertsou & Pastorella, 2017), especially for issues such as climate change which involve hardcore science (Bertsou, 2022). Similarly, non-state groups (individuals or non-government organizations) pass their message to mobilize global audiences who are not physically close (McCauley, 2015). Social media platforms are full of influential opinion leaders who do not work in the public sector. However, one's influence in mass media or reality may not be transferrable to social media platforms, and those who are nobody in real life could be influential online. Both famous people and non-famous people potentially have the same chance to be influential online. Political actors have to compete with both other politicians and influential users when they fight for attention following social media logic. During the 2012 campaign, the Obama digital team interacted with highly active users on Twitter and produced content for journalists to create fact-checks or infographics to attract more people to read (Kreiss, 2016). Twitter

algorithms favour content with high interaction rates (Twitter, 2023; Twitter Help Center, n.d.). Highly active users and journalists will naturally attract more interaction compared to others. This way, the Obama team can raise their influence and possibly present their message to a broader audience.

Although examples and studies show how media boost participation by delivering the message to citizens and the effectiveness of framing during elections, most literature studying offline media focuses on the US and its media environment. The media, political system, and political tension between parties are almost unique worldwide. This uniqueness would raise the question of the generalization of their studies. This section includes a small number of studies focusing on the EU or UK to ensure the conclusion and highlights drawn from the studies mentioned above apply to a broader space. Another issue is the media effect effectiveness. Some scholars report mixed results when testing the media effect (Gerber, Karlan, and Bergan, 2009), which suggests that the media effect is not the only factor influencing citizens. Group identities, social networks, and interpersonal communication can influence public opinion and political engagement (e.g., Beck, Dalton, Greene, & Huckfeldt, 2002). In this case, the media effect may only mediate between other factors and political participation.

Social networks as the source of political discussion

Although media is an important information carrier, citizens do not exchange and communicate political information with media alone. Instead of making independent political decisions, researchers find that people are often influenced by their peers and

communities (Berelson, Lazarsfeld, & McPhee, 1954; Campbell et al., 1960; Katz & Lazarsfeld, 1964). Individual's social networks not only act as sources of political information but also as the basis for further engagement in politics. The like-minded social network reinforces the political preference and attitude of the individual through political discussion and deliberation and engages them to participate in political activities (Berelson et al., 1954; Chen & Lin, 2021). Political discussion within the network can also provide political cues and create an environment for people to express their concerns (Berelson et al., 1954; Huckfeldt & Sprague, 1995). Compared to mass communication, discussion within social networks may potentially alter one-way communication and allow alternative perspectives to emerge. This section will discuss how social networks, especially offline social networks in the mass media era, create the environment for political discussion, influence people's political decisions, and encourage people to express their informal political concerns.

Politics is often viewed as a judgement or action that requires various resources (Rosenstone, Hansen, & Reeves, 2003), which creates barriers for citizens to fully understand it. Although experts and writers in media produce compelling content about elections, average citizens still feel uncertain about some issues raised by candidates as they do not follow closely (Lazarsfeld, Berelson, & Gaudet, 1948). Citizens hold less trust in elected representatives and government officials than in individual experts and businesspeople (Bertsou, 2022; Bertsou & Pastorella, 2017). Thus, social networks become an information shortcut to provide the political context and cues because of their trust and familiarity built upon reliable opinion leaders and daily life (Almond & Verba,

1963; Downs, 1957; Settle& Carlson, 2019). Frequent social interaction strengthens social ties and consequently fosters trust and shared vision or value between individuals within the network (Krackhardt, 1990; Tsai & Ghoshal, 1998). Social ties' trustworthiness can create an open-minded environment for more sensitive topics such as political discussion. Many studies show that people can identify at least one discussant for political discussion, and those discussants are either from the intimate social circle or within other social networks such as workplaces (Huckfield & Sprague, 1995; Levine, 2005). During regular social interactions, people can slowly gain knowledge about public affairs and grow concerned over common issues regardless of which social group they belong to because of the similar social environment members share (Burt, 1987; Passy, 2001).

However, social networks are not necessarily an entirely objective environment for exchanging political opinions. Members within social networks and social groups often shape people's opinions through personal and group influence/norms. The source of personal influence often comes from those who actively participate in politics, have higher political awareness, and educate others in informal settings, which are often referred to as "opinion leaders" (Lane, 1959; Katz& Lazarsfeld, 1964; Rogers, 1962). People with less training or interest in politics and public affairs would turn to those opinion leaders for information and advice to lower the participation barriers (Berelson et al., 1954; Lane, 1959; Katz& Lazarsfeld, 1964). In this respect, opinion leaders are the "experts" who are knowledgeable but independent of government officials. They can, then, persuade members within the network to form similar political preferences on candidates or issues and potentially encourage members to transform their support into

action. Meanwhile, political figures, parties, or interest groups often reach out to opinion leaders and other more active members and let them spread the political message to mobilize a targeted group or community (Lane, 1959; Gamson, 2004).

Group influence and norms also influence how people assess and acquire political information and behaviours. Earlier works on the social aspect of politics had acknowledged the influence of social groups, especially closer ones, on people's formal participation in politics (e.g., Huckfield & Sprague, 1995; MacKuen & Brown, 1987). For example, in Voting (Berelson et al., 1954), the authors argue that the influence of family on voting preference exists before the children reach voting age. Similarly, The American Voter (Campbell et al., 1960) points out how others' voting preferences within the same social network overwrote an individual's evaluation of elements of politics when the said people are self-conscious group members and behave politically like one. Those classical works suggest that people share similar political preferences within their intimate social circle. More recent works also provide well-established empirical evidence to support this view further (e.g., Mutz, 2006).

Apart from intimate social circles, people are also influenced by the weak ties within social networks. Unlike close contacts, people usually have large numbers of weak ties as social contacts (Granovetter, 1973) and receive diverse information and invitations to activities, such as social movements (Friedman & McAdam, 1992; Lim, 2008; McAdam, 1986; Tindall, 2002). Formal groups, in earlier days, have more opportunities for political deliberation and meeting other political elites, encouraging their members to engage

further with politics and related topics (Lane, 1959). At the same time, workplaces, clubs, and other informal groups can also create an environment for political discussion during social interaction and other informal discussions. When people's concern is recognized by their discussant(s) and other members during political discussions, the shared concerns become shared identities (Lane, 1959; Passy, 2001) and form the reason to act based on collective interests (Huckfeldt, 1979; Huckfeldt & Sprague, 1992; Uhlaner, 1989; Klofstad, 2015).

That said, social influence represents both sides of the coin, including both positive and negative impacts. After all, politics is a sensitive topic that can potentially damage the interpersonal relationship. Engaging in political discussion will face potentially dissonant views or information from others. The discussants may try to persuade others by initiating more frequent political talks or discussions (Morey & Yamamoto, 2020). On the bright side, people may become interested in specific topics or issues and engage in other participatory actions. It creates an opportunity for active members to get in touch with them. Earlier studies emphasize that closer social contacts, relatives, and other types of strong ties share political concerns and preferences due to their similar physical environment and social status (Berelson et al., 1954). For example, family members (husband and wife/ parents and children) usually live in the same community and have similar socioeconomic status. When common issues such as crime breakouts or economic crises happen, it affects all family members. Evidence from empirical studies proves the theory and further points out that participants of social movements tend to have shared social identities (Bolton, 1972; Gerlach & Hine, 1970; Kotler-Berkowitz, 2005). For

instance, the long time spent in the workplace helps form shared political concerns and treats social movements as a team-building experience (Keim, 1985; Vogel, 1989).

On the flip side, people feel pressured and uncertain when exposed to disagreements. Many people refuse to discuss politics in many social settings. They are afraid that different views of politics would damage their social relationships or that the discussant is unwilling to discuss the disagreements (Levinsen & Yndigegn, 2015). Although multiple theories and empirical studies have shown the positive side of social networks in terms of political participation and other participatory actions, network formation is more complex in reality than those theorized. Earlier studies theorized that people more often socialize with those with similar social backgrounds and, thus, are more likely to choose similar political preferences as many reflect their social status (Berelson et al., 1954). In other words, people tend to have homogeneous social networks. For a homogeneous network, the political information received and exchanged within often shares similar views with other members (Himelboim et al., 2013; Williams et al., 2015). Thus, this homogeneous network reinforces one's political preference and behaviour. The group that holds the dominant preference enjoys the homogeneous network while ignoring the minority opposite ideas (Huckfeldt & Sprague, 1987; MacKuen & Brown, 1987; see also Basov, 2020; Halberstam & Knight, 2016). However, in heterogeneous networks, people are more likely to be exposed to information and views that oppose their predisposition. Although many argue that exposure to disagreement increases the understanding of the topic or issue and forms rational arguments from both sides (Petty & Cacioppo, 1979; Mutz, 1998; Green, Visser, & Tetlock, 2000; Pietryka, 2016). Yet,

when people move to or are exposed to a political context where the opposite preference dominates, they tend to delay their participation, change their preference, or avoid engaging in politics (Brown, 1981; Mutz, 2002a; 2002b). Scholars have mixed results and theories of whether a heterogeneous environment will increase or decrease political participation (e.g., Gimpel, Dyck, & Shaw, 2004; Oliver, 1999).

The development of social media platforms enables people to connect with those they previously were beyond their reach, expanding one's social network and transforming how political behaviour and discussion are conducted. Although the public sphere is not always "political-friendly," social media platforms have features or policies for users to adjust their privacy settings. Platforms such as Facebook have private groups and pages that only allow members to browse or post, while Twitter allows users to set up additional privacy settings to block unpermitted users (Facebook Help Center, n.d.; X Help Center, n.d.). A Facebook page or group tends to have a theme that attracts those interested in such topics. It can also help establish group identities and a sense of belonging – just like old-fashioned social groups, except it is online and flexible. Those who join the group and form a relatively large social network are more likely to participate in actions such as protests (Chan, 2016; Gustafsson, 2012). Users connect with other like-minded people within the group to gain opportunities and information, and the sense that they are not alone encourages them to engage with politics further (Gustafsson, 2012). However, those online groups do not replace the environment people are exposed to, and people will still encounter cross-cutting networks. However, social media platforms provide additional agreeable networks formed by connecting people to other like-minded or open-minded

individuals they do not know in real life.

Meanwhile, online social movements are more decentralized and often free from the control of formal organizations. For example, Spain's "los indignados" movement involved protests across over 60 cities but managed to keep the major political organizations away (Bennett & Segerberg, 2012). Social media platforms and websites become the media hub that connects participants and establish "togetherness" online (Bennett & Segerberg, 2012). Many participants believe they share collective identities with potential participants, and other like-minded people will also participate (Earl & Kimport, 2011). Bennett and Segerberg (2013) argue that social movements, such as the "los indignados" movement, that are observed on social media platforms are more like "connective actions," which have two characteristics: symbolic inclusiveness and technological openness. Collective actions usually have participants share collective identities and have clear, uniform goals or concerns. Connective actions, however, often frame political content as personalized ideas, such as the slogan "we are the 99%" in PPF and the Occupy movement (Bennett &Segerberg, 2012; 2013). It does not frame to persuade or reason but to create a common cause for people with different reasons or concerns to unite (Bennett &Segerberg, 2013;). This approach allows participants to craft stories from various perspectives, thereby attracting others with similar experiences to join. Connective action also includes various personal communication technologies such as YouTube, Twitter, and Facebook, which allow users to create and share unique themes built by actions with friends or others within the network (Bennett &Segerberg, 2013). Communication becomes more personalized through sharing or posting, bypassing

traditional news media's content modification and attracting users outside the initial issue network.

One limitation raised from the discussion above is that the sociological perspective often excludes the political aspect, treating them as independent entities. Conversations held between citizens may not be mainly about formal politics but everyday sociological yet political concerns. For example, empty shelves in a supermarket may be caused by the strike of public transportation sectors due to their poor work condition. It is a political concern for unions and members in public transportation, but not for the rest of the people unless they actively follow the issue. Within the more closed, privatized environment, such topics are hard to politicize if discussants only recognize those as social or everyday topics. In fact, as social media platforms enable general citizens to become content creators, more opinion leaders have emerged, and political expression has become deeply intertwined with everyday topics. For instance, the idea of "lifestyle politics" refers to the politicization of life choices (de Moor, 2006). Topics such as animal rights, climate change, and ethical codes for production raise moral concerns from citizens. Such concerns are voiced on social media platforms and called for individual actions, including changes in shopping choices and diets (Micheletti, 2003; Kalte, 2021). When individual decisions are used for public matters and common causes, the actions become political matters (Micheletti & Stolle, 2011). This politicized lifestyle choice offers citizens a broader range of perspectives when assessing daily activities and even influences how people perceive "hard" politics (e.g., Hassan, 2022). The daily activities, moral judgement, and politics no longer individually operate in this new environment. Social networking

sites or social media platforms thus create space that facilitates both formal and informal political discussion on diverse topics with various types of audiences. With new participants engaging and political topics emerging, alternative stories and narratives will be established through enlarged and interconnected online social networks.

How emotion influences what people think and how they act

As people communicate with each other, they often share emotional experiences to cognitively process the situation and regulate their emotional responses (Rimé, Philippot, Boca, & Batja, 1992; Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998). Scholars have also acknowledged the role of emotion in citizens' engagement with politics on a philosophical level since Plato and Aristotle's time (e.g., Aristotle, 1889; Plato, 2015). Emotions are essential in mobilizing citizens to raise awareness of issues and participate in various political activities (e.g., Brader, 2005; 2006; Marcus, MacKuen, & Neuman, 2011). Moreover, it is one of the mental shortcuts that citizens use to process political information. Politics is a complex topic that demands extensive resources to understand fully (Rosenstone et al., 2003). With limited mental capacity, the human brain relies on multiple mental shortcuts to reduce the cognitive load when processing information (Gigerenzer & Gaissmaier, 2011), one of which is emotion. Emotion is the automatic responses based on perceived situations (e.g., Clore & Ortony, 2000) that influence how people evaluate and react to the current environment (Kim & Cameron, 2011; Moons & Mackie, 2007). Several studies also show how discrete emotions encourage or depress political information-seeking behaviour (e.g., Valentino, Hutchings, Banks, & Davis, 2008) and, in turn, influence people's political preferences (e.g., Scheller, 2019). Those

studies demonstrate the link between emotion and opinion formation. Additionally, it also indicates how people are sensitive to emotionally charged content (e.g., Stieglitz & Dang-Xuan, 2013; Trilling, Tolochko, & Burscher, 2017) and vulnerable to communication strategies adopting emotional cues (Mercer, 2013; Scheller, 2019). This section will introduce theories on emotion, its influence on behaviour, and its application in communication strategies to shape people's perceptions of events.

Psychologists and neuroscientists typically address "emotion" as a set of physical or mental processes that occur when situational stimuli are present (e.g. Lang & Bradley, 2018; Turowski, Man, & Cunningham, 2014). The human brain first produces unconscious reactions to the given stimulus through complex neural networks and triggers a subconscious feeling by the internal emotional state before finally making a conscious decision (Damasio, 1999; LeDoux, 1996; see also Kahneman, 2012). Simply put, people "feel" the emotion before comprehensively understanding and dealing with the situation. For example, people may feel anxious when they hear others using a serious tone. Fear, in this case, serves as an innate response to the threat and is produced from the amygdala, which responds to the sense of threat even before the brain consciously detects an obvious threat (LeDoux, 2003). It is due to the privileged access that emotional information enjoys to working memory (Okon-Singer, Stout, Stockbridge, Gamer, Fox, & Shackman, 2018). Working memory is the "blackboard" for information processing, such as maintenance, recall, and manipulation, but with limited capacity (D'Esposito & Postle, 2015). With this privileged access, emotion influences the decision-making process and further shapes the action taken. Fear or anxiety, for example, are found to

positively increase information-seeking behaviour and urge people to evaluate the current information thoroughly (e.g., Valentino, Hutchings, Banks, & Davis, 2018). However, it is important to note that the definition of emotion in psychology and neuroscience differs from that in political science. Political scientists adopt a much broader definition that includes sentiment, moods, feelings, and various other related interpretations (e.g., Hutchison & Bleiker, 2014; Mercer, 2013).

The most influential work in political psychology on emotion, political judgement, and behaviour is the Affective Intelligence Theory developed by Marcus and colleagues (2000). In the earlier work, Marcus, Neuman, and MacKuen (2000) theorize that two systems, the disposition and surveillance systems, are the central components that influence emotion and produce behavioural responses. The Disposition System is a comparison system that keeps matching the situation and the completeness of the goal. The level of enthusiasm increases If the goal is complete, but if the goal is not complete, the level of enthusiasm decreases (Marcus et al., 2000). Emotion-affected dispositions can be categorized into enthusiasm/aversion and translated into rewards and punishment. Enthusiasm drives participation, and aversion brings avoidance and defence actions (Marcus et al., 2011). For instance, those with a higher level of enthusiasm or anxiety show greater interest in political campaigns and candidates than those who are emotionally calm (Marcus et al., 2011). In contrast, the Surveillance system is a precautious system that detects threats and sends out warnings regardless of new or experienced threats. With the surveillance system stimulated, people will vote based on the situation instead of their habitual choice (Marcus et al., 2011). Moreover, people who

feel enthusiasm or anxiety tend to pay more attention to the issue and even actively engage in discussion on related topics (Brader, 2005; 2006; Marcus et al., 2011). It also shows that the mobilization effect of emotion applies to more than formal participatory actions such as voting.

Some researchers question the AIT due to the failure to replicate the correlation between emotion and behaviour change (e.g., Nadeau, Niemi, & Amato, 1995; Ladd & Lenz, 2008). Despite the theoretical definition question and the contradictory results with various methodologies, later research replicates the result mentioned in AIT under lab settings. The experiment conducted by Brader (2005, 2006) has not only successfully demonstrated the behaviour change after the audience's exposure to emotional cues but also established the causal relationship between emotion, opinion formation, and behaviour change. Brader (2005, 2006) presents emotionally evocative political ads to the audience versus emotionally natural ones and observes individuals who are exposed to anxiety-triggering content tend to recall more information from the political ads, actively seeking new information and slightly increasing the support for the candidates. Furthermore, Valentino and colleagues (2008) reach similar conclusions by controlling the information environment after asking the participants to recall the emotionally charged experience to examine the influence of specific emotions on information behaviours. The experiment results also suggest a causal relationship between emotion and change in information behaviour (Valentino et al., 2008).

With the support of laboratory experiments, political scientists start to pay attention to

discrete emotions that cause change in political decisions and may be potentially persuasive. For example, fear and anxiety are commonly found to be associated with increases in political attention and information seeking (Marcus & Mackuen, 1993; Marcus et al., 2000; Valentino et al., 2008; Marcus et al., 2011; Clifford & Jerit, 2018; Valentino, Wayne, & Oceno, 2018; Vasilopoulos, 2018). When people feel anxiety or fear, they tend to pay more attention (political attention) and gather additional information about their current situation (information seeking). Both emotions can be triggered when people are in a threatening situation that is new and unfamiliar, which people lack the proper resources to deal with (Lazarus, 1991; MacKuen et al., 2010). People need more information to evaluate and plan to escape the risky situation. Moreover, fear and anxiety cues have a persuasive effect that causes a shift in opinion and habitual behaviour (Marcus et al., 2011; Scheller, 2019; see also Vasilopoulos et al., 2019). Skitka and colleagues (2010) found fearful people, regardless of their previous political ideology, are more likely to support policy to deport certain groups than directly support war after the 911 attack. Fearful citizens reduce their reliance on partisan habits and become more open to various new information, which allows political actors with different political views to take advantage of this fearful state or even actively evoke such a state to reach a broader range of audience (Scheller, 2019). When strategically adopting fear-evoking content in political communication, political actors can manipulate how people evaluate the situation and benefit from the support of specific policies.

Meanwhile, studies on anger primarily focus on its impact on political behaviour and participation. When people can find a target to blame for the current uncertain situation,

they tend to feel anger (Smith & Ellsworth, 1985; Conover & Feldman, 1986). As a result, anger strongly mobilizes various forms of political participation and social movement, such as voting and rallying (Valentino et al., 2011; Groenendyk & Banks, 2014; Weber, 2013; see also Kane, 2001; Whittier, 2001). People also tend to rely on their existing experiences or keep their previous opinions when angry (MacKuen et al., 2010; Valentino et al., 2008; Suhay & Erisen, 2018), a response that differs from their reactions to fear or anxiety. Researchers observed decreased information-seeking behaviour under certain circumstances (Valentino et al., 2008). Hence, angry people are more likely to strengthen their predispositions with more supportive materials and highly evaluate similar ideas (Suhay & Erisen, 2018). For example, when presented with inaccurate information, angry individuals' evaluation of information accuracy drops, especially when the misinformation matches their party preferences (Weeks, 2015). Additionally, angry people are prone to react aggressively to the situation, individual, or group they are facing (Schnakenberg & Wayne, 2024). Anger is also linked to supporting more aggressive policies, such as using military forces (Fisk, Merolla, & Ramos, 2019; Skitka et al., 2006) and punitive policies (Wayne, 2023).

On the other hand, disgust is a relatively complicated concept in political communication and psychology. From the psychological perspective, disgust is feedback from the disease-avoidance system (Curtis, de Barra, & Aunger, 2011) that improves the memory of the disgusting information while preventing people from requesting more related information due to its nature of avoiding risk (Clifford & Jerit, 2018). When people are exposed to disgust cues or feel disgusted, they tend to relate a negative impression to the

target and shift their attitude toward the conservative side (Landy et al., 2023). Vartanian (2010) finds that people with a high level of disgust toward obese people will dislike this group regardless of how researchers address them. Georgarakis (2022) also found a positive correlation between a high level of disgust feeling and support for stricter health policy when exposing participants to COVID-related information with disgust cues. However, disgust is also considered a moral emotion and is associated with moral judgment (Pizarro, Inbar, & Helion, 2011; Söylemez & Kapucu, 2024). When people perceive a moral violation, they report a feeling of "disgust," although this "feeling" tends to be a metaphor rather than an actual biological reaction unless the perceived moral violation is a purity violation (Eskine, Kacinik, & Prinz, 2011; Inbar, Pizarro, & Bloom, 2009; Tracy, Steckler, & Heltzel, 2019). Despite the differences, researchers found a similar trend in which people judge the target as "immoral" and apply harsher moral judgements when reporting feelings of disgust (Schnall, Haidt, Clore, & Jordan, 2008; Eskine et al., 2011). Policies and social issues often involve multiple levels of moral discussion. News coverage of issues such as immigration may emphasize particular aspects of the issue favouring the political actors (e.g., Kovář, 2023; Urso, 2018) and create an environment for moral discussion. The feeling of disgust is negatively correlated with the liking of outgroup immigration (Hodson & Costello, 2007) and shift opinion to oppose immigration policies (Aarøe, Petersen, & Arceneaux, 2017). It will then create polarization not only between the audience and the targeted immigrant group but also between audiences and political rivals.

Emotions can also travel and spread within online social networks (Ferrara & Yang, 2015;

Kramer, Guillory, & Hancock, 2014; Stieglitz & Dang-Xuan, 2013; Thelwall, Buckley, & Paltoglou, 2011). Social media users also favour content with rich emotional elements (Stieglitz & Dang-Xuan, 2013; Trilling et al., 2017). Berger and Milkman (2012) find that articles with arousal emotions such as anxiety and anger are more likely to be viewed as viral content. Incorporating emotion into the messages is, thus, a communication strategy adopted in political communication between political actors and citizens online. Populist parties, for example, constantly blame the current government by exposing their audience to fearful and angry tweets (Hameleers, Bos, & de Vreese, 2016). Such messages often contain anger, disgust, fear, and sadness (Hameleers et al., 2016; Widmann, 2020), which are all considered moral emotions (Iyer, Schmader, Lickel, 2007; Tangney et al., 2007) and divert the responsibility to others to transmit the negative attitude. While populist parties often use negative emotions, mainstream parties frequently positively feature their past achievement and the system to counter the challenges (Widmann, 2020). The emotions embedded in the stories and messages follow a similar logic: positive emotions bring positive impressions and vice versa. Political actors with different ideologies promote their values while competing with others. During this process, emotion can serve as a weapon to strategically prompt people to consider the event from a moral perspective and discredit political rivals.

Moreover, the information environment on social media is more complex than the one in the mass media era, as social media connects users from worldwide. Users from different regions may perceive an event with different interpretations and feelings. For example, researchers find that the fear of terrorism online is higher in France, Spain, and the U.S.

but not in Norway or Finland (Kaakinen et al., 2021). Countries with high fear of terrorism have previously encountered the same type of terrorism (LaFree, Morris, & Dugan, 2010), but the other two do not (Kaakinen et al., 2021). Similarly, Schmuck, Heiss, and Matthes (2020) record different attitudes depending on whether people expose to agreeable information online. Both cases show that the emotion generated from the event is contextual and based on the actual environment built by the information environment and previous experiences. Given the differences in context and culture, emotional cues may trigger different reactions. Thus, messages from political actors and institutions often reach global audiences when facing an international crisis. Users worldwide interact with each other and potentially elicit reactions that differ from those initially predicted by communication strategies. Although current research generally suggests that the valence of emotional cues determines the valence of reaction, it is unclear whether subsequent studies on international crises can replicate these findings. Investigating this topic further is worthwhile.

Can social media bring diverse narratives?

The advancement of technology has given rise to social media platforms, which integrate the characteristics of social networks and media technologies. The inclusivity of social media allows users from diverse backgrounds to coexist, creating a complex information environment. This fresh environment blurs the boundaries between authors and audiences as well as the public and the private by lowering the cost of accessing digital tools to produce new information (Enli & Skogerbø, 2013; Russell, Ito, Richmond, & Tuters, 2008). User-generated content significantly contributes to the dynamics of social media

communities. The general public perceives the political issue and even politics itself from a new perspective, especially for topics outside of traditional politics and close to everyday concerns. Political discussions on social media often do not mirror the concerns that are featured in real-world politics (e.g., Barberá & Rivero, 2015; see also Barberá, 2020). Yet, online discussions can also lead to further political participation and even social movements (e.g., Koltsova & Selivanova, 2019). Therefore, many argue that professionals no longer dominate news firms as citizen journalists take advantage of social media sites (Lotan et al., 2011). Some also view social media as a tool for establishing grassroots narratives, while others question the extent of non-mainstream accounts' influence in truly shaping public opinion. Before directly addressing this debate, it is important to understand the information environment of social media, its operating logic, and the differences from previous eras. This section will first discuss the nature of social media, followed by how people leverage it in the communication process and the strategies applied on social media platforms.

Social media represents a hybrid media system that operates on social networking logic with higher accessibility. The information transmitted and viewed by individuals largely depends on user engagement and the network with which they are connected. The popularity and influence of the content are determined by user interactions, including engagement with the content itself and the size of social networks formed around the content creators. Highly interacted content will appear on the "recommendation" page (Twitter, 2023), allowing it to reach users beyond the initial social circle. As all users are permitted to interact with the content, its popularity is almost decided exclusively by the

information consumers. In turn, this mechanism allows consumers to shape what information is produced. Moreover, the unrestricted registration policy removes the barrier established by traditional media firms, facilitating direct interaction between information sources and the audience. Users choose what information they prefer and disseminate it by constantly interacting with specific sources. It also changes the mass media's one-way communication model and emphasizes the users' preferences instead of the journalists' choices (Ceron et al., 2019). In a way, social media forms a new communication model.

Many critiques regarding the capacity of social media to shape public opinion often underestimate the importance of user interaction metrics and the fundamental algorithm built upon such metrics. User interaction metrics influence both what information users see and how they see it. Information appears on users' homepages or "timelines" based on the formed social networks and the topics they actively follow. For example, Facebook's news feeds prioritize posts from users' friends, especially from others with whom the user constantly interacts (Mosseri, 2016). Similarly, Twitter's timeline shows content from users' following accounts and the one recommended by the algorithm based on browsing or interaction history (Twitter Help Center, n.d.). Almost all social media platforms are egocentric, meaning even two networked friends on the same platform still see different newsfeeds generated based on the network formed by the individual (Wojcieszak & Rojas, 2011). This is a very different information environment from that of mass media technologies.

Aside from what information presents, social media differs in how information is transmitted. Information on social media is not only highly personalized but also networked. New media, such as radio and forums, are also highly personalized (Jauert, 2018; Nyre & Ala-Fossi, 2008), yet their dissemination of information is not primarily based on social interaction. Instead, those new media disseminate information to targeted audiences and spread it to members within identifiable communities. In contrast, if individuals outside those communities wish to access the content, they often need to leverage interpersonal relationships, which requires significant time and effort. Social media, however, shows a different dynamic in community formation and function. For example, users can form a loose social network by clicking "Follow" on Twitter without needing consent from the other party. This process allows others to view the message posted or shared by this particular user without personally knowing each other. Consequently, on platforms like Twitter, communities are formed by shared interests rather than direct personal relationships. Messages can quickly go viral solely based on simple user interactions, such as "like" and share, without the extensive socialization required by offline social network methods.

Besides the change in the communication model brought about by the user interaction mechanism, the lowered access barrier of social media enables more general citizens to post and share content online. Those who never formally participate in the "hard" politics and news production bring new ideas and perspectives to the public. The growing number of individual journalists and opinion leaders also changes how and what people communicate on social media. As mentioned in previous sections, the interest gap

between citizens and journalists differs (Boczkowski & Peer, 2011). Social media provides an opportunity for citizens to raise their concerns. For example, users create content using the hashtag #Blacklivesmatter to protest the killing of a black citizen during police intervention. Yet, journalists start to cover the story only after the discussion using this hashtag heated (Schawe et al., 2023). Social media users, in this case, set the agenda and initiate actions that influence formal politics. Moreover, the increase in the number of general users also promotes political ideas that are usually outside of traditional politics. The idea of small decisions can have global implications, encouraging people to reconsider their lifestyle choices (Bennett, 1998). In return, people use their life choices to promote values and beliefs regarding public concerns and common causes (Bennett, 2012; de Moor, 2016). From consumption to the mode of living, this politicization of everyday choice is often referred to as "lifestyle politics" (Bennett, 2012; de Moor, 2016; Micheletti & Stolle, 2011). Recent social movements, such as the "School Strike 4 Climate" and the Occupy movement, also focus on concerns like climate change and unequal pay, which extend beyond traditional politics. Instead of relying on traditional media to cover the movement, the stories and news about strike action taken by students are posted, collected, and shared on a Facebook page titled "School Strike 4 Climate" (School Strike 4 Climate, n.d.). Meanwhile, activists for the Occupy movement set up a Tumblr blog to collect and post the handwritten stories of people who suffer from economic inequity to help build the narrative of the movement (Weinstein, 2011). With the collaboration of different social media platforms, other social media users see, share, and curate those scattered ideas. People who access the internet can easily search keywords or hashtags to find those with the same interests. The widespread of those ideas

further unites those interested and eventually forms large-scale nationwide or even international social movements.

Both examples of online social movements and hashtag discussion change the relationship between the general user and professional journalists. Whether it be a one-way or two-step model, mass media almost always reflects a top-down approach with professional journalists as the gatekeepers to block citizens' involvement in newsmaking. The communication on social media in the examples above follows a bottom-up model, in which the grassroots participates in setting the news agenda and constructing the narratives before professionals take action. The critiques on the performance of social media in making reality changes and the hybrid media model often solely treat social media as a media hub for information production and dissemination. The role of social media, however, shifts as the user intention changes. In the online social movement example, social media platforms are both the information distribution center to inform and build the narratives of the story and the network tool for people to find related information or groups (Jost, Barbera, Bonneau, Langer, Metzger, Nagler, Sterling, & Tucker, 2018). Social interaction mechanisms are deeply rooted in the operation of social media and should not be treated separately when discussing social media. On top of that, the increasing visibility and importance of social media are also caused by the distrust towards formal organizations. With the experience of an unstable economic environment and the danger of environmental crises, people are also less likely to trust and rely on formal political groups and organizations to solve their concerns (Micheletti, 2003). The narrative presented by the traditional media also falls out of the perception of the general

citizens, causing dissatisfaction and public backlash (Zulli, 2020).

Although the operation of social media emphasizes social interaction, it is still a media technology and the carrier of information. Political actors consider social media as a new channel for political communication. As political figures and institutions set up accounts on social media, the increasing demand to dig out the public and private image of the same person extends to politicians (Enli & Skogerbø, 2013). Some leverage the dual public and private nature of social media platforms to increase the visibility of their ideas. Indian President Modi, for example, tweets with a first-person point of view and addresses his audience directly, which implies that he manages the account by himself instead of a professional team. (Pal, 2015). This strategic application of a personalized social media avatar helps Modi establish a new and modern public impression that attracts users to follow and interact with him. It helps him gain media coverage from different media types and spread his political message to a broader range of voters. While some new communication strategies are developed to fit the new information environment, social media still shares many similarities with mass media technology. Just as in the print press and mass media era, sentiment-rich content generally remains preferred by social media users (Trilling et al., 2017), reflecting a consistent pattern (e.g., Baum, 2003). Emotions can travel and spread over the online network (Ferrara & Yang, 2015; Kramer, Guillory, & Hancock, 2014; Stieglitz & Dang-Xuan, 2013; Thelwall, Buckley, & Paltoglou, 2011). The social media system itself also encourages emotive expression by default. Many social media sites design their system to favour sentiment elements such as likes, dislikes, upvotes, and downvotes (Pierce, 2020). Communication strategies that involve sentiment

and emotional cues also apply to social media communication.

Correspondingly, social media platforms are also the political arena for post-crisis accountability and blaming games between political actors. Blame framing in the social media era maintains its fundamental logic as professional journalists, formal organizations, and political figures set up accounts on social media platforms. Framing techniques evolve as social media users favour emotionally charged news content (Hameleers et al., 2016; see also Widmann, 2020). Those newly raised populist parties, for instance, send messages filled with anger and fear to blame the national government for policy failure (Hameleers et al., 2016). General citizens have also become both information producers and influential social media users. They also join this blame game and demand the truth. Similar to populist parties, those citizens were previously "outsiders" rather than professional journalists. It allows users to take different perspectives when assessing the crisis and related information. However, research on social media and blame avoidance is limited. There is no clear empirical evidence to show the difference in the techniques and actors of blaming games in the mass media and social media. However, it is clear that citizens are actively participating in crisis and post-crisis management on social media platforms.

Social media platforms provide a shortcut to creating and sharing initial news stories as soon as an event occurs (Veil et al., 2011). Users on social media are both contributors and consumers. Many users claim to be citizen journalists with no formal training in journalism but can still write news stories and publish them on social media platforms.

When the terrorist attack happened in Mumbai in 2008, users on Twitter quickly created and used the tag "#mumbai" to report and spread the news about the situation (Arthur, 2008). News about the attack was shared and reposted to other platforms before the officials published a statement about the attack (Arthur, 2008; see also Gruber et al., 2015). This word-of-mouth news is as influential and trustworthy as mainstream media in many circumstances (e.g., Meuter, 2013; see also Berger, 2014). Meanwhile, professional journalists and crisis communication practitioners also adopt social media accounts to update crisis-related information. Crisis management organizations also set up social media accounts to constantly update information about local and international crises. Moreover, the usual contact channel is often unavailable when a crisis or disaster first breaks out, especially as many people try to contact the officials for information or help (Stephens & Malone, 2009). Social media platforms such as Facebook provide an additional connection to those who worry about friends and family. At the same time, social media sites connect locals to volunteers from a broader space. During the 2010 Haiti earthquake, Twitter users used multiple tags to connect with the local community and offer help and advice while promoting other types of support, such as fundraising (Smith, 2010). The users' active participation in post-crisis management and support makes social media platforms the information distribution center for all types of actors involved in the crisis.

This shift in the crisis communication model can be attributed to the characteristics of some social media sites. As a microblogging site, Twitter content is short and easier to share. Twitter welcomes cross-platform content as much as original tweets, making

Twitter both the source and the router for information. For example, studies on several hashtags have demonstrated that the majority of content using hashtags on Twitter is informative content about the event or issue related to the hashtag (Boulianne, Lalancette, & Ilkiw, 2020; Theocharis, Lowe, van Deth, García-Albacete, 2015). Journalists and news organizations are the most active users of political events (Lotan et al., 2011). From the media side, Twitter provides a platform for professional and amateur journalists to report information on popular events or issues (Enli, 2017). Those users target the broadest audience and aim to spread their content as far as possible. Other than pure informative content, opinion expression is also a popular content type on Twitter. People would tweet their opinions or comments about the issue, regardless of support or against it, with hashtags to communicate with others who follow the topic (e.g., Small, 2011).

This section lists various sources suggesting that social media potentially encourage alternative narratives and diverse views. However, concerns about the "echo chamber effect," which attracts only like-minded users, persist. Due to the social network characteristics and highly personalized content of social media, this effect is likely to appear and increase polarization in society (see also Kubin & Von Sikorski, 2021). People's information preferences on social media can further customize the newly discovered information sources based on taste, type, group, or ideology. Users on social media also generally favour content that shares a similar view or identity (Anspach, 2017; Bakshy, Messing, & Adamic, 2015; Flaxman, Goel, & Rao, 2016; Settle, 2018). With algorithms to filter out unwanted content, information on social media platforms is highly personalized, raising the risk of polarization and information segregation (Flaxman et al.,

2016; see also Kubin & Von Sikorski, 2021). This attitude of favouring the conforming view raised the worry that people in the social media era live in an "echo chamber." If echo chambers are formed, a new barrier is set up and the possibility for users to hear alternative voices drops. Conversely, other scholars argued that diverse information sources and expanded social networks expose the audience to broader opinions and ideas (Benkler, 2006; Goel, Hofman, and Sirer, 2012). Friend circles are not only filled with like-minded individuals but also those with opposite opinions (Bakshy et al., 2015; Goel, Mason, & Watts, 2010;). With social media enabling connections worldwide, people will be exposed to weaker ties that hold different opinions (Haythornthwaite, 2002). Thus, "echo chambers" are not easily formed, even on social media platforms. The debate has found sufficient empirical evidence for both sides and established theories to support their points, but no consensus was made.

Conclusion

In conclusion, social media empowers citizens to actively engage in political expression and discussions through algorithms based on user interaction and reduced accessibility costs. The barriers previously prevented general citizens from formally participating in political discussions and other activities mainly due to a lack of political knowledge, environment, and alternative information sources. By incorporating user interaction metrics into information searching and content recommendation systems, the information appears on users' homepages depending on the social networks built by the users and whom they usually interact with. Frequent interaction with other users and content also increases visibility as social media measures popularity based on user interactions. This

mechanism allows users to gain control over what information they receive and shape the information market to fit their preferences. Moreover, social media platforms enable users to interact directly with various information sources and create stories from different perspectives. General users and non-professionals can both be content creators and compete with professionals and officials on the same platform. Stories and opinions on diverse topics travel within the enlarged social network before mainstream media pays attention. This shift enabled the general public to escape the dominance of the information market by mainstream media and professional journalists that was prevalent in the mass media era.

Despite extensive studies on crisis management and online social movements, research reveals mixed evidence regarding social media's capability to establish alternative news narratives. The successful cases discussed in this chapter primarily focused on topics that fall outside traditional political realms. Meanwhile, communication strategies, such as the use of emotionally evocative cues and framing, are as effective on social media as they were observed to be in the mass media era. Given the experiences in communication strategies and various resources, political actors may still dominate the political discourse during international crises. Whether the success of online social movements and local crisis management extends to formal politics remains unclear. This thesis proposes a direct examination of social media's ability to create and spread non-mainstream alternative narratives, taking into account the influence of emotional cues, among other factors. An interdisciplinary approach should be employed to fully understand the mechanism of information processing and social media operation, aligning existing

theories with observed phenomena.

3 What Makes People Retweet? Examining the Role of Emotional Cues in the Social Media Environment

Introduction

A new mode of crisis communication has developed as social media becomes the primary source of information. The social networking nature of social media platforms not only provides additional channels for officials to coordinate crisis and emergency management but also empowers citizens to form self-helping communities (Reuter, Hughes, & Kaufhold, 2018). However, the information presented on users' homepages depends on established social networks and user interaction (e.g., Twitter Help Center, n.d.), which limits the amount and type of information that appears on the user's homepage. To increase the visibility of content, users need to include elements that make the content popular. Content virality or popularity is determined by the number of times the content gets shared. In other words, the most shared content is more likely to be viewed by a broader audience. Existing literature on online viral content suggests that sentimental elements, particularly negative emotions, encourage information-sharing behaviour. Emotions can serve as social connectors (Rimé, Philippot, Boca, & Mesquita, 1992; Choi & Toma, 2014) for people to express their gratitude, show solidary, and offer emotional support to those who suffer during time of crisis (Starbird & Palen, 2012; Wilensky, 2014). When people share negative experiences for venting, their negative effects are also eased (Delelis & Christophe, 2016).

The purpose of this work is to examine the influence of sentimental elements and discrete emotions on information-sharing behaviour in social media environments during times of

crisis. Specifically, this research will focus on sentiment intensity and the discrete negative emotions of anger, fear, and disgust, which are commonly found in previous literature. The sentiment intensity refers to the magnitude of emotion expression rather than sentiment polarity (positive or negative). This research collects textual data based on related hashtags on Twitter and performs sentiment analysis and emotion detection to obtain data related to sentiment and emotion. The collected data is used to test the likelihood of each element's role in creating viral content. The results show that people generally prefer sentimental tweets during crisis times but not sentiment-intense ones. In addition, tweets with emotional cues are more likely to get shared, except for disgust tweets.

This study contributes to existing social media research from both methodological and empirical perspectives. It employs a statistical model that is rarely adopted by political scientists but can effectively reduce the noise caused by exceeded zero value in count data. The model can also detect non-linear relationships between variables and allows for deeper analysis on the same topic. This research takes user metrics into consideration to reflect the actual social media environment and adds generalization to the findings. The findings of this research provide further support to previous studies and offer possible explanations for the seemingly contradicted results. Moreover, the existing literature on sentiment analysis usually focuses on the polarity or valence of the sentiment but rarely tests the intensity. The finding shows that people prefer content with mild tones, which suggests practitioners and influencers optimize crisis communication by controlling the amount of sentiment-sensitive cues shown in the message. This research adds insights

into the influence of sentimental elements from a new perspective.

This paper will start with the introduction of the selected case and its background information. The ensuing section will review existing literature on the field and explain the hypothesis of the study. Post the literature review section, this study will outline the dataset, data collection process, and methodology. Subsequent sections will present my findings, interpreting the results with existing literature and their practical implications.

The Russia-Ukraine War

Shortly after the announcement that Russia recognized the independent state of the Donetsk People's Republic and Luhansk People's Republic, which was previously a part of Ukraine, the Federation Council of the Russian Federation gave consent to use armed force outside of Russian territory (President of Russia, 2022). The following day, February 24th, President Putin launched a "special military operation" and officially entered wartime. This military operation caused a large number of refugees to flee from Ukraine and enter nearby states. The United Nations High Commissioner for Refugees (2022) records more than 8 million refugees across Europe since the war declaration made on February 24th. It has been the fastest-growing refugee crisis since World War II (Beaumont, 2022). The impact of the war also extends to food and energy supply. Russia and Ukraine account for 29% of global wheat exports and 62% of sunflower oil, which adds more pressure to the global food system that is already fragile from the previous year's pandemic (World Bank, 2022). The World Bank (2022) also issued a warning for energy shortages due to the ongoing high price of energy from the previous year, as many

countries and companies heavily rely on energy from the affected area.

The announcement of war soon became a hot topic on Twitter. As an influential information distribution medium, Twitter allows users to post and share original and external information about the war. Existing literature on crisis communication highlights its advantages in real-time updates, alternative information sources, and cross-platform collaboration. For instance, Bennett and Sederberg (2013) noted the role of Twitter in successfully organising social movements, while Reuter and his colleagues (2018) record citizens online forming self-helping communities. Those case studies demonstrate that Twitter plays a vital role in crisis communication. Twitter users contribute to providing updates on crisis-related information from damage reports, military updates, and information on resources, donations and other helplines (e.g., Qu, Huang, Zhang, & Zhang, 2011; Reuter et al., 2018). The platform can capture up-to-date reports from various information sources and potential emotional support and other citizen-to-citizen self-helping messages. Given this multifaceted role, Twitter data becomes a compelling focus for the study.

Literature review

Information sharing and crisis communication

The rise of social media changes how information is both produced and disseminated. Information distribution during mass media was usually through the selection from experts or gatekeepers according to the news value to a fixed range of audiences (Klinger & Svensson, 2015). Instead of a top-down approach, social media distributes information

by users based on their interests to other like-minded users (Klinger & Svensson, 2015). Information sharing, thus, is an essential part of the social media system. From the URLs of external sources to original information posted by users, social media platforms often act as the information brokerage between users and their interested content or communities. People share to spread information, entertain or update their communities, and gain new followers or friends (Boyd, Golder, & Lotan, 2010). The social nature of social media platforms also encourages sharing. Highly shared content is more likely to be ranked as top or popular messages and viewed by other users (e.g., Lee, 2018; Twitter Help Center, n.d.). Viral content has high visibility and potential influence on public opinion. When people see content shared by others, they read it from the author's perspective. When content with similar views dominates the platforms, it defines the events. The Occupy movement activists built the narrative of the movement by collecting and posting stories shared by those who suffered from economic inequities (Weinstein, 2011). As people share those stories on their platforms and homepages, it also reaches a wide range of audiences who previously did not follow the event. For those less interested people, those shared stories are how they perceive the movement. Meanwhile, users deliver the original message through sharing and pass the personal influence of the opinion leaders down to others within the same social network (Katz & Lazarsfeld, 1964). However, they may not be the opinion leaders in the community, nor is new information generated through sharing behaviour. Several studies have shown that the interpersonal influence of social networks affects people's opinions (e.g., Katz & Lazarsfeld, 1964). The sharers spread the original messages to broader communities and attract users with specific interests (Marwick & Boyd, 2010), further expanding the communities and

forming new social networks. Information-sharing behaviour, in this case, serves as the bridge for opinion leaders (whether people or institutions) to reach out to their community.

These changes in information distribution logic in social media also influence crisis communication mode. General users have the opportunity to report and broadcast the crisis. From citizens to citizens (C2C), users construct self-helping communities to inform, update, and support those affected by the crisis (Reuter, Hughes, & Kaufhold, 2018). With other users actively sharing their posts, citizens who live nearby and at a distance will receive real-time updates on the emergency status. People use microblogging sites to report and inform other citizens about the status of the disaster and advice during the 2010 Yushu earthquake in China (Qu, Huang, Zhang, & Zhang, 2011). In some cases, social media also serves as a news site and disaster reporting tool when local press or crisis response teams fail to reach local folks (Sutton, Palen, & Shklovski, 2008). Users' participation and information-sharing behaviours also contribute to rising public awareness of the ongoing crisis and its up-to-date status. Popular online content attracts people and the media's attention. When an issue gets huge online influence, officials and institutions will place it on the table for discussion (e.g., Sutton, 2010). For instance, the 2008 Tennessee Technological Disaster was reported and spread by users through Twitter hashtags as the mainstream media largely ignored the disaster until it went viral online (Sutton, 2010). Information-sharing behaviour influences how different groups, institutions, and individuals communicate during a crisis. As social media redefines crisis communication, the underlying sentiments embedded within shared content become pivotal.

Sentiment and content virality

Past studies on viral content have found that sentimental elements and emotional language influence content popularity. Research across journalism, communication studies, and politics reach a similar conclusion when comparing sentiment-rich news stories or online posts with less sentimental ones. Stieglitz and Dang-Xuan's (2013) study examines the influence of sentiment elements on the number of retweets and finds that regardless of the valence, the presence of sentimental elements positively correlates with information-sharing behaviour. Meanwhile, news articles and stories with emotion-triggering content or sentiment-polarized titles are more likely to captivate the audience and be shared (Dobele, Lindgreen, Beverland, Vanhamme, & van Wijk, 2007; Khuntia, Sun, & Yim, 2016; Trilling, Tolochko, & Burscher, 2017). Although it is widely acknowledged that sentimental words and emotional languages have a particular impact on content virality, some studies challenge this perception in different contexts.

In the case study conducted by Jansen, Zhang, Sober, and Chowdury (2009), authors observed that the majority of tweets contained no obvious emotional cues because users prioritized general information, such as asking questions to help them make decisions and other types of information-seeking activities related to their decision-making, rather than venting. Similarly, Kušen and Strembeck (2018) discovered that tweets with neutral tones, such as invitation links to events, are also influential. As listed above, informative content usually contains less sentimental elements and is categorized as neutral-tone. Despite the lack of sentimental elements, such content is widely shared during crises. Öztürk and

Ayvaz (2018) find that the English-speaking community on Twitter prefers neutral tone content and the Turkish-speaking community shares details about nearby wars. During a public health crisis, researchers find people are more interested in seeking and sharing information on updates of the current situation and what to prepare for the impending crisis from credible sources than emotional expressions (Lee & Jin, 2019). The top topics people are concerned about and shared during the COVID-19 pandemic on social media are the origin of the breakout, the source of the virus, the health impact, and solutions to decrease spreading (Abd-Alrazaq, Alhuwail, Househ, Hamdi, & Shah, 2020). The examples seemingly counter the existing literature, but it does not negate and overwrite the previous findings. Instead, it shows users' information needs to change as the situation changes. When people detect an upcoming crisis, they are interested in how to overcome it first. Tellis and his colleagues (2019) find that while customers generally prefer sentiment-rich content, this tendency shifts towards less sentimental, more informative content when perceiving a higher risk. Similarly, Heverin and Zach (2010) analysed the most shared tweets right after the disasters and found the majority of them were informative content on disaster updates and warnings, with only 3% of the total tweets being emotional expressions.

It is evident from various research that the role of sentimental intensity in content popularity is not clear-cut. While studies in general settings largely agree that sentiment-rich content receives more attention and sharing, informative content with less sentimental elements is influential during the crisis. However, it is worth noting that neutral tone content does not equal content with no sentimental elements, and the findings

should be interpreted as content with no sentiment going viral. The case study on Hurricane Irma revealed that although content with less sentimental words is more likely to be shared than sentimental-rich content, content with no sentimental expressions also receives less sharing than its sentimental counterparts (Xu, 2020). The case study shows the intricate relationship between sentiment intensity and information-sharing behaviour. Thus, this research aims to investigate the intensity of the sentiment the content expresses, not the presence nor the valence of sentiment itself, leading to the hypothesis:

H1: Contents containing high sentiment intensity are less likely to be shared.

Emotion and sharing behaviours

How does emotion relate to sharing? The logic behind emotional content virality is the social sharing of emotions that naturally occur in interpersonal relationships. Introduced by Rimé and his colleagues (1992), the Social Sharing of emotion refers to sharing the emotional scene with others after people experience an emotional episode (Rimé, Philippot, Boca, & Mesquita, 1992; Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998; Rimé, 2009). To illustrate, upon witnessing an accident and experiencing an emotional episode triggered by the scene, people feel the need to talk with others and share their experiences. Positive and negative emotional scenarios can trigger social sharing (Rimé et al.,1992). Luminet IV, Bouts, Delie, Manstead, and Rimé (2000) not only replicate previous studies' results but also find intense emotional experience increases the chance of social sharing behaviour occurrence. In more recent studies, Choi and Toma (2014) investigate media use for the social sharing of emotions. The authors find that other users' immediate feedback on social media matches the psychological needs of people who

experience emotional episodes regardless of positive or negative events (Choi & Toma, 2014). Depending on the situation and emotional episodes, people share the experience for different reasons, including goal-reaching, emotional support, and social recognition (Rimé, 2009). Delelis and Christophe (2016) noted that people's motivation for engaging in the social sharing of emotions is primarily due to venting and bonding. For those who receive the sharing of emotions, people are to offer social support and understanding as proof of social relation while venting and reducing the frustration of those who sharing emotions (Delelis & Christophe, 2016). Kim and Fesenmaier (2017) also pointed out that sharing negative experiences will reduce the extended negative effect, which aligns with previous studies on the social sharing of emotions.

However, a question remains in communication studies and politics: Which emotions prevail in encouraging sharing behaviour? Existing research presents mixed findings on this question. Some studies demonstrate that positive emotion, in general, increases sharing behaviour (Berger & Milkman, 2012; Stieglitz &Dang-Xuan, 2013; Trilling et al., 2017; Brown, Lough, & Riedl, 2020), while others find specific negative emotions increase the likelihood of sharing (Hansen, Arvidsson, Nielsen, Colleoni, & Etter, 2011; Berger & Milkman, 2012; Bene, 2017). Some studies suggest hope, anger, fear, and humour can increase sharing behaviour (Berger & Milkman, 2012; Brown, Lough, & Riedl, 2020). Yet, Myrick and colleagues (2016) discover no significant correlation between positive emotions such as hope and humour. Among negative emotions, anger and anxiety/fear are found to influence sharing behaviour (Berger & Milkman, 2012; So, Prestin, Lee, Wang, Yen & Chou, 2016). Meanwhile, other negative emotions, such as

sadness, either have no effects or decrease the sharing behaviour (Brown et al., 2020; Berger & Milkman, 2012; Myrick et al., 2016). Even within the same valence, discrete emotions impact human behaviour differently. The benefits of analysing discrete emotions are that it breaks down emotion groups further and better predicts behavioural patterns in specific situations (Nabi, 2010). The mixed findings suggest a granular investigation of discrete negative emotions and their influence on sharing behaviour.

Building on the exploration of emotion and sharing behaviour, anger emerges as a potent emotion cue. People experience anger when the desired condition is challenged and can identify a subject to blame (Lazarus, 1991; Conover & Feldman, 1986), whether due to negative events or expressions. For instance, exposure to prejudice stimuli American black and gay men had been shown to evoke anger (Tapias, Glaser, Keltner, Vasquez, & Wickens, 2007). Compared to other emotions, anger raises immediate, intense emotional episodes and triggers the social sharing of emotion (Brans, Mechelen, Rimé, & Verduyn, 2014). It suggests angry people are more likely to share their experiences, and when social media is part of daily life, they may share their experiences with others online. When people perceive information from their political rivals, they are more likely to share related messages as they feel angry based on previous impressions (Hasell & Weeks, 2016). It suggests that anger is carried from the negative impression prior to the current event and still influences information sharing. Anger also increases information sharing between domestic and foreign states during the international crisis. It is a common emotion found during and after a crisis (Utz, Schultz, & Glocka, 2013), especially during international conflicts (Fan, Zhao, Chen, & Xu, 2014). The case study on microblogging

sites in China suggests that the territory conflict between China and Japan causes angry messages to be widely shared on social media (Fan et al., 2014). The researcher analyses that the virality of the angry message may be evoked by patriotism and past conflicts between the states (2014). Meanwhile, anger is sometimes considered a moral emotion as it is triggered when people witness the violation of moral standards such as the ethic of autonomy (Tangney, Stuewig, & Mashek, 2007). People can feel angry even when they do not experience injustice themselves (Tangney et al., 2007), which explains why it can strongly mobilize people in a social movement setting. As people recognize the social stigmatization and injustice brought up by negative expressions, they are morally motivated to share this "anger" with others on social media (So et al., 2016). When people perceive the unfairness of a group disadvantage, it becomes collective anger upon sharing the experience with members and leads to the mobilization of a specific group (van Zomeren, Leach, & Spears, 2012). Given the impact of anger on various participatory actions, its influence on information-sharing behaviour is expected. Hence:

H2: Contents containing anger cues are more likely to be shared.

Fear, often found to co-exist with anger, manifests in the context of negative events or expression (e.g., Berger & Milkman, 2012; So et al., 2016) and is notably prevalent during crisis time (e.g., Cramer, 2016; Do, Lim, Kim, & Choi, 2016). Fear is triggered when people face a new, uncertain situation where the existing experience cannot solve the problem (Lazarus, 1991). Due to the lack of resources to escape or solve the current threat, people will pay extra attention and seek new information to navigate the unfamiliar situation (Lazarus, 1991; MacKuen, Wolak, Keele, & Marcus, 2010; Marcus, MacKuen,

& Neuman, 2011). Fear drives people to find possible solutions, which is evidently seen in the context of crisis (Oh, Lee & Han, 2021). However, the relationship between fear and sharing behaviour is nuanced. Existing studies focused more on its influence on information-seeking rather than information-sharing (e.g., Marcus, Neuman, & MacKuen, 2000; Valentino, Hutchings, Banks, & Davis, 2008). Fear cues motivated people to pay extra attention to the issue and prioritize information-seeking behaviour (Brader, 2005; Miller, 2007). Tweets expressing fear and anxiety also receive attention from other members of the information network (Abd-Alrazaq et al., 2020). The increased attention paid to the current event and situation is related to the boosting participation rates of certain activities (e.g., Valentino, Brader, Groenendyk, Gregorowicz, & Hutchings, 2011; Vasilopoulos, 2018). For instance, young people exposed to shocking images about political issues, including sexual abuse, abortion, and gun control, which present as fear cues, are more likely to seek related information and eventually become involved in politics (Dobele et al., 2007). However, the boosting in participation is often found in low-cost participatory actions rather than high-cost ones, such as protesting, when the surrounding environment is at high risk (Vasilopoulos, 2018). Given that sharing behaviour is a low-cost participatory action, it is possible that fear can boost such action. Exposure to fear and anxiety may also trigger social sharing of emotion, and social media provides emotional support during crisis time. Fear-evoking content is widely shared right after the disaster and falls into the same pattern as the spread of misinformation and rumours (Li, Sakamoto, & Chen, 2014). Uncertain situations increase information-seeking, and they will turn to convincing messages when they hold fear towards the current crisis. Thus,

H3: Contents containing fear cues are more likely to be shared.

Aside from fear, disgust is also found to co-exist with anger, as both are commonly found in aggressive situations (Iyer, Schmader, & Lickel, 2007). This disgusting feeling triggered by moral or social norm violation is often referred to as "moral disgust (Tangney et al., 2007; Hutcherson & Gross, 2011)." While both anger and disgust are associated with the desire to punish moral offenders (Hofmann, Brandt, Wisneski, Rockenbach, & Skitka, 2018), the latter is often found in gossip and social exclusion rather than direct confrontation driven by anger (Hutcherson & Gross, 2011; Tybur, Lieberman, Kurzban, & DeScioli, 2013). Wheatley and Haidt (2005) found participants tend to follow the feeling of disgust triggered by moral transgression terms and make harsher moral judgments than before. Building on this, Schnall, Haidt, Clore, and Jordan (2008) tested feelings of unrelated disgust and found it still affected the severity of moral judgement made by participants. The influence of disgust also extends to policy preference. When people are exposed to disease-related information embedded with disgust cues, they will shift their choice to support a stricter health regulation policy than other options (Georgarakis, 2022). Given the general association of war and its related terms, such as "war crime" and "invasion," with negativity and moral infractions, it is expected to see related content elicit disgust. Psychologists interpret disgust as a response to the disease-avoidance mechanism (Curtis, de Barra, & Aunger, 2011; Oaten, Stevenson, & Case, 2009) and describe it as a feeling of revulsion and a desire to withdraw from the environment that contains the stimulus (Rozin, Haidt, & McCauley, 2000). When employed strategically, disgust can create an "us vs. them" line and cause division

between social groups. However, it is debatable whether people feel the physiological response caused by disgust emotion or, as Royzman and Sabini (2001) point out, use the term "disgust" metaphorically to show the offensiveness of the subject. Some studies found purity violations trigger the physiological response, but the other circumstances may be a metaphor as the participants are self-reporting disgust feelings (Eskine, Kacinik, & Prinz, 2011; Tracy, Steckler, & Heltzel, 2019). Due to the constraints of research methodologies, studies relying on self-reporting methods cannot test the physiological response produced when the emotion is triggered. Nonetheless, this study will proceed with the assumption that the emotional cues triggered a physiological response. Accordingly, this study posits:

H4: Contents containing disgust cues are less likely to be shared.

Data collection

The research question of this study is how sentiment elements and discrete negative emotions influence information-sharing behaviours on social media during crisis time. The dataset is built on original tweets regarding the selected case study to address the research question. The dataset for this project contains a total of 163,160 tweet data regarding hashtags "RussiaUkraineConflict," "RussiaUkraineCrisis, " RussiaUkraineWar," ukrainewar," and "warinukraine" (excluding any retweets and replies). The selected hashtags are featured in Twitter topic trending and top tweets regarding the keyword "Russia-Ukraine war," implying that those hashtags are the most common when users discuss the topic and the most searched ones match those keywords. The data is collected from 24th February 2022, the war declaration day, to 26th February

2022. The raw dataset is scraped via the Python package "snscrape" and is cross-validating through the library "Tweepy" and the official Twitter REST API by matching the results obtained from "snscrape" with the one obtained through "Tweepy." The raw dataset includes user accounts and tweet information within the Twitter full archive.

There are 89,176 user profiles recorded in the dataset. The user-related information includes user ID, description, location, verification status, follower counts, and friend counts. The dataset further labelled user account type and occupation based on their profile and cross-link to other social media. The raw tweet-related data includes retweet counts, like counts, hashtags, and mentioned users. The dataset also performs sentiment analysis to get the sentiment and emotion-related data.

Dependent variable

Retweet

This variable is the number of retweets a tweet has. The retweet is one indicator that shows a tweet's popularity. Once people retweet, those who follow or are friends with them will see the retweeted content appear on their timelines. The retweet function has changed over time. Previously, the 140-word limits were applied to retweets and users at the time needed to shorten or rephrase the original message to retweet certain content (Boyd, Golder, & Lotan, 2010). With the word limit expanded to 280 and the quoted retweet function, the simple retweet can now spread the original messages. The data

recorded in the dataset is the sum of retweets and quoted retweets, as they are collected separately during the data collection phase.

Figure 1.1 shows the histogram of the dependent variable. There are, in total, 163,160 observations (N=163160). The max number in the observations is 12650, and the minimum is 0. From the figure, we can see that the data is highly skewed, with a large number of tweets that have zero retweets. This means that a regular regression model would return results with extremely low R2 and would not reflect most data samples in

Figure 1.1

Compare of zero/non-zero values in the number of retweets
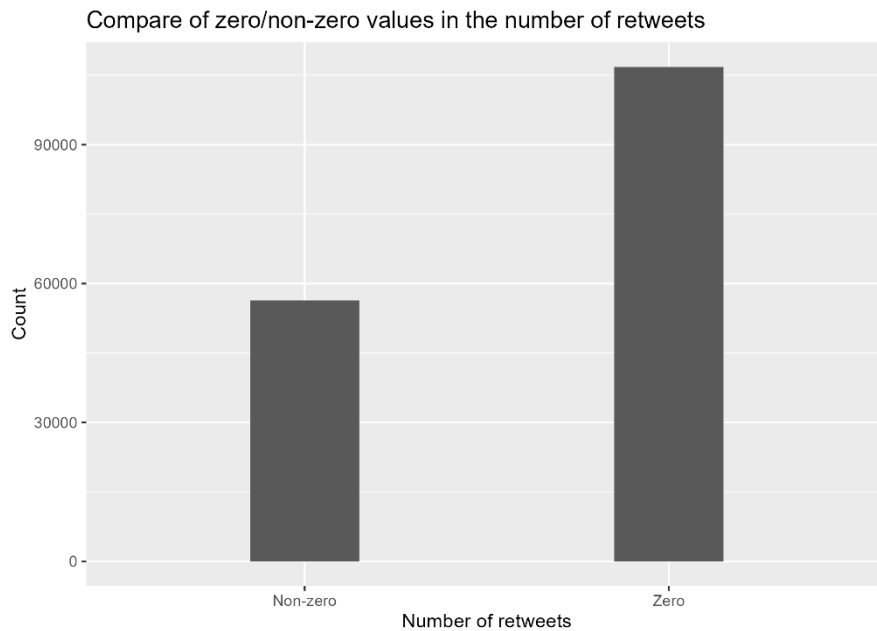
the dataset. It is necessary to use other models to get more accurate results. Many previous studies dealing with zero-excessed count data turn to a zero-inflated or hurdle model.

Independent variables

Sentiment intensity

The sentiment intensity represents the intensity of sentimental elements detected within the text. The model includes this variable to test Hypothesis 1 proposed in the project. H1 suggests a negative correlation between sentiment intensity and the number of retweets.

The more people express their emotions in either a positive or negative valence, the stronger the intensity becomes. The score is converted from the sentiment score using the R package "sentimentr" developed by Rinker and Spinu (2016). The package will produce a score between -1 to 1. The negative number represents a negative sentiment, while the positive reflects a positive sentiment. The closer to 0, the milder the sentiment is. This research does not concern the valence of the sentiment but the intensity of such an element. The dataset, then, converts the score to its absolute value, which ignores the valence and leaves only how intense the sentiment elements are. The purpose is to calculate how intensely people express sentiment in their content and how this intensity influences a tweet's popularity. It is also to distinguish the content expressing opinions and describing the personal experience from less emotional content, such as informative content.

Anger

The model includes the variable to test H2, which proposes a positive correlation between the presence of anger and the number of retweets. This variable refers to anger-related lexicon terms found in the text. The R package "sentimentr" uses a dictionary-based approach that matches the crops with its built-in dictionary to find anger-related terms. The number of anger-related lexicons is calculated based on sentence level and the final result is the sum of the counts from each sentence.

Fear

The model includes the variable to test Hypothesis 3. This variable refers to fear-related lexicon terms found in the text. H3 proposes that the presence of fear will increase the

number of retweets a tweet has.

Disgust

The variable refers to disgust-related lexicon terms found in the text. H4 suggests a positive correlation between the presence of disgust and the number of retweets.

Followers count

This variable is the number of followers the account has. The data is collected directly from Twitter API as an integer. It is also an indicator of the Twitter recommendation system. Tweets with higher retweets and followers are shown at the top of the search results. The model uses this variable as a control factor to mirror the social media environment.

Account ages

The variable refers to the number of days an account has been active since its creation date. Companies and people may use bots and cyborg accounts to post misinformation about the current event. Those accounts are usually created recently compared to ordinary accounts with active users managing them daily. Including the variable in the inflated model as a control is to separate bots and scams from other accounts and to account for the excessive zero-value in retweets.

URL and mentioned users

Previous studies discovered that tweets with URLs would generally boost the retweet rate

but decrease the rate when they mention other users (Zarrella, 2009). The dataset created binary categorical values for both elements as the control factors. The content with link/mentioned users will be marked as 1 and the rest as 0.

Readability

The readability score represents the level of comprehension difficulty of a paragraph. It calculates whether it is easy or difficult for people to read and understand the text. The readability score used in this dataset was developed by Flesch (1948). The score considers four elements: average sentence length, average word length, percentage of "personal words" used, and percentage of personal sentences used (1948). In general, the higher the readability score is, the more accessible it is for people to read and understand the piece of information. Past literature on the readability of tweet content suggests that, despite popular opinions, quoted retweets have a lower readability score, which means they require a high education level to understand (Zarrella, 2009). It may be due to the frequent use of formal words or a formal writing style. The model includes this variable as a control factor.

Methodology

Figure 1.2 shows the overall process from data collection to data analysis. The first step, as described in the last section, is the data collection process, which starts with retrieving tweets and user-related data from Twitter. The raw dataset is separated into textual/string data and numeric data after the data collection process. Textual or string data includes dates users created, the tweet content, user verification status, user mentions, URL

contained, and hashtags. Variables such as user verification status, user mentions, and URL contained are converted from strings "TRUE" or "FALSE" into 1 and 0s. Dates of creation are converted into numbers of days from the day/month/year format string. Then, tweet contents are preprocessed into sentiment scores, sentiment intensity, readability, and the presence of emotions. Lastly, check over the dataset to ensure the data format matches the need for the regression model.

Figure 1.2
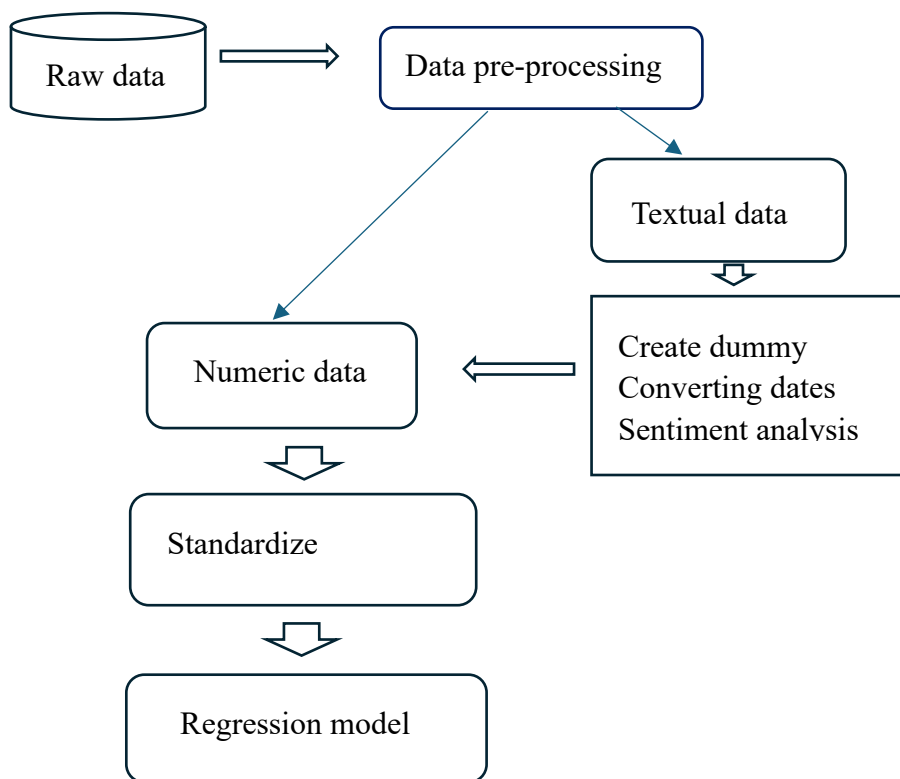
The data cleaning process and model preprocessing

The data cleaning process starts with dropping the duplicate data from the raw dataset by comparing the tweet content, date, and hashtags contained. The preprocessing of textual data is done by the "tm" package in R. It allows us to set and modify the stop words in English to remove common English phrases for high accuracy in sentiment-related analysis. Many sentiment analyses based on Natural Language Processing (NLP)

technique usually require a certain level of data cleaning to avoid capturing common words as noise. It also removes numbers, special characters, and punctuation, as many packages require the text to be a corpus containing only plain text.

The readability score is calculated by the R package "quanteda" (Benoit, Watanabe, Wang, Nulty, Obeng, Müller, & Matsuo, 2018). The package provides many readability score algorithms, but the one used in this project is the Flesch Reading Ease score. Flesch (1984) developed and improved this readability score. The Flesch Reading Ease score is a widely used readability score, especially in grammar checkers such as Grammarly. The score is based on average sentence length, average word length, percentage of "personal words" used, and percentage of personal sentences used (1948).

The sentiment score, sentiment intensity score, and emotion-related value are calculated by the R package "sentimentr," which Rinker and Spinu (2016) built using a dictionary matching up approach to calculate sentiment scores on the sentence level. It is not hugely affected by the length since this is sentence-based, but grouping sentence sentiment returns the average sentiment. It will also return to the emotion of each sentence and highlight those that are emotional.

Sentiment analysis and emotion extraction

This project uses the R package "sentimentr," following a lexicon-based approach. The lexicon-based approach is a common approach for emotion detection from the text in the field of Affective Computing (Calvo & Mac Kim, 2013; Canales & Martínez-Barco,

2014). Lexicon-based approaches rely on lexical resources, and in the case of this R

package, it searches and matches the textual data with the lexicon dictionary built-in and

calculates the score based on its algorithm. The foundational logic of the package

algorithm is based on the opinion mining model proposed by Hu and Liu (2004). Figure

Figure 1.3

| Feature identification | → | Opinion words extraction and position | → | Sentiment prediction |
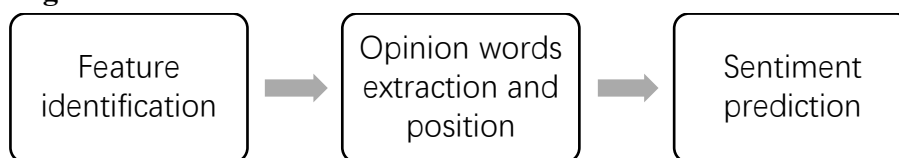
1.3 illustrates a simplified process of Hu and Liu's (2004) model.

The process begins with identifying the features of the sentence. It assumes people

express their opinions in nouns or noun phrases (Hu & Liu, 2004). It first breaks down

sentences and looks for nouns or noun phrases that constantly appear as subjects (2004).

After tagging the original document, the next step is identifying the opinion sentence(s)

within the text and positioning the extracted word to positive/negative dimensions. The

opinion sentence in this model refers to sentences containing identified features and one

or more opinion words (Hu & Liu, 2004). Moreover, it will also identify effective

opinions by searching for the nearest adjectives from the identified feature (2004). Each

extracted opinion word will be placed according to its orientation (positive/negative). The

orientation is based on the lexicon source.

Using Hu & Liu's (2004) model as a foundation, Rinker and Spinu (2016) developed an

augmented algorithm to better deal with valence shifters such as amplifiers, de-amplifiers,

and adversative conjunctions. The package (2016) first searches and matches words

within each sentence with the dictionary of polarized words and marks its orientation as either 1 (positive) or -1 (negative). The extracted words from each sentence will form a polarized cluster, and words will continue to be searched as valence shifters around the extracted ones. Those newly searched words are marked based on their function as either neutral, negator, amplifier, or de-amplifier (Rinker & Spinu, 2016). Each type of word has a weighted value and an orientation, and the algorithm will calculate the final score based on both the polarized cluster and function words with weighted values (Rinker & Spinu, 2016). On top of that, the package also maintains a relatively good speed while processing the document, which saves processing time as the original model is a sentence-based keyword-lookup approach (2016).

Zero-inflated model

Due to the excessive zero values in the dataset, regular regressions may produce biased results or cause overdispersion (Zuur, Ieno, Walker, Saveliev, & Smith, 2009). Zero-inflated models and the hurdle model are commonly used statistic models fitting data with excessive zeros.

Zero-inflated models such as the Zero-inflated Poisson model (ZIP) and Zero-inflated Negative Binomial model (ZINB) are mixed models that are designed to fit count data with excessive zeros values (UCLA,2021; Zuur & Ieno, 2022). The Zero-inflated models assume that there are two types of zeros: true zeros and false zeros. "False zeros" could be created during count processes such as short observation period, wrong place/time, and observer error (Zuur et al., 2009). Figure 1.4 is a reproduced chart from Zuur et al.

(2009) and Zuur and Ieno (2022). Zuur and Ieno (2022) interpret the true zeros as no observation of the target and no target found. In contrast, false zeros mean the target exists but is out of the researcher's sight (Zuur & Ieno, 2022). The missing observation may be due to design error, observer error, etc. (Zuur et al., 2009; Zuur & Ieno, 2022). Such zeros are produced during the counting process, but there is no direct way to tell the difference. The models measure zero observation by the probability of false zeros and not false zeros,

Figure 1.4
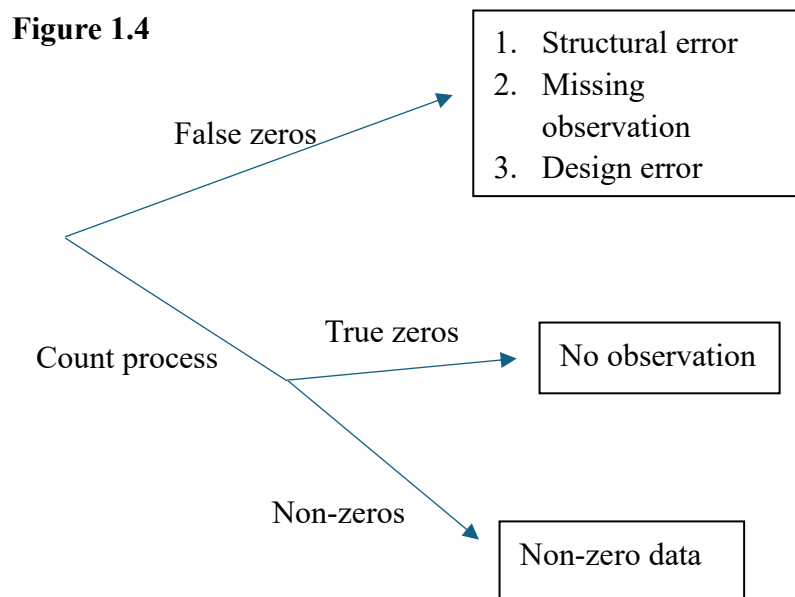
then multiply the sum by the probability of true zeros.

The Zero-inflated models combine two parts: the logit model that predicts whether the count data is a "true zero" and a normal Poisson or Negative Binomial model that predicts data which does not belong to the "true zero" group (UCLA, 2021). The standard model accounts for the event that occurs (non-zeros). The coefficient in the standard model represents changes in the log of the expected count of the dependent variable per unit change in the predictor (PSCL, n.d.). The zero-inflated model, or the logit part, predicts the excessive zero values. The coefficient in this part represents the log odds of a certain zero in a unit change of the predictor (PSCL, n.d.). The direct interpretation of the

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coefficients from both models requires an exponential function.

Figure 1.5
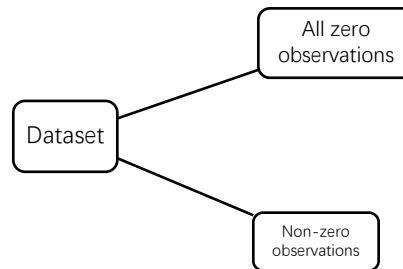
Aside from the zero-inflated model, a two-part model that deals with excessed zeros in the data is called the "Hurdle model." Unlike the zero-inflated models mentioned above, two-part models follow a different logic when analysing zeros and non-zeros. The hurdle model is a two-part model that categorizes the data into only two parts: the zeros and non-zero (Figure 1.5). The hurdle model assumes all zeros come from one structural source, and a binomial probability model determines whether the outcome is zero or positive/non-zero value (Cameron and Trivedi, 1998; UCLA, 2021; Hu, Pavlicova, & Nunes, 2011). It is a popular model in social science. Many studies that focus on Twitter and social media also use this model to deal with highly skewed data (see also Bhattacharya, Srinivasan, & Polgreen, 2014).

Many researchers compare the performance between ZIP, ZINB, and hurdle model but mainly conclude that the performance is tied to the type of data and the selected cases (Rose, Martin, & Wannemuehler, 2006; Hu, Pavlicova, & Nunes, 2011). Rose et al. (2006) compare normal Poisson, NB, ZIP, ZINB, and their hurdle counterparts and find that zero-inflated and hurdle models better explain excessed zeros in the data. Across ZIP, ZINB, and hurdle models, they discovered that ZIP is not good at dealing with overdispersion,

while the other two do not have significant differences for the data they selected (Rose et al., 2006). Similarly, Hu et al. (2011) find that zero-inflated and hurdle models perform better than normal models for highly skewed data. However, they also discovered that the zero-inflated model has advantages as it allows flexibility in interpreting the different types of zeros compared to hurdle models (2011). This contrast shows that zero-inflated and hurdle models are all good at analysing data with excess zero, but performance is based on the data and selected case. Thus, this project will employ the ZINB model because the standard deviation exceeds the mean number of retweets.

Results

The study finds mixed support for hypotheses in analysing the Twitter retweet data. It tests the hypotheses with a Zero-inflated Negative Binomial model that includes a normal negative binomial model for non-zero data and an inflated model to test "true zeros." Table 1 presents the complete model for the analysis.

The first model is the normal negative binomial model that uses retweets from the dataset as the dependent variable to test the influence of sentiment intensity, presence of anger, fear, and disgust while holding the rest as control factors. The second model is the inflated model with the same dependent and independent variable plus additional control factors, such as the account's creation days, to test whether the excesses zeros in the dataset are certain zeros. The significant Inalpha indicates that the data better fits the ZINB model than the ZIP model. The independent variables tested for the hypothesis are the presence of anger, fear, and disgust; each obtained significant statistical results with the dependent

variable retweeted except for disgust. For hypothesis, hypotheses 1, 2, and 3 are supported,

leaving hypothesis 4 unsupported.

Table 1-1

Number of observations = 163,158		Nonzero obs = 53,461
Log likelihood = -228714		Zero obs = 109,697
Prob > chi2 = 0.0000		LR chi2(9) = 20602.87

VARIABLES	Count model	Inflated model
Days created		0.000578***
		(0.0000228)
Number of followers	0.330***	-0.519***
	(0.00295)	(0.0120)
Readability	0.217*	1.053**
	(0.119)	(0.469)
Sentiment intensity	-0.297***	-1.305***
	(0.0769)	(0.321)
Squared sentiment intensity	-0.536***	1.057**
	(0.194)	(0.463)
User mentions	-0.188***	-1.156***
	(0.0259)	(0.185)
Contains link	2.396***	-1.000***
	(0.0184)	(0.0719)
Anger	0.0504***	-0.339***
	(0.0187)	(0.0828)
Disgust	0.0391	0.309***
	(0.0249)	(0.0968)
Fear	0.151***	-0.211***
	(0.0176)	(0.0726)
lnalpha		1.811***
		(0.00700)
Constant	-2.317***	-0.114
	(0.0360)	(0.129)
Observations	163,158	163,158

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

H1 finds partial support as Table 1 shows a significant negative result at p<0.01 level for the standard negative binomial model. Figure 1.6 shows the visualization of the result between sentiment intensity and retweets. The result suggests that one unit increase in sentiment intensity will decrease the log count of retweets by 0.297 at p<0.01 level. Sentiment intensity represents the shift in the sentiment-related lexicon. This result indicates that sentiment-rich tweets are less likely to be retweeted. However, the result of the zero-inflated model suggests that as sentiment intensity increases, the log odds of receiving no retweets decrease by 1.305 at p<0.01 level, which hints that the relationship is not purely linear.

The model then introduces the squared variable to investigate further. As the squared variable increases, the log count of retweets decreases by 0.536 at p<0.01 level in the standard model. The significant result of squared sentiment intensity combined with the significant negative result of sentiment intensity suggests that the relationship between this variable and retweet is an inverted U-shape curvilinear relationship. Practically, the result suggests tweets with a moderate number of sentimental words are more likely to be retweeted. Still, the likelihood of being retweeted decreases when tweets are overloaded

Figure 1.6

92
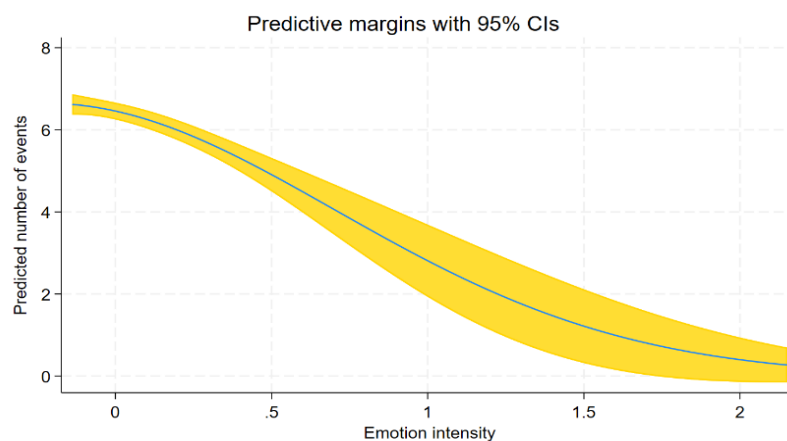
with sentimental rich expressions. Thus, H1 is supported, but the result suggests a more complex relationship than initially postulated.

The presence of anger was found to have a statistically significant positive result in the standard negative binominal model, which supports H2. As visualized in Figure 1.7, a unit change in the presence of anger corresponds to an increase in the log counts of retweets by 0.0504 at $p<0.01$ level. The implication is that tweets with angry language cues have a higher probability of being retweeted. The zero-inflated model presents a significant negative result, indicating that the presence of anger decreases the log odds of being "true zeros." The result of the zero-inflated model matches the finding in the standard negative binomial model, which means tweets with angry words are less likely

Figure 1.7
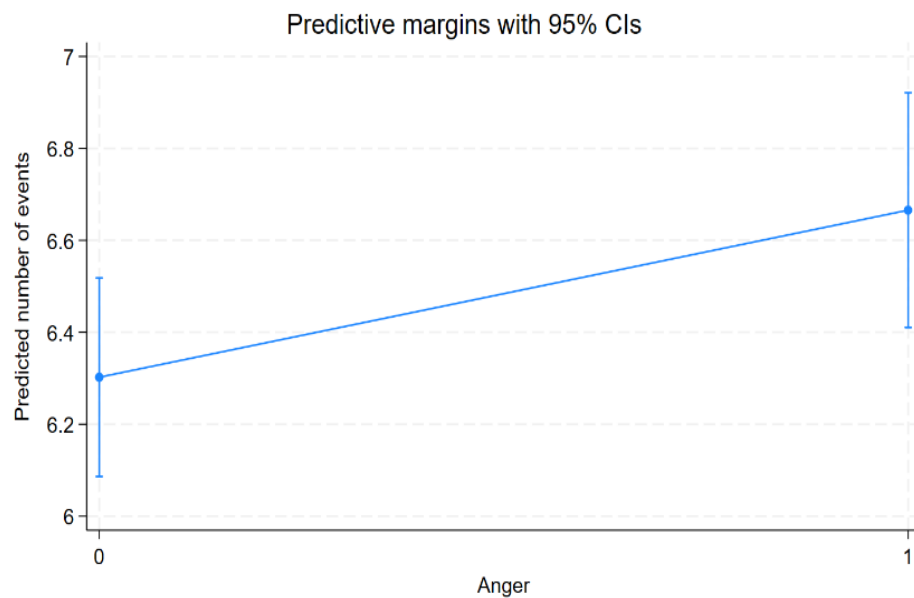
to receive zero retweets and tend to be retweeted. A similar trend is found in the presence of fear.

The standard model yields a positive significant result that supports H3. Figure 1.8 shows

the visualization of the result. A unit change in the presence of fear increases the log

counts of retweets by 0.151 at p<0.01 level. The result shows tweets with fearful words

will receive more retweets. The results from the zero-inflated model also match the

findings in the standard model. One unit change in the presence of fear decreases the log

odds of receiving no retweets by 0.211 at p<0.01 level. In practical terms, fearful tweets

are more likely to be retweeted and less likely to receive no retweets.

Figure 1.8
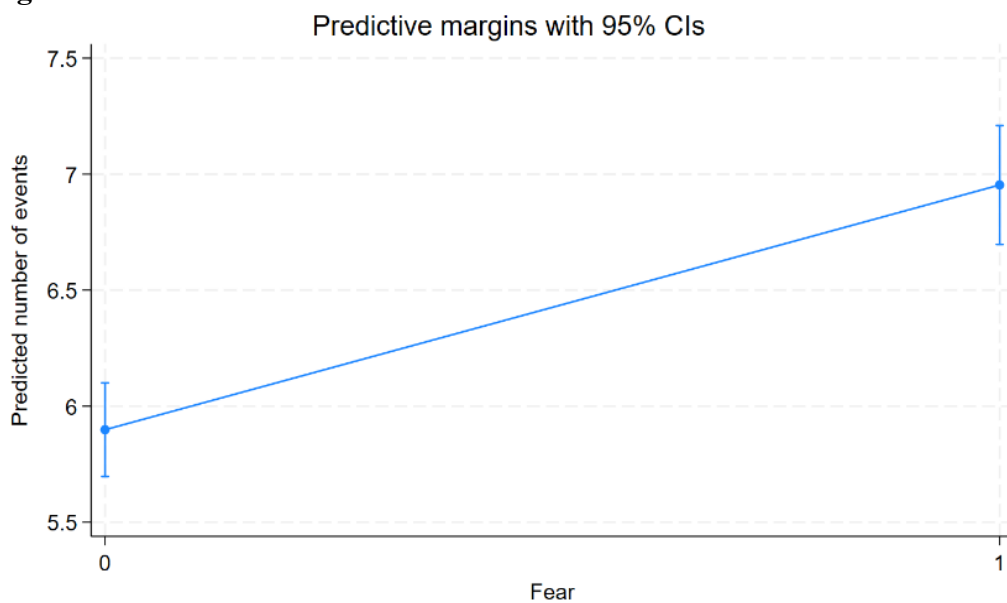
Conversely, the standard model result for the presence of disgust lacks significance,

leading to the rejection of H4. While the data suggests that a unit change in the presence

of disgust increased the log counts of retweets by 0.0391, this change failed to meet

significance at p<0.05 level. The zero-inflated model, however, presents a contrasting

perspective. A one-unit change increase in the presence of disgust increases the log odds

of receiving no retweets by 0.309 at p<0.01 level. It partially supports H4 by showing

tweets with disgust language cues are expected to be "true zeros." Although there is no

evidence in the model to indicate whether the presence of disgust decreases the possibility

of receiving more retweets, it shows tweets with disgusted feelings are more likely to receive no retweets.

For control variables, most results reveal a significant result at $p<0.01$ level, except readability. The number of followers and tweets containing links shows a positive relationship in the standard model and a negative relationship in the zero-inflated model. A unit increase in the number of followers increases the log counts of retweets by 0.330 and decreases the log odds of receiving no retweets by 0.519. Tweets tweeted by people with more followers will receive more retweets, and those with fewer followers are more likely to receive no retweets. The tweet containing links increases the log counts of retweets by 2.396 and decreases the log odds of receiving no retweets by 1.000. In other words, tweets containing links are more likely to be shared. The variable "user mentions" shows a nuanced picture. Both the standard model and zero-inflated model show a significant negative relationship. Tweets that mention user(s) decrease the log count of retweets by 0.188, but it also reduces the log odds of receiving no retweets by 1.156 at $p<0.01$ level. The data suggests that tweets mentioning user(s) are less likely never to get retweeted, but for those who get retweets, such tweets get retweeted less frequently. The zero-inflated model also suggests that a unit increase in the number of days Twitter accounts created increases the log odds of receiving no retweets. Older Twitter accounts are more likely to receive no retweets. Moreover, readability is only significant at $p<0.1$ level, which makes it statistically insignificant in the standard model, but the zero-inflated model yields positive significant results at $p<0.05$ level. The data suggests that there is not enough evidence to support that tweets with high readability will increase the number

of retweets for those tweets that receive retweets. However, it shows that such tweets are more likely to receive no retweets.

Discussion and conclusions

This study shows that emotion-triggering content has mixed effects on attracting people's attention during the early stage of the crisis. Anger and fear-lexicon cues in the text increase information-sharing behaviour but are not content with disgust cues. Content with sentimental cues increases the frequency of sharing. However, content with intense sentiments is less likely to be retweeted, which suggests sentimental elements are necessary to make viral content, but not too much. The findings broadly echo past literature on emotional cues influencing information sharing. Some conclusions may contradict general studies, but they still align with crisis communication studies. It also implies that the change in condition shifts people's information needs and behaviours. This study tests sentiment elements in a social media environment with other factors heavily weighted in the recommendation system to mirror the actual social media environment.

Studies on journalism and marketing in general settings reach different conclusions from studies on crisis communication. Studies on social media also confirm a similar trend (Stieglitz & Dang-Xuan, 2013). Past literature on sentiment and content popularity generally suggests that sentiment-rich content will go viral (e.g., Stieglitz & Dang-Xuan, 2013; Trilling et al., 2017). However, studies in crisis communication indicate that the initial response to the crisis is to find information about the current situation (Lee & Jin,

2019; Abd-Alrazaq et al., 2020) rather than venting. This research finds a non-linear relationship between the intensity of emotional expression and the likelihood of getting shared. This finding suggests that people prefer content containing sentimental elements but not content with intense emotions such as venting. There are two explanations for this finding. First, the data represent the immediate response to the crisis. It contains a large amount of informative content in the dataset, such as notifications, status updates, or other knowledge-sharing content, that usually has less sentimental words. Previous literature on communication studies is often set in a general setting (e.g., Stieglitz & Dang-Xuan, 2013) or have a more extended data collection period. The dataset used in this research records the very early stage of the crisis, where people know little about the situation. It is possible that people prefer informative content rather than comments or advertisements to understand what happens when they first hear of a crisis. Similar results are found in the case study on the 2009 Violent Crisis. The researcher finds that most shared tweets are about informative content of the crisis, and only a small percentage of tweets are about personal emotion (Heverin & Zach, 2010). Several studies have demonstrated how simply posting and sharing information online helps other citizens find customized crisis-related information that is not in official communications (e.g., Sutton, 2010). When the needs are situational, so are the elements making content popular. Although it reaches a different conclusion from journalism and marketing studies, the discrete emotional cues still play essential roles in boosting sharing behaviour.

Literature on anger usually has the consensus that this arousal emotion significantly boosts various forms of participation, including social sharing behaviour and information

sharing behaviour during conflicts (e.g., Fan et al., 2014). An immediate, intense emotional reaction is triggered when people feel anger, resulting in an emotional episode and social sharing of such an emotional episode (Brans et al., 2014). The select case, which involves military conflict, triggers a similar reaction that arouses patriotism during a conflict with foreign states, wherein anger is triggered, and a clear target is identified to blame (Fan et al., 2014). Post-crisis accountability leads to increased information-seeking behaviour as people are eager to see who is responsible for the crisis (Boin, 't Hart, & McConnell, 2009). Consequently, anger often acts as the motivation to initiate further crisis communication (Utz et al., 2013) and is triggered when there is a target to blame (Hameleers, Bos, & de Vreese, 2016). Moreover, the selected case for this study is an international conflict that turns into war. People may feel anger towards the one who declares war, although further analysis of content and opinion is needed to draw this conclusion. Another possibility is that anger cue is also commonly found in moral-related discussions where anger fuels further participation, and researchers observe an increase in information-sharing behaviour (Brady, Wills, Jost, Tucker, & Bavel, 2017). This study does not perform a topic modelling or in-depth content analysis on moral-related anger cues. Therefore, it is impossible to conclude that the anger detected in this dataset is moral-related, but it is worth further investigation.

Similar to the finding with anger, fear led to increased sharing behaviour. Past studies found that fear-evoked content is more likely to be shared after a disaster (Li et al., 2014). The expression of fear and anxiety follows the pattern of the social sharing of emotion. Fear (or anxiety, sometimes used interchangeably in some research) is commonly found

during crises such as war and health emergencies (Do et al., 2016). From the sentiment analysis, content with fear cues may likely be bad news or negative. The Russia-Ukraine conflict was one of the first significant wars after the Cold War. Additionally, both countries are geographically close to the European Union. Moreover, both countries export natural resources, including energy and food, to the world. People may fear that the influence of the war will extend to their daily lives. Studies on crisis communication highlight the role of emotional support of social media during the crisis (Reuter et al., 2018). People may go to their online social network to overcome the negative emotions the current situation brings. Besides social sharing theory, researchers find that tweets expressing fear and anxiety about the crisis and lack of solution also receive moderate attention (Abd-Alrazaq et al., 2020). People are more likely to take related action to ensure their safety when they are exposed to fear during a crisis (Oh, Lee & Han, 2021). However, the highly spread information under fear and anxiety also leads to the spread of misinformation and rumours (Li et al., 2014). It is expected that when people cannot find trustworthy informative content to overcome the crisis, they will turn to convincing information. This deduction requires further analysis of the content to confirm.

The one surprising finding of this study is the complex relationship between disgust and the number of retweets. Disgust-lexicon cues show no significant relationship for those tweets that get retweeted. It indicates that the model lacks evidence to prove whether the presence of disgust cues will decrease the likelihood of being retweeted. However, the results also suggest that tweets with such cues are more likely never to get retweeted. This result partially confirms the hypothesis and implies a more complex relationship between

disgust cues and information-sharing behaviour. Previous studies on disgust suggest two types: moral disgust and physiological response. The physiological response distracts people from the related information (e.g., Oaten et al., 2009; Curtis et al., 2011), but not moral disgust. Given the difference between moral disgust and physiological response, both disgust cues may be evoked in the text depending on the specific content. As mentioned above, this study does not perform in-depth content analysis, nor can this model provide detailed information on the differences in disgust cues. Although this study cannot conclude that the presence of disgust decreases the frequency of getting retweeted from this observation, it indicates that the relationship between the two is more complex than a linear one. Introducing variable interactions between the presence of disgust and other variables, such as sentiment intensity, may provide details on such relationships.

This study also has practical implications as it confirms the patterns found in some previous studies on emotional expression and misinformation or rumours during crisis time (e.g., Li et al., 2014; Daradkeh, 2022) as they suggest the presence of negative emotions, especially anger and fear, trigger more information sharing behaviour after disasters. It is plausible to include such emotional expressions to obtain better online influence. Although previous studies often emphasize the importance of including sentimental cues for potentially viral content, this study demonstrates that people may not prefer highly intense emotional content during the early stage of the crisis. On the other hand, the preference for sentimental and emotional content risks the chances that misinformation and rumours will use emotionally evoking language to gain attention (Martel et al., 2020). The rise of misinformation increases costs for institutions and

professionals to correct the general public on crisis-related information. Institutions and professionals may need to guide social media users as early as possible, even in the very early stages of the crisis.

One important thing to note is that most users in the dataset are physically distant from the crisis sources, namely Ukraine and Russia. In other words, most individuals are not directly influenced by the Russia-Ukraine conflict. The geographical distances influence how people perceive the crisis and their interests in the related topic, resulting in different information needs and attention spans compared to those directly affected. For example, in Öztürk and Ayvaz's (2018) study, the authors discover a distinct focus on information communicated and public opinion between communities at a distance and those who are physically near the battlefield. Consequently, theories on crisis communication and management may work differently on users and contents examined in this research, as previous research mostly focuses on crisis communication between the agencies and the disaster victims. This difference in audiences' proximity might be why the result does not or partially support the hypothesis.

One limitation of this research is that the dataset includes only the textual data because of the research design and methodology. Twitter is a multimedia platform that allows post of images and videos. Images and videos are sometimes the main body of the tweet message, and the textual part is often the introduction or brief description of the main body. In this case, the actual emotional cues are in the multimedia content, and the recorded data in the dataset shows no presence of emotional cues. Another limitation is

the lack of multilingual data. This study relies on dictionary-based sentiment analysis and detection that looks up specific keywords and matches terms with the sentiment or emotion in the dictionary. If multilingual data is included, the researcher needs to translate the data into English or find a dictionary with matched standards. Translation may cause meaning loss or modification and results in reduced accuracy. There are also not enough dictionaries for all languages in sentiment analysis. Only including English data will ensure the accuracy and validity of the result.

In conclusion, this study explores the influence of emotional cues on content virality during an early stage of the crisis. Sentimental-rich content boosts sharing behaviour in both general settings and during crisis time. Yet, content with extremely intense emotional expression has the opposite effect. Discrete emotions, especially anger and fear, can also increase information-sharing behaviour. This study largely syncs with past literature in several fields but presents mixed findings with some variables. For example, the results demonstrate the nuanced relationship between disgust and retweet frequency. By combining factors mentioned in the social media algorithm with discrete emotional appeals on content virality study, this study reflects the actual social media environment and provides ideas for possible communication strategies. Content creators, public relations practitioners, and other related careers may benefit from introducing a considerable amount of emotional expression. Despite its insights, this study is bound by limitations, such as excluding multimedia content from Twitter and lacking multilingual data. Meanwhile, this study touches on the influence of sentiment intensity, a topic rarely studied in past literature and sets up a path for future exploratory research on related issues.

4 Shifting Conversations and Emotions: Tracking Public Reactions to the Russia-Ukraine Conflict

Introduction

Social media's dual characteristics of media technology and networking tools create a unique communication channel for everyday conversations and crisis management. Information exchange on social media usually occurs through conversation and interaction (Yates & Paquette, 2011). Users are both audiences who receive information and content creators who produce information. When authorities and citizens coexist on the same platform, users can establish formal and informal information exchange on social media during times of crisis (Purohit et al., 2014). This bidirectional relation of crisis communication between information producers and receivers on social media reflects a new crisis information behaviour online (Reuter et al., 2018).

However, there has been no conclusive theoretical framework on social media usage patterns in crisis communication and management. The definition of crisis includes various types, such as natural disasters, public health crises, social crises, and similar events. Many cases presented in the existing crisis management and communication studies are natural disasters and public health crises, where eyewitness and citizen reporters are in demand for citizens to become information producers to fulfil their information needs (e.g., Chauhan & Hughes, 2017; Fung et al., 2014). For social crises and those involving foreign policy, citizens access limited information sources and often receive information that reflects the view of elites (Bennett, Lawrence, & Livingston, 2007). It is less clear whether the same information-seeking pattern from public health

crises and natural disasters applies to other types of crises. Previous studies mainly used case studies as methodology and lacked systematic theory on social media usage during a crisis. Meanwhile, existing literature touches on public sentiment during a crisis and often views the shift of sentiment and the change of information need separately.

To address the research gap, this paper proposes a case study on the Russia-Ukraine War that uses topic modelling and sentiment analysis to thoroughly analyse users' information needs during a prolonged, complicated crisis. The central research question is: What topics and sentiment reactions do users prefer as the crisis develops? The research is divided into two parts: the first examines the shift in information preferences, and the second tracks changes in sentiment reactions over time. The selected case covers the Russia-Ukraine Conflict from the end of February 2022 till September 2022. As military actions progressed, citizens fled from Ukraine and became refugees (USA for UNHCR, n.d.) while the geopolitical dynamic heated in the surrounding area. With numerous concurrent events and lengthy duration, the Russia-Ukraine Conflict is a fitting case to test the current information behaviour pattern and explore additional hidden trends. The dataset used for the research is based on the social media platform Twitter. Several scholars have highlighted the advantage of Twitter for breaking news and timely updates on emergencies (e.g., Sutton, Palen, & Shklovski, 2008).

This paper aims to contribute a deeper understanding of social media user behaviour patterns during a crisis, particularly the change in discussion and sentiment with corresponding factors. The result provides evidence supporting the extension of the

existing theory model to other types of crises by showing the shared behaviour pattern across different crisis types. This interdisciplinary study bridges theories from various fields, such as journalism, political communication, and crisis management. The observed pattern also lays potential theory groundwork for future study. The findings of this study can offer valuable implications for practitioners and institutions to craft a better crisis communication strategy.

This paper is organized as follows. The literature review section discusses works focused on social media usage in the crisis communication and management field and touches on political communication and emotion as a supplement to enhance the analysis of citizens' online information needs. The data and methodology section introduces the dataset used in the research and explains the adopted methodology to address the research questions. The discussion and conclusion section offers an in-depth analysis of the findings, how they align or contradict the current literature, points out the limitations, and calls for future studies.

Literature review

Social media and information needs during crisis time

Social media allows for real-time updates, satisfying both the immediate and continuous information needs of citizens and those who are related (Eriksson, 2018). Hence, social media often serves as information dissemination centres, especially for informative content, to benefit crisis planning and management (e.g., Chauhan & Hughes, 2017; Splendiani & Capriello, 2022). For example, the Okanogan County Sheriff Office and

Winthrop city officials used Facebook to update situation and damage reports during the 2014 Carlton Complex Wildfire (Chauhan & Hughes, 2017). In the case of wildfire, portable devices can access the internet and provide alternative communication channels for obtaining information about crisis updates, evacuation plans, and other guidelines. Crisis-related information can also reach distant audiences as a precaution (see Goodchild & Glennon, 2010), given that social media platforms can broadcast information to an extensive range of users. At the same time, citizens use social media platforms to form self-helping communities for information exchange, early warnings, and emotional support (Reuter, Hughes, & Kaufhold, 2018).

The information needed during the crisis can be roughly categorized into three main groups: informative content, sentiment support, and others. Informative content, such as crisis updates and guidelines, are needed as both the precautionary and the evidence for crisis and post-crisis management. Users often upload information about incidents around them, connect other community members and non-governmental organizations for the situation, and inform fellow citizens about the potential dangers. Stories and experiences posted on social media platforms become eyewitness evidence and timely reports of some incidents (e.g., Splendiani & Capriello, 2022) and collected by websites or applications for crisis warning systems such as Ushahidi (Gao, Barbier, & Goolsby, 2011) and LastQuake (Bossu et al., 2018). The 2010 Haiti Earthquake, for example, benefited from citizens' self-reporting of situation updates and accurate humanitarian requests, which helped relief organizations identify the crisis and respond accordingly (Gao et al., 2011). Kankanamge, Yigitcanlar, Goonetilleke, and Kamruzzaman (2020) also report an increase

in noting the benefit of citizen-generated content in the literature of related fields. It indicates that providing such informative content has or potentially became a pattern during and after the crisis.

Citizens also leverage the social networking nature of social media to form self-help communities for crisis updates and emotional support (Reuter, Hughes, & Kaufhold, 2018). Crisis time is a special setting due to the immediate change to one's life and work, especially for natural disasters and public health crises in which physical contact and communication are limited because of the crisis. For example, users seeking emotional support after the 2011 Great East Japan Earthquake due to worries regarding the expansion of affected areas and potential aftershocks (Wilensky, 2014). The earthquake destroyed buildings and damaged communication systems in certain areas. Social media has become the primary source of information and a communication tool, allowing them to communicate with others and share feelings to gain emotional support and ease the discomfort of the crisis (Wilensky, 2014). Likewise, a similar phenomenon is seen in the Covid-19 pandemic. Many countries and regions have adopted a "lockdown" policy that asks people to stay home as much as possible to prevent virus transmission. When facing the fear of the virus, the lack of social interaction, and the threat of (possible) unemployment, many people turn to social media to seek online emotional support from other users (Islam et al., 2021; Rosen et al., 2022). Rosen and colleagues (2022) noticed citizens who rarely used social media before the lockdown policy started to use social media to share feelings about being locked in their homes and other life stories.

Although some literature notices that an information-seeking pattern exists (e.g., Reuter, Stieglitz, & Imran, 2020; Hu et al., 2022), the ratio of informative content and emotional support in citizens' information needs is unclear. At the same time, there are examples of overlapping content, such as the one observed in Wilensky's (2014) research, in which citizens are worried about their families and thus ask other users for updates on their families' destinations. The first half seeks emotional support, but the second half seeks updates on the situation, which is informative content. Several interviewees in Rosen et al.'s (2022) research also show that they sought emotional relief from social media during the lockdown policy, but the content they had was potentially informative. Such an example shows that while some seek pure informative content or emotional support, others seek different information together. Additionally, a decrease in emotional content has been detected in extended crises as they approach resolution on account of the improvement of the situation and resolved uncertainties (Hu et al., 2022). Thus, based on the patterns demonstrated in existing literature, this paper proposes that:

H1: The overall proportion of informative content will be higher than emotional content.

The (potential) change of information needs

Previous studies have demonstrated that people generally request informative content when facing high-risk situations such as natural disasters to use new information to re-evaluate the current environment (e.g., Tellis et al., 2019). More recent research on public health crisis and social media use reveals that people in the early pandemic period, roughly from the first 48 hours to the first two weeks, are more likely to demand information and updates on the situation (e.g., Abd-Alrazaq et al., 2020). In general,

people require new information during the crisis to cope with the newly found uncertainty (e.g., Paton & Irons, 2016; Shklovski, Burke, Kiesler, & Kraut, 2010; Tang & Zou, 2021). The information needed is often focused on very specific areas, such as damage reports or situation updates on one block or individuals, which are beyond the one provided by official sources (Paton & Irons, 2016; Shklovski et al., 2010). People, thus, rely on social media to obtain such information first before they turn to communities for other types of support (Burke, Spence, & Lachlan, 2010). For example, the region of Abruzzo encountered bad weather during the 2016 Italian earthquake, which caused additional damage. Tweets from that region mainly focus on informative content about the situation and helping victims, while emotional expression and reports of damage are almost empty (Splendiani & Capriello, 2022). In addition, official information sources for groups with lower trust in authorities are treated as unreliable during the crisis and require further information-seeking behaviour to confirm (Burke et al., 2010).

Aside from the example discussed above, people's information needs are also influenced by emotional reactions. Crisis time presents a risky environment filled with uncertainties that often cannot be solved by individuals' existing knowledge, especially for health crises about which even the scientific communities have little understanding (e.g., Dillard, Li, & Yang, 2021). Fear is triggered when people face such a new and uncertain situation (Lazarus, 1991). Fearful people often try to avoid the source of fear or escape from the situation (Sege et al., 2018). However, not all environments or situations are avoidable or escapable. Under this circumstance, researchers observed an increase in information-seeking behaviours to mitigate the fear and gain control over the situation (Dillard et al.,

2021; Frey et al., 2014; Restrepo-Castro et al., 2023). In light of the observed patterns, this study will hypothesize that:

H2: Tweets from the first wave of crisis contain more informative content than emotional content.

As mentioned earlier, information needs are not static but sensitive to factors such as emotional reactions. Research in natural disasters also notes that the information needed to seek emotional support on social media can be parallel with informative content (e.g., Tellis et al., 2019). Users provide more than informative content on social media platforms. People also share their feelings and emotions with others online and use social media as self-therapy or alternative help-seeking platforms to reach wider audiences (Gere et al., 2020). The case of the COVID-19 pandemic illustrates the emotional needs of citizens during crisis time. Many countries implement a lockdown policy limiting citizens' actions to prevent further virus transmission. With limited physical contact, people turn to social media platforms for social interactions. At the beginning of the COVID-19 pandemic, the anxiety of the situation, combined with the limitation of action, led people to seek emotional support on social media and mixed needs of both informative and emotional support were observed (Islam et al., 2022; Hu et al., 2022). Meanwhile, people form online communities during crisis and increase their sense of belonging by sharing their feelings and providing/seeking emotional support from other members (Burke et al., 2010; Shklovski et al., 2010).

Apart from the factors mentioned above, citizen's information needs can also be sensitive

to the type of crisis and strategic crisis communication. The cause of public health crises and natural disasters can typically be expressed in scientific language, offering a unified definition, but the cause and context of social crises are often more complicated. A social crisis is as much a social issue as a political one. For example, Europe faced a refugee crisis in 2015, where a large number of refugees fled home without the hope of returning in a short period of time. Instead of providing information on possible solutions, some media outlets started to portray the refugees as uncontrollable, unlawful, and economic burdens that will cause negative long-term consequences for the country (Greussing & Boomgaarden, 2017). By creating a negative image, the media distracts citizen's attention from the cause of refugees to the threat of refugees. Addressing the refugee crisis calls for the elected office to engage in multiple aspects, including foreign policy, economics, and international relations. Such actions often require extensive periods to yield significant outcomes with few short-term rewards. The rival parties and media may take the opportunity to assign blame. Crisis management of social crisis quickly becomes a political arena competing for reputation and influence (Boin' t Hart, Stern, & Sundelius, 2017). The information needed for citizens may potentially shift focus, leading debates on narratives instead of the situation itself. Consequently, the demand for emotional content, such as venting and emotionally charged debates, may be higher for social crises as various corresponding factors and additional events are involved during the time of crisis.

The selected case of this research, the Russia-Ukraine war, represents an extended crisis characterized not only by its prolonged duration but also by its potential to cause

additional social or humanitarian crises. It is expected that corresponding events will concurrently occur with military action as media agencies and the government use social media as a political arena. Past literature devoted limited attention to users' perspectives on information behaviour in this type of crisis. As discussed earlier, a social crisis requires the authority to engage in foreign policy and international relations, areas that traditionally involve little participation from the citizens. The complexity of historical conflict and international politics may extend the duration of the crisis, which causes new uncertainty in the future. Combining the information demand for social crisis and the emotional demand for prolonged crisis, this research hypothesizes that:

H3: Tweets from the last wave of the crisis contain more emotional content than informative content.

The public sentiment in a prolonged crisis

As mentioned in previous sections, crisis time as a risky environment activates negative emotions such as fear. A complex crisis triggers negative public sentiment due to the damaged social order brought by risks and uncertainty (e.g., Luo & Zhai, 2017; Zhao et al., 2020). In this context, public sentiment (or public moods in some articles) refers to attitude and emotional responses to a given crisis or event. It reflects how citizens perceive and feel about the current event and indicates the shifted attention or action. An example of shifting public sentiment as an indicator is the 2018 Cricket Australia ball-tampering incident. At the beginning of the crisis, fans held relatively highest negative attitude on social media and actively sought information on the crisis and background so they could place blame on a target, but the overall negativity decreased as the crisis settled

down and the new game season began (Morgan & Wilk, 2021). The initial negativity is fans' responses to the situation, which shows dissatisfaction about the situation, the crisis management, or both. When the crisis passes and orders are restored, the attitude returns to normal. In the same vein, Garcia and Rimé (2019) observe a peak of anxiety immediately after a terrorist attack, but the wave of anxiety clams as time progresses. Both the 2018 Cricket Australia crisis (Morgan & Wilk, 2021) and the terrorist attack (Garcia & Rimé, 2019) perceive a peak in the initial emotional response, and the response calms over time until the crisis is passed. Based on this observed pattern, this paper hypothesizes that:

H4: The emotional intensity of tweets will decrease over time.

Data collection and methodology

Method

To fully address all three research questions, this research's methodology encompasses two primary techniques: topic modelling and sentiment analysis.

The procedure of data processing and analysis is shown in Figure 2.1. Prior to data analysis, the original dataset was checked for spamming messages, irrelevant messages that hijacked the relevant hashtags, and other non-English tweets using the R package "tm" and "dplyr." The detailed preprocessing includes removing numbers, removing the stop words in English, removing the punctuations, and setting the text to lowercase. Following the initial checking, the original dataset takes a copy and is split into three subsets based on waves of military aid sent to Ukraine, which will be defined in the

following subsection. Each dataset will need to be cleaned and correctly formatted for the chosen topic modelling package to handle. After all preprocessing, the dataset will go through model estimation and evaluation to select the best model based on widely used criteria. Once the best model is chosen, the dataset will officially go through the algorithm to extract topics and classify messages based on topic groups for further analysis. Upon completion of topic modelling, the classified tweets are analysed for sentiment and

Figure 2.1
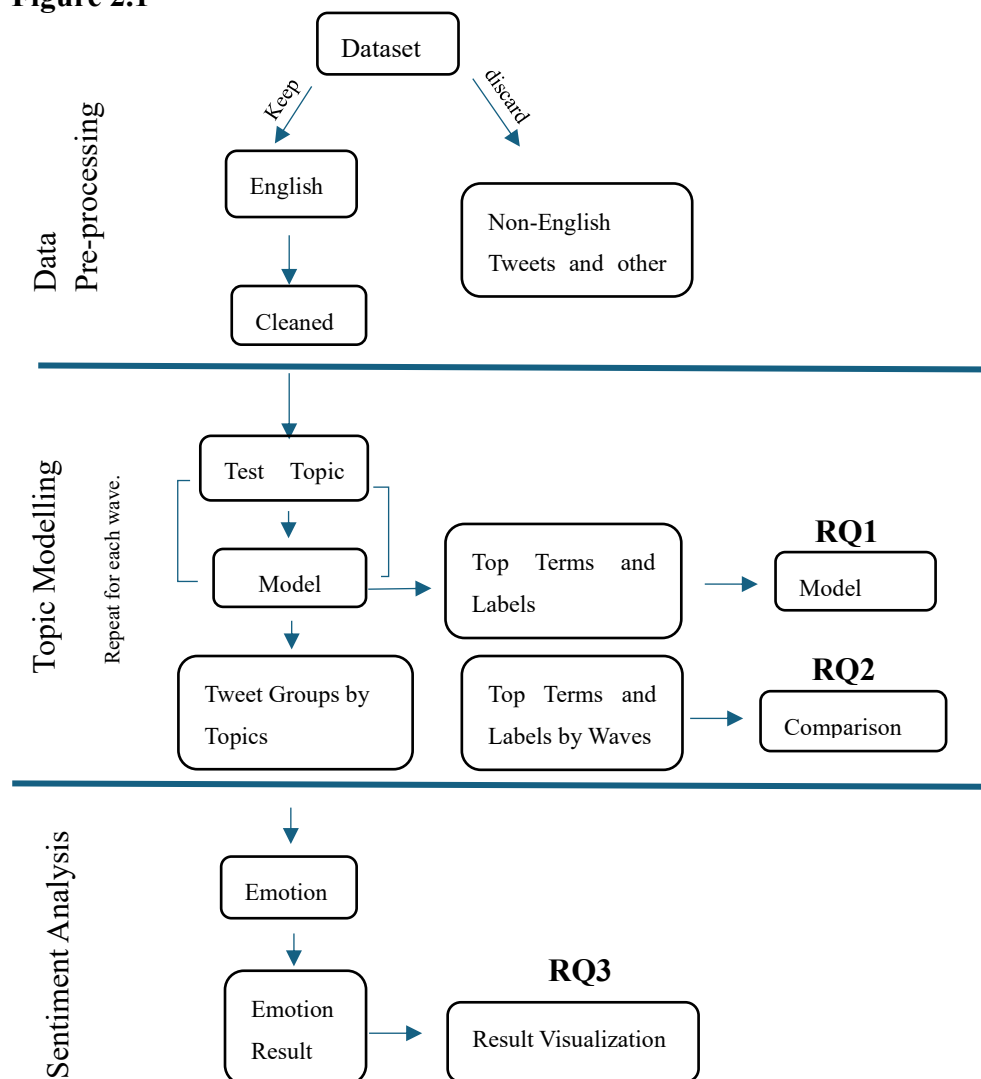
emotional expression.

Data collection

Data

The dataset used in this study is the subset of the dataset collected and managed by BwandoWando (2022) on Kaggle. This dataset has also been adopted by some previous studies on the same case (e.g., Breve et al., 2024; Shultz, 2023). The dataset author collects data using Azure Machine Learning services to run Python processes to monitor hashtags related to the Russia-Ukraine war via the Tweepy library to access Twitter API (BwandoWando, 2022). The monitored hashtags are not fixed due to the change of focus over time. The process for collecting data runs every 15 minutes to avoid the rate limits of Twitter API and saves every 4 runs (BwandoWando, 2022). The original dataset includes tweet ID, text, the time the tweet was created, user ID, user profile description, location, and retweet numbers. Although the original dataset includes tweets in various languages, this study will only use tweets written in English to avoid the linguistic differences produced through the translating process. After filtering out the spamming and non-English tweets, the total number of tweets included is 1,951,693.

Variables

waves

The dataset used for this research includes three subsets based on three different time ranges reflecting major waves of military aid sent to Ukraine from 24 February 2022 until 09 September 2022. This research defines waves by reviewing news and government announcements worldwide and grouping the most concentrated periods.

The first wave of aid started immediately after the war declaration and lasted one month. The United Nations Central Emergency Response Fund (CERF) disbursed donations of

over 60 US dollars starting on 24 February 2022 (CERF, 2023), and many countries noted their contribution to the donation (e.g., Government of the Netherlands, n.d.).

The second wave started on 8 April 2022 and ran until 8 May 2022. During this period, various countries and institutions announced additional military aid sent to Ukraine in response to the ongoing military actions taken by Russia. Countries such as Australia (Prime Minister of Australia, 2022), France (PL & AFP, 2022), and Canada (Brewster, 2022) all announced additional military aid through public media releases or press. Meanwhile, the Ramstein Air Base meeting, which was organized by the US, also took place on 26 April 2022 with the participation of more than 40 countries to discuss Ukraine's defence capabilities and arrange further support for Ukraine (DeYoung & Timsit, 2022).

The third wave started on 8 August 2022 and ran until 8 September 2022. This period contains not only additional military aid sent to Ukraine but also a counter-offensive action announced by Ukraine (Chao-Fong, Grierson, Middleton, & Lock, 2022). Countries that contribute to military aid include Turkey (Ukrinform, 2022), New Zealand (Ardern, Mahuta, & Henare, 2022), and Norway (Les på norsk, 2022).

Informative and emotional content

The terms "informative" and "emotional" content refer to content with different purposes rather than to elements. There is no unified definition of informative content. Previous studies define informative content based on a variety of content types, such as product

information (Lee et al., 2018), crisis updates, and damage reports (Kumar et al., 2022). Regardless of the content differences, messages that are categorized as informative content serve to inform people. For this research, the informative content will include tweets providing news reports and updates about the ongoing war, related military action, aid, and political dynamics surrounding the war. However, it does not mean informative content contains no sentimental elements.

In contrast, emotional content refers to content that aims to deliver emotional content, such as sharing feelings, venting, and support. War stories that describe groups' or individuals' lives to trigger empathic reactions, disappointment in unsuccessful actions, and messages that encourage people to live are all examples of emotional content. The distinction between the two is mainly the intention of the passage. Informative content may also contain emotional expression while reporting certain events to deliver the message. Emotional content, on the other hand, always contains emotional cues to trigger readers' emotions. Those that fall in between the two or have content that is hard to classify are categorized into others.

These categories correspond to the first part of the research, which asks what topics are trending and whether trending topics change. This research employs topic modelling to group tweets discussing similar themes. Depending on the content function, tweets are expected to be categorized into the three categories described above for further analysis.

Topic Modelling

Topic modelling is a statistical model used in NLP to extract hidden "topics" from a document collection. Topics are groups of correlated words determined by their co-occurrence in documents. One of the most well-known tools for quantitatively extracting topics from documents is the Latent Dirichlet Allocation (LDA) topic modelling. Although this bag of words approach is widely used in social science, several scholars have pointed out its limited performance on short text due to lack of word co-occurrence and the ignorance of nuanced grammar and syntax (e.g., Roberts, Stewart, & Airoli, 2016). This research will adopt Structure Topic modelling (STM) as the main method for initial analysis to assess the Twitter text better statistically, balancing the speed and performance of the model on a large collection of documents alongside considering other covariance.

A major advantage of STM is to consider external factors of a document, such as gender and political parties, when calculating the proportion of a topic (topic prevalence) and the specific words used in the context (topical content), unlike LDA, which topic is generated independently (Roberts et al., 2016). In realistic environments, not all articles or messages receive equal attention. The number of articles does not reflect its influence, but it will affect the proportion of topics extracted when applying many topic modelling techniques.

For this research, the dataset is collected from the social media platform Twitter, where various factors determine the influence of a tweet, and the number of retweets is always an important indication of an influential message. To add a layer of realism to the analysis, this research will use the number of retweets of each tweet as the covariate of the model. Roberts and colleagues (2016) introduce observed covariates using generalized linear

models and incorporate their influence through a logistic normal distribution. This enhanced technique allows external factors to shift the weight of the topic and reflect the actual Twitter environment. See appendix B for a more detailed explanation of model estimation and evaluation.

The practical advantage of STM is that the model employs a variational expectation-maximization algorithm with a Laplace approximation to ensure computational efficiency and performance when analysing large collections of documents (Roberts et al., 2016). Given that the dataset of this research contains 1,951,693 rows of tweets plus 7 columns of supplement information such as retweet counts and creation time as covariates, the research requires a topic model that balances the computational time and performance.

Sentiment Analysis

Given that one of the primary research objectives and an identified research gap in previous research is to identify changing public sentiment during the crisis, this research will employ sentiment analysis to identify and extract emotions shown in the text. The advantage of studying emotions rather than pure sentiment scores is to avoid categorizing emotions such as anger with other positive emotions, namely, happiness. Although both emotions are considered positive in various theories, anger and happiness can be very different when studying public opinions for policies and political events. Processing sentiment analysis requires NLP techniques that take significant time when processing large text data. Many NLP tools for sentiment analysis prefer a longer text body. Due to the size of the dataset and the nature of tweets as short text, this research will use the R

package Sentimentr as the tool, designed specifically for short texts while balancing the processing time (Rinker & Spinu, 2018).

Sentimentr uses an augmented dictionary-lookup approach that balances the accuracy of sentiment detection while maintaining the speed when processing large datasets. The Sentimentr package builds the dictionary based on the "Syuzhet" developed by Jockers (Rinker & Spinu, 2018). The initial dictionary includes the "afinn" lexicon (Nielsen, 2011), the "bing" lexicon (Hu & Liu, 2004), and the "nrc" lexicon (National Research Council Canada, 2011), which are all commonly used lexicons resources for sentiment analysis. In addition to the lexicon used in the "Syuzhet" package, the author also considers valence shifters such as negators, amplifiers, and de-amplifiers (Rinker & Spinu, 2018). Valence shifters are words that change the polarity of the word or sentence(s) they belong to. For example, the word "not" in "I am not happy" changes the whole sentiment from positive to negative. The added feature increases the overall accuracy of sentiment and emotion detection while maintaining a balance between accuracy and processing speed.

Results

Overview of the results

Table 1 provides an overview of topics extracted from all datasets across all waves. There are four groups of informative content and five groups of emotional content.

Table 2-1

Topic Labels / Top terms		Proportion	Categories
News on military actions	kherson, russian, ukrainian, kharkiv, region, forc, citi, near, oblast, donetsk	11.47%	Informative
Updates on action taken by other countries	russia, nuclear, power, country, europ, plant, russian, state, secur, minist	11.01%	Informative
Citizen wartime story sharing	time, good, putin, come, want, know, still, need, mani, right	10.94%	Emotional
Reports on specific battle and action	russian, ukrain, militari, forc, ukrainian, arm, destroy, missil, air, armi	9.95%	Informative
Supporting and solidary message	ukrainian, today, support, slavaukraini, standwithukrain, independ, ukrain, peopl, help, thank	9.85%	Emotional
News on war developments	russian, russia, russiaisaterroristst, peopl, kill, putin, mariupol, civilian, attack, die	9.25%	Informative
Resistance stories and supporting messages	ukrain, ukrainerussiawar, ukrainewar, crimea, russia, video, ukrainerussianwar, soldier, occupi, russiaisaterroristst	7.98%	Emotional
War reaction and calling for international aids	ukrain, war, work, fight, continu, standwithukrain, must, invas, presid, zelenski	7.12%	Emotional
Discussion on political dynamic	china, russia, india, oil, taiwan, new, iran, year, buy, develop	6.33%	Other
Discussion on US president candidate	biden, trump, presid, polit, american, vmas, money, fbi, gorbachev, democrat	5.76%	Other
Citizen involvement and humanitarian concerns	back, first, kyiv, last, anoth, show, home, photo, place, day	5.49%	Emotional
Concerns on NATO decision and call for support	nato, join, nafo, live. alli, mriyareport, world, discuss, fella, play	4.85%	Other

As shown in Figure 2.2, the top concerns overall are the "News on military actions (11.47%)" and "Updates on action taken by other countries (11.01%)." Both are informative content containing news on the immediate development of the war, news reports on military actions taken by both, and reactions from the political side, including

news on the aid of neighbouring regions and international communities. The topic "Reports on specific battle and action (9.95%)" is the fourth top concern during the war. Tweets included in this topic dive into the battle report of individual/regional battlefields. "News on war developments (9.25%)" is the last informative topic uncovered in the data, and the content mainly concerns the news reporting on the status of the war and military actions taken by both sides. Although all those are news items, people seem to pay more attention to general news, not detailed ones. The two general news items, "News on military actions" and "Updates on action taken by other countries," contain a higher number of tweets compared to those that have a specific focus, whether the focus is on the battlefield or progression. It can be explained as the news item in the general news topics features immediate reports and updates on war status, while the news with a

Figure 2.2
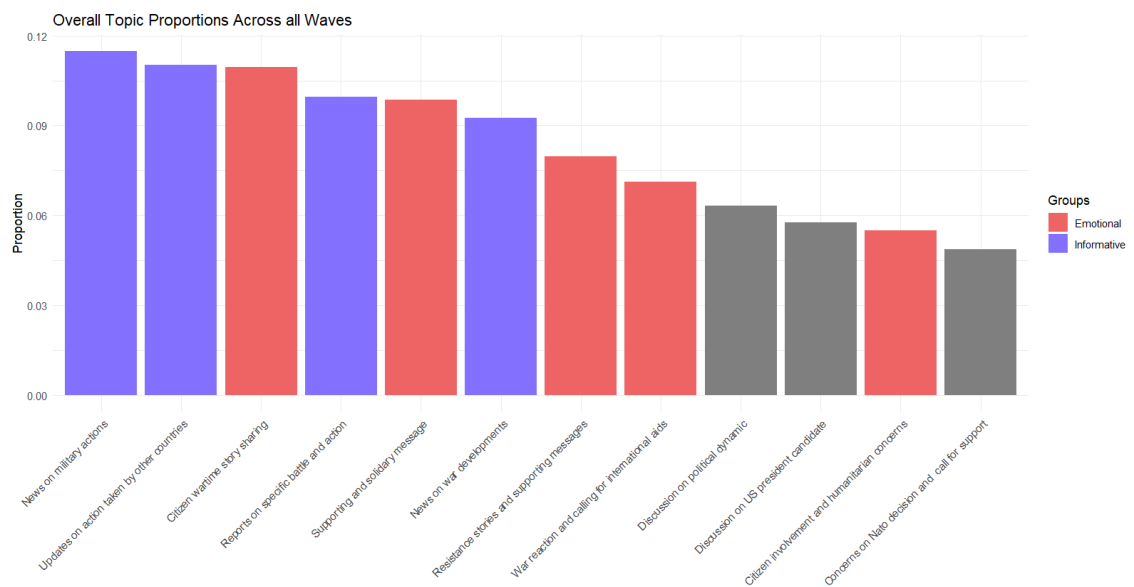
specific focus attracts those who actively follow such news. However, with limited attention and interests, many will shift their focus over time.

The emotional content "Citizen wartime story sharing (10.94%)" is ranked as the third

largest topic. Tweets on this topic mostly relate to ordinary citizens' lives during wartime, especially those who are physically near the region of battlefields. Such tweets usually have a format similar to news stories or a documentary-like tone but with emotionally charged words that aim to engage others. Similar to this topic, "Resistance stories and supporting messages (7.98%)" and "Citizen involvement and humanitarian concerns (5.49%)" also feature Ukrainian involvement in the war, but with a different focus. "Resistance stories and supporting messages" primarily cover stories specifically on how soldiers and citizens defend the region or themselves, with some supporting messages attached. "Citizen involvement and humanitarian concerns" focus on the involvement of citizens, including casualty reports and particular battles that involve the death of citizens or the deconstruction of civil facilities. Another large emotional topic is "Supporting and solidary message (9.85%)," which contains messages of standing with Ukraine or expressing support to Ukrainians, both to citizens and soldiers. In addition to the supporting messages, "War reaction and calling for international aid (7.12%)" also includes messages from the international community expressing their emotion as they hear the status of the war and calling their governments for various aid to Ukraine.

The total proportion of informative content is 41.72%, and emotional content is 41.68%. This observation partially supports H1, which predicts the overall proportion of informative content will be higher than emotional content. Yet, the two content groups have almost 1:1 ratios in the complete dataset across all waves, and the difference between the two is relatively small. This result cannot be interpreted as people generally prefer informative content. Rather, it suggests that the long-term emotional content is as

essential as informative content on the crisis itself.

The topic distributions and changes by waves

Figure 2.3 illustrates the average topic proportion across waves, which presents the change of topic trending. The average topic proportion is calculated by the average of theta value, which is the estimation of the proportion of terms assigned to a certain topic by the topic model (see also Roberts, Stewart, Tingley, & Benoit, 2023). Due to the calculation methods employed, the sum of the topic proportion within each wave will not equal 1. Moreover, the covariate used in the model is the retweet count, which reflects the level of spread and engagement in Twitter environments. The average proportions shown are already weighed as the model estimates the topic proportion of the term in each document.

The topic distribution between informative and emotional content is relatively even in the first wave. The topic in the first wave almost follows the pattern that emotional content precedes informative content, followed by a repetition of emotional content and then informative content. Aside from the "other content," the most prevalent topics of this wave are "Supporting and solidary message" and "News on war developments," followed by "Citizen wartime story sharing" and "Updates on action taken by other countries." The sum of the average proportion of emotional content is 67.11%, and that of informative content is 54.12%. It is important to note that the proportions are not mutually exclusive, and each tweet may contain more than one type of topic.

Figure 2.3
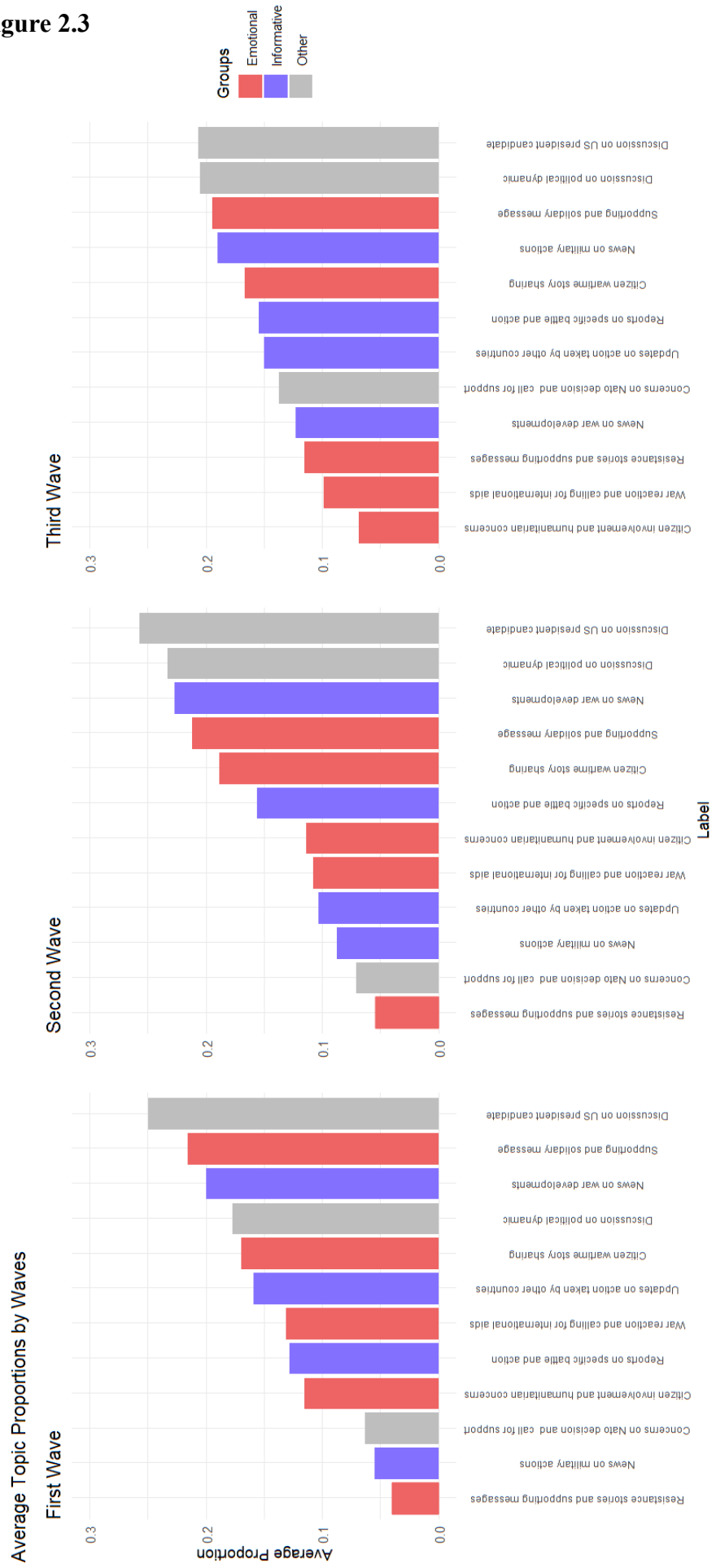

Average Topic Proportions by Waves

Figure 2.4 shows an example of tweets with mixed topics. The highest theta value indicates that the tweet most likely belongs to "News on military actions" but still has a decent theta value on "News on war developments." Although the example only shows tweets with mixed informative content, there are more tweets with mixed content types. Given the observed data, the higher ranking and the proportion of emotional content compared to informative content, this study finds no support for Hypothesis 2, which claims a preference for informative content during the first wave of the crisis.

Figure 2.4

Death toll in Russian rocket strike on apartment building in Kharkiv rises to 12

"All of them are civilians. Many of them are elderly and disabled. There is no military facility near the destroyed building"

edition.cnn.com/europe/live-ne…

#StandWithUkraine #Ukraine #UkraineRussianWar

In the analysis of topic trends across later waves, this study observes a shift in both the prevalence of informative and emotional content. According to Figure 2.3, most informative content either maintains its proportion or gains an increase, except for "News on war developments." This topic was initially dominant in the second wave and overtook the emotional content "Supporting and solidary message" but fell to sixth place in the third wave. Meanwhile, a huge increase is observed for "News on military actions" from eighth place in the second wave to second place in the third wave. Such a change in topic proportion suggests a shift in the information needs and public attention over time. The sum of the average informative topic proportion increases from 57.27% in the second

wave to 61.69% in the third wave. Conversely, the proportion of several emotional content decreases in the third wave, including "Citizen wartime story sharing," "Supporting and solidary message," "Citizen involvement and humanitarian concerns," and "War reaction and calling for international aids." Despite the dominance of "Supporting and solidary message" in the third wave, the average proportion of the topic decreased.

The only increased emotional content is "Resistance stories and supporting messages," but the average proportion is relatively small compared to other topics. The sum of the average emotional topic proportion slightly increases to 67.53% from the first wave but falls to 64.36% in the third wave. If based on the ranking of topic proportion, this study observes partial support for H3, which posited a preference for emotional content in later waves. However, when examining the shifts in average proportion and topic ranking, this hypothesis finds limited backing.

Both H2 and 3 find no or limited support from the observation. The trend in the first two waves partially reflects the hypothesis but not the third wave. This result suggests a more complicated relationship between the information needs of the audience and the information produced by content creators on Twitter. The increasing attention to informative content may also reflect the additional side events happening during the third wave, such as the counter-offensive action announced by Ukraine.

The shift in public sentiment by wave

Figure 2.5 presents the average emotional intensity comparison between three waves of data. The plot for the first wave shows intense fear and anger at the beginning of the wave when Russia first announced the special military action against Ukraine. The intensity level of fear and anger in the first two waves shifts between 0.15 and 0.5, showing frequent spikes. Specifically, fear and anger have surged consistently since the beginning of March 2022 and throughout the first two waves, indicating sustained discussion and intense emotional expression on the topic. The corresponding events might cause constant spikes during this period. For example, further military action and its influence were reported, including the attack on Ukrainian military bases near NATO countries border on 13 March 2022, and a large number of citizens were evacuated from the cities near the frontline (Polityuk & Zinets, 2022). Yet, without further analysis of the content, this study cannot draw the casual conclusion that corresponding events caused the emotional reaction.

Furthermore, the plot for the second wave shows a similar pattern in which fear is the most intense emotion, followed by anger and sadness. Fear, anger, and sadness in the second wave also display somewhat parallel increases with overlapping spikes, suggesting synchronous reactions to events during this period. The spikes observed in the plot could also result from debates with different focuses and views; some might have a higher level of anger, and others might not.

Figure 2.5
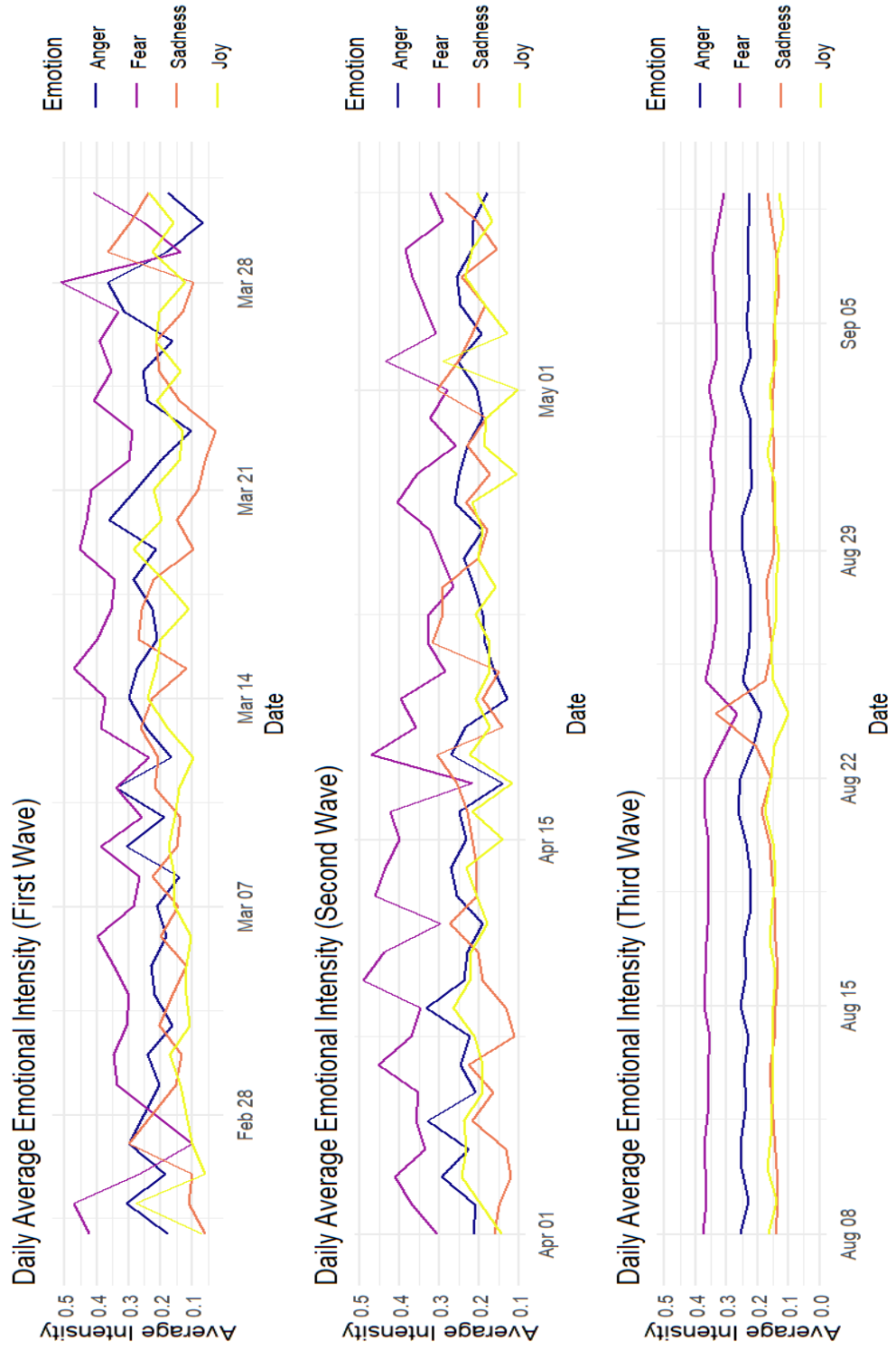
However, the emotional intensity shown in the third wave is more stable across all

emotions than the previous two waves. The intensity level of anger is maintained at the

same level as the previous two, while the intensity level of all other emotions drops

slightly. The intensity level does not drop as expected, thus showing no support for H4. The consistently intense emotional expression, especially fear and anger, suggests an ongoing concern over the topic and uniform response to the event. The lack of spikes shows no significant shift in sentiment and implies that people either have a fixed impression of this prolonged crisis or lack of active discussion with opposing views. Still, with the current methodology, this study cannot draw the conclusion that the discussion surrounding this event fades and people's attention falls elsewhere.

Discussion and conclusion

This research aimed to explore how information behaviour evolved on social media after the crisis, with a particular focus on changes in the focused topic and public sentiment. This study proves that people have complicated information-seeking behaviour that simultaneously seeks multiple types of content. Users initially prefer emotional content during crisis outbreaks, although informative content is not ignored. The attention to informative content has increased over time and reached a relatively even ratio between the two types of content. There is no clear overall preference for any particular type of content. For the shift in public sentiment, people showed strong emotional reactions in the first two waves, but both the intensity and presence of emotional elements declined in the last wave.

The initial information preferences partially align with previous findings in journalism and political science studies (e.g., Abd-Alrazaq, Alhuwail, Househ, Hamdi, & Shah, 2020; Trilling, Tolochko, & Burscher, 2017) but not with studies in crisis communication,

especially for health crises and natural disasters. This research expects a preference for informative content during the first wave, mirroring existing studies' conclusions. As mentioned in the literature review, people are more likely to seek informative and less sentimental content when they are facing high-risk situations or threats so that the newly found information can improve the situation, especially in crisis communication and some health communication studies (e.g., Abd-Alrazaq et al., 2020). Although the overall pattern indeed reflects the preference for informative content, the difference between informative and emotional content is too low for the exclusive conclusion. Meanwhile, the content preference on the first wave points to emotional content followed by informative content. The later waves and the overall dataset, on the other hand, suggest an increase in the influence and popularity of informative content. Still, the ratio of informative and emotional content posts is nearly balanced.

Several factors can explain this observation, such as a mixture of topics within one tweet due to the topic model methodology and the dataset only containing tweets in English, potentially excluding communities that get directly involved in the crisis. The data contains only English-language tweets, but not all users are influenced by the Russia-Ukraine War posts in the same languages. Unlike local media, which produces information mostly on surrounding areas, social media platforms host users worldwide. Both the differences in expected topics from the first wave and the shift in the later wave suggest different interests in the war. An example of diverse focus is observed in a study on the refugee crisis, in which the Turkish-speaking community focuses on nearby war and sends out positive tweets for support, while the English-speaking community is

interested in negative and neutral tweets on comments and global impact, showing different users' interest on the same event (Öztürk & Ayvaz, 2018). Many English-speaking communities are not physically near Russia or Ukraine. The urgency is not as high as for those directly involved in the crisis. This difference in users' interests also influences the attitude or sentiment towards the event, explaining the unexpected results presented in this study.

Moreover, the covariate employed by the topic modelling is the number of retweets, which reflects the sharing behaviour or the intention to share the content. Sharing, as one of the user interaction metrics, determines the possibility for the said content to appear on other users' homepages (see also Borges-Tiago et al., 2019). In other words, more sharing results in higher popularity. Therefore, the preference for emotional content in this research can also be interpreted as more popular/wide-spreadable than informative content. When looking at sharing behaviour, previous research on communication noted that people are generally more likely to respond well to emotional content (e.g., Bruni et al., 2012; Stieglitz & Dang-Xuan, 2013; Trilling et al., 2017). For example, news and stories with more emotional expressions receive more attention from the readers and are easier to spread (Khuntia, Sun, & Yim, 2016; Trilling et al., 2017). This mechanism also encourages users to include more emotional elements or to create emotional content to increase the chances of gaining visibility. Thus, this study observes a preference for emotional content under the covariate of retweeting, as sharing is more likely to be triggered by emotional content. However, information needs and seeking behaviour do not always correlate with sharing, which may explain why observations in the study

appear to contradict previous findings in crisis communication. Aside from the reasons above, another possible explanation for the decline in emotional content in later waves is the "social media exhaustion" mentioned in the existing literature. It describes a phenomenon in which people feel tired or overloaded by the information on social media, so they decrease or stop social media usage (Islam et al., 2022). However, more evidence is needed for both explanations to be considered valid, as this research is observational.

Regarding the change in information needs, a potential interpretation is that fear drives the desire for informative content. This study observes an increase in fear intensity corresponds with an increase in informative content for the first two waves. Fear is one of the common emotions triggered when people face an unfamiliar, risky environment that lacks the experience and resources to solve the issue (Lazarus, 1991). Previous literature suggests that fear increases information-seeking behaviour because this emotion activates mechanisms that urge individuals to locate new resources to cope with uncertainty (e.g., Marcus et al., 2000; Clifford & Jerit, 2018). When the information demand increases, content creators tend to produce more informative content, which in turn results in rising attention to informative content.

Furthermore, this study noted a slight increase in both informative and emotional content as the intensity of anger spikes in the first two waves. As mentioned earlier, the covariate for the adopted model is retweeting. Anger is commonly found to positively correlate with sharing behaviour (Berger & Milkman, 2012). Physiological arousal, irrespective of whether it is positive or negative, boosts social transmission in forms such as the exchange

of information (Berger, 2011). In other words, anger as an arousal emotion (Russell, 1980; Russell & Barrett, 1999) tends to trigger information-sharing behaviour, which is retweeted in this context. As a result, this study observes an increase in both informative and emotional content. On the other hand, anger is also a moral emotion (Tangney, Stuewig, & Mashek, 2007), often found in moral discussions. For a crisis such as the Russia-Ukraine war, people may judge the crisis from a moral perspective and blame the target for which they feel responsible. The rise in emotional content in this circumstance possibly reflects the increased moral discussion of the war.

In parallel, the study also explores the shift in public sentiment over time in a prolonged crisis. Still, no consistent pattern is found in public sentiment across all waves. As mentioned earlier, the intensity of fear and anger is found to increase during the first two waves, which reflects the immediate and continued emotional reaction of users. Yet, the public sentiment shifts dramatically in the last wave. The data reveals a stable and calm public sentiment plot, contrasting the intense emotional expressions and fluctuations captured in the first two waves. The intensity of public sentiment decreases as time progresses, but the association between emotional intensity and the corresponding event is not always presented. Despite numerous side events occurring and continuous news coverage of the Russia-Ukraine War, no observation of spiked emotional intensity was found after six months had passed since the announcement of Special Military Action. Both the decline of emotion intensity level and tweet count suggest that either people's attention is shifted from the crisis or emotional response to the crisis is not preferred in the long run.

Most hypotheses are either fully or partially supported, implying a complicated social media information behaviour pattern during a prolonged social crisis with several side events and potentially related crises. In light of these findings, it becomes evident that the information needs and public sentiment during crises are complex, challenging existing literature and emphasizing the need for a flexible crisis communication strategy to respond to information behaviour and emotional expression dynamics.

The result also has several potential practical applications. Firstly, it reveals a balanced preference for both informative and emotional content, suggesting equal importance of informing the audience with informative content while providing emotional support/expression for higher visibility in social media settings. A higher visibility brings online influence and advantages in building the crisis narrative. The informative content sets the definition and facts about the crisis, while the emotional content adds a tone supporting the informative content. Secondly, the study finds people pursue emotional content in later waves but increase their interest in informative content. This observation of changing preferences hints at a flexible communication strategy rather than stasis plans. So, the promotion and communication strategy needs to emphasize stories over pure facts in the long run. Simultaneously, content from the beginning of the crisis is often high in fear and anger. Both emotional cues increase information-seeking and sharing behaviour. Including or addressing both emotions may result in a better response to the crisis. Nonetheless, public sentiment is likely to stabilize over time with no sudden surges in the long run. This demonstrates that the optimal period for crisis management occurs during

the early stages of crises, as people may develop fixed opinions or impressions of the event. Failure to manage the crisis within this critical window means losing the advantage of interpreting and defining the event. By effectively tailoring the elements above, political figures and institutions can gain more support in future policy and political events.

There are several limitations in the research. Aside from the limitation stated in both the result and earlier paragraphs, including observational data cannot lead to causality and contains only English tweets; the dataset only includes textual data. The actual Twitter environment is a multi-media environment where videos, images, and text are equally appealing and attractive. However, the methodology employed can only accurately analyse textual data, which leaves a gap between the dataset and the actual environment. Images and videos also carry sentimental elements. Sometimes, they are the main body of the tweet, and the textual data serves only as the title or introduction of the multi-media content. Future studies can develop methods to incorporate multi-media content analysis with textual analysis to reflect a realistic environment. In addition, this research is observation research and lacks direct analysis of the specific reasons or mechanisms behind the observed activities. Thus, no direct causal between behaviour patterns and the factors listed above is drawn.

5 How People Describe the Russia-Ukraine Conflict on Social Media: A Comparison of Western Mainstream Media and Alternative Narratives

Introduction

On 24 February 2022, following Russia's announcement of a "Special military operation" in Ukraine, immediate coverage was triggered by both Western mainstream Media and independent media outlets. Historically, mainstream media outlets have been perceived as channels for distributing elite perspectives on war and foreign policy (Entman, 2004; Iyengar & Kinder, 1987; Robinson, Goddard, Parry, & Murray, with Taylor, 2010). Thus, the reported issue often shapes the narratives to specific political or military agendas (e.g., Eberl et al., 2017; Lecheler & de Vreese, 2012). However, this traditional framing is increasingly contested by the rise of social media, which offers alternative platforms and sources to disseminate information and narratives. In numerous countries, social media platforms, notably Twitter, have become primary sources of daily news and information (e.g. Pew Research Center, 2023). Such platforms emerged as a crucial space for political discourse, empowering users as information consumers and producers (see also Enli & Skogerbø, 2013) to challenge the existing elite-driven narrative.

Unlike in the mass media era, where information sources are often fixed and broadcast to all audiences, the information environment in social media allows for personalized information channels. Meanwhile, an individual's influence in a real-life context does not necessarily translate into online influence on social media platforms (e.g., Petersen, Vincent, & Westerling, 2019). The discrepancy forces professionals to compete with

various actors on the same platform for attention (Petersen et al., 2019; see also Iyengar & Massey, 2019). The presence of alternative information sources on social media facilitates the spreading of fresh narratives (Shen, Xia, & Skoric, 2020; van Dijck & Alinejad, 2020), fostering a bottom-up perspective that challenges the traditionally dominant top-down elite views.

This dynamic shift in the media environment raises questions about the applicability of current theories on elite influence within the new media landscape. This study aims to explore the media representation of the Russia-Ukraine Conflict on Twitter, investigating languages used to describe the countries involved and narratives employed by mainstream media and other media accounts.

This research employs semantic network analysis and community detection based on predefined target words to extract potential labels and narratives used to describe involved entities. It is commonly used in fields of social science for analysing term associations and structures entailed from the relationships between terms (e.g., Boudana & Segev, 2017; Paranyushkin, 2019). This exploration approach balances the need to navigate the complexities of social media's fluid environment and the time cost of advanced computing methods. It also offers insights into the potential bottom-up perspective in domains traditionally dominated by elite views.

The findings shed light on the online public discourse regarding war and foreign policy in comparative ways, providing the basis for future theoretical work in political

communication for social media platforms. Meanwhile, it addresses the ongoing debate on the possibility of bottom-up narratives on traditionally viewed as elite-driven subjects.

This research is organized as follows. The literature review section discusses the debate over whether the elite view the dominant information disseminated via media on matters of foreign policy and international conflict. This section also examines the growth of social media and the rise of possible bottom-up perspectives on global affairs. The research design section highlights the challenge of studying international conflicts on social media and the need for exploratory research. Following the research design section, data collection and methodology will explain how the dataset is collected and analysed and explain the customized NLP process. The result section will present the findings and illustrate the results with visual aids. The discussion section will further interpret the results and connect existing literature with the conclusions.

Literature review

News coverage on war and foreign policy and public opinion

It is widely acknowledged that during the mass media era, the news coverage on war and foreign policy often reflects elite perspectives (e.g., Entman, 2004; see also Holsti, 1992). Citizens at that time generally lacked information and participation in decision-making regarding war and foreign policy, thus almost always having to see through the lens of the media (Eberl et al., 2017). While some scholars criticize the unilateral focus on the top-down perspective, others question why the press often releases news favouring the elites. Despite the debate over the consistency of public opinion, many recognize that the

limited presence of alternative information sources and the need to disseminate information quickly caused the unequal coverage of war and foreign policy during the mass media era (Entman, 2004; Robinson, Goddard, Parry, & Murray, with Taylor, 2010).

For citizens in the mass media era, the most common ways to obtain political information include watching television debates (Abramowitz, 1978), political advertisements (Goldstein & Freedman, 2000) and talk shows or interviews with candidates (Delli Carpini & Keeter, 1996). Citizens generally have limited political knowledge, especially on topics such as foreign affairs and policies (Bennett et al., 1996; Dellmuth, 2016). Media, in this case, primarily functions as the channel for the elites to disseminate information to citizens. General citizens can hardly compete with the other elites in terms of media visibility without a sufficient understanding of the issue. If the news coverage of campaigns is the competition between different elites, the coverage of war and foreign policy is the designed stage for the current government. Information on international crises, war, and foreign policy was almost solely from government officials in earlier days (Entman, 2004; Robinson et al., 2010). Government officials selectively disclose information that gives them an advantage (Bennett, Lawrence, & Livingston, 2008). Even other elites have limited information to challenge the initial decision made by the current government (Iyengar & Kinder, 1987; Zaller, 1992).

Apart from the limited presence of alternative information sources, the strategy employed by media outlets and the need to dominate the information market also cause selective reporting. The relationship between media outlets and the audiences often follows the

demand and supply model. Media outlets are suppliers that fulfil the information demands of their audience (Baum & Potter, 2008). Media agencies often need to publish information quicker than their competitors within media firms, resulting in a flawed fact-check process (Bennett, Lawrence, & Livingston, 2008). In the case of coverage of the Iraq war, the New York Times finds unverified information comes from a small circle of informants, but both the journalists and editors rush to publish the report, and they fail to process the fact-check procedure (Bennett et al., 2008). The lack of access to alternative information sources or informants not only limits how other elites question the political decision (Hallin, 1986; García-Montoya & Manzi, 2023) but also potentially leaves citizens unable to challenge the reports published by professionals. In the absence of fresh narratives, media representation of war and foreign policy may predominantly reflect the viewpoints of the selected few.

Framing as tools

Messages delivered through media often focus on specific aspects of the issue. Such an information modification process is referred to as "framing." Although the definition of framing depends on the context, one common notion is to interpret complicated information into something understandable (Chong & Druckman, 2007). The purpose of implementing framing in communication varies. Researchers find that strategically applied framing techniques for elites can boost support for particular candidates, shift public opinion on issues, and influence citizen's political behaviour (e.g., Eberl et al., 2017). For media, framing is also a tool to attract citizen's attention. As an information supplier, the media sell appealing stories to the audience, but the general public has

limited attention and interest in focusing on every issue (Baum & Potter, 2008). Media

needs to modify the information to keep the audience interested in the stories and maintain

its dominance in the information market. For example, Schnell and Callaghan (2001) find

the report on pro-gun control fits the newsworthy elements of drama and conflict that

potentially boost their visibility but does not fully align with elite framing. The example

suggests that media does not merely function as a channel to reflect the elite view. Instead,

media outlets adopt framing techniques to fit their diverged purposes.

Opinion and judgment are vulnerable to persuasive manipulation. Framing techniques

such as labels can influence people's first impression of the subject. Labels are shortcuts

that attach to the information communicated between the sender and their audience to

reflect the attitude (Liu & Scheufele, 2016). For example, using the terms

"undocumented" or "illegal immigrants" generate a more threatening attitude than

"undocumented" or "illegal workers" (Pearson, 2010), while "undocumented immigrants"

is perceived more positively than "illegal immigrants" (Ommundsen, Van der Veer,

Larsen, & Eilertsen, 2014). The label and its lexicon choice imply how people want to

perceive the topic, as people will automatically match the existing impression of the label

to the topic (Denver, Ballou, & DeWitt, 2023).

In addition to label framing, emphasizing a particular perspective or describing the issue

from a specific viewpoint changes how people perceive the issue (Jacoby, 2000; Li & Su,

2018). In a study examines Russia's news coverage and commenting on EU energy policy,

authors find that some media outlets and commentators claim that Russia's previous

energy relationship with the EU is fair, but the EU pressuring Russia for their own benefit without negotiation (Stančík, Osička, & Overland, 2021). The claim emphasizes Russia's innocence in contrast to the EU's unilateral approach, which attributes the responsibility and blame for the changed circumstances to the EU. The victimhood framing also increases people's support on the victim side. For instance, the researcher manipulates the news story on sexual assault by appointing different characters as the victim under various situations and finding participants are more likely to support the victim side regardless of the circumstances compared to the control group (Flusberg, van der Vord, Husney, & Holmes, 2022).

One explanation for the increased support or shift in intentions is that individuals are able to empathize with the victims. Research on children and pro-environment action reveals that when presenting the framing of animals as extinct due to climate change, children with higher empathy feel anticipated guilt and actively choose pro-environment actions (Pearce, Hudders, de Sompel, & Cauberghe, 2021). Both examples demonstrate that individuals are sensitive to framing cues. The observed potential for framing to influence public opinion and behaviour calls for further investigation into how such strategies are employed under circumstances of war and foreign policy. It leads to the first research question of this study:

RQ1: How is the Russian-Ukraine conflict portrayed regarding linguistic choices and attribution of responsibility by Western mainstream media accounts and other media accounts on Twitter?

The change and challenge in the social media era

The rise of social media challenges the dominance of mass media outlets in information markets and changes the overall modes of communication (Chaffee & Metzger, 2001). Social media platforms largely rely on user-generated content. There is no apparent limitation to creating social media accounts, and users on social media platforms often have a dual role of information receiver and content creator (e.g., Dolan et al., 2019; Lee, Hosanagar, & Nair, 2018). The setup of social media platforms encourages users to spread creative political views and contribute participation outside of the traditional political fields. Individuals or groups previously not interested in or have limited access to the topic have equal opportunities to participate. Lifestyle politics is an example of creative political participation that promotes political values and beliefs via lifestyle changes and the sharing of stories on social media (de Moor, 2016). The initiative of lifestyle politics is not necessarily influential in real life. The online influence is calculated by users' interactions, such as sharing, favouriting, and commenting. This unique calculation of influence results in a different information environment compared to the broadcasting environment in the mass media era (e.g., Chaffee & Metzger, 2001). No political institutions, figures, or single media outlets can directly interfere with how and what people post online unless the content violates laws. It forces institutions and individuals to follow the social media logic, co-exist with various actors, and compete with other users on the same platform.

As people actively document life and create narratives online, they break the previously established viewpoint that is predominantly based on the perspectives of elites and experts.

The Occupy Wall Street Movement, for example, starts with the collection of individual hardship stories due to economic inequity (Weinstein, 2011). This grassroots narrative sets the tone and objective of the social movement against the existing viewpoint on the matter. Similarly, an international social movement protesting the government's lack of action to address climate change constructs a bottom-up perspective (Carrington, 2019; Glenza, Evans, Petersen, Zhou, 2019). Each division of the social movement has different concerns about the influence of climate change, such as floods (Carrington, 2019) and oil dependency (Glenza et al., 2019), but united under similar objectives. The movement set up social media groups to share news and updates on the movement (School Strike 4 Climate, n.d.) to construct their narrative without the participation of mainstream media. The success of various social movements illustrates how social media reduces the participation cost for rallies and makes real-life changes (e.g., Bennett & Sederberg, 2012; 2013). It also raises concerns about the decentralized structure of such movements and questions the generalization of such success (Gladwell, 2010). Furthermore, the debate over whether bottom-up perspectives and grassroots movements influence public opinion reaches no consensus.

This study seeks to address this debate of generalization from a comparative perspective that compares the narrative between different accounts. Thus, this study proposed the research question of the following:

RQ2: To what extent does the framing or narrative constructed by other media accounts diverge or align with mainstream media perspectives?

Research design

This study employs an exploratory approach to address the open-ended research questions on how the Russia-Ukraine Conflict is described on social media and whether the narratives established by various media accounts differ. The research design is similar to previous research on social media, public opinion, and news. Unlike confirmatory research, which aims to test hypotheses that build upon prior research and theories, exploratory research often relies on data. This approach is well-suited for this study and the chosen case due to the changing environment of social media, the lack of general conclusions, and the difficulty of constructing an objective hypothesis.

The social media information environment is highly personalized and ever-changing. Social media platforms host diverse users, each with unique professional backgrounds, cultural perspectives, and interests. The communication styles on social media are shaped by user interaction, such as following and sharing. Given the diversity and fluidity of social media, applying the standard theoretical framework and research design poses challenges, especially for topics on foreign policy and international conflict traditionally dominated by elites and professionals (Süleymanoğlu-Kürüm, 2021; Winkler & Jerdén, 2023).

Meanwhile, the absence of a unified theoretical framework on foreign policy, war, and social media poses a challenge in identifying social media framing techniques. This study, aimed at analyzing potential framing techniques adopted by social media users within the context of the Russia-Ukraine conflict, encounters additional challenges due to its

reliance on English tweets. The necessity to produce a testable hypothesis in such a changing environment may inherently influence the objectivity of the methodology.

Considering the complexities outlined, this study opts to explore research without constructing a priori hypotheses and proposes open-ended research questions to conduct content analysis. This study asks RQ1: How do Western mainstream media and independent media on Twitter describe the Russian-Ukraine conflict and attribute responsibility? RQ1 investigates the term choice or labels used to describe the conflict and entities involved. The purpose is to discover potential labels media give to both sides and the narrative built upon those labels. The existing literature demonstrates social media users can create alternative viewpoints through non-mainstream media. While some scholars have expressed concerns about the limited generalizability of these findings, such evidence inspires this study to investigate further the existence of alternative perspectives, especially in the context involving war and foreign policy.

Second, the study asks: RQ2: To what extent does framing the Russia-Ukraine conflict on social media diverge or align with mainstream media perspectives? Whereas RQ1 explores the narrative of the event in a broader context within the text, RQ2 directly addresses the debate over whether social media provide alternative narratives on war and foreign policy. The result adds a comparative perspective of the information environment on social media, thereby contributing to a deeper understanding of the dynamics of public discourse online.

Methodology

This research aims to understand how media describes different sides of an international conflict on social media by examining the word choice of the social media post and the narrative built. This research conducts a semantic network analysis with community detection to identify the word co-occurrence of targeted words. The semantic network will show the most frequent terms associated with the target and map the co-occurred terms in a network graph. To be explained in further detail later in this document, the term "target words" refers to nouns representing the side of the war. These include the name of the country, the location of the central government, the capital city, and the name of the political leader. After identifying the target words, this research will perform data cleaning and extract words that appear together with the target words. Then, this research will compare the network with the same target words but different sources to analyse the differences and similarities in word choice during the early weeks of the Russia-Ukraine Conflict.

Data

The dataset adopted for this study is a merged dataset including a sub-dataset containing tweets on Twitter with hashtags related to the Russia-Ukraine Conflict (for independent media and non-mainstream media) and a sub-dataset collecting tweets posted by Western mainstream media accounts with keywords related to the conflict (see appendix C for detailed explanation). This study aims to analyse the linguistic choice of online content. Although tweets with diverse languages increase the representation of the overall Twitter community, the performance of natural language processing and other content analysis

methodologies on multilingual text can be limited. Thus, all tweets included in this study are in English to avoid linguistic differences brought by translation. The total number of tweets included after filtering non-English, irrelevant, and spamming tweets is 12,113.

The non-mainstream dataset is derived from the "(🌇Sunset) ᴜᴀ Ukraine Conflict Twitter Dataset" that is collected and managed by Kaggle user BwandoWando (2022). This dataset has been employed by several previous studies (e.g., Breve et al., 2024; Pohl et al., 2023; Schwarz et al., 2023; Shultz, 2023), two of which (Breve et al., 2024; Shultz, 2023) examine the same case study—Russia-Ukraine Conflict—as this study does. The original dataset contains tweets from 23 February 2022 until 9 March 2022. The dataset author retrieves tweets through the Python library Tweepy with three processes running every fifteen minutes (BwandoWando, 2022). According to the author, the tweets are retrieved based on event-related hashtags, but because of the fluid environment, the hashtags submitted to the process are not fixed (2022). This study first selects the top 20% of the most retweeted tweets as the dataset for analysis. Sharing is an important metric for social media platforms that indicates the online influence of the message. In other words, the most retweeted tweets are most likely the influential tweets people see when browsing the topic. After selecting the initial subset, this research removes users who are not affiliated with media firms based on the user profile description. The kept user profile includes those working in formal media firms, such as journalists, commentators, and television or radio hosts, and those working in independent media, such as bloggers, YouTubers, and citizen journalists. There are 6,066 users with 9,839 tweets in the non-mainstream dataset.

The mainstream dataset is collected manually from 6 March 2024 to 23 March 2024. The definition of mainstream media follows a common-sense definition, which refers to media agents and their employees established during the mass media era. They are well-known internationally and originally based in the US, UK, and other EU countries. Scholars in communication and media studies also follow similar patterns when identifying Western Mainstream media (see also, Shearer & Mitchell, 2021). The mainstream media agencies included in the dataset include "The British Broadcasting Corporation (BBC)," "Cable News Network (CNN)," "The Guardian," "Reuters," and several other agencies. Due to the differences in writing styles, mainstream media tweets rarely contain hashtags related to the Russia-Ukraine Conflict. Thus, the research has to use related keywords to search in the Twitter advanced search function for each mainstream media account. There are 29 accounts with 2,274 tweets in the mainstream media dataset.

Target words

Target words serve as the anchor to identify terms that frequently occur together within sentences. The co-occurring terms often describe the target words or the action taken. Given the purpose of the research, the target words will focus on terms associated with the involved sides in the conflict, namely, Russia and Ukraine. The related target words, as mentioned earlier, include the name of the country, ethnicity, capital, political leader, and government. Table 1 details the list of target words selected for each side.

Table 3-1

Target words for Russia	Target words for Ukraine

Russia	Ukraine
Russian	Ukrainian
Putin	Zelensky
Moscow	Kyiv
Kremlin	

Semantic network analysis with community detection

A semantic network is a graphic presentation of knowledge that extracts elements from a source text and constructs those elements into a network based on the relations among them (Segev, 2022). Unlike content analysis, which often classifies content, semantic network fundamentally concentrates on the interaction between the extracted elements and the structure created from the relationships (Segev, 2021). The co-occurrence determines the connection between elements. When there are predefined target words, the extracted elements are terms or phrases that interact with the target. This attribute makes the semantic network a fitting methodology for this research, as the study intends to reveal the potential labels or themes that shape the narrative of the Russia-Ukraine Conflict. Labels and themes define how people understand the event. Semantic networks not only show what terms are connected to the target word but also the structure and theme entailed from the relationships.

Similar to social networks, semantic networks have two essential components: nodes and edges. In semantic networks, nodes represent words or phrases, while the edges indicate the connection between these nodes. The edge is often calculated by the frequency of co-occurrence of the pair, and the position of the terms is determined by the calculated degree (Segev, 2021). The general semantic networks use betweenness and centrality as metrics

to calculate the closeness between extracted word pairs and position them on the graph. In this research, however, edges are defined by the proximity of terms within a predetermined word window centred around predefined target words, which reflects the contextual association between terms. In other words, the study focuses on how terms are associated with specific target words, and metrics such as betweenness and centrality are not the primary concern.

This research employs the igraph package as the tool to construct the semantic network. To enhance the accuracy and validity, a data cleaning process using the "tidyverse" package is performed to remove URLs, special characters, and common English words. Constructing a semantic network begins by extracting co-occurring words that appear from the source text. The word window is set to nine, and the average sentence length of Twitter users after the platform increases the character limits from 140 characters to 280 (Boot, Tjong Kim Sang, Dijkstra & Zwaan, 2019). The word window decides the scope of network word pair discovery. Following the word pair extractions, the network calculates the betweenness of the pairs for the position on the graph. Meanwhile, the "igraph" package allows for community detection after extracting the word pairs. The purpose of community detection is to find nodes that are connected by the high density of edges and group them as clusters. The interpretation of the community can be themes or topics, as the clusters of terms frequently appear together in specific contexts. Community detection helps the researcher understand and trace back to the type of content and context of the extracted terms. Lastly, the network will take the most frequent co-occurring terms within the text to form a graph that spreads around the target words.

Result

1 Language use and narratives for Russia

1.1 *Russia in mainstream media*

Figure 3.1

Co-occurrence Network for Russia in Mainstream Media Account
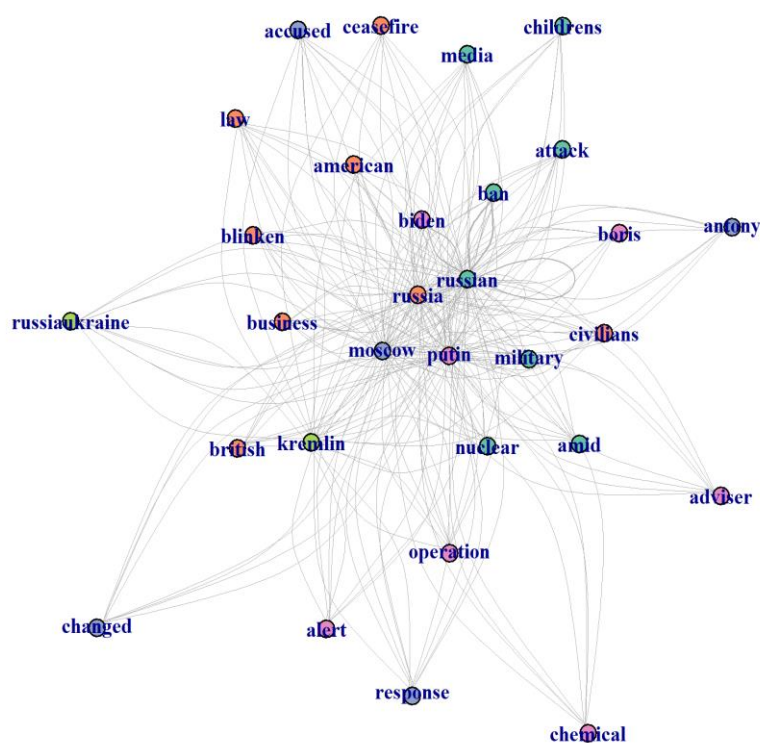
Figure 3.1 shows the semantic co-occurrence network from the Western mainstream media describing Russia and related terms. The network includes the top 30 most frequent words based on the number of appearances with the target terms in the sentence. The Russia-related target terms are positioned in the centre of the graph. The grey lines represent the connection between terms and the targets.

Five communities have been identified within the mainstream media network, with each

community corresponding to a specific target word. It is worth noting that the community mentioned in this research is not equivalent to topics in topic modelling. Although terms may be categorized in clusters, it does not mean the term is only associated with the target word within the cluster. Therefore, the analysis of the source text in the section below will look at both the content within the cluster, which reveals the context of that cluster, and the rest of the source text.

Terms within the community that are centred around "Russian" point to the military actions undertaken by the Russian army and their direct consequences. Notably, the term "children" highlights the involvement of civilians, especially the attacks on civilian facilities and the victimization of the vulnerable. The following content contains examples from the source text and the word pair "Russian" and "Children."

> ⚠ *Ukraine latest: Russians bomb children's hospital in Mariupol*
>
> *Russia-Ukraine war: children buried in rubble after Russian air strike on Mariupol hospital, Zelenskiy says […]*

The examples emphasize "children" as the victims of the ongoing conflict, and their suffering is due to the Russian military action. Similarly, mentioning "nuclear" expands the discourse on nuclear capabilities and actions.

> *'It's extremely concerning' that Russia has attacked Europe's largest nuclear power plant, […]*

The mention of nuclear from the source text either expresses the concerns over the attack

on nuclear plants or the fear of nuclear war with Russia. Both directions frame Russia and its nuclear power as a potential and very likely threat the people should be aware of.

The terms centred around Russia mainly address the political and economic consequences of military actions. The economic consequences are reflected by terms such as "business," "America," and "British," which reports on business withdrawal from Russia and updates on the remaining brands operated in Russia. For instance,

British American Tobacco will continue selling cigarettes in Russia.
PayPal, Samsung and Zara stop business in Russia over its assault on Ukraine

On the political front, terms such as "Blinken," "civilian," "law," and "ceasefire" describe the reaction and possible action taken by international communities in response to the military operation undertaken by the Russian army. An example of such a reaction is shown below:

"We will defend every inch of Nato territory if it comes under attack"
US Secretary of State Anthony Blinken has pledged to support Lithuania as it provides supplies to Ukraine in its war with Russia

Particularly, the term "civilian" bridges the previous cluster that reflects not only updates on Russian military action but also the victimization of the vulnerable, just like "children" in the last cluster. The examples include:

Ukraine civilian evacuation routes to Russia and Belarus "nonsense," says UK minister James Cleverly
'Pure genocide': civilian targets in Mariupol 'annihilated' by Russian attacks

Such text accuses Russia of morality culpability in civilian involvement, drawing attention to the potential humanitarian crisis. Noting that in the first example, the quote

acknowledges the existence of a civilian evacuation route but criticizes the intention as Russia and Belarus are both geographically and politically close.

Terms within the community that associate with "Putin" indicate the political response from other politicians and comments directed at Putin's decision. Other political leaders' responses often contain political statements, comments, and criticism regarding Russia's military action or towards Putin as a political leader. Moreover, many statements made separate Putin and Russian citizens:

> *Boris Johnson says "a tidal wave of violence" in Ukraine has been authorised by Russia's President Putin*
> *"I cannot believe this is being done in your name," the PM tells the Russian people*
>
> *Pres. Biden announces U.S. ban on Russia oil imports: "The American people will deal another powerful blow to Putin's war machine."*

Both examples attribute the blame to Putin and treat him as the enemy of the country. Instead of blaming Russia as a whole, those statements isolate Putin from the rest of the Russian people (including other political parties) and make him the sole target. The implication of this narrative is to frame Putin as a threat and rally international support.

The themes of the remaining clusters are comparatively less defined, and terms linked to those clusters suggest ideas that overlap with those specified in previous clusters.

Overall, the narrative established by mainstream media portrays Russia as the perpetrator and attributing responsibility to Putin for the damage caused. This narrative emphasizes the suffering of civilians and the destruction of facilities, thereby allowing other political

leaders to raise moral and political criticisms against Russia.

1.2 *Russia in other media*

Figure 3.2 illustrates the semantic network for Russia in independent media accounts. The cluster centred around "Russian" seems to underscore similar themes as the network for mainstream media. The terms "bombs," "battle," "capital," "defense," and "block" all point to battlefield updates and coverage of military actions.

Figure 3.2

Co-occurrence Network for Russia in Other Media Account
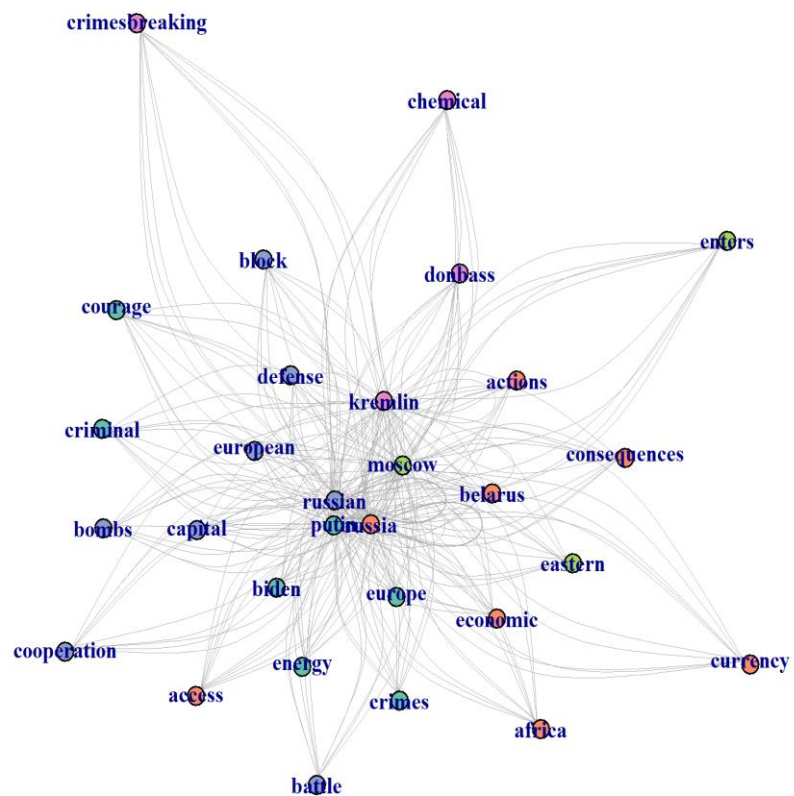
However, the terms used in independent media are more straightforward and informal than those used in mainstream media. For example,

[...] # Kyiv's mayor says the city is now completely surrounded and all exits

blocked by Russian troops. No way to evacuate civilians.
Just like during WW2, people in Kharkiv which heard explosion from Russian
bombs today have started gathering underground to shielding themselves from
bombs. […]

Unlike battle reports and news coverage in mainstream media, independent media uses

more vivid language. The narrative presented in independent media on battle reports and

updates is in alignment with mainstream media, in which Russia is the perpetrator, and

civilians are suffering as a result. Independent media accounts also concern individuals

impacted by the war, focusing on their experience and emotions during the conflict, such

as:

> *# Putin's invasion of #Ukraine terrifying for children: 'My son needs me so I will*
> *be with him': […]*

The cluster centred around "Russia" also reflects the political and economic consequences

of the military action undertaken. The post in the independent media account pays more

attention to the broader economic impact brought by the conflict, including sanctions and

exports, rather than the decisions made by individual brands. For example,

> *Oil & gas prices surge, global financial markets tumble […] but what more*
>
> *global economic pain can we expect & what impact will these new sanctions*
>
> *have on # Russia's economy, if any? […]*

Apart from the economic consequences that directly influence Russia, some independent

media account also raises concerns over the international economic impact, including

those in Africa:

> *"The war between #Russia and #Ukraine is likely to have an impact on many*
> *regions including #Africa and the #MiddleEast. There are already global*
> *economic issues as well as security and energy-related concerns. […]*

Compared to the cluster on economic consequences in mainstream media, the two examples shown here do not directly attribute the responsibility of economic impact to Russia but discuss the situation and express concerns over the potential upcoming economic impact on the world. The narrative in independent media posts is more diverse than in mainstream media posts.

The community associated with Putin in the independent media network entails criticism of him from other political leaders and media users. The type of criticism posted in independent media accounts focuses more than quotes and comments from political figures.

The criticism includes blaming Putin for the consequences and accusing him of being a war criminal. The mainstream media describes an event and lets the repercussions imply criticisms, whereas independent media tend to assign the blame explicitly and label Putin as a criminal. The most common expression is the usage of hashtag #PutinIsaWarCriminal. Other than the hashtag, independent media directly declare guilty of Putin's decision, such as:

> *Putin's regime commits #warcrimes in #Ukraine. [...] #Putin and all his accomplices must be treated as war criminals.*

The remaining community in this network appears to be more ambiguous, similar to its counterpart in mainstream media networks. One interesting finding in this network is that some posts do not express blaming toward Russia or discuss the current event. Instead, they use the current situation to extend the discussion beyond its initial scope. For

example:

> *[…] liars criticize Pres. Biden's handling of the #UkraineRussiaCrisis, remember that they worship a criminal who was planning Trump Tower Moscow — with a free penthouse for #Putin […].*

In this example, the tweet indeed labels Putin as a criminal. However, instead of blaming Putin for his actions, the focus shifts to the unfair criticism aimed at Biden. The tweets further connect Trump, Biden's political rival, with Putin, thereby associating Trump with "a criminal." Additionally, some posts extend the blame to other political figures, such as the following one:

> *The West, Biden are squarely responsible for Russia's invasion of Ukraine: Abhijit Iyer-Mitra on Russia […]*

The term "invasion" is employed in this tweet, and responsibility is implicitly attributed to Russia for its action. Still, the tweet simultaneously assigns the blame to the West and Biden for triggering Russia's action in the Russia-Ukraine Conflict.

In short, the narrative established in the independent media does not differ from the one set in mainstream media in a broader sense. Russia is seen as the perpetrator, and blame is placed on its actions. Nonetheless, the communication styles and the topics covered are more diverse than mainstream media. The independent media favour informal languages and cover stories from different perspectives. In the meantime, a small proportion of tweets extend the discussion from the current situation to broader political competition.

2   Language use and narratives for Ukraine

2.1 *Ukraine in mainstream media*

Figure 3.3

Co-occurrence Network for Ukraine in Mainstream Media Account
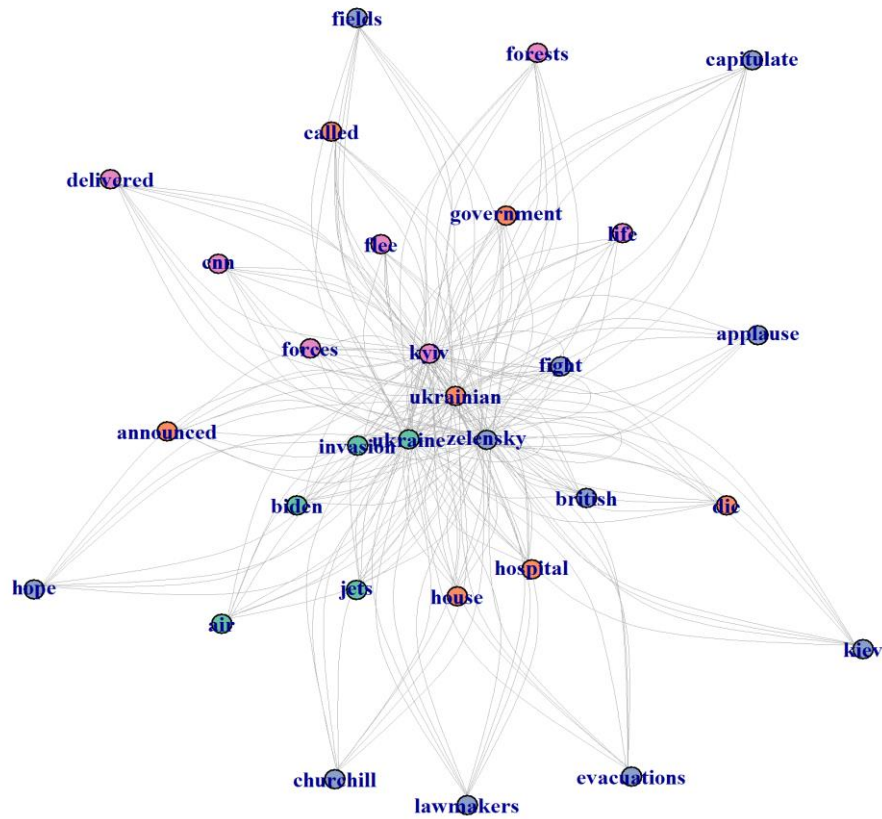
Figure 3.3 presents the semantic network for Ukraine in mainstream media. One should

consider that target words related to Russia often appear with target words related to

Ukraine within the same sentence. Thus, this section will not discuss similar examples.

However, it is worth noting that attributing responsibility to Russia is equivalent to

treating Ukraine as the victim in many examples mentioned above.

Compared to the semantic network for Russia, the themes shown in the Ukraine network

are relatively unified and defined. Terms such as "forces," "flee," and "life" within the

community centred around Kyiv reveals the updated situation as the Russian military

advanced but from the perspective of Ukraine. Posts such as

Ukraine civilians flee towns near Kyiv after more Russian shelling

The tweets that contain the extracted terms describe the lives of civilians as the result of Russian military action. Although many posts do not explicitly blame Russia, positioning the suffering of civilians in the aftermath of Russia's military action suggests that accountability resides with Russia. In contrast to the semantic network for Russia, the content is relatively concentrated on a single broad topic.

Terms within the community associated with Ukraine represent a mix of updates on damage to civilian infrastructure and the political response from international government bodies triggered by those events. The news coverage on attacking civilian infrastructure highlights citizen housing buildings and hospitals. As a result, government bodies from various countries, but mainly Ukraine, the UK, and the US, condemn the action. It should be noted that the extracted term "house" in the network often refers to the House of Commons rather than the building. Examples of such posts include:

White House condemns Putin's 'barbaric' bombing of maternity hospital

The community ties closely with the target words "Ukraine," which shows a diverse topic coverage, from discussing the conflict itself to announcing military aid. For example,

Poland said it would make its MiG-29 combat jets available to the U.S. after days of talks about how to get planes to Ukraine

The extracted terms "jets" and "air" focus on military aid and other support from international communities. "Biden" refers to US President Joe Biden's statement and decision regarding the Russia-Ukraine Conflict. Meanwhile, "invasion" describes the

events in the Russia-Ukraine conflict. Instead of using more neutral terms such as conflict or war, the mainstream media overwhelmingly covers the Russia-Ukraine Conflict as Russia's invasion of Ukraine. This language choice automatically attributes the blame to Russia. Together with updates on civilian suffering and damage to civilian infrastructure, this narrative treats Ukraine as the victim that was attacked for no reason. At the same time, terms belonging to the community centred around Zelensky also reference Churchill and his quotation, drawing parallels with the historical political leader who led the country during wartime.

2.2 *Ukraine in independent media*

Figure 3.4

Co-occurrence Network for Ukraine in Other Media Account

Figure 3.4 displays the semantic network for Ukraine in independent media. The broader theme of each community is somewhat in alignment with the network in mainstream media. For example, the community strongly associates with Kyiv and discusses updates on the situation and damage report, similar to the Kyiv cluster in the mainstream network. Similarly, a community centred around Ukraine also covers possible military aid from international communities and battle reports.

In addition to military aid, independent media also mentions humanitarian aid and other type of support from both official and non-official sources, including:

> *3,000 U.S. volunteers have responded to # Ukraine's call for people to serve in an international battalion that will help resist # Russia's all-out invasion [...]*

Differing from the reports for Ukrainians in the mainstream media, which focus on the damage to civilian facilities, independent media covers defence from the Ukrainian army and people. For example,

> *#Ukrainian Armed Forces hit a convoy of #Russian equipment near #Kharkiv.*

The news reports in the independent media include more viewpoints from different angles, such as the counterattack from the army, which is shown in the example, and the resistance from non-military units and the international community. An example of reporting on such resistance is:

> *Video of UNARMED citizens of the town of Backman, forcing a Russian Convoy to turn around [...]*

The theme reflected by the community associated with Zelensky is similar to the broader theme revealed in mainstream networks. In comparison to the narrative mirroring the

historical leaders, independent media accounts quote Zelensky's other statements, such as:

> *Ukrainian President Zelenskiy turns down U.S. request to evacuate Kyiv, saying: "I need ammunition, not a ride"*
> *[…] #Zelensky, disappointed, pointed to a renunciation of #NATO membership.. "Alliance is afraid of controversial issues and confrontation with Russia. #Ukraine is not a country on its knees begging for something, "[…]*

Both examples build the image of a strong leader capable of guiding the country during wartime. Meanwhile, independent media explicitly the topic of the assassination of political leaders, such as:

> *Shocking 😱: Ukraine ᴜᴀ President Zelenskyy has survived at least three assassination attempts against him By Russian ʀᴜ Forces! […]*

Concurrently, the same term also appears with a target word related to Russia:

> […] Calls for Putin's Assassination
> "All of this is, to me, the danger zone of representing acceleration." […]

The topic of assassination also targets Russia and its leader, but the attitude toward the assassination in the report is not always approved, as shown in the example above.

In brief, the narrative established by independent media on Ukraine is mostly in alignment with the one in mainstream media but with various viewpoints from different perspectives. Aside from framing Ukraine as the victim, independent media also features the counterattack and resistance from both military and non-military units, which provide a fresh angle during the conflict.

3　Hashtag analysis

Figure 3.5

Hashtags in other media accounts　　　Hashtags in mainstream media accounts
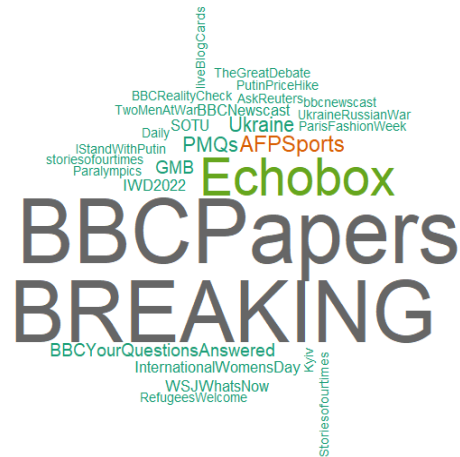

Figure 3.5 compares hashtag usage for both types of media accounts. The graph on the left represents the independent/non-mainstream media, and the right represents mainstream media. The content in other media accounts is more diverse than mainstream media accounts. The content of hashtags in other media accounts includes the names of the involved entities, the names of geopolitical locations, the names of international organizations, and attitudes towards the event. The results show that independent media accounts use hashtags to replace the words mentioned in the text and frequently use this feature in their communication style.

On the other hand, hashtags used in mainstream media mainly focused on the name of the program. A few hashtags, such as "#Ukraine" and "#UkraineRussiaWar," are directly related to the conflict. It shows that while the independent media account generally favours event-related hashtags in the text, mainstream media features their branding over the event in the hashtag.

A possible explanation might be the influence and visibility are different for mainstream media and independent media accounts. The influence of mainstream media is long established in the mass media era, but the influence of each independent media varies. Hashtags help increase the visibility of searching function and create a sense of community. Both benefit independent media in terms of online presence and influence. Despite that, further evidence is needed to verify the explanation provided, as this research is an observational study.

4   Other highlights

Although the majority of tweets in both mainstream and independent media unconditionally support Ukraine, framing Ukraine as victims and blaming Russia, there are still few tweets in the independent media that express support for Russia and Putin.

For example:

> *[…] The West is full of hypocrites that are living on the corpses of people from other countries. […]*
> *Russia had been telling the truth the whole time #IStandWithPutin #istandwithrussia*

Despite the low proportion of such voices, tweets in independent media show more diversity in attitude than the uniform support for Ukraine in mainstream media.

Discussion and conclusion

This research demonstrates the use of semantic network analysis to discover and compare the language use and narrative established in tweets posted by mainstream media and independent media accounts on Twitter regarding the Russia-Ukraine Conflict. The result

of this study indicates a clear distinction between narrative builds for Russia and Ukraine for both types of media accounts. Russia is always seen as the perpetrator that escalates the conflict, while Ukraine is the victim with the courage not to surrender. The narrative presented by independent media aligns closely with mainstream media's depiction of the conflict. Still, it differs in terms of specific word choice and communication styles, details of which are provided below.

In response to the research questions, the findings indicate that mainstream and independent media present a distinct contrast between Russia and Ukraine. Russia is portrayed as evil and threatening as a large proportion of tweets highlights the damage wrought by Russian military action. Those tweets frequently discuss attacks on civilian infrastructure, violations of international law, and sanctions or business withdrawals announced by the international community as consequences. Some tweets are also implicitly underscored through emotional stories or quotations that connect tragedies directly to Russian military actions. Meanwhile, tweets in both mainstream media and independent media separate Russian people from Russian political figures or armies and cover stories of Russian people protesting the war. The distinction between mainstream media and independent media is rooted in the language used to describe Russia and in the explicitness of attributing blame. For instance, independent media often directly label the action and Putin as "crazy" and "criminal," In contrast, mainstream media tend to indirectly assign blame by quoting others who criticize the actions or discuss the potential political consequences. Moreover, mainstream media almost always use the term "invasion" to describe the Russia-Ukraine conflict instead of neutral terms such as war

and conflict, whereas independent media use all three words inclusively.

On the other hand, Ukraine is treated as a victim that suffers from "the evil." Tweets from both mainstream media and independent media feature the deconstruction of civilian objects, including hospital and residential areas, by Russian military actions. On top of that, independent media cover a wider range of stories, including how Ukrainian people and military units defend against the Russian army, offering a more diverse perspective than those found in mainstream media.

The bias shown in the result is aligned with previous studies on news coverage regarding international conflict and crisis (e.g., Bar-Tal et al., 2009; Evans, 2010). The framing of an "existing threat" is commonly found in news coverage of security issues where one side is labelled as good and the other as the villain (Amin, 2020; Boudana & Segev, 2017; Entman, 2003). In this study, the Russia-Ukraine war is framed as a just war that defends the victim from the villain Russia. Such narrative is paralleled with the framing in several cases, including the post-911 speech, which claims that military action is the "civil" nation against the "evil" terrorist (Entman, 2003; Reese & Lewis, 2009). Not to mention that the label "provocateur" in Russia exists among news sources before the announcement of special military action (Boudana & Segev, 2017).

A similar narrative is also found in the US press discussing the conflict in the Middle East, where Iran is labelled as the "evil" and other countries as the passive victim (Amin, 2020). Entman (2003) refers to this black-and-white security issue framing as the "Cold War

paradigm." By framing one side as evil, political figures can morally justify their decisions and even trigger the "rally around flag" effect to gain further support (e.g., Hetherington & Nelson, 2003). The almost unified word choice shown in the mainstream media reflects a similar pattern.

There is no significant difference between the narrative established by mainstream and independent media accounts, which somewhat contradicts the idea that the development of social media platforms can provide alternative voices that differ from the elite perspective (e.g., Castells, 2007; Ihlebæk et al., 2022). The result of this study does not reject the possibility of alternative perspectives but questions the potential of creating non-elite perspectives in all fields on social media platforms.

One crucial difference between the previously successful case of bottom-up perspectives and foreign policy or international crises, such as war, is the existence of alternative information sources. Existing literature on news coverage of war and crisis indicates that even professional journalists and media outlets lack information sources other than the government (Feinstein, 2018; Robinson et al., 2010). This shortage of alternative information sources prevents the spread of alternative voices. In fact, voices on social media platforms demonstrate a different viewpoint of news coverage by focusing on stories about Ukrainians defending the country. However, this different viewpoint serves more as the enhancement of the existing narrative rather than telling stories from the other side.

The findings of this study enrich the existing understanding of online political discourse and media narratives in several ways. First, this study reveals the clear distinction between the role of Russia and Ukraine portrayed in social media posts regarding the Russia-Ukraine War. Furthermore, by offering a comparative perspective between mainstream and independent media, this research contributes to the ongoing debate on the influence and dominance of mainstream media in the international crisis on social media platforms. Such findings not only highlight the diversity of perspectives or possible alternative opinions online but also the potential for independent media to shape public opinion online. The findings also construct and address the debate on independent media's potential to shape public opinion on social media platforms. It builds the foundation for future theory frameworks on alternative sources and perspectives in the information age.

However, one thing to notice is that almost all media accounts, categorised as mainstream or not, belong to or broadcast to people outside the affected area of the Russia-Ukraine conflict. Given the competitiveness of the information market in the social media age, as discussed in the literature review section, media agencies will tailor the content delivered to the preferences of their target audience. In this case, when most audiences are physically far away from the crisis sources, their interests and perception of the crisis will differ from those directly involved or affected by the Russia-Ukraine conflict. Therefore, this research's result should be interpreted as information communicated in English-speaking communities and not apply to all communities across the platform.

The lack of diversity in languages is also a limitation of this research. The study chooses

only English-language tweets to avoid meaning loss or change during translation. However, given neither Russia nor Ukraine are predominantly English-speaking countries, perspectives expressed in those languages are missing from the dataset. The method for extracting word pairs also faces challenges, as the word window selection does not look at the sentence's grammatical structure. The extracted terms may not necessarily modify the target words. For example, the extracted term "invasion" is strongly associated with the target word Ukraine, but this extracted term usually modifies the target word "Russia" that appears within the same sentence as the target word "Ukraine." Although this research traces the extracted words back to their source text, the oversight of grammatical structure may influence community detection and interpretation of the theme reflected within the community. Moreover, this study is pure observational research. Further evidence is needed for possible explanations and associations provided in the study.

6 Synthesis and conclusion

The influence of media in shaping public opinion is widely studied in both academic research and everyday discourse. Some suggest that the media selectively deliver information to its audience to fulfil the needs of the elites (e.g., Zaller, 1992; Entman, 2004). Many populist figures, such as former US President Donald Trump, have also openly accused the media of spreading "fake news" and being the "enemy" of the people on many occasions. While Senator Bernie Sanders disagrees with this accusation, he voiced concerns over the concentration of media ownership, in which few companies control what most people read and watch (Sanders, 2019). The dominance of mainstream media and traditional press in delivering political information limits how and what people speak of politics. The rise of social media, on the other hand, provides a platform for people to offer their insights. India Prime Minister Narendra Modi has noted how people use social media to deliver news and updates about the Uttarakhand disaster to those affected (Ani, 2013). Several social movements, including Black Lives Matter and Fridays for Future, also utilize social media platforms to build stories and ideals from the grassroots perspectives (e.g., Della Porta, Lavizzari, & Reiter, 2022; see also Castillo-Esparcia et al., 2023). However, does the rise of social media platforms truly challenge the narratives constructed by mainstream media?

This dissertation demonstrated that although social media adopt a different communication mode, the narratives built by mainstream media are not challenged by other social media users. The top contents of the Russia-Ukraine Conflict almost uniformly portray the same side as the unequivocal victim and the other as the evil, with

no influential alternative narrative present. Individual studies in this dissertation also offer insights into elements that determine the top content and the audience's preference for war-related messages on social media by employing quantitative methodologies. The social network side of social media, such as user interaction, influences the virality of the content. Still, the content elements that led to the popular news stories in previous eras are vital to making top content on social media platforms. This advancement of communication technologies does not change the preference for war-related and foreign policy news. This concluding chapter will first summarize the central findings of the dissertation. Three main findings correspond to three individual studies in the dissertation. It also provides explanations linking these findings to the theoretical contributions. Additionally, the chapter will discuss the study's limitations and suggest directions for future research.

The first important finding of this dissertation is, as shown in Chapter 3, the content characteristics and social networking elements influence the virality of the content. Top content requires both high numbers of followers and the presence of emotional cues that trigger the readers' emotional reactions. On one side, this finding further supports the idea that the communication mode of social media combines social networking and media technology (see also Kwak et al., 2010). Social networking elements on social media refer to metrics such as user interactions and the number of followers. Such metrics stimulate interpersonal relationships in the real world. For instance, Chapter 3 observes that content with user mentions is less likely to become top content. Messages with mentions are often viewed as private communication between the sender and the mentioned users, which is

less likely to receive attention from people outside of the relationship (Honey & Herring, 2009).

Those social networking mechanisms distinguish social media from other media technologies.

Traditionally, professional journalists and editors act as information producers and disseminators to create news stories, while the general public is the information receiver (Kramp & Loosen, 2018; Ngomba, 2011). After determining the news story, journalists disseminate information via print press or mass media technologies (Kramp & Loosen, 2018). In other words, the general public does not actively engage in the information-producing process or fully participate in the information-dissemination process except for sharing news within their social networks. Citizens' actions do not influence what and how information is delivered. However, social media not only blurs authorship by allowing all users to produce content (Kramp & Loosen, 2018; Loosen, 2015) but also uses user interaction as the metric to determine content popularity. The role of general users shifts from being pure information receivers to becoming information producers, interpreters, disseminators, and receivers. Online producers now tailor the content for better results by viewing user interaction metrics (e.g., Oestreicher-Singer & Zalmanson, 2013; see also Wojdynski, 2015). The importance of news-sharing behaviours has increased compared to previous eras. Even when users do not produce content, their sharing behaviour shapes the information market. Moreover, social media's user interaction metric allows users to interact directly with the information producer (e.g., Kington et al., 2021). Without media as information brokers, people can potentially access

less filtered information by interacting with alternative information sources, including witnesses or experts. This new communication mode creates the basis for alternative narratives.

On the other side, content characteristics, especially sentimental elements such as emotional cues, continue to play a crucial role in achieving popularity in the social media era. This dissertation finds that content containing fear and anger cues is prone to becoming viral. People generally prefer sentimental-rich content to mild and fact-stating content (Berger & Milkman, 2012; Heimbach & Hinz, 2016; Trilling et al., 2017). In fact, scholars have observed this pattern since the print press and mass media era (e.g., Sundar, 2003; Brosius, 2003). The media's duty at the time was to inform citizens, but often through emotional arousal. Emotion plays a vital role in delivering messages from the information producer to the audience. Scholars found that people are better at remembering and recalling information with examples that trigger emotional reactions (Brosius, 2003; Sundar, 2003). Negative emotions such as fear pose threatening situations that have long-lasting effects on recalling the information (Sundar, 2003), supporting the findings in Chapters 3 and 4. Yet, this finding contrasts with the tendency to share news in the information age, where news firms are moving online. Some scholars suggest that people are more likely to share positive content online (Berger & Milkman, 2012; see also Heimbach & Hinz, 2016). The result has been successfully replicated in other studies.

To address this issue, Miller (2008) argues that relationships on social media sites are "phatic" and emphasize the creation and bonding of relations rather than simple

information transmission as described in the Berger and Milkman (2012) work. Given that this dissertation's case is Twitter data, the relationship between users on this platform is significantly different from others that emphasize the nature of social networks, not to mention real-life social networks. For instance, Facebook's mechanism, in which people must confirm their "friend request," forms bidirectional relationships in which users access their friends' posts while friends can see theirs (Settle, 2018). Users on Facebook also tend to follow and interact with those they personally know (Anspach, 2017; Pempek, Yermolayeva, & Calvert, 2009), which creates a public place where users show off their public image to others rather than a private place that people anticipated (Settle, 2018; Thorson, 2014a). In contrast, Twitter is a one-way relationship where people gather based on shared interests or purpose, regardless of the user identity. The amount of information required to create a Twitter account is also significantly less than Facebook, and multiple accounts are possible. Both increase Twitter's anonymous level and can create a different persona than the public image users show in real life. Studies on sharing Twitter news indicate that negative content tends to be popular (e.g., Hansen et al., 2011), again, similar to the findings in this dissertation. Both studies in the mass media era and on social media have shown that emotional elements, negative ones in particular, are crucial for citizens to disseminate messages further. Technological advancements do not influence the importance of content characteristics. These unchanged elements leave advantages to media firms and professional journalists in making top content on social media platforms. Once they convert the real-world influence into social network metrics, it leaves little space for alternative information sources and general citizens to build narratives from various perspectives to compete with the professionals. However, it does not mean that

no alternative narratives are available. Information needs and interests vary from topics and events. People's attention changes based on their situation.

The second important finding of this dissertation is that, regarding information needs and interests, audiences equally demand both informative content and emotional content right after the crisis. Chapter 4 examines users' information needs and emotional reactions over time by examining the topic extracted from the discussion. The proportion of emotional content exceeds that of informative content in the first week after the declaration of military action. It is important to note that the term "emotional content" used in this chapter differs from content with emotional cues or sentimental elements. Emotional content in this chapter refers to content that aims to deliver or trigger emotional reactions, such as expressing attitude, sharing feelings, and venting. In contrast, informative content refers to descriptive or statistical information that discusses the event and the related. The type of content is determined by the topic extracted. The chapter finds that initially, people prefer emotional content to informative content. Still, the interest shifts towards informative content over time, and the proportion of each type of content eventually reaches a one-to-one ratio overall. The initial preference for emotional content contradicts recent studies on crisis communication, which suggests that people seek informative content to manage the situation when faced with risky environments or crises (e.g., Abd Alrazaq et al., 2020). However, it aligns with early social psychology research indicating that people do not always rely on descriptive or statistical information when making judgments but on information with vivid examples (e.g., Baesler & Burgoon, 1994; Wilson et al., 1989). Such patterns are also found in Brosius's (2003) and Sundar's (2003)

work describing news preferences in the mass media era. While this explanation links the findings of Chapter 4 with those of Chapter 3, an alternative explanation for the observation exists.

Another possible explanation is the representative of the dataset. This dissertation's dataset contains only English tweets. Neither of the involved countries, Ukraine nor Russia, primarily speak English. Similarly, the surrounding countries are not mainly English-speaking either. The English tweets collected in the dataset suggest that most tweet authors likely reside in English-speaking countries or, in other words, not the surrounding area. The information needs and interests of those individuals will differ from those who live in close proximity to the event. Öztürk and Ayvaz's (2018) study demonstrated that online communities residing near the crisis location care about the crisis' development, whereas other communities are inclined to seek natural or negative news about the countries involved. The most frequently discussed topic in the dataset for this dissertation is invariably the discussion about US presidents. Over time, discussion on political dynamics has emerged as the second most discussed topic. This observation further supports the possibility that the contradiction with previous studies and the change in information needs are due to a lack of immediate threats. Consequently, the expectation and narrative portrayed in this dataset reflect the interests of those observing from afar.

The third important finding, and the one that most directly addressed the main research question, is that the narratives constructed by non-mainstream media generally align with those of mainstream media, with only slight differences in language usage. Both

mainstream media and other accounts frame Ukraine as pure, innocent victims who suffer from the unreasonable invasion of the Russians. The narrative of non-mainstream accounts is considerably more diverse in describing the situation and the country involved, but it maintains a similar overall perspective. On a related note, the data in both individual studies 2 and 3 contains a large amount of emotionally charged war narratives, particularly highlighting civilian loss and casualties caused by Russian troops. This narrative not only reinforces the negative perception of Russia in the conflict but also potentially justifies foreign policies, such as sanctions against Russia, as public opposition to civilian casualties generally leads to decreased support for military actions (see also Johns & Davies, 2017 for survey experiment on civilian casualties and support for military actions).

Other than the differences in the information environment, the availability of information sources and the type of the selected case also influence the research outcome. Social media changes the communication style and the accessibility to information as a whole, but it does not change the availability of information sources in some instances. In previous eras, reasons for the inaccessibility of information sources included physical barriers to reaching the scene, language barriers, security considerations, and similar factors. Successful cases of establishing competing alternative narratives often overcome the challenge of connecting information sources to the internet. With the expansion of network coverage and the development of social media platforms, individuals who are physically nearby can now share their stories with the world, even during international crises, such as natural disasters. Many crisis management applications and networks rely

on volunteers on sites (e.g., Japan Earthquake Reports Twitter). Individuals affected by the disaster who still have internet access often update the situation online, some even ahead of traditional news media (e.g., Arthur, 2008; see also Gruber et al., 2015). Another successful case is grassroots social movements such as the Occupy Wall Street Movement and several climate change movements. Such grassroots social movements rely on news media to promote their ideology and demand a broader audience back in the mass media era. The source of information is always the grassroots participants and the organizer. The success of both cases can be attributed to their elimination of the intermediary information broker, namely, the mainstream media. Social media removes the technological barriers to ideological promotion inherent in the mass media era, allowing the general audience direct access to messages from the information sources mentioned in the examples above, unfiltered by traditional news media and journalists. This technological advancement gives the time advantage to movement participants to build strong and clear messages before the elites form their opinions.

Furthermore, the advancement of technology indeed changes how people communicate and acquire information, but it does not alter the fundamental difficulties in accessing specific information sources. Contacting social movement participants within the state is more effortless than accessing refugees who have not yet fled, soldiers on call, and government officials from the opposing sides. Meanwhile, for the case selected in this dissertation, both countries involved are not major English-speaking countries. Information sources from non-English-speaking countries still have limited influence due to language barriers and lack of established credibility. Language barriers imply that even

when individuals gain access to the information sources, they must wait for translation and interpretation. The limited accuracy of translation and unfamiliarity with the culture hinder individuals' ability to quickly comprehend the messages. This delay weakens the time advantage typically provided by social media platforms.

Another point is that messages can be easily lost or modified during communication. Thus, it is up to professional journalists and government officials to modify and interpret it. On top of that, the existing impression of the involved countries influences how people intuitively think about the event. The existing literature noted how Russia is portrayed as the evil aggressor (e.g., Tsygankov, 2017; Repina et al., 2018) before the announcement of the military action in February 2022. Citizens generally lack sufficient political knowledge to critically assess foreign policy and related events (Rapeli, 2014). The emotional cues and storytelling techniques appeal to the general public (e.g., Stieglitz & Dang-Xuan, 2013; Trilling et al., 2017), while the familiar narratives based on established impressions avoid cognitive dissonance. Considering all the factors discussed above, the aligned narrative found in this dissertation is not surprising. It does not contradict the conclusions of successful case studies, such as those on the online social movement and crisis management.

Limitations

One limitation of this dissertation is the lack of multilingual data. All datasets contain only English texts, despite the fact that the countries involved in the case studies are not English-speaking. The language barrier is the main reason for excluding non-English data.

The sentiment analysis methodologies adopted in the individual studies largely depend on a dictionary approach, which searches for pre-annotated lexicons. This approach identifies specific keywords and returns results based on matched annotation. If the dataset contains non-English words, this dictionary ignores all keywords and returns null results. To solve this issue, the researcher would either need to translate the non-English words into English or import non-English dictionaries. However, translation can lead to a loss or shift of meaning, and the researcher cannot verify the non-English dictionaries. This dissertation focuses solely on analyzing English text to balance the sentiment analysis's performance and ensure the results' validity. Consequently, the data and its results should be understood as representing the perspective of the observers. That is to say, the narratives discovered from this dataset reflect the views of the international English-speaking communities, most of whom are not directly influenced by the crisis. Their interests and information needs differ from those directly influenced or physically nearby. Therefore, the results should be cautiously interpreted as the narratives built by English-speaking communities align with the Western mainstream media in English. However, this interpretation does not undermine the validity or generalization of the findings. The lack of non-English text does not equate to a lack of reliable information sources. People or organizations based in the involved countries may be multilingual and serve as information sources to deliver news in other languages. The limitation in interpreting the results lies in the absence of causal analysis due to the nature of the observational study instead of the result generalization.

Apart from multilingual data, this dataset also lacks multimedia data. Twitter allows users

to include images and videos along with text to form the content. Previous studies suggest that sound, tone, and images may trigger specific emotional or stereotypical reactions (Cox, 2008; Jacob-Dazarola et al., 2016). In many cases, images and videos are often the main body of the content, while the text merely serves as a title or brief introduction. Analyzing only the text in such instances can lead to inaccurate sentiment analysis results due to the absence of multimedia emotional cues or expressions. That said, current emotion and other communication strategy identification techniques in academia return data in various formats. To incorporate multimedia data while addressing the research question, researchers must prepare such data alongside textual data in a unified data format before processing. The research questions either require a quantitative model to assess the likelihood of content popularity by elements or to reveal topics within public discourse. The former needs numeric data that reflects the presence and the intensity of emotional expression, and the latter requires interpretation of the content itself. Yet, there is no unified standard for video recognition to determine the intensity or interpret content. Processing data with different standards may result in a loss of accuracy and validity. Twitter and social media research often focus on a single data type for better performance (e.g., Kateb & Kalita, 2015; see also Tufekci, 2014). Therefore, this dissertation acknowledges this limitation and adjusts the interpretation of the findings to avoid overstatement.

Another limitation is the lack of mechanisms to identify and filter out bots and cyborgs. A social bot is an automatic program that actively participates in discussions on social media platforms (Chu et al., 2012). A cyborg is a hybrid between human and bot accounts.

Given that this dissertation's central research question focuses on alternative narratives, the presence of bots and cyborg accounts poses the challenge of identifying the appropriate categorization of such accounts. For example, if a bot account is managed by a journalist from a mainstream media company, should this account be classified as a non-mainstream or mainstream media account? Previous studies suggest that social media users have the ability to identify social bots based on profiles, although the accuracy varies (i.e. Wischnewski et al., 2021; Yan et al., 2021). Users typically block, report or ignore social bots once identified (Chu et al., 2012; Wischnewski et al., 2021). It is expected that social media users will be familiar with the presence of social bots and manage them accordingly. Even if users fail to identify bots, the user interaction metrics still reflect user's preferences to some extent, which in turn reflect the narrative preferred by the general users. Therefore, this limitation does not undermine the validity of the result.

On the other hand, the existence of automatic accounts benefits social media platforms by regularly updating news and feeds, thus keeping the community active. Many automatic accounts contribute positively to crisis communication during natural disasters (e.g., Bossu et al., 2023). Despite these benefits, the rising concerns over spam and disinformation potentially cause shifts in public opinion, political astroturfing, or other serious consequences (e.g., Keller et al., 2020; Schäfer et al., 2017).

Future studies should consider incorporating multilingual and multimedia data into the quantitative model. Twitter is not a single-language community, yet many lexicon

dictionaries are built for single languages, especially English. Meanwhile, multilingual dictionaries may encounter the issue of overlapping words, where the same spelling in different languages can result in distinct meanings. For example, brave in English means "fearless," but the same spelling in Italian refers to "good" in plural form. In developing and applying multilingual dictionaries, language recognition functions may need to be added for accuracy. Moreover, multimedia data constitutes a significant part of social media content, although fewer methodologies analyse both text and multimedia content together. To expand the content analysis, future studies could incorporate or develop new methodologies that combine video and image recognition with textual analysis. Moreover, during the analysis of this dissertation, the researcher observed a large amount of repetitive content with the same phrasing and structures. This dissertation does not intend to identify social bots in this circumstance. Rather, this observation raises the question of whether social bots can help spread narratives and not actively create new narratives. Future studies could also incorporate bot identification mechanisms to investigate the role of social bots in these circumstances and assess whether or not such accounts influence public opinion. Another point to consider is the representation of the data. As mentioned earlier, the information environment for Facebook and Twitter is different. Facebook is a public place full of familiar faces, meaning the relationship on this platform is close to real life. Therefore, the audiences' expectations, habits, and information behaviours vary depending on the platform. A comparative study may help expand the application of observed information behaviours and strategies in related studies.

Implications of the dissertation

While discussing the limitations of the research, it is also crucial to note the broad theoretical, methodological, and practical implications of this dissertation. This dissertation introduces interdisciplinary theories to the existing communication model and social media studies and examines how emotions influence political discussion and decisions. Although the data do not directly corroborate with cognitive theories, they enable a novel application of the theory. Individual studies integrate sentimental elements to explore the relation between emotions and the observed phenomenon, supporting previous studies on emotion's influence on viral content and perceptions of the event. The result also suggests that the advancement of social media technologies changes the role of audience and information accessibility, not information preferences. Both observations propose a modified theoretical framework that accounts for new variables or contexts observed in the findings. Furthermore, the dissertation assesses the public opinion of communities that are relevant but not directly involved, challenging the current literature, particularly on grassroots social movements, and highlighting the general public's limitations in engaging with information from foreign contexts or cultures. Notably, the majority of communication research on Russia focuses on Russia's influence or propaganda on its citizens' narrative but rarely compares how Russia is portrayed in the English-speaking communities. This dissertation adds new perspectives to the existing literature on crisis and political communication, especially issues related to foreign affairs.

Methodologically, this dissertation employs several automatic quantitative methods, including Zero-inflated negative binomial (ZINB) models, topic modelling, semantic

networks, and sentiment analysis. These methodologies enable researchers to conduct large-scale analysis quickly and incorporate greater variation in the dataset, better reflecting real-world complexity. The approach not only ensures more objective and reliable results but also balances the subjective interpretation typically associated with content. As a result, the findings and explanations are more balanced and easier for later studies to validate and replicate.

For practitioners, the findings suggest that less effort is required to shift public opinion under similar circumstances. The observation that users are likely to accept narratives in line with established impressions implies that familiarity is essential in public relations and political communication strategies. When foreign policy proposals follow familiar or even stereotypical impressions, public opinion is less likely to oppose these decisions. In the case of the Russia-Ukraine Conflict, political figures can leverage the existing negative political perceptions of Russia and Putin to justify sanctions, thereby gaining both moral support and votes for future elections. When there is no existing negative impression, political figures can create such narratives by gathering and spreading messages on social media before publishing policies to undermine their political rivals. Additionally, the stabilizing emotional reaction over time indicates a fixed impression in long-term crisis management. In other words, the golden hour of crisis management, regardless of the crisis type, is the early stage of a crisis, during which timely and effective responses are essential to control the news narrative and attribution of responsibility. If the negative perception begins to form, a divergent strategy may be effective, as it draws the attention away from the current issue to counteract political opponents' framing tactics

during the early stage, especially in election strategies.

These findings also foreshadow a more competitive online political environment and a diverse information landscape. Communities from various geographical locations with different cultures, languages, and ideologies co-exist on the same platform, and each has distinct interests in the event. To match the existing perceptions, practitioners need to first identify the target audience. On the flip side, the vast information flow and constant social media use during crises may lead to information overload, resulting in hasty judgments and making citizens more vulnerable to misinformation and propaganda in the social media era.

Conclusion

In conclusion, the change in communication mode driven by the rise of social media technologies is particularly evident in the shifting role of participants. The content characteristics, namely, emotional expression and news values, are still crucial for making popular content. Social media platforms indeed expand opportunities for various players to engage in the political arena. Public figures, such as celebrities and politicians, can utilize their interpersonal influence while the general public produces content from different perspectives with popular content characteristics that resonate with audiences. However, the ability of the general public to construct alternative narratives that challenge those established by mainstream media varies depending on the specific topics and strategies. Mainstream media continue to dominate the narrative around war and foreign policy, with public discourse and preferred narratives aligning with existing impressions

of the countries involved. Additionally, while people demand news stories with both emotional expressions and fact statements, emotional reactions and public discourse tend to stabilize over time, leaving a limited time window for crisis management.

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8   Appendices on terminologies and methodologies

A.   Appendix: Emotional Valance and Selection of Discrete Emotions

A.1 Emotional valance and dimensions

As discussed in the Literature Review Chapter (see Chapter 2), this dissertation adopts AIT as the theoretical basis for investigating the influence of emotional cues in individual studies. AIT theorizes and examines discrete emotions and their influence on political behaviours. However, many cited sources in this dissertation also employ other classifications when describing emotional elements. Stieglitz and Dang-Xuan (2013), for example, use positive and negative emotions as values to broadly describe the valence of a set of emotions instead of listing all emotions detected. This difference in classification choice is usually due to the various focus and theoretical bases. This section will introduce other emotion theories and discuss why the dissertation employs discrete emotions rather than valences or other dimensional classifications.

Although emotion is recognized in earlier works, there are no unified foundation theories to describe the relationship between emotion and political behaviour. Many related studies follow three other broader theories or approaches when mapping the connection between emotion and behaviour. For example, the Approach-Avoidance theory describes a system that motivates specific behaviour patterns according to the type of stimuli detected (Corr, 2013). The two behaviour systems, of which one is sensitive to "punishment" and the other is sensitive to "rewards," support the activation of the central states (2013). The reward/punishment mechanism is activated by the input signal of

reward or punishment stimuli (Gray, 1975). When the brain detects signals of reward or punishment, it will generate emotions sensitive to the stimuli. Those emotions will encourage either reward-seeking or risk-avoidance behaviour (Gray, 1990). Therefore, people in "reward" stimuli are more likely to have approach behaviours but have avoidance/escape behaviours when they are in "punishment" stimuli (Gray, 1975). As the Approach-Avoidance Theory sets up the two-factor system, it entails that the systems work independently and should subtract from each other when facing a conflicted situation (Miller, 1944). Thus, emotions, which act as feedback, should also roughly be categorized into two dimensions under this context. Even earlier research shows that different schools assume some emotions are naturally opposed (Smith & Ellsworth, 1985; Larsen & McGraw, 2011). One problem earlier researchers faced was the inconsistent empirical result of emotion dimensions except for pleasantness and activation level (Smith & Ellsworth, 1985). This problem stops researchers from digging further into the field until later researchers propose a multi-dimensional theory by organizing the existing dimensions at the time.

Emotion valence, on the other hand, represents another school of thought that emphasizes the positive or negative character of emotion and its aspect(s). The term "valence" is introduced to psychology by Tolman (1932), which describes the change in the direction of behaviour due to the characteristics of emotion that apply "attracting or repulsive forces" (p. 179). Simply put, the valence of an emotion causes a change in a specific direction of behaviour and, thus, is divided into positive or negative. The notion of "valence" in Tolman's (1932) work is close to the idea of electric charges instead of its

original German counterpart (Colombetti, 2005). Earlier studies on valence classify emotions based on the direction of behavioural changes, grouping emotions that lead to approach and retaining as positive and those that lead to withdrawal and escape as negative (e.g., Davidson, 1993; Davitz, 1969; Schneirla, 1959). That said, the relationship between emotion and behaviour is not always consistent, as the same emotion can have various characteristics or lead to opposite directions of behaviours under different circumstances. This approach is often criticized as oversimplifying the emotion and its influence (Colombetti, 2005). For example, Davidson's (1994) work on emotion valence suggests that certain emotions, such as fear, are associated with right hemispheric activation, leading to a bad feeling and withdrawal behaviour, while others, such as anger, exhibit a combination of bad feeling and approach-oriented behaviours. Meanwhile, as Colombetti (2005) discussed in her work, some emotions may also lead to the opposite direction of behaviours, such as fearful people asking others for help. Although fear is a negative emotion, the behaviour in this example is approach-oriented, which contradicts the pattern of emotion valence, leading to an oversimplification of the cognitive process of emotion.

Aside from the two theories introduced above, the Appraisal Theory has a more detailed mapping of individual emotions and the situation that triggers them (Lazarus, 1991; Smith & Ellsworth, 1985; Roseman, 1996; Brader & Marcus, 2013). The theory argues that emotion connects to the interpretation of the environment or goals' significance (Smith & Ellsworth, 1985). According to Smith and Ellsworth (1985), pleasantness is one dimension that appraises all 15 emotions but fails to differentiate emotion beyond the

initial steps. That means all emotions studied fall under either pleasant or unpleasant. As an initial step, this dimension can roughly label emotions into a more familiar category: positive and negative emotions. The other approach in this theory is Lazarus' (1991) work, which sees emotion as the motivation to act based on their situation, and such motivation is categorized into two ways: whether the motivation is a dispositional trait or transitional. Dispositional motivation relates to the goal hierarchy system: a goal hierarchy exists so that people can evaluate the importance of each goal in their minds. The more important the goal is, the more intense the emotion they will have (Lazarus, 1991). The motivation is transitional if it relates to the person's environment. When the environment is not goal-related, then the motive is lacking. For instance, when a threat is present and it generates negative emotions, then the person is motivated to react to the current negative situation (Lazarus, 1991).

Although all theories and schools introduced above show advantages in some aspects, none of them directly study the relationship between emotion and political behaviours. Political behaviours often rely on a set of complex information processing before a decision is made. Many theories either simplify or overlook the influence of emotion but ignore the environmental and other factors that may potentially persuade citizens. For this reason, this dissertation employs AIT, which directly examines emotions and political behaviours. It also has follow-up experiments and other studies to establish causal relationships between the observed behaviour change and the involvement of emotional elements.

A.2 Selection of specific Emotions

This dissertation mainly focuses on discrete emotions: fear, anger, and disgust. The second individual study also included joy and sadness as the control, but the focus of the analysis remained the same. This section will explain why those specific emotions are chosen for this dissertation.

People generally experience emotional discomfort after trauma, disasters, and crises. Many participants in various studies report feeling negative emotions during and after those types of events (Gruebner et al., 2018; McKinzie, 2018). Fear naturally arises after crises and disasters due to the risky environments and uncertainty they create. The emotion section in the Literature review chapter explains why people feel fear after crises. Moreover, anger is commonly found in crisis communication during and after a crisis. Many studies in communication and crisis management examine the influence of anger or citizens' angry reactions on crisis communication (e.g., Gruebner et al., 2018; Utz et al., 2013). Meanwhile, blame games are common in crisis communication, as people seek to identify who should hold the responsibility. Public discourses in these circumstances tend to involve moral discussion, which evokes moral-related emotions such as disgust. The selected case for this dissertation involves a complex international crisis that is both political, economic, humanitarian, and social. Yet, studies suggest emotional factors are independent of crisis type (Utz et al., 2013), which means all emotions mentioned above are likely to appear within the collected public discourse.

Additionally, several studies have noted that emotions are not always triggered separately,

nor do emotions function independently (Storbeck & Clore, 2007; see also Barrett, 2016). In other words, a given stimulus may trigger multiple emotions simultaneously, and circumstances such as pure fear and anger are unlikely to happen in real life. Multiple triggered emotions also cause interaction and function overwrite between presented emotions. Clifford and Jerit (2018), for instance, report that disgust suppresses information-seeking and learning behaviour even in a threatening situation, which also triggers anxiety/fear and is supposed to boost information-seeking and learning. Given the possibility of interactions between different emotions, this dissertation pays particular attention to all those selected emotions.

A.3 Sentiment analysis and emotion detection

This section will briefly explain why Sentimentr was chosen as the main sentiment analysis tool throughout the dissertation while discussing other considerations of emotion selection.

The field of emotion detection from text mainly adapted two types of emotion models from Psychology: emotional categories and emotional dimensions (Canales & Martínez-Barco, 2014). Emotional categories refer to the approach that classifies emotions as class or label. It is also one of the most popular approaches in the field of Affective computing (Calvo & D'Mello, 2010; Calvo & Mac Kim, 2013; Canales & Martínez-Barco, 2014). The other emotion model used in Affective computing (AC) is emotional dimensions, which place emotions in a certain location within the dimension.

There is no review from the AC field specifically comparing which model has better performance in general. The AC field does not always compare the performance of the emotion model because the emotion model is used most of the time for how the data is presented rather than how the data is analysed. However, the research design of this project requires a categorical return as the independent variable. Thus, emotional categories are preferred in this case.

One of the most commonly used emotion category models is Ekman's (1999) basic emotion model, which features anger, disgust, enjoyment, fear, sadness, and surprise. The word "basic" refers to the notion that emotions exist as families and groups rather than separated individuals, and more importantly, many more complicated emotions are the combination of the more fundamental ones (Ekman, 1999). This is the theory that many categorical emotion models adopt in the AC field. Although many models adapt the theory, they have different emotion categories. The R package "sentimentr" used in this project, for example, uses Plutchik's (1980, 1982) emotion theories, which feature eight emotions: anger, fear, sadness, disgust, surprise, anticipation, trust, and joy. He matches the subjective expression to other expressions such as behaviour, function, traits, etc. (1980,1982). For example, fear is the subjective language, but its behavioural language is "escape," and functional language is "protection" (Plutchik, 1980). It is the opposite of anger, in which behavioural language is "attack" and functional language is "destruction" (1980). According to Plutchik (1980), the eight basic emotions can be categorized into bipolar pairs based on their languages, such as fear vs. anger, joy vs. sadness, etc. Although this theory does not have the same assumption as the basic emotion theory,

many algorithms favour the presentation of Plutchik's model. Moreover, all emotions (fear, anger, and disgust) that this dissertation focused on are included in the model. This choice is the balance between model performance, theoretical basis, and validity.

B. Appendix: Shifting Conversations and Emotions

B.1 Structural Topic Modelling and Model Estimation

Structural Topic Modelling (STM) builds on probabilistic topic models like Latent Dirichlet Allocation (LDA) but incorporates document metadata (Roberts et al., 2019). As a result, STM shares some evaluation metrics with LDA for model estimation. The implementation of this topic model is the R package "STM", which is also employed in this dissertation. The package offers a "searchk" function for model estimation to test a given range of topic numbers (k) after applying the selected document metadata. There are four metrics for the model to determine the best number of topics in the model: held-out likelihood, residuals, semantic coherence, and lower bound.

The held-out likelihood refers to the probability of unseen held-out documents being generated by the model trained on the given documents (Wallach et al., 2009). In other words, it tests the ability to predict new data based on what has already been learned or how well the training model generalizes to the new, unseen documents. A higher held-out likelihood means the learned topic can be applied to new documents. Residuals indicate how much the observed value varies from the estimation (Taddy, 2012). It shows the differences between the actual data and the model's predicted distribution. The lower the residuals are, the better the model fits the true distribution. Semantic coherence measures whether the most probable words frequently co-occurred together (Mimno et al., 2011). This process corresponds to human interpretation rather than statistical fits (Mimno et al., 2011). Higher semantic coherence suggests words in each discovered topic often occur together and should be recognized as one topic. Lastly, the lower bound represents the

convergence of the solution during model estimation (Weston et al., 2023). It is the approximation of true posterior distribution, which means that a higher metric indicates a better model that is close to the actual distribution.
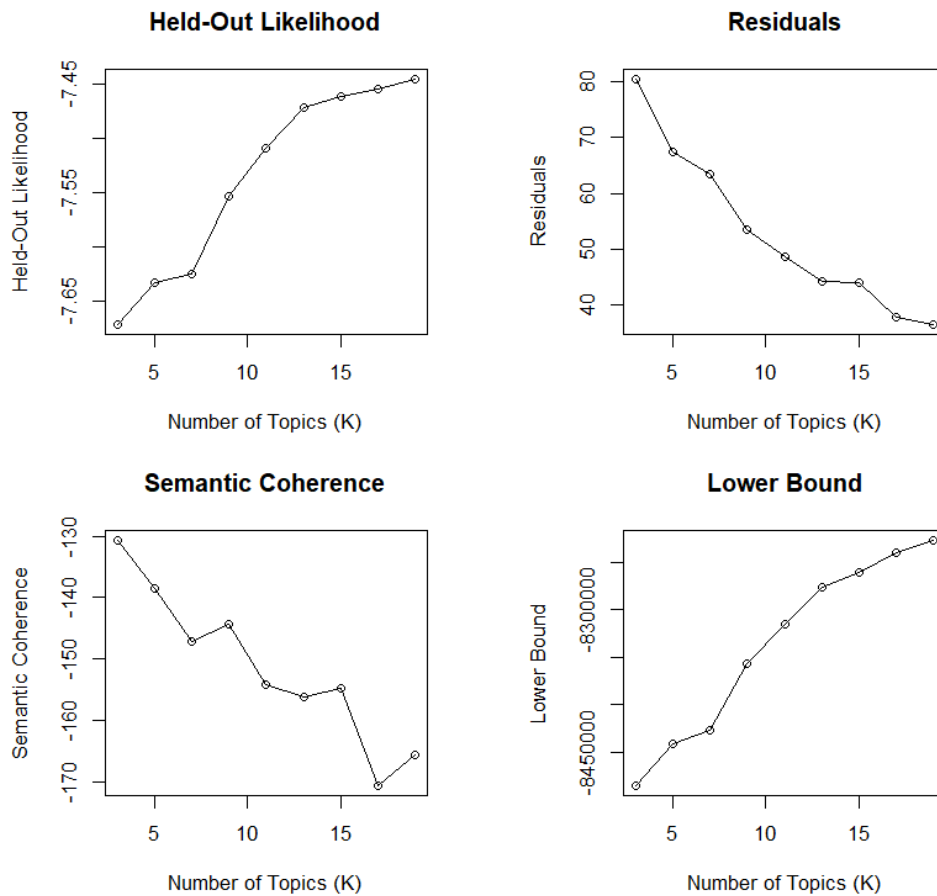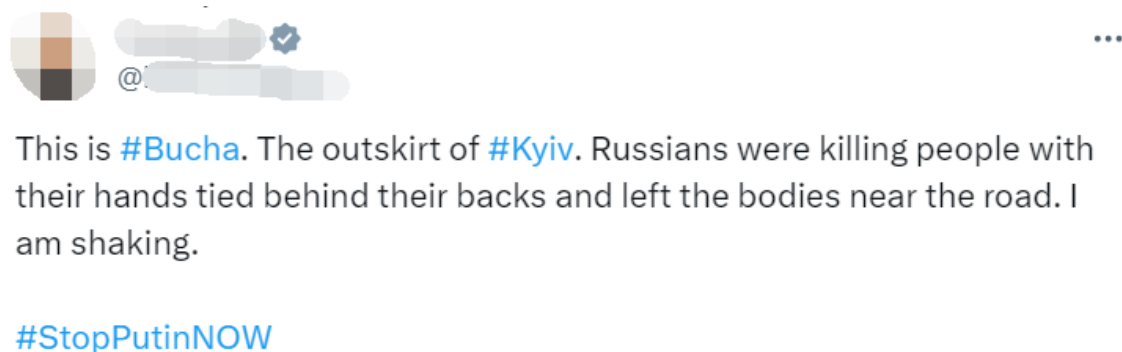
Figure B.1

Figure B.1 illustrates the plotted metrics for the dataset employed by this dissertation. As shown in the top left corner, the held-out likelihood increases as the number of topics increases. In the top right corner, the residuals generally decrease as the topic number increases, suggesting that a higher number of topics results in a better fit. Furthermore, the lower bound on the bottom right corner also generally increases when the topic number increases, showing a better fit for more topic numbers. However, the trend in

semantic coherence shows an interesting result. Overall, it shows a downward curve but also slightly increases at around k=8 and k=15. After the topic number reaches 15, the semantic coherence significantly drops, which suggests that more than 15 topics lead to difficulty in understanding the discovered topics. Based on the data and plot, the best topic number is between 8 and 15, where semantic coherence is high enough for the researcher to interpret the results while keeping a good fit for the model. Yet, aside from the curve trending, I will also consider the "Elbow method" to balance the performance of the model and the availability of my data analysis tools. The "Elbow method" refers to a heuristic method to determine the number of clusters by choosing the point where diminishing returns do not need additional cost (see Thorndike, 1953). In other words, this method chooses a point where more topics do not significantly improve the performance of the model. Although a higher number of topics means a better fit in this case, a large k value also requires more computer resources to run the analysis. Given the high memory requirements for R studio, running a model with large k numbers may result in slow progress, freezing, and even interruption due to a lack of available memory. Therefore, it is important to determine a k value that balances the performance of the model and the software. In this case, k=12 is a good choice as semantic coherence does not drop to the lowest level while everything else remains at a high-performance level. Because of the nature of online public discourse, the collected data is expected to have a high level of noise and mixed topics within one tweet. A higher topic number may return a more detailed classification of mixed messages.

B.2 Topic classification and labelling

This study classifies all tweets into three categories: informative, emotional, and others. The definition of each category is provided in the methodology section of the study (see methodology). Topic classification is based on the top extracted words from each topic combined with random samples from tweets belonging to the topic. The motivation behind this classification standard is the possibility of mixed topics within one message. Figure B.2, for example, shows a message that updates the development of war but with emotionally charged phrases at the end. If judging by the tweet content alone, this tweet belongs to both emotional and informative. One possible solution is to determine the main intention of the message, but this method lacks objectivity.
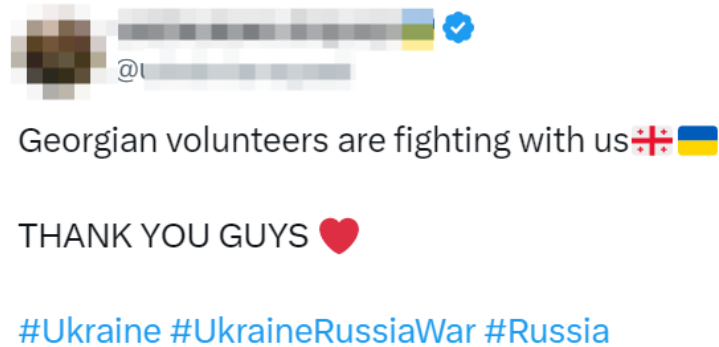
Figure B.2

This is #Bucha. The outskirt of #Kyiv. Russians were killing people with their hands tied behind their backs and left the bodies near the road. I am shaking.

#StopPutinNOW

Therefore, this study employs a mixed method. The model generates a set of probabilities for each topic and assigns the document to the topic with the highest probabilities. After categorizing tweets by the highest possibilities, the researcher filtered tweets containing top words and randomly extracted the original tweets to determine the intention. For example, Figure B.3 shows a randomly chosen tweet from topic 5, which contains the top words "Ukraine" and "thank" with the intention of expressing gratitude for volunteers. As such, tweets belonging to this topic are mainly emotional content and supporting

messages. This topic is, then, labelled as "Supporting and solidary messages."

Figure B.3

On the other side, Figure B.4 shows randomly chosen tweets from topic 10. Although the tweet contains the keywords "Ukraine" and "Ukrainian," the main theme in the message is US politics and is irrelevant to the Russia-Ukraine Conflict. With a large proportion of tweets on this topic using Ukraine as the case to criticize US politicians, the researcher categorizes this topic into "other" and labels it as "Discussion on US president candidate."

Figure B.4
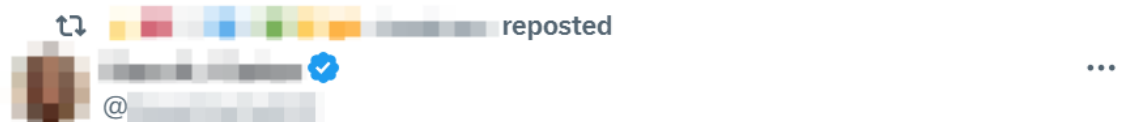
C. Appendix: How People Describe the Russia-Ukraine Conflict on Social Media

C.1 Additional data collection

This study merges BwandoWando's dataset on Russia-Ukraine Conflict tweets and an additional dataset collected by the researcher. The researcher inspected BwandoWando's dataset before processing the formal analysis and found that many mainstream accounts are excluded from this dataset. One possible reason is that this author collects data using hashtags (as stated in the data collection section), but many mainstream accounts do not use hashtags when posting Twitter messages. To make sure major mainstream media accounts are included in the study, the researcher manually collects mainstream account messages within the same time period as the BwandoWando dataset. The complete mainstream media list is shown in Table 1. Given the lack of hashtags within the tweet content, the researcher uses event-related keywords to search for the most shared tweets within the time period. The newly collected dataset has the same columns and criteria as the BwandoWando dataset to keep the data consistent for easy understanding and processing later on.

Table C-1

List of mainstream media account names included in the additional dataset.			
BBC	BBCNews	BBCNews	BBCBreaking
itvnews	ITVNewsPolitics	GMB	SkyNews
SkyNewsBreak	Channel4News	Reuters	thetimes
guardian	Independent	MailOnline	BBCWorld
CNN	CNNPolitics	FoxNews	NBCNews
ABC	CBSNews	MSNBC	nytimes
washingtonpost	WSJ	business	Telegraph
AFP			