This is a peer-reviewed, author's accepted manuscript of the following research article: (Eds.) (2021). The microblogging discourse of disasters: Twitter and Weibo in action in the aftermath of two major industrial accidents. *Social Semiotics*. https://doi.org/10.1080/10350330.2021.1931097

The microblogging discourse of disasters: Twitter and Weibo in action in the aftermath of two major industrial accidents

Abstract

This study explores how micro-bloggers react to disasters in social media by examining the discursive-semiotic activities activated in Twitter and Weibo in responding to the 2013 West explosion in the U.S. and the 2015 Tianjin explosions in China. By analysing 1,322 Weibo posts and 1,387 Twitter posts, the article shows how users of Twitter and Weibo mobilized alternative repertoires of *representatives*, *expressives*, *directives*, *commissives* and *eliciting* to make sense of disasters, in ways which in turn evoked a contrasting sense of communities of collective purpose. While the discourse of the 2013 West explosion reflected a strong sense of the creation, sharing and distribution of knowledge, as well as showing support and sympathy to the suffering, the discourse of the 2015 Tianjin explosions, displayed strong critical and oppositional properties that disrupted the official discourse of the accident. This study contributes not only to a better understanding of social media in disaster communication, but also to the methodologies for studying social media data in relation to disasters.

Keywords: Disaster communication, discourse analysis, Twitter, the 2013 West explosion, the 2015 Tianjin explosions, Weibo

If we ask of any form of communication the simple question what is being communicated? the answer is: information from the social system. The exchanges which are being communicated constitute the social system.

-- Douglas 1971, quoted in Halliday 1978, 79

1. Introduction

On April 17, 2013, a fire broke out at West Fertilizer Co., a fertilizer plant on the north side of town of West in the US state of Texas. The plant contained stores of ammonium nitrate, an important ingredient in fertilizers, but one with considerable explosive potential. The fire in fact triggered two explosions, though these were only milliseconds apart, the blasts from which killed 15 people, including 12 first responders, and injured at least 200 others. The force of the blasts destroyed nearby schools, as well as an apartment complex and a nursing home, and damaged hundreds of homes in the surrounding area. The explosion registered as the equivalent of a 2.1 magnitude earthquake and attracted much media attention: President Barack Obama and Texas Governor, Rick Perry, attended the memorial for first responders. By any definition the event was a disaster (one which prefigured in many respects the portside explosion in Beirut in 2020) and is considered one of the worst industrial accidents in American history.

Just over two years later at the port of Tianjin on the Eastern seaboard of China, two explosions occurred within 30 seconds of each other at a chemical warehouse in the port area. The second explosion was far larger than the first, detonating 800 tons of ammonium nitrate, equivalent to about 250 tons of TNT. Fires continued to burn uncontrolled over the following three days resulting in 8 additional explosions on the 15th August 2015. The official casualty report was 173 deaths, 8 missing, and 798 non-fatal injuries. Of the 173 fatalities, 104 were firefighters. Like the event in Texas, USA, this was a major industrial disaster, considered to be the worst in the history of the People's Republic of China since its foundation in 1949. In both cases – in West Texas and in Tianjin – social media played a highly significant role in

framing and developing responses to the disasters especially for local populations caught up in the tragic aftermath.

With the growth of the internet, the mobile telecommunications revolution, and the development of social media in the early 2000s, the role of social media in disaster communication has become a significant area of study, for they have the capacity to disseminate information rapidly, the potential to assist with emergency management, and the ability to communicate personal experience and involvement with events (see e.g. Matheson 2018; Palen and Hughes 2018; Yan and Pedraza-Martinez 2019). Thus, compared with legacy media like radio and television, social media offer new ways of mediatizing disasters and enhancing public participation, for example through citizen reporting (e.g. Charles and Allan 2019; Mortensen 2014), or the collaborative diffusion of information and knowledge (e.g. Macias, Hilyard, and Freimuth 2009; Qu, Wu, and Wang 2009). Indeed, social media have become not only an important source of information in the immediate aftermath of a disaster: they are also capable of providing frameworks of meaning and understanding for those living through the event inasmuch as they have the potential for articulating the impact and nature of the disaster including the concerns of ordinary people occupying initially the "liminal zone" (Fitzgerald and Evans 2018) when facts and details are not yet available and official or semi-official media sources have not begun to define the event (Wu and Montgomery 2020).

In recognition of the importance of the role of social media in disaster communication, the sub-field of *crisis informatics* (Hughes and Palen 2009; Palen and Hughes 2018) has emerged. This covers broadly issues regarding the socio-technical innovations afforded by social media in relation to disaster communication, as well as social media communications as data sources, and their application to emergency management (see Palen and Hughes 2018 and the literature review below). This article builds on the concerns of *crisis informatics*, but addresses a more fundamental concern by focussing on the particular social semiotic sense-

making practices of social media platforms in relation to crisis and disaster events. Our approach, therefore, treats social media in disaster communication as more than simply technical devices, providing sources of information, or crisis management tools, but as semiotic resources for making sense of emergent realities in which both word and image play significant roles.

In this respect, our study explores the actual discursive-semiotic practices of microblog users by focussing on two large scale industrial accidents, the 2013 West fertiliser plant explosions in the U.S. and the 2015 Tianjin chemical explosions in China, two major disasters separated in time and space but similar in many essential characteristics. As we will see, there are similarities between the discourses that emerged around the two events on Twitter and Weibo but there are also important differences. Twitter and Weibo, two of the most popular microblogging services in the U.S. and China respectively, share similarities in the design of their templates and some basic functions of posting and sharing, but will be seen to perform different roles in the two disaster situations due to the sociopolitical contexts in which they operate (Wu 2018). Accordingly, a detailed analysis of users' discursive-semiotic activities on social media can, we believe, contribute to a better understanding of how members of the public make sense of an unfolding disaster in real time, and in turn how they establish a collective response or a "community of engagement" with the disaster (Wu and Montgomery 2020).

2. Literature review

2.1 Social media in disaster communication

The rise of mobile technologies and social media platforms has inevitably had an impact on research in disaster communication. Indeed, this rise lies behind the relatively recent emergence of *crisis informatic*s, a field which investigates social and communicative behavior in response to disasters, most particularly in the social media context, as well as the appropriate

methodologies for such investigation (Hughes and Palen 2009; Palen and Hughes 2018). In a review of social media in disaster communication, Palen and Hughes (2018) lay out three major research themes covered in *crisis informatics*, namely "socio-technical innovations afforded by social media", "social media communications as data sources", and "applications to emergency management" (2018, 499). The first research theme mainly covers social activities performed by the public in disaster events such as citizen journalism, collaborative diffusion of information and knowledge, collective intelligence and distributed problem solving, as well as digital volunteerism to meet humanitarian needs (see e.g. Charles and Allan 2019; Dittus, Quattrone, and Capra, 2016; Keegan 2015). The second research theme examines the filtering and processing of large amounts of social media information, including the role of social media in enhancing situational awareness, as well as the veracity or reliability of social media data (see e.g. Karami, Shah, Vaezi, and Bansal 2020; Kaufhold, Bayer, and Reuter 2020; Starbird et al. 2016). The third research theme explores the applications of social media in relation to emergency responses and management (see e.g. Mavrodieva and Shaw 2021; Yan and Pedraza-Martinez 2019).

Research in *crisis informatics* has undoubtedly offered useful insights into managing practical responses to disasters, their mitigation and the processes of post-crisis recovery. However, those studies have not addressed the fundamental issue of how meanings are made and communicated through various semiotic resources in disaster situations on social media platforms. Nor have they examined the collective social actions achieved by the meaning potential of discursive repertoires in particular contexts of situation and societies. In this sense, despite the importance of *crisis informatics*, there is an emerging and significant subset of research that explores the discursive practices of individuals empowered by the mobile and internet technologies during and after disasters. Relevant studies include Wu and Montgomery's (2020) exploration of discursive forms of bearing witness in crisis contexts on

Weibo, Wu's (2018) case study of Weibo users' discursive strategies in constructing an alternative discourse of the Tianjin explosions, Shaw et al.'s (2013) examination of the discursive practices of sense making, and negotiation of roles on Twitter during the floods in 2010 and 2011 in Queensland, Australia, and Wu's (2012) case study of the impetus, processes, and discursive dispositions of China's middle class in the aftermath of the 2011 Wenzhou train crash on Weibo. These studies not only highlight the role played by social media in disaster communication, but also reveal a process of communal sense-making, the technologically mediated construction of social realities, and the enactment and negotiation of social relationships during disasters.

However, as Palen and Hughes (2018) note, lessons learnt from one emergency event do not necessarily apply to other kinds of emergency even though the social media platform may be the same. They develop this point by making a distinction between the "endogeneity and exogeneity of hazards" (508). According to Palen and Hughes, exogenous hazards refer to natural disasters like hurricanes and earthquakes while endogenous hazards refer to criminal events like terrorist attacks and gun shootings. This distinction is helpful inasmuch as it highlights ways in which different social media responses to mass-casualty events can be conditioned in part by variations in the nature of the events themselves. At the same time, it is important to recognize – as they do - that the distinction between exogenous and endogenous may on occasion be blurred.

Our study focuses on two mass-casualty events, the 2013 West explosion and the 2015 Tianjin explosions, in which – though the initial status of the event was unclear – over time they came increasingly to be regarded as the result of criminal negligence, and hence endogenous rather than exogenous. It attempts to capture the prominent characters of the discourses constructed around the two industrial accidents by showing in detail how the sense-making practices of social media gave shape to the events in different ways even though the

events are similar in nature and involve similar social media platforms. Building upon the previous research of social media in disaster communication from both perspectives of *crisis informatics* and discourse analysis, this study deploys the tools of discourse analysis within a broad social-semiotic framework to explore the discourses of two endogenous hazards – the 2013 West explosion and the 2015 Tianjin explosions on Twitter and Weibo respectively.

2.2 Social semiotics and discourse analysis

In order to delineate the discursive-semiotic activities of Twitter and Weibo users in relation to the two industrial accidents, we draw broadly upon social semiotics and discourse analysis. A social semiotic approach to social media focuses on the meaning-making mechanisms and the "meaning potential" (Halliday 1978) of multi-semiotic resources afforded by social media, as well as the broader sociocultural context in which such meaning-making takes place. It also, however, highlights the significance of social media technologies in both the meaning-making process and the shaping and constitution of the sociocultural context, in what is known as the social semiotic multimodal approach (Djonov and van Leeuwen 2018; Poulsen and Kvåle 2018). Apart from social semiotics, a discourse approach to social media sees social media, Twitter and Weibo in this case, as a form of social action realized through choices drawn from a set of discursive practices. Microblogging in this way may be understood as a genre of social media discourse constituted in and by a particular configuration of discursive practices instantiated through choices from a range of semiotic resources, including discourse acts and a range of visual-verbal relations. These choices may be articulated as the overall meaning potential for the genre but more specifically as discursive repertoires for particular datasets.

Our analytical model draws ultimately upon Searle's Speech Act theory (1976) (itself inspired by Austin's *How to do things with words* (1962)). Although speech act theory in its earliest manifestation was – as the name indicates – obviously oriented to spoken

communication, the same fundamental approach can be applied to written texts and multimodal texts such as social media data (Grundlingh 2018). For instance, Hemphill and Roback (2014) study how constituents lobby congress via twitter through speech act theory, Carr and Dauterman (2012) classify the speech acts within Facebook status messages, and Grundlingh (2018) explores memes as speech acts. In this study, we argue that speech act theory offers useful insights into examining how users perform social actions in disaster contexts such as breaking news, sharing personal experience, expressing feelings, and organizing responses.

In analyzing the Twitter and Weibo data, however, we use the term "discourse act" instead of "speech act" because microblogs more often involve words, pictures and videos rather than speech. Moreover, although there are occasionally sequences or threads of interaction, it is worth noting that microblogging does not take the form of conversation understood by conversation analysts where turns at talk take place in real time under strict sequential rules, interaction in the microblogging sphere is more of a collective or communal form of communication full of asynchronous discursive activities. Such communication builds an immediate social context and maintains a thread of "conversation" through imagining the audience, taking advantage of the technological affordances of the microblogging platforms, and meta data such as hashtags and the @reply/mention function (Marwick and Boyd 2010). In this sense, the application of discourse acts, and pragmatics in general, needs to be sensitive to the norms and contexts of social media.

In this article, then, discourse is considered as a social semiotic resource for performing actions such as informing, greeting, apologizing, expressing feelings, etc. From this basic notion of the performativity of discourse, we have classified the discourse acts in the two datasets into five broad categories, viz. *representatives*, *directives*, *commissives*, *expressives* and *eliciting*. Apart from *eliciting*, these categories are borrowed from Searle's (1976) account. In this study, *representatives* commit the user to "something being the case, to the

truth of the expressed proposition" (Searle 1976, 10). *Directives* refer to the user's attempt to get the recipient(s) to do something. *Commissives* commit the user to some future course of action. *Expressives* express the psychological state about a state of affairs specified in the propositional content. Finally, *eliciting* is added to the taxonomy of discourse acts based on our observation of the two datasets. It attempts to seek information or response from other users.

These categories, drawn from speech act theory, provide the basis of a pragmatic approach to microblogging, offering in this case the key terms for categorizing social actions in response to disaster events. Conceived of in terms of a social semiotic repertoire of actions, and allied with a multimodal discourse approach, it enables the exploration of situated meaning-making, news-breaking, and knowledge-sharing as it takes place in the two social contexts as two different groups of microbloggers struggle to come to terms with the separate disasters.

The finite set of choices for action constitutes a statement of the meaning potential at the level of discourse act for the context of situation underlying the two datasets that comprise our study. In practice of course, the options that constitute the network may be realized in different ways. The network of discourse acts therefore will help distinguish between the discursive load activated by microblog users in two separate disaster contexts. Moreover, this network provides a methodological framework for examining how micro-bloggers mobilize semiotic resources so as to interact with each other online. In the next two sections, we explore in more detail the system network of discursive choices deployed by Twitter and Weibo users in response to the two industrial accidents.

3. Data and Method

This study, therefore, explores microblog users' discursive and social semiotic responses to the West, Texas, explosion on Twitter and the Tianjin explosions on Weibo in order to cast light

more generally on the collective sense-making practices on social media in the face of large-scale disasters. The two cases were chosen to capture the various uses of microblogging for expressing responses to disaster events: firstly because they were unexpected large-scale disaster events; secondly, because both cases saw the active participation of Twitter and Weibo users in collecting, creating and distributing knowledge of the disasters in forms of pictures, videos, and personal accounts; and thirdly, in both cases Twitter and Weibo served as a shared public space where people could create social networks through collective discourse practices such as breaking news, expressing sympathy and support to the victims, and discussing problems of common concern as the events evolved.

The data for this study are 1,387 microblogs containing the keyword "West explosion" from Twitter and 1,322 microblogs containing the keywords "天津塘沽大爆炸" (Tianjin Tanggu Massive explosions) from Weibo (Wu 2018; Wu and Fitzgerald 2020). The Twitter data were collected between 17:00 on April 17 and 18:00 on April 25, 2013, and the Weibo data were collected between 23:00 on August 12 and 24:00 on August 20, 2015. These two datasets provided an insight into how microblog users responded to evolving disasters and further constitute a relatively manageable dataset for in-depth discourse analysis. Due to limitations of space, this paper focuses more heavily on the Tianjin data than the West data, with the latter serving basically as a point of comparison for the former. The selected Chinese examples have been translated into English by the researchers for this study. As laid out in the second part of the literature review, we develop the analytical method based on the five discourse acts, i.e. *representatives*, *directives*, *commissives*, *expressives* and *eliciting*, observed among the two datasets. It is worth noting that both datasets are rich in the expression of opinions; and this can raise issues for coding. We categorize the expression of opinions based upon feelings and emotions under the discourse act of *expressives* because they are concerned with users' psychological states. Where opinions are based upon personal judgements and

beliefs about social realities using a high degree of modality, they are categorized under the discourse act of *representatives*.

The five discourse acts can be modelled as a system network (Halliday 1978, Chapters 3, 6 and 7) in the following way:

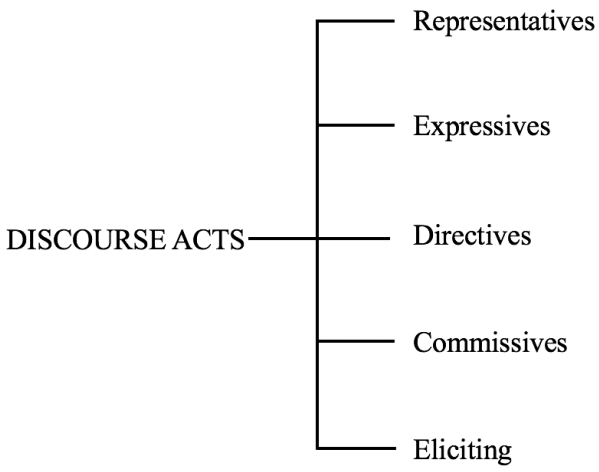

Figure 1: A system network for Discourse Acts

A fuller version of the discourse model including categories of narrative and quotation, as well as more complex sub-categories under each discourse act, is described in detail in Wu (2017). Due to limitations of space, however, we present the five most basic categories of discourse act to serve as the analytical framework of this study. Our purpose is not to argue whether Searle's taxonomy is complete or adequate, but to demonstrate that our framework is a way that helps open up the understanding of the microblogging discourse of disasters.

4. Data analysis: examining the discourse of disasters on Twitter and Weibo

Our analysis, therefore, focuses in particular on five discourse acts – *representatives*, *expressives, directives, commissives,* and *eliciting* – mobilized by social media users to respond

to the two industrial disasters. The full range of discourse acts constitutes a social-semiotic repertoire of meanings, from which users may make differential selections in the realization of different contexts. Accordingly, in the analysis below we examine in detail how Twitter users and Weibo users in the two datasets constructed the discourses of disaster.

Representatives

Representatives, as noted above, commit the users in varying degrees "to something being the case, to the truth of the expressed proposition" (Searle 1976, 10). In this study, examples of microblogs using *representatives* include those which provide a description and evaluation of the accidents, and statements based on users' reflection upon the accidents. In short, *representatives* were deployed by users to document and make sense of the accidents.

In the West case, *representatives* displayed features of journalistic discourse, by – for instance – rather like a news headline, briefly summarizing the main news elements of the event (who, what, where and how) in one sentence. Ex. 1 (below) presented the West explosion using expressions strongly associated with news broadcasting such as "BREAKING" and "reported". It also adopted an elliptical sentence structure commonly seen in TV news headlines (Montgomery 2007). The emphasis fell, therefore, on presenting the event in factual and objective terms.

Ex. 1

BREAKING: Multiple injuries reported after explosion at fertilizer plant in West, TX (north of Waco). pic.twitter.com/Ej51e8IWFL

In the Tianjin case, however, *representatives* tended to be characterized by multimodal narratives of personal experience that combine witnesses' firsthand accounts of the disaster with a juxtaposition of multiple pictures taken close to the event, as in the following:

Ex. 2

[…] 爆炸极其剧烈，冲击波把楼都震动了好几下，耳朵有压感，蘑菇云很大！ (The explosions were so powerful that they shook the buildings. My ears hurt. [I saw] a big mushroom cloud!)

Here the user presented and documented the accident through describing his/her sensations – painful ears, the shaking building, and large mushroom clouds. Alongside the verbal descriptions, the user incorporated four pictures of the mushroom cloud created by the explosions. In this way, *representatives* – especially among the Chinese data – informed the micro-blogosphere not just what happened but what it felt like, based on users-as-witnesses' immediate experience. Rather than being a bare record of "fact", they shared the experience of the event. They also established its veracity based on the details of the users' subjective engagement with the accident, bringing spectators both close and distant closer to its lived realities (Andén-Papadopoulos 2014; Peters 2001; Wu and Montgomery 2020).

In this way, particularly among the Chinese data, beyond documenting the course of the

accident, *representatives* displayed the distinct use of reflexive and interpretative comments regarding the authorities and the company that owned the chemical warehouses. This is shown in Weibo users' critical evaluation of the Tianjin government's reaction to and handling of the accident as well as creating and spreading speculation throughout the network concerning the actual death toll and the underlying truth behind the accident. Example 3 (below) illustrates this networked practice in action:

Ex. 3

政府故意掩盖死亡失踪人数 而且智商实在感人 掩盖的太没技术含量... (The government deliberately covers up the actual number of fatalities and missing people. But they are just too stupid to do it well…)

The example starts with a critical judgment accusing the government of hiding the death toll and the number of missing persons on purpose, but further ridicules them for doing so incompetently. Ex. 4 (below) points to the possibility of political-business collusion between the company and local governmental sectors.

Ex. 4

我不相信 只峰和只姓副市长没有关系 太巧合了 只姓太少了 查查户口本 他爹是谁 说不定是前妻的儿子 (I just don't believe that Zhi Feng and the deputy mayor Zhi are not related. It's such a rare coincidence that they happen to have the same family name because 'Zhi' as a family name is rare. Check Zhi Feng's residential certificate to see who his father is. He could be the son of Zhi Shenghua and his ex-wife)

This posting came as a response to a previously rejected speculation that Zhi Feng, the owner of the responsible company, was the son of Zhi Shenghua, the former deputy mayor of Tianjin Municipal Government who was in charge of fire security, a speculation based on the uncommon family name ("Zhi") shared by them. Despite the authorities' effort to clarify the connection between the two people, Ex. 4 attempted to maintain and support this speculation by an alternative account which maintained that Zhi Feng was the son of Zhi Shenghua with

his ex-wife. (This speculation received such wide re-posting and commenting to such an extent that it survived attempts to suppress it. Ultimately the local authorities had to respond by clarifying the relationship between these named personages and promised to investigate the background of the company.)

Generally speaking, *representatives* in both cases served to document the course of the events, effectively breaking news to local and distant audiences. While Twitter users adopted a journalistic style of discourse to report and make sense of the disaster, Weibo users, adopted shared stories of personal experience often in multimodal forms. Supported by the quasi-instantaneity and the networked nature of Twitter and Weibo, *representatives* facilitated the collective sense-making of the disasters as each user communicated a fragment of the reality and shared their experiences, perceptions and evaluation of the accidents to a wider microblogging audience. In addition to making sense of the event, *representatives* in the Chinese case displayed reflexive and interpretive characteristics which disrupted and challenged the official discourse of the disaster through criticizing the performances of the authorities, as well as circulating hypotheses regarding the underlying truth of the accident.

Expressives

Expressives, in this study, were adopted by users of Twitter and Weibo to convey emotional responses to the two events, including feelings of shock and lamentation, as well as invoking prayers for the people in the affected areas. Both datasets feature many instances of *expressives* in both verbal and visual forms. Linguistic markers of this type of discourse act firstly include *affect*, a term adopted by Martin and White (2005) (following Biber and Finegan 1989; and Ochs and Schieffelin 1989) to express the positive or negative emotions of the speaker/writer, as in the following Examples:

Ex. 5

… I teared up!! This is so damn sad😢😰…

Ex. 6

… 心碎#天津塘沽大爆炸# (Heartbreaking #TianjinTangguMassiveExplosion)

For instance, the use of verbs like "teared up" in Ex. 5 and adjectives like "sad" in Ex. 5 and "心碎" (heartbroken) in Ex. 6 draw on the linguistic resources of *Affect* to convey users' sorrow and grief. In addition to these lexical items, emojis add a further dimension to the expression of emotion (see Example 5, above), simplifying both the expression and interpretation of feelings (Zhou, Hentschel, and Kumar 2017).

Alongside the expression of lamentation and sorrow, we also find many instances where positive wishes and hope for the damaged areas are conveyed, signaled by verbs such as "hope" and "pray for" in English and "希望" (hope), "愿" (wish) and "祈祷" (pray) in Chinese, and nouns such as "prayers", "heart" and "thoughts", as seen in the following:

Ex. 7

Prayers go out to those in West, Texas affected by the massive explosion.🙏😭👼

Ex. 8

宝坻人民发来祝福。愿逝者安息，生者坚强，风雨同舟，心脉相连，人间有爱，塘沽加油！(Blessings from Baodi people. May the dead rest in peace and survivors stay strong. [We will] stand and fight together. [Our] hearts are with you. There is love in the world. Fighting, Tanggu!)

These sentiments are also realized visually by emojis such as praying hands, angels, hearts and lighting candles (e.g. 🙏 and 👼 in Ex. 7). However, the Weibo data displays richer ways of expressing good wishes and support by firstly making use of four-character expressions in Chinese language. For example, in Ex. 8, the writer deploys six four-character

expressions in a row – “逝者安息，生者坚强，风雨同舟，心脉相连，人间有爱，塘沽加油！” (May the dead rest in peace and survivors stay strong. [We will] stand and fight together. [Our] hearts are with you. There is love in the world. Fighting, Tanggu!) – to pray for the victims, comfort the survivors, and support the affected city. Moreover, Weibo users also mobilized multimodal resources such as incorporation of words and pictures to express their sympathy and support. For instance, in Ex. 9 (below) twelve lighted candles are placed in a heart shape as a backdrop while foregrounding four Chinese characters “唯愿平安” (pray for safety) to signal positive wishes.

Ex. 9

Translation of the verbal message: Pray for safety.

Expressives in these cases project empathy for victims of the event and in so doing implicate the building of solidarity between those relatively close to the event and the wider audience who are assumed to be united in concern at the accidents. In this way, *expressives* communicated compassion for the distant suffering of others. Moreover, they also encourage emotional alignment and identification in the microblogging communities by the frequent use of the collective “we” and “us” in English and “我们” (we, us) in Chinese together with recurring formulaic expressions like “our thoughts and prayers are with everyone affected by the explosion in West, TX” and “风雨同舟，心脉相连，塘沽加油！” ([We will] stand and fight together. [Our] hearts are with you. Fighting, Tanggu!)”. In this way, *expressives* invoke

a broad sense of a public, of "us all", and a generalized orientation of care for the affected people and areas (Matheson 2018).

Directives

Directives are designed to get the recipient(s) to do something. In this study, users in both groups deploy *directives* to give advice or to request help in relation to the accidents. One prominent feature of *directives* is the use of imperative structures that explicitly formulate actions for their recipients as in the following:

Ex. 10

Join us each Tuesday at CAG-West [on] Wednesday at CAG-East for Word Explosion.

Ex. 11

…当地居民请关好门窗！路上请给救护车和消防车让道！请转播 (…Local residents, please close your doors and windows! Please give way to ambulance and firetrucks! Please re-post this message.)

Thus we find "join us" in Ex. 10, "请关好门窗" (please close your doors and windows), "请给救护车和消防车让道" (Please give way to ambulance and firetrucks) and "请转播" (Please re-post this message) in Ex. 11. Note that *directives* of this kind do not target an individual recipient (but sometimes address the local residents as a collective recipient) and, therefore, employ reduced deontic modality, indicating a lower degree of pressure on the addressee to carry out a command or perform an action (Halliday and Matthiessen 2014).

Weibo data, on the other hand, displayed many instances of *directives* that explicitly targeted the authorities, especially the Tianjin government, urging them to investigate the details and causes of the accident and demanding that they hold the responsible to account.

Ex. 12

…希望政府彻查原因，给遇难者以慰籍，给生者以交代。(… Hope that the government investigates the cause of the accident to console the victims and survivors.)

Ex. 13

事故原因！！事故原因！！！事故原因！！！！事故责任人！！！事故责任人！！！事故责任人！！！！重要的事说三遍！只有查明原因和真相才能为逝去的人和消防队员及家属有个交代！！！ (The cause of the accident!! The cause of the accident!!! The cause of the accident!!!! The perpetrator!!! The perpetrator!!! The perpetrator!!!! Important matters should be repeated for three times! Only with the truth of the accident can we console the dead, firefighters and their families!!!)

For instance, Ex. 12 takes the form of an indirect demand that the government look into the cause of the accident in a rational manner, using an optative verb "希望" (hope). Ex. 13 uses triple repetition for "事故原因" (the cause of the accident) and for "事故责任人" (the perpetrator), as well as an unconventional use of exclamation marks, to adopt a more emotional manner that raised the deontic modality so as to demand that the government investigate the accident. This triple repetition that demands that the government look into the accident is then explained by the gloss "重要的事情说三遍" (important matters should be repeated for three times) – a common phrase widely used on the Chinese internet. Although in Ex. 13, and many other Weibo posts, the government is not explicitly named, it is by implication the targeted addressee since it is the government that possesses the legal competence and resources to conduct such an investigation and reveal the truth to the public.

Directives play an important part in the reactions of the microblogging communities to the disasters of Tianjin and West, Texas, not only in original messages but also in fragments of conversational exchanges supported by the affordances of Twitter and Weibo through the @ function that targets a post at certain recipients and the comment function that allows users to leave a comment under a microblog post. These interactions evoke an image of social actions performed collectively by social media users, such as joining together to undertake disaster relief work. In addition to that, *directives* in the Tianjin case exhibit a distinct tendency towards

leading and setting the public information agenda. As shown in the above analysis, popular opinion that took shape on Weibo requested the Tianjin government to investigate the accident and reveal the truth to the public. It exerted such a strong pressure on the authorities to the extent that the state demanded that the Tianjin government respond to the requests raised by Weibo users.

Commissives

Commissives commit the user to a future action. Close scrutiny of the *commissives* in both datasets reveals a recurring structure: first-person pronouns + future auxiliary (for example "we will", "I will" and "我会" (I will)) + verb of material or mental process, as in the following:

Ex. 14

We'll be doing all we can to help - Massive fertilizer plant explosion in West, TX

Ex. 15

… 我会坚持关注天津爆炸事件！希望以群众的力量，让事实浮出水面！不要让时间淡化这么多人的伤害及牺牲！(… I will keep paying attention to Tianjin explosions! Hope that the truth will be out through the effort of the masses! Don't let the damage and sacrifice fade over time!)

While users in the West case mainly commit themselves to help with the relief work of the West explosion (e.g. "We'll be doing all we can to help" in Ex. 14), users in the Tianjin case display a strong determination to keep the Tianjin accident on Weibo's trending list and, further, to follow up on the investigation of the accident. As shown in Ex. 15, the user starts with a commitment that s/he would follow the Tianjin explosions, reinforcing this with a *directive* to the microblogging community to maintain public attention so as to get to the truth of the massive explosions.

Indeed, *commissives* among Weibo data invoked a sense of warning or even threat to local government officials. *Commissives* of this kind were often realized through an adverbial clause of condition consisting of a condition and a consequence, for example:

Ex. 16

只想告诉那些所谓的领导，你们记住！对不起人民，就别怪我们让你下台！(To those so-called leaders: Always keep in mind that if you let people down, we will bring you down!

Here, the user nominated a specific group of recipients ("To those so-called leaders") and then directly addressed them through second-person pronoun "you" with a warning ("if you let people down, we will bring you down!"). The warning contains a condition (if the officials failed their people) and a consequence (the people would bring the officials down). Moreover, the warning and threatening effect was strengthened by an imperative sentence "always keep in mind" and two exclamation marks.

To sum up, *commissives* in both cases align users as spectators with the distant suffering especially when they commit themselves to future actions in supporting the relief work. Such alignment becomes stronger as more users join the networked practices of committing themselves to actual offline actions such as raising and donating money and dispatching daily necessities to the affected areas. More particularly, in the Tianjin case, however, *commissives* reinforce a critical stance toward the Tianjin authorities and an emerging public sentiment in favor of investigating the accident and holding the perpetrators criminally responsible.

Eliciting

Eliciting is a discourse act that is designed to draw verbal responses from its addressee(s). As pointed out earlier, *eliciting* as a discourse act was not mentioned explicitly in Searle's taxonomy and yet occupies an important place in this study, where *eliciting* performs the

communicative function of both information seeking and fact checking. This was particularly so in the first few hours after the accidents took place when details were not immediately available. *Eliciting* is often indicated by an interrogative sentence pattern and a question mark (distinct from rhetorical questions which did not require an answer). For instance, Ex. 17 (below) is a fact-checking polar question regarding the possibility of an explosion in West. In a different manner, Ex. 18 poses four information-seeking questions regarding the updates and cause of the Tianjin explosions. The series of *elicits* demonstrated users' understanding and perception of the event in process as they turned to social media to look for fragments and pieces of knowledge and information to gradually put together a more complete picture of the event.

Ex. 17

An explosion in West?

Ex. 18

谁知道原因及最新进展？110、120、119 都出动了吗？是否造成人员伤亡？事故还是……？！(Who knows about the cause and development of the news? Were rescue workers and emergency responders (110, 120, 119) all out? Any casualties? Was it an accident or…?!)

Besides getting an answer from the recipient(s), *eliciting* among the Chinese data also fulfills other communicative functions such as identifying gaps in knowledge, speculating, and challenging official accounts. For example, Ex. 19 (below) uses three rhetorical questions to direct attention to the background of the responsible company. The succession of questions did not necessarily request an immediate answer but rather prompted a further search for a possible explanation as to why a young company was able to store dangerous chemicals at general logistic warehouses. These elicits imply that the responsible company had some political connection with the local governmental sectors that allowed them to violate the rules and regulations of security. This speculation regarding business-political collusion is not only

reinforced by the triple rhetorical questions in a row but also the progressive increase of question marks from single ("?") to double ("??") and finally to triple ("???").

Ex. 19

天津东疆保税港区瑞海国际物流有限公司，一个成立时间 3 年都不到的公司，可以一路顺畅的将普通物流存放变成危险品堆垛场，背后的关系人后台是不是很硬？一个没有背景的人能搞出这么震惊全世界的动静来？？十万个为什么？？？
(Tianjin Dongjiang Port Ruihai International Logistics, with a history of less than 3 years, managed to turn some ordinary logistics warehouses into warehouses for dangerous chemicals without effort. Does it have a solid background? How is it possible that a person without a strong background shocked the world in this way?? A hundred thousand questions???)

In summary, *eliciting*, on the one hand, played a crucial role in the collective digital sense-making during the early stages of the accidents. In both cases, it entailed conversational exchanges among social media users through evoking a mechanism of questioning and answer. Those fragmented and asynchronous conversational exchanges contributed to maintaining the interaction and discussion on Weibo and Twitter. On the other hand, *eliciting*, in the Tianjin case performed the function of challenging the authorities, as shown in users' networked practices of questioning the background of the responsible company and then making and circulating speculations of the connection between the responsible company and local governmental sectors. In this sense, *eliciting* contributed to reinforcing the critical stance toward local authorities and challenging the official discourses of the Tianjin accident.

5. Discussion: Two microblogging communities, two publics

The above analysis reveals that social media platforms such as Twitter and Weibo in the aftermath of a disaster give shape to a specific discourse that enables certain kinds of collective social actions to take place in response. These collective social responses to some extent would hardly be possible without a sense of "imagined community" (Anderson 2006) or "virtual

community" (Rheingold 2000). Such a community is *imagined* and *virtual* because although its members may not meet or share first-hand knowledge of each other, each individually acts as if aware of a group or audience that is predicated on common interests, goals and values, and hence capable of engaging in collective social actions.

In this study, hashtags and keywords "West explosion" and "天津塘沽大爆炸" (Tianjin Tanggu massive explosions) connected and brought together users who then found common concern in sharing details of the accidents. While witness-survivors documented the accidents and broke the news by sharing their experience of the events on Twitter and Weibo, others in the role of distant spectators also actively engaged with the events by further sharing the content, commenting on the event, and expressing support and sympathy to the people affected by the disasters. Thus, a sense of commonality and solidarity was established among the users. Moreover, this sense of imagined community was further evoked through the collective and collaborative discursive practices of documenting and making sense of the disasters (as illustrated in the sections of *representatives* and *eliciting*), supporting the suffering and building solidarity (as illustrated in the sections of *expressives* and *commissives*), as well as forming popular opinions and stances among the users (as illustrated in the sections of *representatives*, *directives*, *commissives* and *eliciting*).

Nonetheless, these two microblogging communities evoked in the two cases were subtly different in character. Although both of them played a significant role in helping to make sense of the two industrial accidents and in expressing support and sympathy to the victims, the Weibo community in the Tianjin case fulfilled some functions that were not shared by the Twitter community in the West case. Indeed, the Weibo community displayed some characteristics of a *counter-public*, providing an alternative or critical stance to that supplied in official responses, offering instead elements of the popular opinion of ordinary people (Warner 2002; Fitzgerald and Housely 2007). This was manifested in Weibo users' criticism

of the government's handling of the accidents, as shown in users' critical evaluations such as "The government deliberately covers up the actual number of fatalities and missing people. But they are just too stupid to do it well…" in Ex. 3. Such oppositional characteristics are also seen in Weibo users' discursive resistance to the discourses offered by the Tianjin authorities and the official media, especially when they attempted to downplay the scale and details of the accident (see Wu 2018). The discourse created by Weibo users provided a collective voice – seeking the truth of the accidents as well as seeking to hold those responsible to account (Wu and Fitzgerald 2020). The Weibo community exerted communicative pressure both on the state and local governments to the extent that the state government ended up by requiring the local government to respond to the issues raised by Weibo users.

Conclusion

It is a fundamental premise of an approach to language as social semiotic that the exchanges that take place in any form of communication in the last analysis carry, express or realize information from the social system: indeed, they do, in effect, constitute the social system. From the social semiotic perspective, the social system itself exists as series of interlocking typical contexts of situation, each characterized by a distinctive semantic network comprising choices in meaning – the meaning potential – for that situation. Drawing on social semiotics and multi-modal discourse analysis, this study has explored how two different microblogging communities in similar contexts of situation have tried to give shape and meaning to large scale industrial disasters. Using an analytical framework of discourse acts, it identifies in each case characteristic discursive repertoires that model the meaning potential drawn upon by each community. These discursive repertoires are seen to feature such discourse acts as *representatives*, *expressives*, *directives*, *commissives* and *eliciting*, but this study reveals that the meaning potential of each repertoire is realized in subtly different ways. While the discourse

of the West explosion is characterized by a strong sense of the shared knowledge creation and distribution, as well as showing support and sympathy to the victims, the discourse of the Tianjin explosions displayed a greater tendency to disrupt and challenge the discourse provided by the local official/mainstream media and disseminated in the aftermath of the accident. In other words, this study demonstrates how the meaning potential in similar contexts of situation may vary across cultures and societies. In particular, it shows how in the context of the Tianjin disaster, microbloggers on Chinese social media had a more marked tendency to view the event as it unfolded in endogenous terms and thus began to set the public agenda in more overtly political terms (as a failure of possibly corrupt local government) than those responding to the West disaster where reactions tended to encode the event more neutrally as exogenous (for example, as an earthquake). This use of social media in China as a potential site for the development of an alternative counter discourse to official government discourse has not been previously noted by research in crisis informatics.

In this way, the social semiotic dimensions of this study add a further perspective to the work in *crisis informatics* inasmuch as they highlight the role of meaning-making in the aftermath of a disaster. They highlight the use of social media in the West explosion and the Tianjin explosions as discursive sites for collective sense-making, for the discussion of issues of concern, for defining a collective voice and for building solidarity. They also have the capacity to reveal the differential play of power relations. More specifically, this study reveals how particular repertoires of discourse acts may be mobilized in China. The Weibo discourse shows a collective political potential in China that is ready to set the public agendas, challenge the dominant public discourses of disasters with its traditional disaster communication model – previously dominated by the mainstream/official media – in an attempt to bring about positive social and political changes (e.g. allowing partial political engagement and plural voices to be

heard) in the context of strict media censorship (Montgomery, Shen, and Chen 2015; Wu and Fitzgerlad 2020; Yang 2009).

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