Typologies of Twitter Traffic
Mass Shootings in the USA

Thesis Presented
by Lia Petronio

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Abstract

This paper investigates publics that emerge on Twitter in response to crisis events, referred to in this study as response publics, using mass shootings in the United States of America as cases for this study. Research is based on over 3 million shooting-related tweets from October 8, 2016 to January 6, 2017, and 131 mass shooting events; 118 occurring within the timespan of the tweets and 13 major mass shootings that occurred in the past. Three response publics are identified and explored: (1) Exploitive, (2) Peripheral, and (3) Event Centric. Their typologies are characterized through analyzing relationships amongst the contents of circulated information, its relation to the shooting event or the context in which the shooting can be situated, and how metadata is leveraged to concentrate attention or create associations. Data visualization is used as a tool for qualitative analysis, providing a legible viewpoint from which more deliberate views are made to answer more informed questions.

keywords: crisis informatics; information theory; publics; data visualization; twitter; mass shootings
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1. Introduction

The perceived epidemic of mass shootings in the United States of America (US) has led to a surge of news articles and social media (SM) broadcasts. These events are a trigger for ongoing discourse provoking arguments on the factors involving these events such as policies for national security, immigration, the accessibility of firearms, discrimination, and the mental health of society. They also provoke participation of citizens, politicians, and news organizations through mainstream media (MM) and SM platforms. Following major mass shooting events there are surges of SM responses. Looking specifically at Twitter, propagated information includes self-reporting by those close to the scene, broadcasting updates of official reports, bridging arguments into adjacent contexts like gun control, discrimination, or governance with the use of hashtags, and expressing feelings or support for those affected by the shooting.

Individuals make use of Twitter’s ability to amalgamate information based on its metadata, commonly driven by hashtags and user mentions to find, label, and help circulate related information, engaging in and formatting what is referred to in this paper as response publics, or emergent spaces for communication enabled by techniques of pooling data on information communication technology (ICT) platforms where participants mindfully tag or broadcast information to contribute in shared goals around crisis events. We can understand this through a common notion of public spheres, or spaces where citizens participate in information sharing, media making, and democratic debate (Jackson and Foucault Welles 2016). Specific to the virtual domain, publics can be understood as formations within the vast virtual domain whereby individuals participate in interpreting, representing, and sharing our physical and social realities mediated through ICTs.
Typologies of response publics are the products of the ways in which individuals and groups share, react to, and amalgamate information. In this paper, four high-level response types that emerge from mass shooting events are characterized as:

(1) *Objective* reportive  
(2) *Participative* reportive  
(3) *Argumentative*  
(4) *Reactionary*

The ways in which these response types are assembled makeup typologies of response publics.

*Objective* reportive responses following a mass shooting often originate from official mainstream news sources and consist of reports that the shooting occurred, its location, victim counts, police actions, and for events with higher volumes of coverage, updates on these factors. This type of response may also consist of recounting incidents and victim tolls.

*Participative reportive* responses are unique to SM, consisting of self-reporting from individuals close to the crisis event, either physically or emotionally. The contents of such tweets may contain first-hand accounts of an events unfolding, or more emotional accounts of the events proximity, offering essence of the reality of the event. These responses lack the detachment of ‘objective’ reports, and have been very useful during crisis events when information is either inaccessible or undesirable to mainstream sources (Jackson and Foucault Welles 2016). Such information may consist of videos taken by individuals close to the scene or updates on the situation from a first-person perspective. These perspectives are particularly valuable in times of crisis because individuals from different places with different viewpoints can contribute to the pool of information, compiling a multi-faceted perspective of the event in real time.
Argumentative responses are ones which reference an event with a
general argument, such as a mass shooting event referenced with
an argument supporting the illegalization of firearms. Often
these argumentative responses stem from broader pre-existing
information communities around specific goals or values. These
communities adhere to other contexts or crisis events, via hashtags,
often comprising ad hoc formations, evolving based on surrounding
environmental typologies.

Reactionary responses encompass individuals’ emotions and perceptions
of the state of the world. Such responses may express sympathy
for victims of shooting events, or exhaustion towards a perceived
frequency of events. They are essentially emotional, expressional, and
opinional in comparison to the other three response types.

Following major crisis events, these four response types emerge
and network, creating response publics, where groups participate
in the usage of “conventional linguistics to meet communication
needs,” via hashtags, to self-organize and concentrate attention to
their subject (Starbird and Palen 2011). These linguistic conventions
given to major events become normative identifiers that are capable
of surviving time on our SM platforms, and even in our offline
social worlds. Such instances are seen following the attacks in Paris,
France in November 2015 and Orlando, Florida in June 2016, where
there was participation of individuals around the world sharing
information, including live video streams, emotional support,
and political arguments, for weeks and years following the event,
occupying extensive response publics tied by common hashtags
including #PrayForParis and #PrayForOrlando (Twitter 2016). These
supportive publics have maintained presence across SM platforms
and their normative identifiers have become utile in bridging
arguments into contexts like discrimination, terrorism, and political
parties.
In the most extreme cases, a single mass shooting event can trigger world-wide assemblages whereby individuals self-assemble through conventional linguistics to optimize communication based on variations of needs within the vast structure. Following less extreme mass shootings, with lower victim counts that receive less mainstream news coverage and which do not receive common identifiers on SM, the typologies which emerge are more difficult to identify. While the topic of mass shootings has a pronounced presence in MM and SM, the relationships between individual events, their general presence, and the resulting emergences, are less pronounced.

This paper seeks a better understanding of the typologies of response publics emerging from mass shooting events, using Twitter data as a start to this pursuit, and beginning by asking some essential questions:

(1) Which mass shootings trigger the most Twitter response?
(2) Is metadata leveraged to concentrate attention to the event, or to bridge the event into other contexts?
(3) What factors of the shooting or its context have influenced this?
(4) What characterizable typologies can we identify through analyzing the relationships between these inquiries?
(5) Can these typologies give us a better understanding of the tendencies and values of information in our virtual social worlds?
To answer these questions, Twitter data and mass shooting event reports are collected. Tweets are indexed to individual mass shooting events using consistent search methods for each mass shooting. Methods used for analyzing this SM data are framed with examples of contexts where such an examination led to deeper understanding of the relationship between people and ICTs during crises-events, how they use them, the formations that emerge, contextual influences, and influence over MM. Data visualization is used to construct contextualized views of the gathered and aggregated research and data as a tool for performing qualitative research, with a focus on understanding “how things work in particular contexts” to produce “cross-contextual generalities” (Mason 2002). Data visualization interfaces are designed to display the indexed results for each mass shooting event, showing tweet volume over a timespan following the day of the shooting. Exploration is enabled through filtering quantitative information to delve into the qualitative textual information of the tweets. This tool provides a legible viewpoint from which mass shooting events or contexts that are significant for further investigation are identified and explored by producing more deliberate views to answer more informed questions. These visualizations provide accessible and informed viewpoints into the emergent information structures of our combined online actions, thereby allowing reflection and analysis of otherwise inaccessible social phenomena.
2. Information Society

ICT platforms, especially SM, are increasingly dominant sources from which we formulate our perception and interpretation of the world around us, and which enable our participation and enactment within it. As Luciano Floridi describes, many people today live hyperhistorically in

“societies or environments where ICTs and their data processing capabilities are the necessary condition for the maintenance and any further development of societal welfare, personal well-being, as well as intellectual flourishing” (Floridi 2014).

Hyperhistorical societies “depend” on ICTs to function, in comparison to historical societies that use “systems to record events and hence accumulate and transmit information for future consumption” so that future generations may learn from past generations (Floridi 2014).

In such a society Floridi states that the successful management and lifecycle of information is crucial to the society’s success and progress, as more of our physical reality is encoded and experienced “informationally” in what he refers to as the “infosphere” (Floridi 2014). Floridi describes the infosphere as the informationalization of our biosphere enabled by ICTs through the envelopment of reality into collectible, quantifiable and machine-readable information—and as people who spend a lot of time online, machine-readable and updatable life styles (Floridi 2014). As more of our realities are interpreted, represented, and distributed over ICT platforms and as more of our society’s functions require ICTs, they are “as much modifying our world as they are creating new realities and promoting an informational representation of every aspect of our world and our lives in it” (Floridi 2014).
For example, SM has enabled individuals to communicate across the world, modifying our behavior, communication, and our needs to fit the form of ICT platforms. Our realities are increasingly influenced by the availability, traceability, and relatability of information. In this context, relatability can be understood in two primary ways. One is the degree of connectivity of an information’s source such as an event, to other entities such as people and facilities, and to concepts such as ethics, politics, and empathy. The other is enacted through tagging information to define identifiers or to bridge it to adjacent publics. As we can now infiltrate and amalgamate conversation across the world through manipulating a platform’s metadata, we can also form vast emotional data-enabled relationships and new notions of togetherness.

2.1 Affective Bonds

An instance where participants take advantage of the amalgamating capacities of platforms to commandeer and concentrate communication across space and time, forming affective bonds, is well demonstrated during the protests for the killing of unarmed African-American teenager Michael Brown by a Missouri police officer in Ferguson, Missouri on August 9, 2014. The hashtag #Ferguson was used on Twitter to connect people in different places to a common space to share information, emotions, and support. An additional community adhered, supporting the protest as Palestinians participated and shared advice about how to deal with teargas and militarized police, coupling the hashtags #Ferguson#Gaza to form the bridge (Renzi and Langlois, 2015).

This ad hoc formation of bridges hosts a new notion of togetherness between groups, where information and advice can be shared by people of shared experiences in different places or contexts, resulting in “transindividual fields of relations” (Renzi and Langlois, 2015).
Renzi and Langlois paraphrase Simondon and Stiegler’s description of transindividuation as something that “designates the socio-technical context, or the milieu, through which transformation unfolds, allowing for individuals to gain new awareness and bond with groups that also evolve and mutate in reaction to events, other groups, and individuals” (Renzi and Langlois, 2015). This term is described in the context of technology and specifically data, as “a vector for the circulation of affective and emotional bonds” (Renzi and Langlois, 2015). With this framing, we can look at publics which form around shared issues as having affective relationships expressed and maintained through engagement with data and techniques of participating in common spaces for communication.

2.2 Emotional and Political Impact of Perspectives

The increasingly available first-person perspectives enabled by ICTs introduces a new viewpoint of the world; one from within. As opposed to a viewpoint from without, held traditionally by MM sources, such as major news organizations, the inside viewpoint is often used to disclose information that is otherwise absent from mainstream sources, distributing its own values and setting its own agendas.

When looking at perspectives in MM and SM together, there have been significant instances where perspectives on SM give insight to the agenda of the mainstream. Used to support and organize social movements, participate in democratic debate, and report on events, SM enables users to create and participate in shared spaces for contribution to and circulation of information on events and issues with little mediation from the outside. Especially in times of crisis, citizens make use of SM to tell their own experiences and make viewpoints visible that are often overlooked or perhaps intentionally avoided by MM (Jackson and Foucault Welles 2016). This has proven
to have great influence over the public sphere and its motivation to participate in social debate, media making, and information sharing, reducing, if not rejecting, its reliance or trust on MM sources (Jackson and Foucault Welles 2016). The use of SM during times of crisis to self-report lived experiences in real-time conduces an environment made of “a continuous stream of information from the perspective of those closest to the crisis events”, differing from the limited perspective of traditional news reporting (Jackson and Foucault Welles 2016). The availability of such viewpoints helps us transcend the boundaries of traditional reporting and when amplified through strategic SM practices, has given citizens the power to set the agenda of the information broadcasted on ICT platforms. Let us look at two examples that demonstrate the emotional and political impact of inside perspectives within publics responding to crisis events.

Live Streaming of Police Brutality on Facebook
The introduction of live streaming on Facebook has enabled individuals to share in real-time events that are occurring around them from their perspective. During the shooting of Philando Castile by Minnesota police officer in St. Antony, Minnesota on July 6, 2016, the incident was recorded and streamed live to Facebook by his girlfriend in the car. The angle of the footage and the physical and personal proximity of the camera to the victim made this footage particularly impactful to its viewers. Streamed live without mediation from any outside source, there is no doubt as to the authenticity of the actions, emotions, and reality of the event. The resulting viewpoint is one that is relatable to the viewer, rather than detached through editing, cutting, or viewing from afar. Though we are still divided by screens, the closeness of this perspective personally, physically, and temporally causes stronger emotional and relatable responses from viewers, strengthening shared emotions, and provoking formations of publics, united together as witnesses of unmediated evidence to an act of violence.
The strength of shared emotions was clear after Facebook removed the video. The public expressed outrage over SM channels, causing Facebook to restore the video. Here we can see the power citizens can achieve in setting the agenda of information in their ICT platforms.

#Ferguson is Everywhere: Initiators in Emerging Counterpublic Networks
Understanding how publics develop and grow, how they use ICTs, and the dynamics of the shared spaces gives insight into the possibilities of ICTs as “accountability technologies” in which citizens can surveillance those in power (Offenhuber and Schechtner 203). Sarah Jackson and Brooke Foucault Welles study a case where Twitter “catalyzed national response” in the first week of #Ferguson tweets immediately following the police killing of unarmed, 18-year-old Michael Brown on August 9, 2014 in Ferguson, Missouri (Jackson and Foucault Welles 2016). Jackson and Foucault Welles identify what they refer to as “initiators” of “counterpublics” that emerged in the first week after the incident, looking at tweets using #Ferguson.

Counterpublics are described as groups marginalized from the public sphere, who demonstrate a lack of faith in traditional, elite institutions, such as major news organizations. In a counterpublic, these marginalized groups reject the mainstream public sphere and create and maintain their own narratives, with objectives to communicate their own realities and push the mainstream to acknowledge and respond to them (Jackson and Foucault Welles 2016). Initiators are “crowdsourced elites”, or actors who are influential in creating and distributing alternative or anti-establishment narratives, emerging as a result of retweets and user mentions (Jackson and Foucault Welles 2016). In this case, initiators are crowdsourced elites who triggered the #Ferguson phenomena (Jackson and Foucault Welles 2016).
A counterpublic was initiated from a tweet only 30 minutes after the moment Michael Brown was murdered from a community member near the scene. This first tweet, with #Ferguson, uses the terms “unarmed”, “boy”, “executed”, and “Shot him 10 times”. In contrast, the first tweet from a local mainstream newspaper that achieved crowdsourced elite status on the same day reports: “Fatal shooting by Ferguson police prompts mob reaction”. By looking closely at which tweets were retweeted or incorporated user mentions from mainstream sources versus the counterpublic, they find that there is an intentional focus by the network in highlighting state abuse, with tweets that criticize the terminologies used and details given by the mainstream sources. The counterpublic also called attention to individuals they considered to be accountable and demanded response and action from them, by adding user-mentions to force individuals in power into the conversation. The high volumes of tweets using #Ferguson and the vast use of user mentions of those high in power concentrated attention to the perspective of the counterpublic, eventually at such a scale that its narrative was adopted by the mainstream.

This study makes visible the divide between information provided by counterpublic members versus mainstream professional sources, and how emergent counterpublics that form in the wake of crisis events can have the power to set the agenda of information propagation from the bottom up. Through this close inspection of actions over time we see how individuals interact with technology to express their own perceptions and agendas and how the strategic use of metadata on ICT platforms can lead to large scale demonstrations, developments of counterpublics, dominance over mainstream perspectives, and most importantly, the information groups value in these publics.
2.3 Digital Prehistory and Reflection

While ICTs have massively increased the reach of our communication and emotional relationships to other contexts, ICTs do not easily allow for reflection, as they are constantly updated. Floridi claims that our ICTs function prehistorically and states:

“This is the paradox of a digital ‘prehistory’—ICTs are not preserving the past for future consumption because they make us live in a perennial present. Memory is not just a question of storage and efficient management; it is also a matter of careful circulation of significant differences, and hence of the stable sedimentation of the past as an ordered series of changes, two historical processes that are now seriously at risk” (Floridi 2014).

Floridi suggests that the act of ‘updating’ or ‘saving’ should be looked at as rather ‘replacing’ or ‘deleting’ the previous version, and therefore maintaining a present state which has no memory of its own past (Floridi 2014). This state is reflective of George Orwell’s notions of past and present in his novel 1984, where history is rewritten and distributed in the newspaper each morning (Orwell 1949). We can think of this notion as the present history, or the past as it exists today as possibly different from yesterday, or tomorrow. Such a state alters the present, as the present adopts meaning through recognition of its past. Histories also become ‘overwritten’ on ICTs through obfuscation: The speed, quantity, and increments in which information is created, distributed, and responded to exceeds the rate at which it can be reflected upon. We are living in a perennial present, where history and context get lost.
The inspection of archived data to capture instances of human engagement online over time gives us a view of otherwise ‘overwritten’ histories, providing a space for reflection. This is becoming increasingly important as the catalyzing effects and unregulated power of individuals and entities through ICTs continues to demonstrate massive impact on our physical and political realities. As the propagation of information through ICTs continues to strengthen and demonstrates consequences in physical space and tactical uses of metadata for assemblages, understanding the processes and influences of these resulting formations is ever more pressing.

In the most extreme cases the resulting formations of sophisticated media practices and engagement with ICTs are rather prominent, manifesting as assemblages in physical space or high-density metadata amalgamations. This paper focuses on, rather, more discrete events relative to ubiquitous contexts. Specifically, events which are also interpreted as problems and political arguments having a constant socio-technical and physical presence. Mass shootings in the US are strong cases for this study, as they continue to provoke initiatives for prevention and campaigning, framed as an epidemic and associated with terrorism, discrimination, and gun laws. The most extreme incidents evoke outbreaks of MM and SM response, linked by common identifiers, and capable of persisting through time. However, most mass shootings do not receive these common identifiers and are not easily traced, yet their presence in general maintains normative responses. The challenge of this study is to attain insights from the socio-technical presence of mass shootings on Twitter, beginning by first indexing the tweets to mass shooting events to make sense of the responses.
3. Mass Shootings and Media

In October, 2015 President Obama gave an impactful speech following the tragic mass shooting at Oregon Community College,

“How this has become routine. The reporting has become routine. My response here, from this podium, has become routine. The conversation in the aftermath of it. We’ve become numb to this” (TIME 2015).

This was the fourteenth speech given by President Obama in response to mass shooting events that occurred during his presidency. A widely-expressed feeling amongst the American people, mass shootings are perceived to be occurring too frequently and discussion about them has significant presence in media. Strong response publics develop around mass shooting events and the phenomena in general. Following mass shootings with high death tolls in public spaces, response publics express support for victims and their families, help distribute the latest official reports, and report inside perspectives from those close to the scene, both physically and emotionally. As there is much debate on the topic of mass shootings in politics, news, and SM, the mass shootings that receive high coverage in MM, as well as SM, tend to be ones which reinforce a common public moral, such as the equality of gender and race, and the protection of children, or those which can be used to leverage a political ideal, such as gun regulations and national security. Among these events are those with high death tolls that take place in public spaces.
Examples of such shootings are

Luby’s Café in Texas, 1991
Columbine High School in Colorado, 1999
Sandy Hook Elementary School in Connecticut, 2012
Charleston Church in South Carolina, 2015

These types of mass shootings are known as mass public shootings defined as incidents that occur in relatively public places within a short time span, involving at least four deaths by firearm, not including the shooter, and whose victims are selected somewhat indiscriminately (Congressional Research Service 2013). These are specific types of mass murder, which are historically defined by the FBI as the killing of four or more people by one or a few assailants within a single event (Fox and Levin, 1998).

Of all mass murders, mass public shootings are the most publicized and the least common (Fox and Levin, 1998). They receive very high media attention and provoke calls to action regarding national and domestic security and gun control. For example, in response to three mass public shootings that occurred between 1989-1993 the Federal Assault Weapons Ban of 1994 was passed, officially called the Public Safety and Recreational Firearms Use Protection Act. The ban lasted 10 years, expiring in 2004. It was found that there was no reduction in mass shootings resulting from this ban (Fox, 2016). In 2012, in response to the mass public shootings in Aurora, Colorado, and Newtown, Connecticut, efforts were made to pass another firearm ban, but were unsuccessful. Most recently, in the days following the mass public shooting in 2016 in Orlando, Florida, Senator Chris Murphy and Senate Democrats spent nearly 15 consecutive hours discussing gun control (Kim and Everett 2016).
The high-exposure in media to the most extreme mass public shootings, enhanced by our increasing use and sophistication of ICTs, has influenced the public’s fear of these events. According to Criminologist James Alan Fox mass shootings are not increasing, but only the public’s perception of them, as a result of changes in the nature of media coverage, whereby we can watch 24 hours of live coverage of the event (Lafraniere, Cohen and Oppel Jr. 2015). In a poll conducted by the Associated Press, news editors considered mass shootings as the top story in 2012, followed by the U.S. election in second (Associated Press 2012). The shooting in Newtown was particularly terrifying to the public, covered live on the scene as children evacuated the school. In a poll conducted by USA Today/Gallop for 1,000 adults, 87% followed news stories on the Newtown school shooting closely during the week following (Saad 2012).

Fox describes that this high coverage of the most extreme mass public shooting events has also consequently become the context for which other types of mass or multiple victim shootings are associated (Fox, 2016). He insists that the differentiation between characteristics of mass public shootings and other mass or multiple victim shootings is significant when responding to, discussing, and associating these events (Fox, 2016).

While mass public shootings have a relatively distinct definition, and receive distinctive reactions, mass shootings do not. In further reaction to the 2012 mass public shootings, there has been dispute pertaining to the significance of counting deaths versus injuries, public versus private spaces, and discriminate versus indiscriminate killing. Consequently, there are a few variations of definitions for mass shootings and initiatives for the data collection of mass shooting events. One change was implemented in 2013 when President Obama passed a mandate to the Investigative Assistance for Violent Crimes Act of 2012 that permits U.S. Attorney General to provide
federal assistance during active shooter incidents and mass killings. In the act, mass killings are reduced from four or more deaths in a single incident to three. In effect, more shootings qualify as mass shootings effective in 2013. Other prevalent definitions introduced around this time focus on events in which shots are fired, penetrating three or four people. A few notable organizations doing this are Gun Violence Archive, Mass Shooting Tracker, and Every Town Gun Archive. Of the events these organizations record, few of them fit the FBI criteria for mass shootings or mass public shooting, and in turn, this reduced threshold has significantly increased the number of events. These mass shooting event archives have had major influence on the depiction of mass shootings in mainstream news reporting and response publics, providing accessible materials for individuals to make political and emotional arguments.

The combination of high coverage of the most extreme mass public shooting, their ties to policy making, and these new criteria for counting incidents impacts the way mass shooting events are portrayed and discussed by politicians, news organizations, and individuals. In the wake of major mass public shootings, the escalated media attention and the emergence of response publics are prominent, however, most mass shootings, when using the most lenient definition of four individuals shot, do not provoke such media attention, and the impact each has in our virtual social worlds is unclear. To understand the subtleties of virtual response to mass shooting events, and the response publics which emerge in effect, Twitter responses are traced to events and data visualization is implemented to provide an environment conducive for contextual examination. From the results of this research’s application, we achieve a better understanding of how events manifest into other contexts and can reflect upon the associations embedded in our ICT platforms and tendencies that influence the information that dominates them.
4. Application

This section examines the typologies of response publics that emerge from mass shooting events on Twitter. The examination focuses on the networking between four high-level response types: (1) ‘Objective’ reportive, (2) Participative reportive, (3) Argumentative, and (4) Reactionary—and its relationship to:

(1) Details of the shooting event like victims, location, or political association
(2) Adjacent contexts in which the shooting is associated
(3) Leveraging of metadata to concentrate attention to the shooting, or to bridge it into other contexts.

This examination follows an assertion that emergent typologies are products of relatability of the event or degree of association to larger contexts: spatially, emotionally, politically, and ethically. It hypothesizes that the typologies of response publics will be characterizable by the relatability the event or its context demonstrates.

The first step in this study seeks to better understand triggers for response on Twitter about mass shootings, by indexing tweets to the mass shooting events in which they refer. To do this, Twitter data pertaining to shootings is collected, along with mass shooting incident report data, described in detail in the following section. Once indexed, data visualization is used to provide an interface for a quantitative and qualitative analysis of the tweets, from which significant emergences are identified and pursued through visualizations designed to represent more informed inquiries.
Results are understood under the assertion that:

(1) **Tweet volume is a function of relatability**
(2) **The incorporation of hashtags asserts the viewpoint or intention of the tweet**
(3) **Tweets can be characterized in terms of the four response types**
(4) **The combinations of response types make up the typology of the response public, which is representative of the information valued amongst its participants.**
4.1 Data Collection

Twitter Data

The Twitter data used in this project is collected using Twitter’s Streaming API. This API returns a sample of tweets in near real-time, from which one can download and store the data for future use. For this analysis, tweets containing the keyword ‘shooting’ that are posted between October 5, 2016 and January 7, 2017 are collected, resulting in 9,289,142 tweets. From the 9,289,142 tweets containing the term ‘shooting’ between October 8, 2016 and January 7, 2017, many of them do not refer to firearm shootings, but rather basketball shooting, film shootings, shooting stars, and more. To filter out these unwanted tweets, visualization interfaces are created which group re-tweets or hashtags, and sorts them by total elements in the group. A list of grouped objects is displayed on the web-browser showing the re-tweeted ID or hashtag and the text. Scanning through the tweets a list of remove-words consisting of terms, hashtags, or re-tweeted IDs are compiled. Using Google BigQuery, where the data is stored and managed, unwanted tweets are filtered out. The resulting number of tweets is reduced to 3,524,241.
Mass Shooting Data
For mass shooting event incident reports, two distinct event types are incorporated: (1) major historical mass public shootings and (2) mass shootings which occur within the timespan of the Twitter data.

Mother Jones’ Investigation: US Mass Shootings¹, 1982-2017 is used for historical mass public shootings, consisting of the indiscriminate killing of 4 or more people in a public place. From this data set, 13 major mass public shootings are selected to incorporate in the analysis. These incidents provide a context for which we can better understand how mass shootings manifest in SM months or years after they occur.

Mass shootings which occur between October 8, 2016 and January 6, 2017, are collected by merging the incident report archives from Mass Shooting Tracker², Gun Violence Archive³, and VICE Mass Shootings in the United States in 2016⁴. VICE provides short descriptions for each mass shooting event in 2016, which are merged into the data. Descriptions are manually written for events where VICE does not align with the other archives. These three sources count events in which four or more people are shot, not necessarily killed. There are 118 mass shootings events within this timespan.

1. Mother Jones is a non-profit news organization which does independent and investigative reporting on topics such as politics, crime, and climate.

2. Mass Shooting Tracker is a crowdsourced database counting mass shooting incidents in which four or more people are killed or injured by firearms in a single incident, excluding the shooter.

3. Gun Violence Archive is an archive of gun violence incidents in the US collected from over 2,000 media, law enforcement, government and journal sources daily. Its mass shooting archive counts incidents in which four or more people are killed or injured by firearms in a single incident, excluding the shooter.

4. VICE 2016 Mass Shooting Tracker is a project launched by VICE aimed at tracking every mass shooting in the US in 2016 with brief descriptions for each. They follow the example of the Gun Violence Archive as their criteria for counting incidents.
4.2 Data Manipulation

Indexing Tweets to Mass Shootings

For each mass shooting event, a list of keywords is manually created. For mass shootings that occur within the timespan, keywords consist of the city and state where the shooting took place. Tweets are required to contain at least one of the keywords and to have a timestamp within a 48-hour timespan proceeding the day of the shooting. In many cases this keyword indexing method is insufficient in indexing tweets to shootings. Cases where this occurs most commonly include instances where shootings occur in the same city within a close timespan, when a city has high volumes of discussion in general about shootings or has had a recent controversial shooting—most often police shootings of unarmed citizens, and when a status is retweeted from local news sources, in which the name of the news source contains the city name, but the tweet refers to a shooting outside of the city. For these occurrences, a list of remove-words is created for the shootings, and an additional conditional statement is added to the code, requiring the tweet to have at least one of the keywords but not the remove-words. This indexing results in a total of 232,001 tweets matched to mass shooting events.

Historical mass public shootings have acquired popular identifiers in the form of hashtags from response publics that formed around them and are easily indexed by using these popular identifiers like #Pulse for the shooting at Pulse Nightclub in Orland, Florida in 2016, or #SanBernardino for the shooting at Inland Regional Center in San Bernardino, California in 2015. Tweets pertaining to these events are traced between October 8, 2016 and January 7, 2017. These events are included in the analysis to provide comparisons between events that maintain significant and ongoing presence in publics and events that have not, or not yet, achieved this significance and relevance to broader social topics. This indexing results in a total of 92,189 tweets matched to historical mass public shooting.
### Tweet Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>user name</td>
<td>string</td>
</tr>
<tr>
<td>user ID</td>
<td>integer</td>
</tr>
<tr>
<td>tweet ID</td>
<td>integer</td>
</tr>
<tr>
<td>timestamp (milliseconds)</td>
<td>date</td>
</tr>
<tr>
<td>text</td>
<td>string</td>
</tr>
<tr>
<td>hashtags</td>
<td>string</td>
</tr>
<tr>
<td>user mentions</td>
<td>string</td>
</tr>
<tr>
<td>retweeted count</td>
<td>integer</td>
</tr>
<tr>
<td>retweeted status</td>
<td>boolean</td>
</tr>
</tbody>
</table>

### Shooting Events

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Shootings occurring from October 8, 2016 to January 7, 2017</td>
<td>118</td>
</tr>
<tr>
<td>Historical Mass Public Shootings</td>
<td>13</td>
</tr>
</tbody>
</table>

### Tweets

<table>
<thead>
<tr>
<th>Type Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Cleaning</td>
<td>9,289,142</td>
</tr>
<tr>
<td>After Cleaning</td>
<td>3,524,241</td>
</tr>
<tr>
<td>Indexed to Mass Shooting</td>
<td>232,001</td>
</tr>
<tr>
<td>Indexed to Historical Mass Public Shooting</td>
<td>92,189</td>
</tr>
</tbody>
</table>
### 4.3 Visualizations

*Visualizations for Qualitative Analysis*

Implementing methods of data visualization, an interface is designed that organizes and displays the data providing an environment conducive for quantitative and qualitative analysis. The visualization displays all mass shooting events that occur within the timespan in one view, each event represented as a unique plot, showing volume of tweets over time, for a 48-hour timespan following the day of the shooting (Figure 1).

For historical mass public shootings (Figure 2), the timelines extend from the October 8, 2016 to January 7, 2017. From this view, we can immediately see the few shootings that have outstanding response having relatively normal distributions with high peaks, followed by shootings with lower peaks, many with ambiguous or scattered distributions, and finally, those without tweets. To receive more detail about the contents that make up the plots, upon selecting a plot, a description of the shooting, the text of the tweets, and a list of hashtags grouped by hashtag and sorted by total occurrences are displayed. The hashtag list can be switched to show a list of users who participate in the discussion, grouping and counting the user-mentions and the retweeted-from-user fields. The hashtags signify the orchestration of response publics provoked by the events. The user-mention/retweeted-from-user represent twitter users who are active participants, significantly influential, or commonly retweeted. Using this interface, we can compare the volume of response amongst shootings and delve into each shooting to read through the tweets and formulate relationships between factors of the shooting, volumes of tweets, contents of tweets, hashtags, and user participants.
There are 118 mass shootings which are displayed as timelines, showing a 48-hour timespan following the day of the shooting. The bars represent total tweets per hour. Upon selecting a plot, tweets, information about the shooting, and the hashtags are displayed. (See detail overleaf).

There are 13 historical mass public shootings which are displayed as timelines spanning from October 8, 2016 to January 7, 2017. The bars represent total tweets per hour. Upon selecting a plot, tweets, information about the shooting, and the hashtags are displayed.
A: 9 wounded, 1 killed

At about 1:30 AM, two people who'd gotten into a dispute earlier in the night ran into each other in the 35th district that was even more crowded than usual thanks to the Bayou Classic football game. They resumed their argument, and a shooting ensued. Gunfire struck nine bystanders: two women and eight men between the ages of 20 and 37. Demonstrating wounds in the hospital; as of publication, five of the victims had been released after treatment and four were still in life-threatening condition. Responders arrested and charged two men on site with the illegal possession of firearms, but one of the other is not believed as of publication to have been involved in the incident. As of publication, they were seeking...
Focused Visualizations for Deep Understanding
To see how information evolves over time, an interface is created to explore four mass shootings which receive the most tweets:

(1) Fort Lauderdale-Hollywood International Airport  
Broward County, FL January 6, 2017 (Figure 4)  
(2) Azusa CA, November 8, 2016 (Figure 5)  
(3) New Orleans, LA, November 27, 2016 (Figure 6)  
(4) Seattle, WA, November 9, 2016 (Figure 7)

This interface plots retweeted statuses over time, counting the total retweets per status, per hour over a timespan following each shooting. The values over time are normalized to show what percentage of total tweets per hour each status is retweeted. The list of tweets is also displayed from which five categories are identified:

(1) political, consisting of information about topics like the election, political candidates, terrorism, and gun control  
(2) shooter, consisting of information about the state of the shooter, such as whether he has been arrested  
(3) alert, consisting of updates about proximate facilities closing  
(4) emotion, consisting of individuals expressing sympathy or remorse towards those affected.  
(5) neutral, consisting of reports pertaining to the incident such as victim count and the location, and not any of other categories.
For each category a list of keywords is compiled (Figure 3). If the tweet text contains any keyword from any list, that category is added to the retweeted status in the form of a list. Tweets may have one to five categories. The statuses are colored by the categories deemed most significant. If a status contains “political” content it will be blue, regardless of the other categories it may contain. In descending order the categories by color-dominance are as follows: political, alert, shooter, emotion, and neutral. Because the data is normalized, we can see the percentages of tweets pertaining to each category over time. The chart can be filtered by category, which shows how its percentage changes over time. Upon filtering, the timeline and the tweet list are both updated. Through working with the interface, the category term lists are checked and refined for ultimate results.

<table>
<thead>
<tr>
<th>political</th>
<th>shooter</th>
<th>alert</th>
<th>emotion</th>
<th>neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>imwithher</td>
<td>gunman</td>
<td>lockdown</td>
<td>pray</td>
<td>if the tweet does not contain any of the other categories</td>
</tr>
<tr>
<td>trump</td>
<td>shooter</td>
<td>lock down</td>
<td>awful</td>
<td></td>
</tr>
<tr>
<td>obama</td>
<td>assailant</td>
<td>closed</td>
<td>rip</td>
<td></td>
</tr>
<tr>
<td>hillary</td>
<td>gunmen</td>
<td>down</td>
<td>condolences</td>
<td></td>
</tr>
<tr>
<td>donald</td>
<td>suspect</td>
<td>closed</td>
<td>love</td>
<td></td>
</tr>
<tr>
<td>clinton</td>
<td>custody</td>
<td>closing</td>
<td>heart</td>
<td></td>
</tr>
<tr>
<td>america</td>
<td>manhunt</td>
<td>delay</td>
<td>affected</td>
<td></td>
</tr>
<tr>
<td>democrat</td>
<td>armed</td>
<td>cancel</td>
<td>families</td>
<td></td>
</tr>
<tr>
<td>republican</td>
<td>arrested</td>
<td>all the people</td>
<td></td>
<td></td>
</tr>
<tr>
<td>liberal</td>
<td>esteban</td>
<td>avoid</td>
<td>sorry</td>
<td></td>
</tr>
<tr>
<td>conservative</td>
<td>santiago</td>
<td>sad</td>
<td></td>
<td></td>
</tr>
<tr>
<td>capitalist</td>
<td>perpetrator</td>
<td>home</td>
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<td>election</td>
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</tr>
<tr>
<td>polling station</td>
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</tr>
<tr>
<td>vote</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Figure 3**
Term lists for five categories.
If the tweet text contains any words in any list, the category is added to the tweet.
A tweet can have multiple categories.
Figure 4
Retweeted statuses for five hours following the shooting in Fort Lauderdale-Hollywood International Airport, FL on January 6, 2017.

Figure 5
Retweeted statuses for four hours following the shooting in Azusa, CA on November 08, 2016.
Figure 6
Retweeted statuses for eleven hours following the shooting in New Orleans, LA on November 27, 2016.

Figure 7
Retweeted statuses for eleven hours following the shooting in Seattle, WA on November 09, 2016.
Figure 4 In Detail
The tweets can be filtered by category to see each of the graphs shown below.

Retweeted statuses containing neutral contents

Retweeted statuses containing shooter-related contents
Figure 4 In Detail

The tweets can be filtered by category to see each of the graphs shown below.

Retweeted statuses containing alert contents

Retweeted statuses containing emotional contents

Retweeted statuses containing political contents
5. Resulting Typologies of Response Publics

Three distinctive response publics are discovered through the visualizations and are identified as:

(1) Exploitive
(2) Peripheral
(3) Event Centric

While these response publics, to be described in detail below, can be understood as having fuzzy boundaries and are often involved in networks of other publics, they each demonstrate generalizable characteristics made up of the interactions between the generation, circulation, and relatability of responses, distinguishing their typologies.

(1) *Exploitive Publics* dominantly contain ‘objective’ reportive information, which gets appropriated by participants, used as arguments or as the sources for reactions. While appropriation of content is common in information production and exchanges on SM, the type of information and the way it is appropriated by participants is quite cohesive and consistent in response to shootings, and demonstrates this in the similarity of content and terminologies used in tweets within these publics. In this study, a prominent type of information is appropriated to support individual or group incentives: tallies of incident fatalities, victims, or occurrences.

*Tallies* of incident fatalities, victims, or occurrences are most commonly used to support or oppose gun control. These tweets often contain gun-related hashtags such as #guncontrol, #gunsense, #2A. They also include political claims, expressing blame towards political parties along-side incident tallies. At a more emotional level, individuals also respond to the tallies with remorse and expressions of helplessness, exhaustion, outrage, and cries for help.
Chicago
These publics are particularly active in Chicago, a city with significant attention given to shootings in MM and SM. Although Chicago does not have the highest gun deaths per population, the shootings which occur there are numerically high, as the population is large, and provoke emotional responses from those within the city as well as those outside. Chicago has become a symbol for gun violence, drawing gun control activist groups, news reporters, and researchers to study and portray the city’s gun violence.

To explore this public in Chicago, the tweets which contain ‘chicago’ between October 8, 2016 and January 7, 2017 are isolated and input into a visualization for further analysis. There are 63,574 tweets in this data set, comprising 1.8% of all shooting-related tweets in this study. A list of keywords and phrases is manually constructed to identify tweets with content that tallies shooting incidents and victims. This results in 38,200 tweets out of the 63,574, or 60% of all Chicago-related tweets. This shows that information which tallies incidents and victims is the dominant type in which discussion about Chicago shootings is situated.

Mass Shootings
When looking specifically at information about mass shootings, only 0.9% contain “mass shooting” or #massshooting in the tweet, and of these, 23% use tallying. Just over 4% of the 63,574 tweets can be indexed to specific mass shooting events, and of these, 10% use tallying.
Gun Control-Related
3% of the 63,574 tweets mention gun-related phrases or hashtags, of these 48% are included in tallies—most of which argue gun control does not work, in tweets like:

#GUNCONTROL Chicago has the strictest gun laws in America. And also over 4,000 shootings this year.

Obama progressive gun control Chicago: 8 killed, 43 wounded in Chicago weekend shootings.

Gun control utopia #CHICAGO already celebrating #2017 with multiple shootings. #HAPPYNEWYEAR.

2500 shootings, 500 homicides last year in Chicago. Strictest gun control in the USA.

Gun violence in Chicago equals a mass shooting every week. Pres. @BARACKOBAMA is silent because the progressive gun control laws don’t work.

Criminally Gun-Controlled Chicago sees over 4,300 shootings in 2016. Democrats are responsible for all these deaths!

We also see arguments for the opposite, but far less, in tweets like:

17 dead, 41 wounded in Halloween weekend shootings across Chicago more gun control please..

Chicago gun control works. only 33 shooting victims so far this year.
Chicago Summary

Chicago hosts exploitive publics around tallying incidents and victims toll of shooting events. The fact that Chicago has strict gun legislation makes these statistics easy to argue that the legislations do not work. This emergence is well-kept, consisting of continual production and circulation of new statistics, which are frequently retweeted. The use of statistics for arguments can be seen strategic in ensuring the up-keeping of the emergence, in comparison to the dissipative response received by individual shootings that do not attain normative identifiers.
(2) *Peripheral Publics* are like exploitive in that they dominantly contain ‘objective’ reportive information, which gets appropriated by participants, however, they differ in that they are more random or incidental emergences which result in arguments or reactions that are the result of associations to which an event or its context can be attributed. These associations increase the amount of attention the event source receives, as they are implemented through metadata bridging via hashtags. The more prominent the bridged publics are, the more the event source will become appropriated to suit the domain of its adhered publics. For example, in this study we see these publics emerge in response to shootings which (1) can be associated into another context, like discrimination or politics, and (2) occur on days of national significance, including holidays or days in which public events are held.

*Albany, NY November 24, 2016*
Around 2am a shooting broke out after a dispute between customers during a private event for a hip-hop promo party, held at the Rocks Nightclub, which is typically known as being a gay bar (DiMascio and Yonkunas 2016). Four men were shot, and one died from his injuries. Police officials and news responders stressed after the incident that this was not another hate crime targeting the LGBTQ community (Ennis 2016).
About 28% of tweets responding to this shooting contain LGBTQ-related hashtags, and 77% specifically mention LGBTQ-related content in describing where the shooting took place. 20% of LGBTQ-related content contains information either clarifying the incident is not an attack against the LGBTQ community, in tweets like:

update: deadly overnight @ROCKS77 shooting in #ALBANY not #lgbtq-bias related, say police.

albany pd says shooting @ rocks nightclub not random attack on lgbt community. 1 dead, 3 injured.

Other tweets consist of individuals relating this shooting to the Pulse nightclub shooting in tweets like:

oh, please not again. shooting at an lgbt bar in new york.

sad news from new york! another shooting at a “gay” venue.
#LOVEISLOVE #GAYWAKEFIELD #GW #LGBT #NY

Albany Summary
Of the 14 shootings in this study occurring in nightclubs, this shooting receives the second-highest number of tweets—440—but has the lowest number of victims—4. The nightclub shooting with the most tweets—663—has twice as many victims—8, and the shooting with the third-highest number of tweets—334—has 6 victims. We can speculate that the peripheral assemblage of other publics which respond to the Albany shooting have increased attention to it. In this regard, the context of the shooting has made it more relatable to other publics.
Seattle, WA, November 24, 2016

Around 6:45pm, a personal argument broke out within a group of people outside a 7-Eleven near a major downtown bus stop. One of the men pulled out a gun and opened fire on the group, hitting four men and one woman before leaving the scene. One of the victims included a bystander. Police were in search of the perpetrator who left the scene on foot. The shooting took place around the corner from where an anti-Trump rally was taking place (Perez 2016), and this led to high volumes of tweets responding to the event.

Within 24-hours of the incident, it received 10,468 tweets, the fourth-highest number of tweets for an individual shooting in this study. About 77% of the tweets have election/protest-related content, as highly active (online and in physical space) publics relate to this incident, spreading information to other protestors to proceed with caution, in tweets like:

apparent shooting outside our offices in #SEATTLE - right next to trump protest. be safe everyone.

there was a shooting at the anti-trump protest in downtown #SEATTLE where i was moments ago. i’m ok, back at my hotel.
Response reaches rumor, when considering the linguistic of the tweets:

- breaking news: mass shooting reported in seattle at trump protest.
- there is a mass shooting at the anti-trump rally in seattle.
- breaking news: shooting in seattle where anti-trump protests were taking place. #NOTMYPRESIDENT.
- breaking: mass shooting reported right next to trump protest in seattle. #TRUMPPROTEST.
- there’s been a mass shooting at an anti-trump rally in seattle. sad thing is i’m not surprised by this at all.

These tweets specify that it is a “mass shooting”, a term which most shootings do not specifically receive in tweets. They also say it occurred “at” the protest, which was not the case.

After a short time, we see more tweets specifying the shooting took place “near” the protest.

- update: seattle tv station now says shooting happened near trump protest not at. #BREAKINGNEWS
- mass shooting: - seattle, washington - 5 people shot - anti trump rally nearby, not at the rally.
About 34% of the tweets seek to clarify the rumoring, providing more detail like:

march was 3 miles away when shooting happened.

the shooting in downtown seattle appears to be unrelated to the #NOTMYPRESIDENT protest.

seattle fire responding to a possible shooting at 3rd and pine. this is not related to the anti-trump protest

the #seattle shooting was “nearby” the anti-trump rally, police have not made an “official” connection yet.

#BREAKING: #TRUMP protesters were not in the area of the shooting scene at the time.

shooting does not appear to be #ANTITRUMPSEATTLE related. march was in cap hill at time of shooting.

again, the #NOTMYPRESIDENT protest wasn’t near that area of downtown seattle when the shooting occurred.
About 12% of the tweets use trump or protest-related hashtags, dominantly:

#NOTMYPRESIDENT  
#TRUMP  
#TRUMPPROTEST  
#DONALD

Seattle Summary
The proximity of the shooting to Seattle’s anti-Trump rally has influenced the high coverage it receives. What we see in this shooting is an emergence of a public, connected by proximity to a highly-political protest, whereby information is adjusted to the needs of the public in which it has been adhered to—in this case, a public that relies on and leverages metadata on SM, to assemble in physical space and concentrate attention to its cause. Brought into the hashtag amalgamation of the protest is this nearby shooting, which becomes appropriated as an event that “is” or “is not” related to the protest, and occurred “at” or “near” it. The information spreads throughout the community both in the form of rumor and clarification, but also warning protestors to proceed with caution. Little is mentioned about what happened in the shooting or the motive of the shooter, and there is a lack of emotional support expressed for victims by individuals in this public, which, as we will see, are typically common to shootings which provoke large response publics.
Event Centric Publics consist heavily of ‘objective’ reportive and participative reportive information which does not stray far from its event source and arises at high velocity. These publics emerge when there is a need by many for information regarding what happened at the scene of an event, who is involved, whether the threat has subsided, and uniquely, for information like this from individuals who are amongst the chaos and can provide valuable perspectives inaccessible to MM coverage. These publics are most prominent during high-profile events, such as was seen following the attacks in Paris, France in November 2015 and Orlando, Florida in June 2016. Individuals orientate around common hashtags, which are essentially ‘nominated’ through crowdsourcing or frequent selection by individuals, providing a space where dense amalgamations can form and expand. It is common for these publics to encompass diverse ecologies of other publics, including exploitive and peripheral, especially after the initial chaos of the event subsides. In this study, only one mass shooting provokes the emergence of an event centric public–the shooting at Fort Lauderdale-Hollywood International Airport, with 206,481 tweets responding to the incident within the first 14 hours.

Fort Lauderdale-Hollywood International Airport
Broward County, FL January 6, 2017
At approximately 12:55pm a shooter opened fire at Fort Lauderdale-Hollywood International Airport near the baggage claim in Terminal 2. The shooter, identified as Esteban Santiago-Ruiz, a 26-year-old resident of Alaska and a military veteran, checked a declared 9mm pistol in his baggage and upon receiving it from baggage claim, loaded the pistol in the airport bathroom before opening fire. The shooting lasted about 70 to 80 seconds leaving 5 dead and 6 wounded. After running out of ammunition, the shooter lay on the ground and was arrested by law enforcement officers. About 36 others sustained injuries during the panic, as crowds fled the scene.
At 12:57pm, an initial tweet reports “I’m at the Ft. Lauderdale Airport. Shots have been fired. Everyone is running” (Strassner 2017). Within minutes, there is a massive spike in tweets reporting what has just occurred, peaking at 2pm with an accumulation of 79,530 tweets. Circulated information includes official reports, confirmations, and actions taken by authorities, emphasizing information from official sources, with phrasing like “officials confirm”, “us official tells cnn”, and “broward county sheriff’s office tweets”, in tweets like:

#BREAKING: multiple reports of #SHOOTING at fort #LAUDERDALE airport, #FLORIDA.

#BREAKING we are following reports of a shooting a @FLLFLYER (fort lauderdale airport). @BROWARDSHERIFF is responding.

former wh press secretary @ARIFLEISCHER reports a shooting at ft. lauderdale airport.

#BREAKING: the former wh press secretary is tweeting about a shooting at the ft. lauderdale airport.

About 25% of tweets report the status of the gunman, describing whether he has been captured and regarding his identity and possible motive (Figure 8).

Figure 8
% of shooter-related retweeted statuses per hour in 14 hours following the shooting
Information also circulates from reporters or eye-witnesses on the scene:

@ABCActionNews: #BREAKING: reports of shooting at ft. lauderdale airport.

we have seen people running outside terminal. one shooter; five victims - former wh press secretary who is in the #AIRPORT cites police.

more: “he was just picking off things like target practice,” eyewitness says of gunman at fll airport shooting…

witness to ft. lauderdale shooting said he heard “popping noises,” ran to another terminal with his children…

Because the airport is related to many other facilities and processes, information about flight delays and cancellations, and the state of lockdown inside Fort Lauderdale airport is also spread.

#us: shooting has occurred in #FTLAUDERDALE airport. airport is currently closed. verify your travel plans.

#FLL still shut down after shooting; ph # to call if you have family/friends going through #FLL is 1-866-435-9355

united flight from denver to fort lauderdale diverted, southwest flight delayed in wake of airport shooting
Emotional and Physical Proximity

Amidst these official reports and updates, we begin to see individuals reacting to the shooting, expressing feelings that the shooting is “close to home” or praying for the safety of individuals they know who are expected to be at the airport that day. About 17% of the 206,481 tweets express emotion and mention themselves or people they know who frequent the Fort Lauderdale airport (Figure 9), in tweets like:

- current shooting at fort lauderdale airport and my mom is in the same terminal hiding. please keep her and everyone there.

- incredibly blessed to have made it out of the ft lauderdale airport an hour before the shooting. #BLESSED.

- minutes after I boarded my flight to Baltimore from Ft Lauderdale airport, there was a shooting in my terminal.

- I am currently at the airport waiting for my flight into Ft. Lauderdale and just read there’s a shooting going.

- my son flew home through #fortlauderdale airport today. this shooting hits very close to home. praying for victims.

**Figure 9**

% of emotional retweeted statuses per hour in 14 hours following the shooting
Content gradually shifts from reporting to reaction and argument as exploitive publics adhere. Almost 9% make political argument from this event, blaming political parties, religions, or presidents.

One tweet in particular is frequently retweeted, making up 8% of all politically-related responses:

> multiple are dead in the fort lauderdale shooting and this is the first thing conservatives do... disgusting, but sadly not surprising.

This tweet is in reference to another, containing the image in Figure 10:

> How much you wanna bet the Fort Lauderdale shooter was a Muslim

**Figure 10**
We also see publics similar to those that emerge around Chicago, in tweets like:

today is the sixth day of 2017. #FTLAUDERDALE is the sixth mass shooting of the year

the shooting at fort lauderdale airport is already the 6th mass shooting of 2017, according to the gun violence archive.

florida lawmaker @GREGSTEUBE’s take away from today’s horrific mass shooting in florida enabled by weak gun laws

Fort Lauderdale-Hollywood International Airport Summary
This high volume and high velocity of response to the Fort Lauderdale shooting demonstrates the speed and scale at which information following crises events can be spread. It shows us how Twitter is used to spread different types of information and how the context, being an airport that is connected to many other facilities and functions, makes content from official sources, as well as individuals at the scene particularly valuable. We also see strong emotional bonds within this public and arguments on politics and gun legislation. Overall, this shooting demonstrates a variety of relatability factors, making it a host from which diverse ecologies of response publics can emerge.
6. Consideration

This research was approached with a desire to understand typologies of publics which emerge in response to mass shooting events. With such a general inquiry, the process of indexing tweets to mass shootings proved to be more difficult than expected. Throughout the process of indexing, it was found that indexing based on general keyword and timespan-matching often returned noisy results. This demonstrated the hardships of investigating large SM data sets without using hashtag-driven searches, or searches based on normative terminologies given to specific events. With this challenge, data visualization played a key role in providing an environment to display indexed results, along with noise, so that unexpected contextual phenomena could be found. For example, when indexing shooting events in Chicago, many tweet results were not related to the shooting event, but were general discussions about shootings using tallying, which were incidentally retweeted frequently during 48-hour timespans following a few mass shootings that were looked at.

If methods were used that implemented stricter indexing, or excluded events which could not be indexed, this exploitive public would not have been found. In short, what would have been considered noise, was instead information pertinent to this research, and was allowed to surface by implementation of loose indexing criteria. With this said, indexing played a major role in making sense out of the massive quantity of SM data. This initial step shaped the investigation, and proved useful for finding general patterns in response volumes to shooting events, and relationships between the degree of indexicality of a shooting and the volume of results. It was often found that shootings that were more easily indexed also had either higher tweet volumes, or more consistent response contents.
Data visualization continued to shape this research, as unique phenomena found in the first interface could be pursued with more informed intentions in following visualizations. Setting up environments conducive for intent-driven inquiries, which also allow for unexpected phenomena to surface, was key throughout the process of this study. In this sense, we can view data visualization as a tool for qualitative analysis, providing legible viewpoints from which more deliberate views can be made to answer more informed questions. These methods can help us to look beyond that which is easily measured or traced, like hashtags and retweets, and explore more meaningful content in our virtual social worlds.
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