

BEND. DON'T BREAK.
ANALYZING RESILIENCE AND COPING DIALOGUES ON SOCIAL
MEDIA IN THE AFTERMATH OF TWO TERROR ATTACKS

by
Staci B. Smith

A Dissertation

*Submitted to the Faculty of Purdue University
In Partial Fulfillment of the Requirements for the degree of*

Doctor of Philosophy



Brian Lamb School of Communication
West Lafayette, Indiana
May 2020

THE PURDUE UNIVERSITY GRADUATE SCHOOL
STATEMENT OF COMMITTEE APPROVAL

Dr. Howard Sypher, Chair

Brian Lamb School of Communication

Dr. Stacey Connaughton

Brian Lamb School of Communication

Dr. Ralph Webb

Brian Lamb School of Communication

Dr. Nathalie Duval-Couetil

Department of Technology Leadership and Innovation

Approved by:

Dr. William B. Collins

Dedicated to my husband Brian Smith, and my four sons Parker, Connor, Isaac, and Joshua.

Thank you for believing in me and supporting my chance to be more.

ACKNOWLEDGMENTS

This dissertation has been inspired and influenced by many individuals to whom I wish to acknowledge. First, I am grateful for Dr. Howard Sypher who served as the chair for this dissertation and as my advisor throughout my doctoral studies. You listened, understood, and patiently helped me through the options and processes of navigating a doctoral degree. You allowed me to stay true to my goals and values. Thank you, Dr. Sypher, for your commitment to me throughout this process. I also acknowledge the contributions of the other committee members. Dr. Stacey Connaughton helped me develop my research agenda and always listened to my concerns. Dr. Nathalie Duval-Couetil for her professional and academic advice. Dr. Ralph Webb for being willing to step in and provide invaluable guidance in the final step of this dissertation. I also acknowledge the many other members of the Purdue faculty who taught me and who encouraged me in my scholarly pursuits. My education at Purdue opened my mind to new ways of looking at research and new areas to explore.

Most importantly, I acknowledge the role that my family played in this process of pursuing, first, a master's and then a doctoral degree and writing a dissertation. Pursuing a doctorate while being the mother to four boys was something miraculous. Without the support and encouragement of my husband, none of this would have been possible. His constant encouragement that nothing is impossible and taking it one step at a time helped me to pursue this degree one semester at a time. Brian would have special boys' nights when I would have night classes. He made these nights so amazing that my boys would be sad when I would have class cancelled. He encouraged me to do something that very few mothers of four children are capable of because he considered my education as an asset to our family and our relationship. It was never a burden to be a part of the process of me obtaining a Ph.D. My four sons, Parker, Connor, Isaac, and Joshua I thank you for sharing your hugs, smiles, and listening ear as we sat at the kitchen table doing homework together. Their willingness to eat out on occasion and to take a walk when I needed a break did not go unnoticed. Brian and my sons were as much a part of this process as I was, we all grew and developed new skills and abilities that could not have been acquired any other way. I'm grateful for the process. Finally, I acknowledge my parents, Dr. Jim L. Bushnell and Sue Bushnell MA., for inspiring me from a young age to always seek the truth and encourage me to attain as much education as possible. They always taught me to

believe women are capable of earning a Ph.D. My mother constantly told me she was proud of what I was accomplishing as a mother and as a scholar. Lastly, to all women and mothers to believe we should never stop learning, and just because you have the title of mother doesn't mean you can't also have the title of Ph.D. We are capable of doing so much more than we think.

TABLE OF CONTENTS

LIST OF TABLES	8
LIST OF FIGURES	9
ABSTRACT	10
CHAPTER 1. INTRODUCTION	11
Scope and Context of the Study	12
Method	13
CHAPTER 2. LITERATURE REVIEW	15
Social Media Engagement	15
Information Diffusion	15
Dialogue	17
Crisis	18
Crisis Coping	19
Resilience	21
Resilience and Crisis Coping	22
Assessing Coping and Resilience through Social Media Dialogue	23
CHAPTER 3. METHOD	25
Data Collection	25
Data Analysis	26
CHAPTER 4. RESULTS	29
RQ 1. How Did Individuals Use Social Media to Respond to the Paris Terror Attacks?	30
RQ 2. How Did Individuals Use Social Media to Respond to the Barcelona Terror Attacks?	40
CHAPTER 5. DISCUSSION	51
Information Distribution, Emotional Expression and Community	51
Emotions and Crisis Coping	52
Resilience in the Paris and Barcelona Terror Attacks	53
Coping, Resilience, and Health Communication	56
Implications for Public Relations and Crisis Communication	57
Limitations and Future Directions	59

Conclusion	60
REFERENCES	61

LIST OF TABLES

Table 1. Paris terror attack clusters text.....	32
Table 2. Paris terror attack sample tweets.	33
Table 3. Barcelona terror attack clusters text.....	43
Table 4. Barcelona terror attack example tweets.	44

LIST OF FIGURES

Figure 1. Paris terror attack clusters.	31
Figure 2. Paris terror attack cluster 1.	35
Figure 3. Paris terror attack cluster 2.	36
Figure 4. Paris terror attack cluster 3.	37
Figure 5. Paris terror attack cluster 4.	38
Figure 6. Paris terror attack cluster 5.	39
Figure 7. Barcelona terror attack clusters.	41
Figure 8. Barcelona terror attack cluster 1.	45
Figure 9. Barcelona terror attack cluster 2.	46
Figure 10. Barcelona terror attack cluster 3.	47
Figure 11. Barcelona terror attack cluster 4.	49
Figure 12. Barcelona terror attack cluster 5.	50

ABSTRACT

Social media have become increasingly useful in identifying conversations during a crisis, particularly on Twitter where discussion tends to be public, accessible, and extensive. Through social media, individuals engage in social interaction and dialogue, making social media platforms a place where crisis coping activities may be identified, tracked and evaluated. This study examines crisis response of two separate crisis events, the terror attacks in Paris (2015) and in Barcelona (2017). Using semantic network analysis, this study examined dialogue surrounding each crisis over three days following the original crisis events, marked by the hashtags #Paris (24,728 tweets) and #Barcelona (27,338 tweets). Results show that the most dominant dialogue in the Paris and Barcelona terror attacks demonstrated central themes of information distribution, emotional expression, sense of community, and calls to action. More specifically, results show that the emotional connections trend positive in expressing community and unity. While most of the literature on crisis emphasizes negative response, this study shows that positivity during a crisis is a significant theme of discussions. Furthermore, this study showed resilience in efforts to seek positivity, build community, and create new normals, suggesting that social media engagement might help facilitate resilience.

CHAPTER 1. INTRODUCTION

Bend. Don't break. When a crisis hits, the ability to be flexible, and even resilient, in the face of difficult or even catastrophic events may be the sign of effective crisis response. Yet, resilience is not a focus of crisis communication literature. Instead, much of the literature on crisis focuses on organizational strategies for dealing with crisis, responding to events, and managing crisis recovery. The personal level of a crisis, or what the strategic communication literature might consider the public level of a crisis, receives arguably less attention than the corporate-centered research, leaving principles like resilience underdeveloped.

Resilience may be defined as the ability to bounce back in the face of change, and comprises efforts to “create new normalcies” and affirm identity anchors (Buzzanell, 2010, p. 9). Resilience may be placed in the larger context of crisis coping, a growing research area in strategic communication literature. Crisis coping explains the behaviors individuals may engage in to deal with a crisis. Coping behaviors run the gamut from efforts to understand the impact of crisis events (cognitive coping) to considerations on taking action (conative coping) (Jin, et al., 2012). Crisis coping calls for a focus on individual communication activities and crisis response behaviors.

Social media increase the need to understand the individual or public side of a crisis, especially because they also tend to magnify crisis events. Through social media, individuals engage in social interaction and dialogue, making social media platforms a place where crisis coping activities may be developed, considered, and negotiated. Therefore, social media may do more than serve as places to track crisis response, they may also facilitate and influence crisis coping activities.

Overall, social media serve as a rich context for investigating crisis coping behaviors – they provide evidence for crisis coping as an interactive process built on communication and dialogue, and they may also influence crisis coping. In particular, social media may clarify underdeveloped crisis responses like resilience. This dissertation considers the way social interaction occurs around a crisis, specifically in an online platform. The emphasis of this analysis is coping strategies and resilience behaviors and dialogues around crisis, to better understand how individuals use social media to bend and not break in a crisis.

Scope and Context of the Study

To examine crisis coping and resilience in a crisis, this study investigated crisis response during two separate but categorically-related crises: the terror attacks in Paris in 2015 and in Barcelona in 2017. In November 2015 and August 2017, a series of coordinated terrorist attacks were carried out in Paris, France and Barcelona, Spain, respectively. Once the news of the attacks broke, social media outlets were flooded with updates, experiences, support, and outrage about the attacks. In particular, social media platforms like Twitter provided opportunities for individuals to discuss and debate the causes and impact of the terror attacks. In line with previous research, the terror attacks showed how social media create a space for self-expression, dialogue, and for creating a sense of being there through the virtual environment (Watkins, 2017; Oh & Sundar, 2016). This study examined dialogue surrounding discussion on social media about the terror attacks in Paris and in Barcelona.

Dialogues were chosen as the main focus of this study because studies often focus on social media platforms information-seeking engines (i.e., Austin, Liu, & Jin, 2012), than as self-expression and discussion platforms. And yet, dialogue and self-expression are central components of engagement (Oh & Sundar, 2016). In particular, social media provide users a virtual presence in events that may produce a similar emotional response to physical presence, as individuals gain the sensation of “being there in a mediated environment” (Oh & Sundar, 2016; p. 186) through social media engagement.

By examining social media content, this study identified two concepts in the dialogues between users: crisis coping behaviors and resilience. Crisis coping and resilience may be central to understanding the ways a crisis influences and impacts a society. They are also two concepts that have been underdeveloped in research. In fact, even the connection between crisis coping, which represents the behaviors individuals show in response to a crisis, and resilience, which represents the ability of individuals to maintain normalcy and bounce back from a crisis, is underdeveloped in research. This study considered crisis coping behaviors a factor of resilience. In other words, resilience comprises and is influenced by crisis coping behaviors.

Method

This study employed a mixed-method approach to understand the crisis coping and resilience in Twitter dialogues surrounding the Paris and Barcelona terror attacks. In particular, this study used a semantic network analysis and text analysis to obtain a fuller picture of the nature of discussion following the terror attacks. Semantic network analysis involves analyzing the connectedness of words in social media content across all participants in the discussion about the terror attacks. Semantic network analysis reveals relationships between words in a dataset, and is based on the assumption that words that exist close to each other are likely related (Lambert, 2017). The unit for this analysis is the words in Tweets that featured the hashtag #Paris or the hashtag #Barcelona. All tweets for each hashtag were downloaded from Twitter using Crimson Hexagon from a period of time of three days following each respective terror attack. Dialogue clusters were created using NodeXL and AutoMap software, which revealed themes for the dialogues surrounding each cluster. A text analysis was then conducted to verify suggested themes and reveal depth and nuance for each of the dialogue clusters.

This study was based on a pilot study of the Barcelona and Paris terror attacks. However, that pre-study only evaluated a short-period of time (24 hours following the Terror attacks), thus limiting the total number of Tweets analyzed. More importantly, the timeframe of Tweets limited the pilot study. Crisis coping and resilience, and the overall development of an issue on social media are all processes that span longer than 24 hours. This study examined a longer period of time—three days following the crises—arguably a sufficient amount of time to gather both the lifecycle of social media discussion about the terror attacks and the extent of crisis coping themes and processes displayed on social media.

Using semantic network analysis and content analysis together allowed the researcher to examine the data from two perspectives, in order to tell a more complete story of crisis coping and resilience following these terror attacks than any one method would allow. In this study, the semantic network analysis is a starting point to identify how the content is clustered and the content analysis allows for in depth understanding of the dialogue clusters. In past research, content analysis was coded tweet by tweet to identify themes within a tweet and then to see if those codes were common among other tweets coded with the same hashtag.

This approach also allowed me to get at the core of what defines a public in a crisis. Publics are a “group of people who face a common issue” (Gonzalez-Herero & Pratt, 1996, p.

84). Themes within each dialogue cluster may be considered the themes underlying the ways that people face the common issue (in this case, the terror attacks). In other words, the varied ways individuals discuss the attacks on Twitter may be used to define and differentiate a public as they gather and cluster around a concept or term. For, example, one public in a terror attack may be talking about sympathy and hope for victims and another will be discussing response time of government official.

Semantic network analysis is also consistent with the notion that meaning in communication is co-created. For example, Capriotti and Pardo Kuklinski (2012) suggest the concept of inter-creativity to emphasize the proactive nature of publics in creating content. As digital media tools have facilitated the transition of consumers into “prosumers”—or content creating consumers—intercreativity emphasizes the way individuals create meaning together, which provides evidence for the importance of social media listening for organizations and groups. Furthermore, digital tools also shift the focus from one-to-one interactions to an array of multilateral relationships between different sets of publics (Capriotti & Pardo Kuklinski, 2012, p. 621). This multiplicity of connection points suggests that interest may overlap and lead to combined actions between communicators in a system (Canfield, 2007). The recognition of public experiences and contributions, as well as the co-creation of reality in a dialogic partnership, may be particularly suited for crisis communication research where insight on publics’ experiences have been overshadowed by a focus on crisis communication strategy. And, as Kent (2011) pointed out, “A focus on the organization just ignores the fact that genuine crises have broad implications for a variety of stakeholders” (p. 706). Therefore, crisis communication should examine the way publics express themselves in a crisis. This study sought to fulfill this need by examining Twitter dialogue about the terror attacks.

CHAPTER 2. LITERATURE REVIEW

Social media provide a lens on the communication activities of individuals during a crisis, through the commentary that individuals provide on social media platforms. However, more importantly, social media may influence and even facilitate crisis coping and resilience through the dialogue and interaction that platforms provide. This chapter outlines the literature on social media in a crisis, as well as resilience and crisis coping behaviors.

Social Media Engagement

Social media are two-way, interactive media platforms through which users exchange information, engage in dialogue, and manage self-presentation (Perlmutter, 2008; Rettberg, 2009). Social media are often used for discussing and debating issues (Park & Reber, 2008). Social media activities, including liking, sharing, commenting, and following, are often collectively referred to as engagement. Scholars have taken an experiential approach to understanding social media engagement, arguing that social media activities may lead to emotional immersion in the media experience (O'Brien, 2016; Oh & Sundar, 2016). As a process of becoming emotionally absorbed through social media platforms, engagement may be driven by concepts like usability, appeal, and level of involvement (O'Brien, 2016; Oh & Sundar, 2016). Within the context of crisis discussion on social media, two particular facets of engagement worth considering are the technological aspects (information diffusion) and the interpersonal aspects (dialogue) of social media platforms.

Information Diffusion

Though engagement has been considered experiential, at its core, it may be a process of information diffusion facilitated by technological capabilities and structures. In fact, social media engagement is commonly evaluated by examining the diffusion of information through such behaviors as commenting, sharing, following, and forwarding content, suggesting that engagement is a process of diffusion. One area where online information diffusion has seen considerable attention is social movements and protests (Earl, et al., 2010). Digital media offer unique opportunities for participants to organize cheaply, quickly, and easily (Earl & Kimport,

2011). Digital media technology allows individuals to meet in a virtual environment, changing the content and the dynamics of the social process, and reducing the need for participants to be physically present to act collectively (Earl & Kimport, 2011). For example, a study about an activist effort in Guatemala in 2009 showed that online technology allowed individuals to support the activist effort, demand justice, and ask for an end to violence all through social media platforms (Harlow & Harp, 2012). Another study of upheavals in Egypt and Tunisia showed how digital media helped to turn individualized, localized, and community-specific dissent into structured movements with a collective consciousness about both shared grievances and opportunities for action (Howard & Hussian, 2011). In each of these examples, the success of the online protest effort depended on the diffusion of information.

Information diffusion through social media is not limited to online platforms. In the above examples of Egypt, Tunisia, and Guatemala, offline information was distributed online, and vice versa. Therefore, the proper way to consider information diffusion on social media may be through a hybrid approach that considers offline and online media equally. In 2011, Lotan and his co-authors (Lotan, et al., 2011) argued that old media (or traditional offline media) and new media (or digital social media and web media) have a symbiotic relationship, and that each platform fulfills distinct roles for media users. Furthermore, they argue that media users (i.e., activists, bloggers, journalists, etc.) are pivotal in spreading information, and this diffusion transcends both offline and online media (Lotan, et al., 2011). Hybridity, or the diffusion of information across media types, often depends on what has been referred to as “the drama of instantaneity,” or the priority of capturing what is happening now, through crowdsourcing efforts among elites, influencers, and other media users (Papacharissi & de Fatima Olveirs, 2012). The resulting stream of information combines news, opinion, and emotion to the point where discerning one media type from another is difficult (Papacharissi & de Fatima Oliveirs, 2012). Some may argue, then, that hybridity in media cancels the need to consider digital media separate from traditional media.

However, others argue that the flow of online information is different enough to warrant distinguishing diffusion online from traditional offline media. For example, Hermida, et al., (2014) argued that Twitter discourses demonstrate a trajectory of news flow that is partially independent from mass media reporting. The Twittersphere often has messages that circulate within a specific community, but might also be a way of broadcasting information to readers and

viewers that provides real-time coverage from the scene of news events (Hermida, et al., 2014). Furthermore, Hermida, et al. (2014) argued that Twitter can serve as a channel for the distribution of materials from journalists and mainstream media, especially around a crisis or breaking news.

Inasmuch as engagement is a process of information diffusion, it is necessary to consider all the influences of distribution, including both online and offline involvement. Taking a hybrid approach to understanding information diffusion as a facet of engagement allows for a holistic view of the way information is distributed as part of the social media experience.

Dialogue

Social media have been praised for their capability to engender connection and dialogue (Waters & Williams, 2011), rendering dialogue a principal construct for examining social media engagement. In fact, dialogue may be considered one of the natural aspects of the social media experience. Kent and Taylor defined dialogue as “any negotiated exchange of ideas and opinions” (1998) and suggested the concept could be used to build corporate websites. Dialogue, according to Kent and Taylor (1998) was composed of five principles of effective web design: information usefulness, a website’s ease of use, feedback loops on the site, the conservation of visitor time on a website, and the generation of return visitors.

However, the concept of dialogue, according to Kent and Taylor, goes beyond a set of guidelines for building a website. Rather, they argued that dialogue is “meaningful interaction” that includes a mutual orientation between participants, the importance of input, empathy, risk, and commitment (Taylor & Kent, 2014, p. 388). Dialogue is built on mutual understanding and equality among communicators (Taylor & Kent, 2014). For dialogue to flow, there must be shared meaning, understanding, trust, and commitment to the interaction (Taylor & Kent, 2014, p. 389).

Dialogue is also co-created. Capriotti and Pardo Kuklinski (2012) argued that dialogue is built from a proactive process of content creation between communicators. They argued that digital media have turned consumers into prosumers (consumers who create content), and therefore, the exchange between communicators on social media platforms is intercreative (Capriotti & Pardo Kuklinski, 2012). Because digital media connect all types of individuals and organizations, there are a multiplicity of connection points, and dialogue may comprise

intersecting layers of interest, relevance, and connection (Capriotti & Pardo Kuklinski, 2012, p. 621; Canfield, 2007).

Dialogue is particularly relevant to social media interaction and crisis – engaged social media users may be inclined to be involved in interaction and committed to the debates surrounding a crisis. Therefore, if dialogue represents the ways individuals may invest in a discussion or debate, then a dialogic approach to understanding crisis response on social media would emphasize the ways individuals express themselves in a crisis.

Crisis

Crisis is a broad term that may describe a number of different event types. However, the literature suggests that crises are major, unexpected events that result in significant impact on human lives, property, or other important facets of society (Coombs, 2012; Sellnow & Seeger, 2013). Though definitions vary throughout crisis research, the notion that a crisis must leave a tangible impact is fairly consistent across definitions (Sellnow & Seeger, 2013). Perception is also a critical component of defining a crisis. Fediuk, Coombs, and Botero (2012) argued that a crisis comprises “the perception of an event that violates important value expectancies” (p, 638).

Several different models for crisis have been developed, primarily in public relations literature. Most models focus on the way an organization should manage communication based on factors like the attribution of blame by an organization’s publics, or the ways publics might get information about a crisis from a company. Perhaps the dominant model of crisis communication is the situational crisis communication theory (SCCT), which prescribes how a company should respond to a crisis based on factors like crisis responsibility, crisis history, and pre-crisis reputation (Coombs, 2012). Other models are more social media-based. For example, Jin and Liu (2010) proposed the blog-mediated crisis communication model (BMCC), which was based on the notion that crisis information is distributed through blogs, and that organizations should tap influential bloggers to distribute their messages. The authors later renamed the BMCC to the social-mediated crisis communication model (SMCC) to capture the array of social media platforms, but the essence of the model remained the same – that companies should distribute crisis information via social media influencers (Liu, Jin, Briones, & Kuch, 2012). These social media models are also based on an assumption that crisis information is distributed between individuals through online networks and communities. The SMCC model suggests that crisis

information is transmitted based on form (traditional media or digital media) and user type (creators, followers, or inactives), and that information flows either directly (between creators and followers) or indirectly (between followers and inactives) (Austin, Liu, & Jin, 2012; Liu, et al., 2012).

Crisis communication models like the SMCC and SCCT models focus heavily on message distribution, leaving the meaning-making activities of those involved in a crisis relatively under-developed. Furthermore, these models feature very little focus on the content, itself, creating a blind spot around crisis perception. Therefore, despite the value of crisis models like the SCCT and SMCC, more research is needed to understand the way individuals discuss, share, and make meaning of crisis information. In particular, the concepts of crisis coping and emotional response provide a valuable context from which to assess social-mediated behavior in a crisis because doing so puts the focus on meaning-making experience. The sections that follow explore crisis perceptions and coping activities that an individual may engage in following a crisis, as well the way social media may influence those meaning-making processes.

Crisis Coping

Crisis events represent an inevitable and unexpected change from the norm, and often require adaptation, adjustment, and flexibility (Coombs, 2012; Sellnow & Seeger, 2013). This departure from routine invokes a response whereby individuals choose what type of action to take, and how to respond to and manage the impact of crisis events. This response is known as crisis coping, and may include activities such as assigning responsibility, interpreting the relevance and impact of events, and evaluating the effectiveness of potential responses. Some have taken coping a step further, to define it as an individual's use of behavioral and cognitive strategies to modify adverse aspects of their environment or to escape a threat (Gil, 2005, Weinberg et al., 2014).

In public relations and strategic communication literature, coping has been divided into two categories. The first are cognitive strategies, whereby individuals seek to gain "further comprehension" or change opinion" (Jin, et al., 2012, p. 273). The second type of coping are conative strategies, which are characterized by "taking action" in response to a crisis event (Jin et al., 2012, p. 273). Furthermore, research shows that cognitive coping strategies tend to precede conative coping strategies (Jin, et al., 2012).

Research outside of public relations and strategic communication has identified other coping strategies. For example, some have considered coping a dichotomy between active and avoidant strategies, where active coping involves using available physical, financial, and human resources, and avoidant strategies involves refusal to address or acknowledge a crisis situation (Gerry and Li, 2010). Others have considered passive forms of coping, including cutting expenditures, leisure, utilities, and borrowing money or resources (Cleaver, 2005). Increasing participation in networks is linked to more active coping strategies and is linked to increased individual and household productivity (Van Den Broeck, & Dercon, 2011).

Network participation is another coping strategy. Van Den Broeck and Dercon (2011) found that participation in networks is linked to active coping strategies, as well as increased productivity among individuals and households. Others have considered reliance on network and community resources as a form of coping, including Habibov and Afandi (2017), who studied survival coping strategies, whereby individuals rely on community-based resources and social capital to deal with crisis events. They found that high levels of social capital within a community engender safety-net coping strategies, including relying on community resources and the welfare state to recover from a crisis (Habibov & Afandi, 2017). Overuse of safety-net strategies may lead to depleting coping strategies, which include reducing consumption of community resources and less reliance on safety-net strategies (Gerry & Li, 2010; Notten & de Crombrughe, 2012). Socio-demographic characteristics also played a role in the use of safety-net strategies. Others have categorized coping into active and avoidant coping strategies, where active coping reflects proactive efforts to cope, and avoidant represents efforts to ignore a crisis (Wu, et al., 2013). Finally, network participation has been identified as a crisis coping strategy, and research has suggested that participation in community networks may reduce social exclusion following a crisis (Gerry & Li, 2010).

Emotions play a central role in crisis coping, as individuals negotiate a range of negative and even positive emotions in response to a crisis. Crisis emotions are often based on the meaning and responsibility one assigns to a crisis event (Feduik, et al., 2012), and may be either negative (i.e., anger, fright, anxiety, and sadness) or positive (i.e., hope, relief, and sympathy) (Feduik, et al., 2012; Jin, et al., 2014; Lazarus, 1991). Jin, et al. (2012) established a systematic approach to understand the connection between crisis coping behaviors and emotions. In their Integrated Crisis Mapping (ICM) model, they proposed four dominant emotional responses to a

crisis: anger, fright, anxiety, and sadness. The model predicts that sadness and fright in a crisis elicit cognitive coping behaviors, while anger and anxiety elicit conative coping strategies (Jin et al., 2012). Furthermore, the model suggests that conative strategies are dominant, but cognitive strategies may occur first because “one makes sense of the uncertainty of a crisis within oneself first, before one takes action to deal with the situation” (p. 288).

Much of the literature on crisis emotions centers on the four negative responses identified by the ICM. However, in the pre-study to this study (Smith, Smith, & Knighton, 2018), findings suggested the need for an increased emphasis on positivity in crisis response. Using a mixed methods approach (semantic network analysis and content analysis), we analyzed Tweets 24 hours following terrorist attacks in Paris in 2015 and in Barcelona in 2017. The results showed that the largest dialogue clusters in the study were primarily positive, including the prevalence of hope, sympathy, and even relief as primary emotional responses. This suggests that in the first 24 hours of a crisis, emotional response may be more positive than might be expected, at least on social media. This signals the need to consider positivity in a crisis, and its place in the ICM. Results showed that positive emotional expression may correlate most with cognitive coping strategies like positive thinking.

The results of the pilot study suggest the need to expand consideration of crisis response to an under-recognized concept: resilience. Attempts to maintain the status quo following the Paris and Barcelona terror reverberated through some of the largest dialogue clusters in the Tweets we analyzed.

Resilience

Resilience may be considered the ability to return to form or maintain stability despite difficulty (Brand, & Jax, 2007). Buzzanell (2010) argued that resilience comprises an individual’s effort to “create new normalcies” and “affirm identity anchors” in the face of change (p. 9). Resilience is the ability to rebound or bounce back after a crisis (Walsh, 1996). Some view resilience as the capacity to thrive in the face of adversity, and consider it a dynamic process (Luthar et al., 2000). Resilience levels can grow and change after one faces adversity, but can also collapse when confronting chronic stress (Meredith et al., 2011). Resilience is a dynamic process that can vary based on life experiences, personality, and circumstances (Connor & Davidson, 2003).

Resilience is often a result of communication processes like discourse and interpersonal interaction (Buzzanell, 2010). To develop resilience, an individual may need access to resources and shared beliefs (i.e., through family and friends) that foster a sense of coherence, competence, confidence, and collaboration that are vital to resilience (Walsh, 1996). A family or a network of individuals that acts like a family may provide the framework individuals need to be resilient after a crisis. Taking this one step further, an individual may have this framework either online or offline. A network of individuals going through a crisis either in person or online many provide the supportive framework necessary to foster resilience.

Of course, an individual's resilience may also be based on the resilience of a society's ecology, infrastructure and social systems (Xu, et al., 2015). If key social systems are not stable, an individual may not be able to establish high levels of resilience. For example, following a natural disaster, Costa Rica's infrastructure (i.e., water, electricity, and roads) were slow to recover. The inability of their infrastructure to be resilient made it difficult for individuals to be resilient, demonstrating that resilience can be explored through a system's adaptability (Xu, et al., 2015). Connectedness between individuals and systems can be critical for resilience because it provides an exchange of resources (Holling & Gunderson, 2002). Connectedness can also undermine resilience if individuals are too dependent on systems for recovery.

Finally, resilience may comprise an individual's ability to reach different levels of stability. For example, in the process of bouncing back from a crisis, an individual may go through multiple states of stability before it can be said that an individual has fully recovered from a crisis or attained a new normal (Xu, et al., 2015).

Resilience and Crisis Coping

It may be difficult to place resilience within the discussion of crisis coping. Is resilience a coping mechanism, or is crisis coping a factor of resilience? Though the literature on resilience in a crisis has not established a definitive answer on this issue, research suggests that crisis coping may be a factor that influences levels of resilience.

Despite being closely related and often used interchangeably, there is growing consensus that resilience and coping are conceptually distinct, but connected constructs (Campbell-Sills et al., 2006). Resilience is a set of protective factors (close relationships with family and community, optimistic outlook, embracing challenges) that allow an individual to have a positive

response to adverse events, and crisis coping comprises the variety of responses an individual may have to an adverse event (Connor & Davidson, 2003; Meredith et al., 2011). A further connection is that resilience is assessed by a measurement of one's ability to cope with adversity (Connor & Davidson, 2003).

Research has also explored the ways crisis coping influences resilience. For example, resilient individuals have been found to employ greater amounts of active coping (Feder et al., 2013; Li & Nishikawa, 2012) and social support-seeking behaviors (Wu et al., 2013). Individuals who engage in active coping strategies are likely to have higher levels of resilience, while individuals using avoidant coping strategies are unlikely to have lower levels of resilience (Connor & Davidson, 2003; Cook & Heppner, 1997; Tobin et al., 1989; Garcia-Secades, et al., 2014). Furthermore, Fletcher and Sarkar (2013) found that active coping and avoidant coping correlate with an increase or a decrease, respectively, of resilience levels.

Assessing Coping and Resilience through Social Media Dialogue

Social media have become a gateway for seeking and sharing information during a crisis (Liu, Austin, & Jin, 2011) because of their ability to transform “monologues into social dialogues” and facilitate content dissemination “through social interaction between individuals, groups, and organizations” (Botha & Mills, 2012, p. 85). Social media platforms may be natural places where crisis coping and resilience develop because of the tendency of these platforms to cognitively and emotionally immerse individuals in the media experience (Oh & Sundar, 2016, p.183). Engagement in social media is often marked by “voluntary extra-role behaviors” (Kang, 2014, p. 400), including peer-to-peer interaction and dialogue. To this point, Gil de Zúñiga, Molyneux, and Zheng (2014) and his colleagues found that self-expression and interaction on social media lead to prosocial behaviors.

Central to both social media engagement and crisis coping is social interaction and dialogue, making social media platforms a rich environment to identify and track crisis coping behaviors and levels of resilience. Dialogue has grown as a research topic over the last decade, particularly around social media engagement (Igenhoff & Koelling, 2009). However, very few studies have centered the focus on the level of public meaning and understanding in engagement and dialogue (per Kent & Taylor, 2016), and that the capacity for social media to enable connection and interaction has “barely been scratched” (Kent & Taylor, 2016, p. 62). Taking a

dialogic approach to social media analysis entails recognizing public needs and experiences in social media engagement. Furthermore, if the purpose of dialogue is to engender “shared understanding” (Johnson-Cramer, Berman, & Post, 2003), then a dialogic approach to examining social media engagement during a crisis means understanding crisis response on individuals’ terms. To this point, this study filled a need in the literature to examine the public experience in a crisis and used the concept of dialogue to analyze crisis coping and resilience on social media following two terror attacks. The following research questions guided this study:

RQ 1. How did individuals use social media to respond to the Paris terror attacks?

RQ 2. How did individuals use social media to respond to the Barcelona terror attacks?

CHAPTER 3. METHOD

Given the capacity of social media to facilitate and provide an outlet for discussion through the ways the technology enables “the transformation of broadcast monologues (one to many) into social dialogues (many to many)” (Botha & Mills, 2012, p. 85). This study examined dialogue surrounding two categorically-related crises, the terror attacks in Paris in 2015 and in Barcelona in 2017. Examining dialogue on social media is both convenient (public dialogue is readily available on social media platforms) and also purposeful because of the way that meaning is communicated through networks, a concept that Dorefel (1998) referred to as meaning networks. This study was based on the notion that there is meaning inherent in text-based interactions and networks, consistent with seminal research that has demonstrated how conversation may indirectly reveal cognitive structure among individuals (Chang, 1996; Danowski, 1992). Furthermore, the Barcelona and Paris terror attacks received significant attention on social media, making them valuable contexts for examining dialogue and meaning.

To examine dialogue, this study used a semantic network analysis to identify and make meaning of the dialogue surrounding the terror attacks. This study also used a text analysis to verify the themes suggested by the semantic network analysis.

Data Collection

This study followed up to an initial pilot study examining the terror attacks in Paris and in Barcelona. That pre-study only examined social media content 24 hours following the attacks, representing a potential limitation—the timeframe of the Tweets limited just how much coping, resilience, and development of the crisis in social media dialogue was available. These processes arguably take longer than 24 hours to develop, especially on social media. This study examined a longer period of time: three days following the crises. This is arguably a sufficient amount of time to gather both the lifecycle of discussion about the terror attacks on social media and the extent of crisis coping themes and processes on social media because issues tend to have a lifecycle of a few days.

Specifically, this study examined social media content for three days following the attacks (in 24 hour snapshots) to get a broader picture of crisis response types and even the

development of resilience. Using a longer timeframe revealed more detail and depth in crisis coping and resilience. In the pre-study, coping was primarily cognitive, which follows the literature assumption that cognitive coping comes first. This study, a more longitudinal exploration captured more nuance in crisis coping and resilience, and displayed a more extensive list of crisis response behaviors. Though the literature is relatively quiet on the subject, this study was designed around the assumption that individuals would demonstrate more resilience in the days following the crisis than they would in the first 24 hours.

Crimson Hexagon was used to download all the tweets for the respective terror attacks. To get the most complete set of data, tweets were downloaded using the hashtags #Paris and #Barcelona. Both English and non-English language tweets were downloaded to get a comprehensive set of data. Any non-English words that came into the data were translated using Google Translate during analysis. Crimson Hexagon allowed a maximum of 10,000 tweet downloads per 24 hour period, but none of the text corpus downloads reached 10,000 tweets, suggesting that all available tweets were downloaded for each of the three 24 hour periods per terror attack context. In total, this study analyzed 24,728 #Paris tweets, and 27,338 #Barcelona tweets. Tweets were downloaded into an excel spreadsheet which featured the NodeXL extension for the purpose of analysis. Even though all available tweets were downloaded, Twitter places limitations on the number of tweets they will allow even a paid system like Crimson Hexagon to download. So, it cannot be assumed that every tweet mentioning #Paris and #Barcelona was downloaded, but the number of tweets that were downloaded was sufficient to assume that most of the tweets were downloaded.

Data Analysis

This study utilized both semantic network analysis and text analysis to identify and confirm the themes of the two terror attacks on Twitter. Semantic network analysis was used first to analyze the connectedness of words and phrases on Twitter, followed by text analysis to identify and clarify themes in each semantic network cluster, thereby capturing a complete story of crisis response through social media dialogues.

Semantic network analysis reveals relationships between words in a dataset and is based on the assumption that words that exist close to each other are likely related (Lambert, 2017). The unit for this analysis was the words in tweets, or more specifically the connection between

words, that featured the hashtag #Paris or the hashtag #Barcelona during the timeline listed above. The purpose of examining word connections was to reveal meaning, which is consistent with the concept and purpose of semantic network analysis (Chang, 1996; Danowski, 1992).

Following data collection, Automap software was used to generate a list of co-occurring words based on the assumption about proximal relationships between terms (Lambert, 2017). This process generated a list of word pairs along with a network of word pairings. Word pairing networks are created because one word may co-occur with multiple different words, which in turn, co-occur with other words. For example, #Paris may co-occur with attacks, but attacks might also co-occur with terrorist, yielding a thematic cluster. For thoroughness, multiple evaluations were conducted to refine the data and capture the most representative text. This effort entailed creating a separate text corpus for tweets of each of the two terror attacks, making it possible to analyze each crisis event separately.

Loading each text corpus into Automap software generated a concept list, which was sorted by frequency. Prepositions and other superfluous words (including pronouns, numbers, days and months, single letters, punctuation, and HTML symbols) were removed to clean up the data and generate a semantic concept list. The semantic concept list was then loaded into NodeXL's visualization tool to examine the co-occurring pairs. In semantic networks, the words become the nodes and lines that connect the words represent the edges (Smith, et al., 2010). When graphed, the thicker the width of the line between words, the more frequent the two words co-occur. From the visualization, co-occurring words were grouped by cluster to identify dialogues within each terror attack discussion. In this part of the study, the researcher employed the Clauset, Newman, and Moore (2004) groups by cluster algorithm. The Harel-Koren Fast Multiscale algorithm (Koren, 2002) was used to show all related words.

After identification of dialogue clusters, the research returned to the data based on the co-occurring word clusters to verify the themes of each cluster. The most common co-occurring words and word-pairing networks were used to guide content analysis. This was done to confirm the themes suggested by the word pairs, and to expand analysis of the meanings underlying each cluster of word pairs. The themes of each cluster were compared to the literature in crisis coping and resilience, including the concepts of cognitive and conative coping (Jin, et al. 2012), and active and avoidant coping (Gerry & Li, 2010). The Connor-Davidson Resilience scale was used to understand resilience in the tweets (Connor & Davidson, 2003).

Using semantic network methods suggests that connections between words matter in social media usage. Therefore, textual relationships are considered important in this study to identify themes, patterns, and clusters of publics. Identifying topics within a conversation allows for relationships between Twitter feeds to evaluate and reveal the underlying associations between topics. As researchers look at the data set and as nodes bind together as one unit and become clustered communities, themes develop within the semantic network analysis that are unique to this method. The unique combination of semantic network analysis and text analysis allows for different perspectives on Twitter data and networks as they evolve in a crisis.

The value of semantic network analysis in studying social media engagement is that it reveals connections that are difficult to identify otherwise. A basic review of Twitter data might show thousands of unconnected Tweets. However, identifying word pairings surrounding hashtags reveals deeper levels of connection between text, and consequently, thematic dialogues among social media users who may otherwise be unconnected. Therefore, the dialogic connection is a textual one, and semantic network analysis provides a unique lens on that connection.

Therefore, by using semantic network analysis and cluster analysis, this study's purpose was to identify dialogue that occurs around shared word pairs to reveal shared meaning. Each dialogue cluster could be considered its own community, as those who are using the same hashtag and the same social media content may be seen as co-creating meaning within the particular thematic cluster. Coupling semantic network analysis with content analysis stands to reveal nuance around why certain word pairs have stronger ties than others.

CHAPTER 4. RESULTS

This chapter outlines the findings from the semantic network analysis and text analysis of tweets regarding the Barcelona and Paris terror attacks. The findings demonstrate both crisis coping and resilience behaviors, with differences per terror attack context. Furthermore, the findings should be considered specific to the social media context, as dialogue may differ on other platforms. This study specifically looked at Twitter data for its capacity to distribute news quickly and publicly, and the ease for users to contribute to conversations in a visible and accessible way. Other platforms, like Facebook, tend to be more private and based on network connections. Therefore, Twitter represents a natural space for analyzing the way public discussion of the two terrorist attacks evolved over time.

It is important to note that though each of the two data sets yielded a total of 15 dialogue clusters, these clusters may not be representative of the entire conversation on Twitter about the terror attacks in Paris and Barcelona. Furthermore, they may not fully represent user intent of posting content on Twitter. The content analyzed here was taken at face value and the clusters show the dominant themes in the text corpus for each of the Paris and Barcelona Twitter content.

The data were first analyzed by generating a list of the most frequently occurring words in the text corpus. All Twitter data were gathered despite language of Tweet. The most common language was English, with French and Spanish being the second most common languages for Paris and Barcelona, respectively. French and Spanish words were translated into English using Google Translate for analysis. However, the words were left in their natural, untranslated form in the tables and figures to maintain data richness.

The preliminary results yielded a list of the most frequently occurring words for each of the terror attacks. Using these words for the analysis would reflect a traditional content analysis approach. However, a content analysis does not give insight into the dialogue individuals engage in on social media regarding the terror attacks. Nor does it reveal connections between themes. Therefore, the results analyzed in this study were dialogue clusters, composed of co-occurring words--one set for Paris, and one set for Barcelona. When words co-occur together in a text corpus frequently this shows the emergence of themes. These co-occurrences are presented below for each terror attack context in two ways--visually (see figures) and textually (see tables).

All words that co-occurred 50 times or more in the tweets were included in the visualization of Paris and Barcelona semantic network. The figures under each research question show node size as an indication of degree. The larger the size of the node, the more the word that the node represents is connected to other words in the text. The thickness of the width between each node demonstrates the relative frequency with which the words co-occur. The nodes with more connections are situated in the middle center of each of the figures, while the nodes with fewer connections are pushed to the outer edge of the graphic layout.

RQ 1. How Did Individuals Use Social Media to Respond to the Paris Terror Attacks?

The tweets collected and analyzed regarding the Paris terror attacks demonstrate 15 dialogue clusters. The Clauset-Newman-Moore algorithm was used on the text corpus of the Paris terrorist attack, yielding algorithm clusters with words that have a close connection in the text corpus. These clusters are presented in Figure 1.

Cluster 1, the most significant cluster (featuring the most co-occurring words), is presented with dark blue text at the top left corner. The clusters then move generally down each column and left to right. Therefore, moving down from Cluster 1, Cluster 2 is the light blue cluster at the bottom left. Cluster 3 is presented at the top of the next column in dark green text. Cluster 4 is to the right of Cluster 3 in the light green text. Cluster 5 is to the right of Cluster 4 in the red text. For readability, Table 1 lists the words for each cluster, and zoomed-in images of each cluster are presented with the outline of each cluster theme. Multiple words in between commas in the table represent word phrases. Connected words (without a space) represent hashtags.

Analysis focused primarily on the first five clusters because they represent the most common dialogues on Twitter. Tweet examples for each of the first five clusters are presented in Table 2. Clusters outside of the first five clusters are presented to add nuance and niche themes and are also discussed.

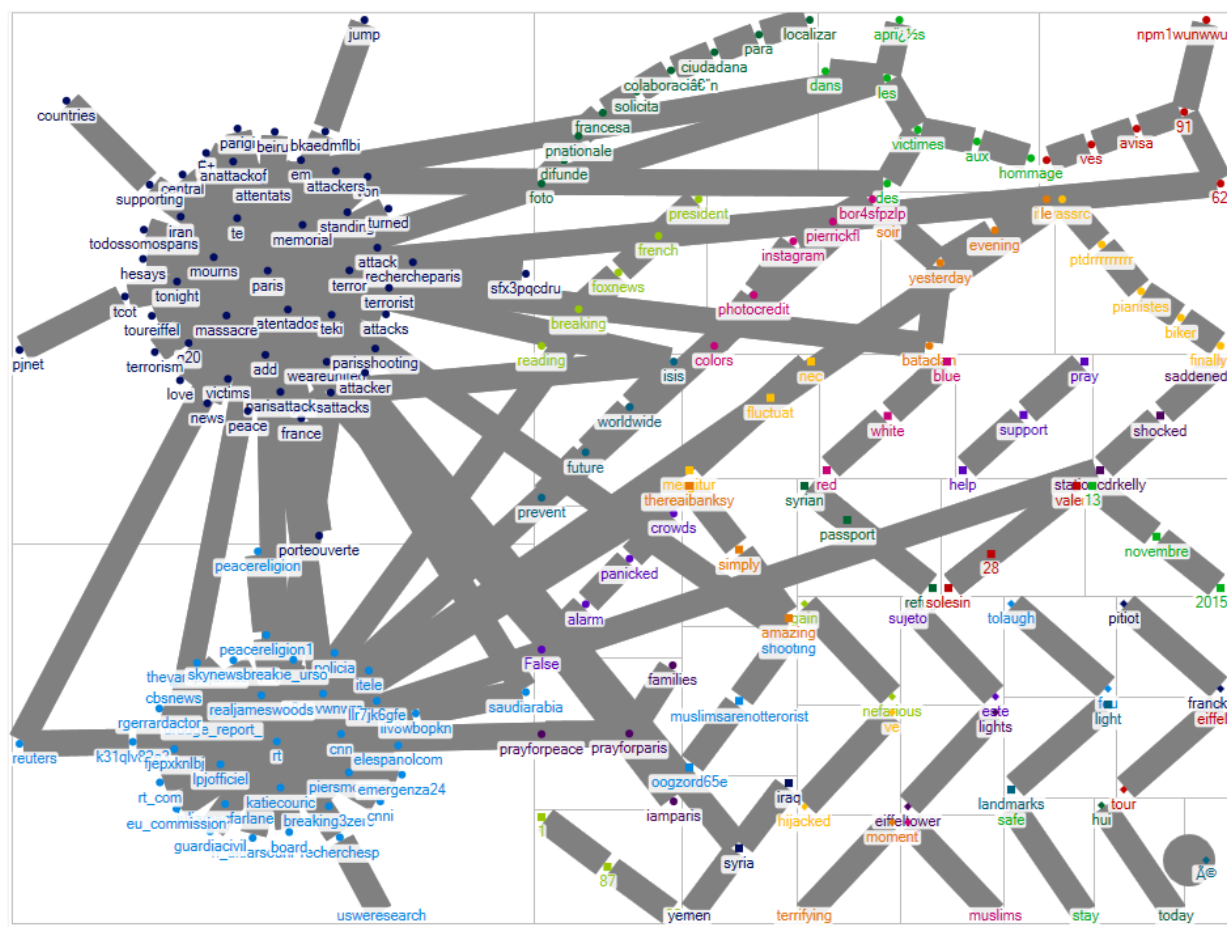


Figure 1. Paris terror attack clusters.

Table 1. Paris terror attack clusters text.

Cluster	Words
1	Paris, peace, memorial, attackers, love, mourn, we are united, Supportingcountries
2	Guardiacivil, emergenza24, police, katiecouric, eu_commission, rt, piersmorgan, skynewsbreak, cnn, peacereligion, peacereligion
3	Localizer, para, ciudadana, colaboraciaen, solicita, Francesca, pnationale, difunde, foto
4	Dans, les, victims, aux, hommage
5	Lo, ves, avisa, 91, 62, npm1wunwwu
6	yesterday, evening, Bataclan, soir
7	itsyassrc, ptdrrrrr, pianists, biker, finally
8	foxnews, breaking, reading, French, president
9	bor4sfpzlp, pierrickfl, Instagram, photocredit, colors
10	prayforparis, iamparis, prayforpeace, families
11	false, alarm, panicked, crowds
12	isis, worldwide, future, prevent
13	Syria, Iraq, Yemen
14	muslimsarenotterrorists, shooting
15	refugees, Syrian, passport

Table 2. Paris terror attack sample tweets.

Cluster	Tweet
1	<p>@SleepintheGardn #paris I love you. My heart and thoughts are with those who are suffering this unspeakable</p> <p>@LynnTilton Kudos to the people of #Paris for fighting back vs #Violence & #Terror w/ #Defiance #Love & #Mourning. #PrayForParis</p>
2	<p>RT @katiecouric My heart is breaking reading this. So important to know the names, the lives, not just the numbers. #Paris</p> <p>RT @piersmorgan These murderers aren't refugees. Nor are they real Muslims. They're terrorists who've hijacked a religion for nefarious gain. #paris</p>
3	<p>@guardiacivil La Policía francesa @PNationale difunde foto de un sospechoso de los atentados de #Paris RT Si le viste ☐062 ☐091 (French police @PNationale spread a photo of a Paris terrorist suspect)</p> <p>@policia La Policía francesa solicita colaboración ciudadana para localizar a este sujeto. Si lo ves, avisa #091 #062 #Paris</p>
4	<p>@_alienation Il faudrait un concert P.de la République en hommage. Comme les concerts for peace à Berlin. #Paris (There should be a P.de la République concert in tribute. Like the concerts for peace in Berlin. #Paris)</p> <p>@azureduserpolet #Uneminutedesilence en hommage aux victimes de #Paris mais également pour toutes les victimes dans le monde entier (#Uneminutedesilence in tribute to the victims of #Paris but also to all victims worldwide.)</p>
5	<p>@Foro_MDM La Policía francesa solicita colaboración MÁXIMA DIFUSIÓN puede estar en España . Si lo ves, avisa #091 #062 #Paris (The French Police request collaboration MAXIMUM DIFFUSION can be in Spain. If you see it, warn #091 #062 #Paris)</p>

The dialogue clusters suggest themes underlying the main conversations on Twitter regarding the Paris terror attacks. Conclusions about each cluster can only be made through a combined analysis of words, connections, and representative tweets. Interpreting the meaning of the network graph, one needs to look not just at the presence of the nodes in the graph but how those nodes are connected. The words in each cluster have a strong tie to each other, as well as to other words in other clusters (which is represented by the lines between words). Therefore, the frequency of words is important, but the frequency of connections between words is even more important in understanding the theme of each dialogue.

The most dominant dialogue (Cluster 1) demonstrates an emotional response to the terror attacks in Paris (see Figure 2).

Word pairings centered on peace, love, mourn, weareunited, and supporting countries shows a focus on providing support and expressing sympathy to victims of the terror attacks. This may be unexpected as Twitter's tendency for distributing information would suggest the most dominant themes would be informational, including sharing news and information updates. That focus isn't represented until Cluster 2 (see Figure 3), which features news-related discussion surrounding first responders (i.e., the police, GuardiaCivil) and news reporting (i.e., Katie Couric, Piers Morgan, CNN, Skynewsbreak).

Cluster 3 (see Figure 4) features a focus on community collaboration and response, including words like "localizer" (Spanish for "locate"), "ciudadana" (Spanish for "citizen"), "difunde" (Spanish for "spread or distribute"), "colaboración" (Spanish for "collaboration"), and "solicita" (Spanish for "request").

Cluster 4 (Figure 5) also features a support theme, but a focus on memorializing those affected, with words like "victims" and "hommage" (French for "tribute"). Finally, Cluster 5 (Figure 6) features a focus on warning and presenting information, with words like "avisa" (Spanish for "warn") and "lo ves" (Spanish for "you see it").

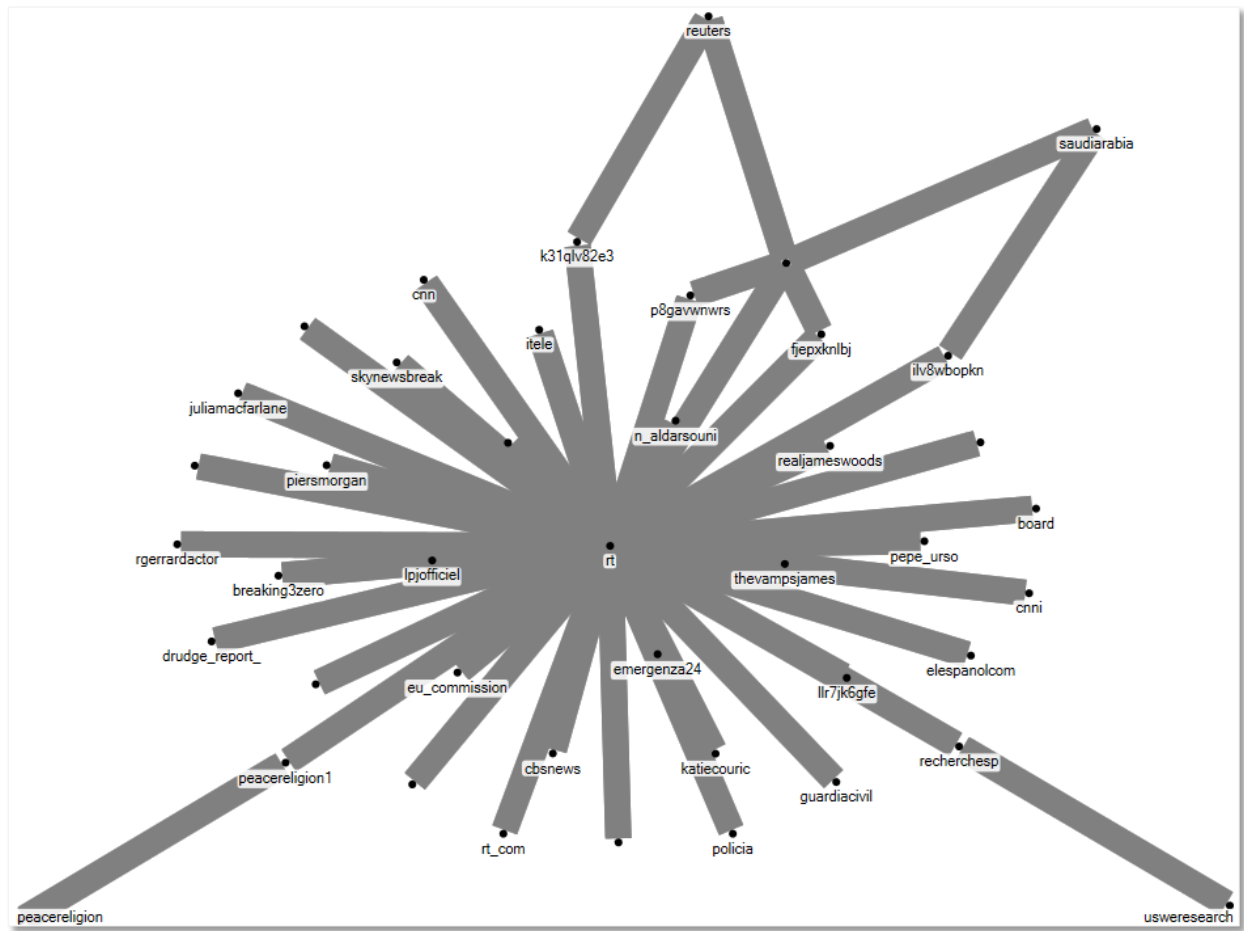


Figure 3. Paris terror attack cluster 2.

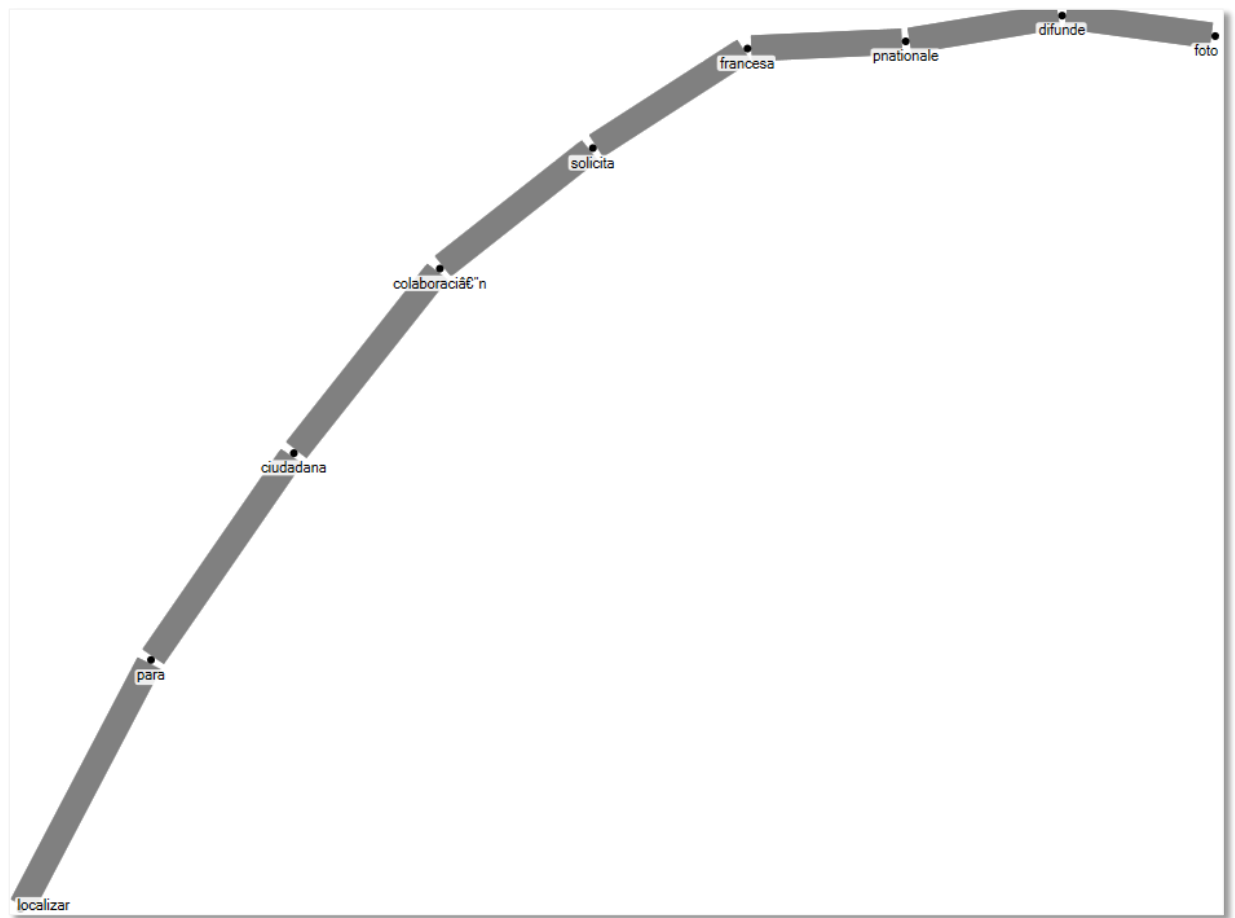


Figure 4. Paris terror attack cluster 3.

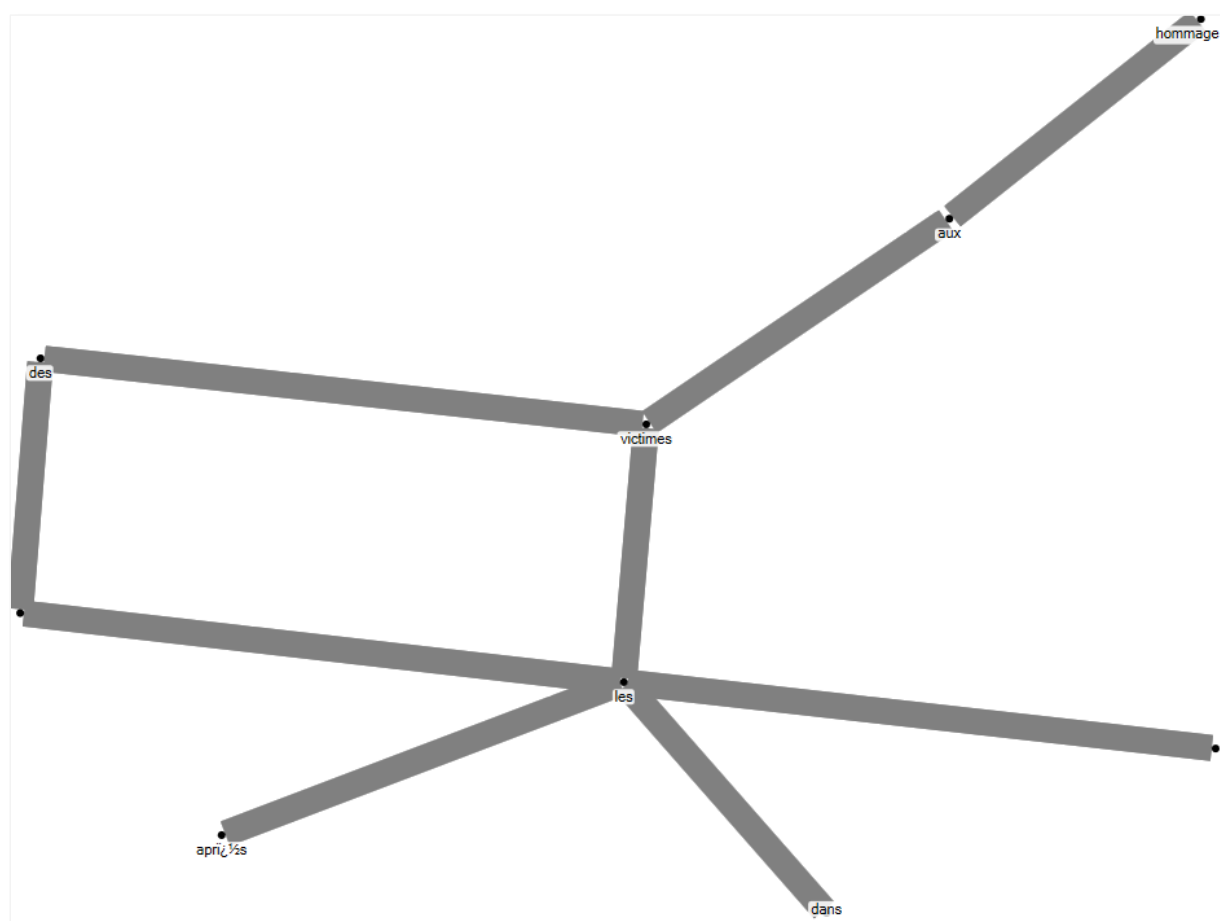


Figure 5. Paris terror attack cluster 4.

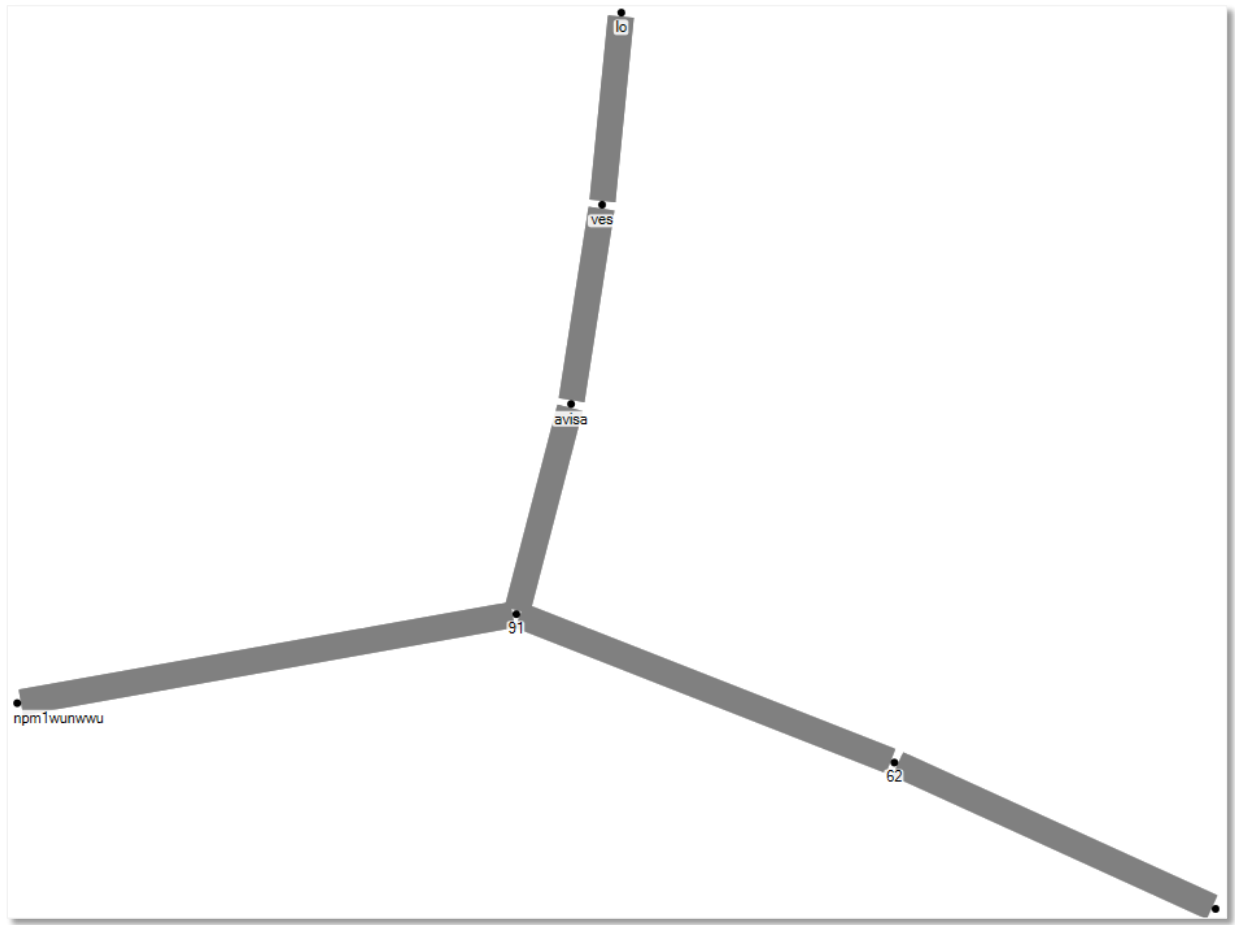


Figure 6. Paris terror attack cluster 5.

Clusters 6 through 9 seem to show a news and information sharing focus, with one cluster (7) capturing random and seemingly irrelevant content (which can happen in a semantic network analysis). After Cluster 9, however, emotive word pairings begin to reemerge, including showing solidarity, sympathy, and community (Cluster 10), showing anxiety (Cluster 11), and looking to the future (Cluster 12). Clusters 13 through 15 seem to connect events beyond the immediate terror attacks and may even demonstrate agenda-building through word pairings with MuslimsAreNotTerrorists, Syria, and Syrian refugee passports.

One nuance evidenced throughout the clusters is the appearance of Twitter user account names. This analysis did not collect the usernames of those who posted each tweet, but if a tweet mentioned or tagged another twitter user, then that user's information was included in the data set. The presence of Twitter user account names suggests a number of possibilities. First, tagging other Twitter users, particularly journalists like Katie Couric and Piers Morgan, suggests an effort to cite the source of information, which may also be a way to provide a sense of validity to the information, and perhaps, by extension, the sense of validity to the user who forwarded the information. This also signals a tendency to retweet information rather than create information on one's own, which further validates the notion that users seek credibility when responding to the Paris terror attack. Tagging other users may also be an effort to get the attention of Twitter users for various reasons, including to encourage message distribution and signal relevance of content to other users. This shows the tendency for message distribution in crisis response on social media.

RQ 2. How Did Individuals Use Social Media to Respond to the Barcelona Terror Attacks?

The same Clauset-Newman-Moore algorithm was used on the text corpus of the Barcelona terrorist attack to cluster words with a close connection in the text corpus. Similar to the Paris terror attack text, the data yielded 15 dialogue clusters. These clusters are presented in Figure 7.

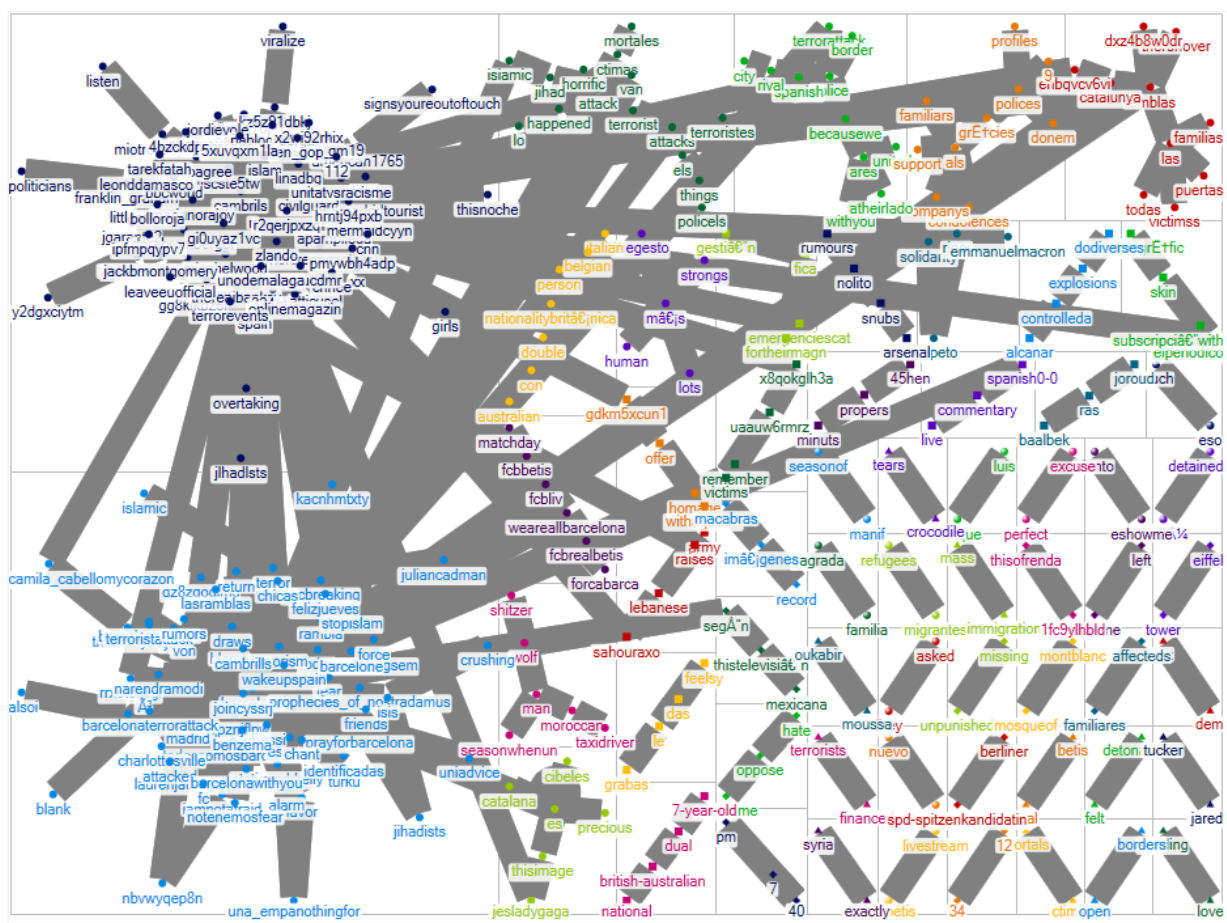


Figure 7. Barcelona terror attack clusters.

Cluster 1 is in the top left of the graph in dark blue text. Cluster 2 follows in light blue, just under Cluster 1. Cluster 3 follows in the dark green text at the top and just to the right of Cluster 1. Cluster 4 is located just to the right of Cluster 3 in a different shade of green. Finally, Cluster 5 is in red and is located at the top right corner of the chart. For readability, Table 3 (below) lists the words for each cluster, and zoomed-in images of each cluster are presented with the outline of each cluster theme. Again, similar to the Paris data, multiple words in between commas in the table represent word phrases. Words connected without a space represent hashtags.

As was the case for the Paris terror attacks text corpus, analysis for the Barcelona terror attack data focused primarily on the first five clusters because they represent the most common dialogues on Twitter in that context. Tweet examples for each of the first five clusters are presented in Table 4. Clusters outside of the first five clusters are presented to add nuance and niche themes, and are also discussed.

Findings show that the most dominant dialogues in the Barcelona terror attacks occurred around emotional response and sense of community. Cluster 1 (Figure 8) adds emotional reaction to the reporting of events, including using words like “listen,” “signsyouroutoftouch” [sic] with reporting on events with words like “Spain,” “Cambrils” (a city where terror attacks were averted in Spain), “overtaking jlhadists,” “Islam,” and “estanoche” (or “tonight”). Cluster 2 (Figure 9) mixes reporting on events (i.e., “Barcelona attacked,” “terror Islamic”) with signs of support (i.e., “Barcelonacontigo,” “iamnotafraid” and “notenemosfear,” “prayforbarcelona”) and community (i.e., “Friends Rambla” and “todossomosbarcelona” or “we are all Barcelona”). Cluster 2 even includes calls to action (i.e., “wakeupSpain”).

The community support and emotional reactions to reporting events continued through Clusters 3 through 5. Cluster 3 (Figure 10) focused on the horrors of the attack in Barcelona with connections between words like “horrific,” “attacks” and “terrorist islamic Jihad”. Another indication of emotional response is the discussion of the “victimas mortales” (death victims), in which the discussion moves from reporting on the deaths to offering prayers on behalf of the victims.

Table 3. Barcelona terror attack clusters text.

Cluster	Words
1	spain overtaking jlhadists, islam, atticusel, linadbg, cnnee, leonddamasco, viralize, signsyouroutoftouch, listen, girls, politicians, esta noche, cambrils
2	barcelonacontigo, thiswithyou, return, Barcelona attacked isis crushing, una_empanothingfor, propheciesofnostradamus, iamnotafrail, notenemosfear, prayforbarcelona, Charlottesville, friends rambla, todossomosbarcelona, terror islamic, wakeupspain
3	attack, horrific, ctimas, mortals, van, attacks els things policels, attack terrorist isiamic jihad, attack ctimas mortales
4	spanish rival city, terrorattack, spanish police, police-border, a su lado withyou united, becausewe
5	ramblas, therunover, todas, victims, puertas, familias, catalunya
6	policies, donem, 9, profiles, gretcies, als, condolences, companys, support, familiars
7	belgian, Italian, person, nationalitybritanica, double, con, australian
8	es, thisimage-jesladygaga, cibeles, precious, catalana
9	man, wolf, shitzer, seasonwhenun, Moroccan, taxidriver
10	weareallbarcelona, fcbliv, fcbbetis, matchday, fcbrealbetis, forcabarca
11	lots, thegesto, human, strongs
12	emmanuelmacron, solidarity, respeto, rigor
13	arsenal, snubs, nolitito, rumours
14	dodiverses, explosions, controlleda, alcanar
15	remember, victims

Table 4. Barcelona terror attack example tweets.

Cluster	Tweet
1	<p>@American1765 #SignsYourOutOfTouch You blame #Barcelona on #Charlottesville instead of on the hordes of JIHADISTS overtaking Spain's border police.</p> <p>@MadridTourist Esta noche La Cibeles es catalana! #madrid #barcelona</p> <p>#TotsSomBarcelona #cambrils #Ramblas #Catalunya (Tonight La Cibeles is Catalan! #madrid #barcelona #TotsSomBarcelona #cambrils #Ramblas #Catalunya)</p>
2	<p>@enriqueiglesias #Barcelona Mi corazón está con todos vosotros. Que tristeza mas grande. #paz #BarcelonaContigo (#Barcelona My heart is with all of you. What a great sadness. #paz #BarcelonaContigo)</p> <p>@Sup_Policia CONDENAMOS los atentados terroristas de #Barcelona y #Cambrils #notenimpor #notenemosmiedo (@Sup_Policia CONDEMN the terrorist attacks of #Barcelona and #Cambrils #notenimpor #notenemosmiedo)</p>
3	<p>@StationCDRKelly #Barcelona, we stand with you. There is no place for terrorism on Earth. My thoughts are with all those affected in today's horrific attack.</p> <p>Te pedimos, Dios de la vida, por las víctimas mortales del ataque terrorista.</p> <p>#Barcelona #PrayforBarcelona (We ask you, God of life, for the mortal victims of the terrorist attack. #Barcelona #PrayforBarcelona)</p>
4	<p>@iamhamzaabbasi #Barcelona We Pakistanis feel the pain of innocent people dying anywhere in the world because we have been biggest victims of terrorism.</p> <p>@AtticusEl Si alguien muere a tu lado, aunque no puedas hacer nada, te sientas y le das la mano. No le grabas. #Barcelona (If someone dies by your side, even if you can't do anything, you sit down and shake hands. You do not record. #Barcelona)</p>
5	<p>@bolloroja Nos hemos encontrado esto pintado en las puertas de la mezquita de Montblanc. Quiero que este acto no quede impune. #Barcelona #Cambrils (We have found this painted on the doors of the mosque of Montblanc. I want this act not to go unpunished)</p> <p>@JuanDiegoBotto Mi solidaridad con las víctimas y sus familias. Que el terror en ninguna de sus formas nos imponga su lenguaje. Todos somos #Barcelona (My solidarity with the victims and their families. That terror in none of its forms imposes its language on us. We are all #Barcelona)</p>

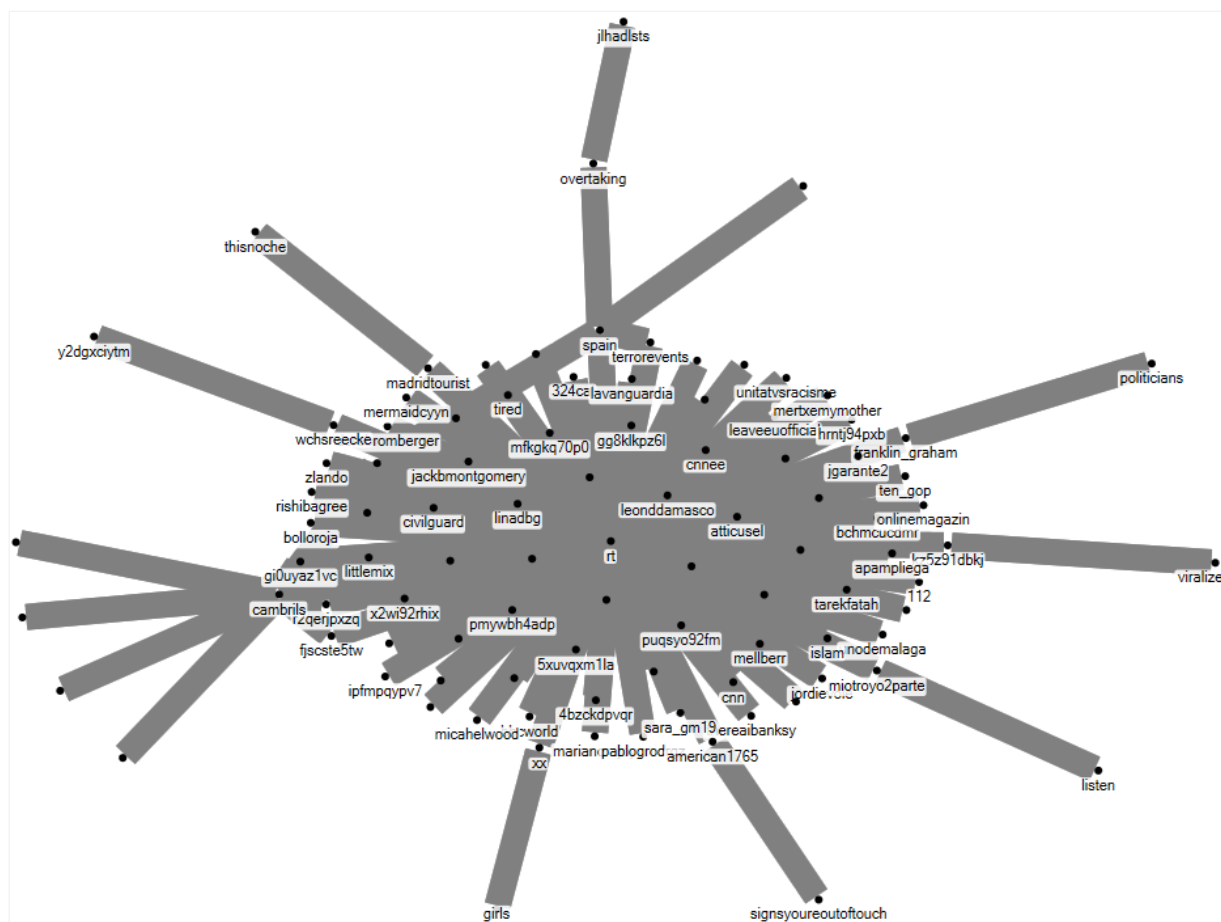


Figure 8. Barcelona terror attack cluster 1.



Figure 9. Barcelona terror attack cluster 2.

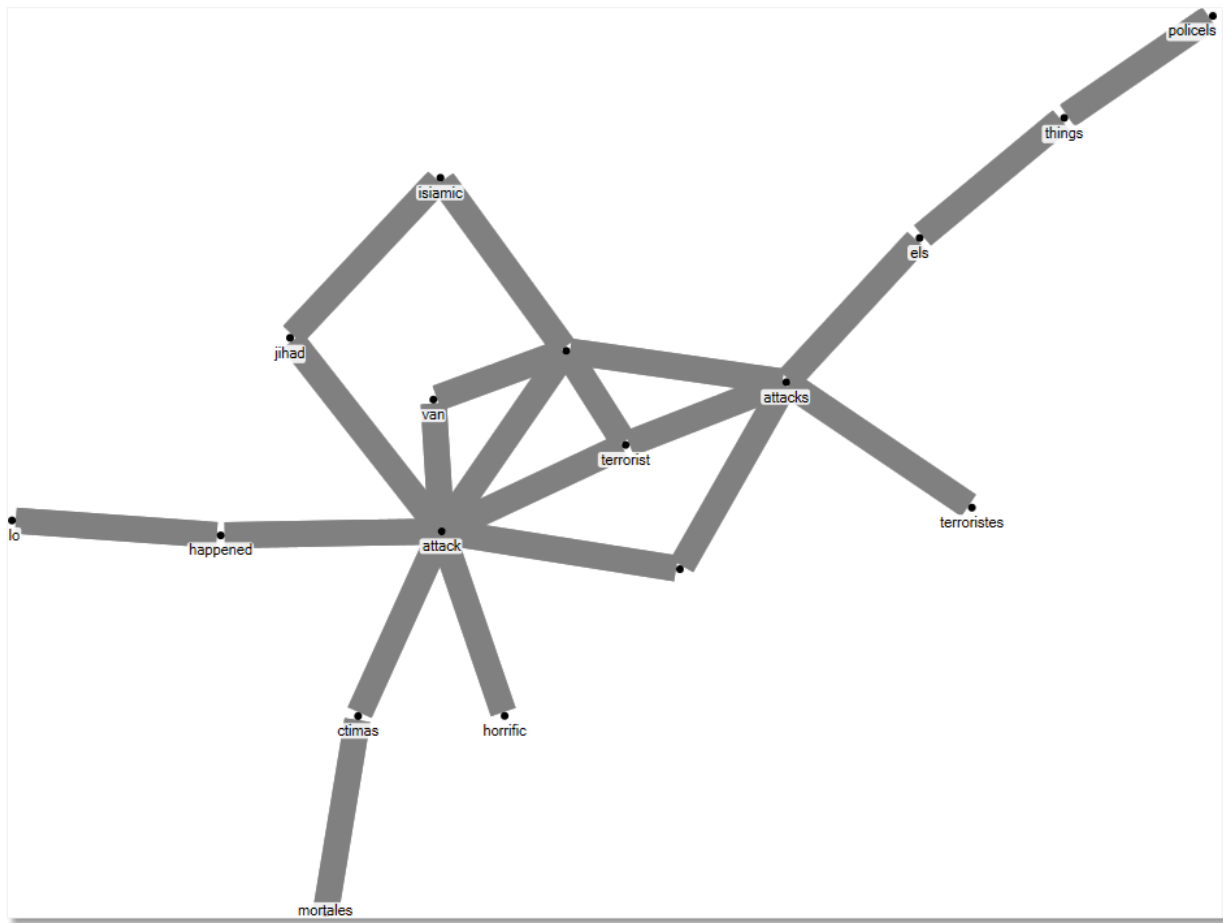


Figure 10. Barcelona terror attack cluster 3.

The community support theme continued through Cluster 4 (Figure 11) and Cluster 5 (Figure 12). Cluster 4 features connections between words like “terrorattack” and “a su lado” (or “at their side”), “with you united” and “becausewe”. Cluster 5 features connections between “therunover” and “familias” or “families”.

The rest of the clusters reinforce the sense of community and support with expressing condolences (Cluster 6), showing solidarity (Cluster 12), and honoring victims (Clusters 10 and 15). Nuance is also evident, with reporting on the nationalities of the victims (Cluster 7) and reporting on the status of a Soccer player transfer to another team (Cluster 13). Cluster 9 features an interesting nuance, with the dialogue focusing on the quality of reporting by CNN news anchor Wolf Blitzer (referred to as Shitzer).

Similar to the Paris terror attacks text corpus, the Barcelona tweets also feature various Twitter user account names, though recognizably fewer than the Paris data, and mostly situated in the first cluster. User accounts that show up in the data as frequently co-occurring text include journalists and news agencies (i.e., @CNNE or CNN Spain and references to Wolf Blitzer), as well as non-professional Twitter accounts (i.e., @leonddamasco, @linadbg, and @atticusel). Like the Paris data, these accounts may co-occur with other text so frequently because of an apparent quality of content, active involvement in reporting, or to provide validity and credibility to the content. Furthermore, tagging other users may also demonstrate the distributive nature of Twitter’s platform.

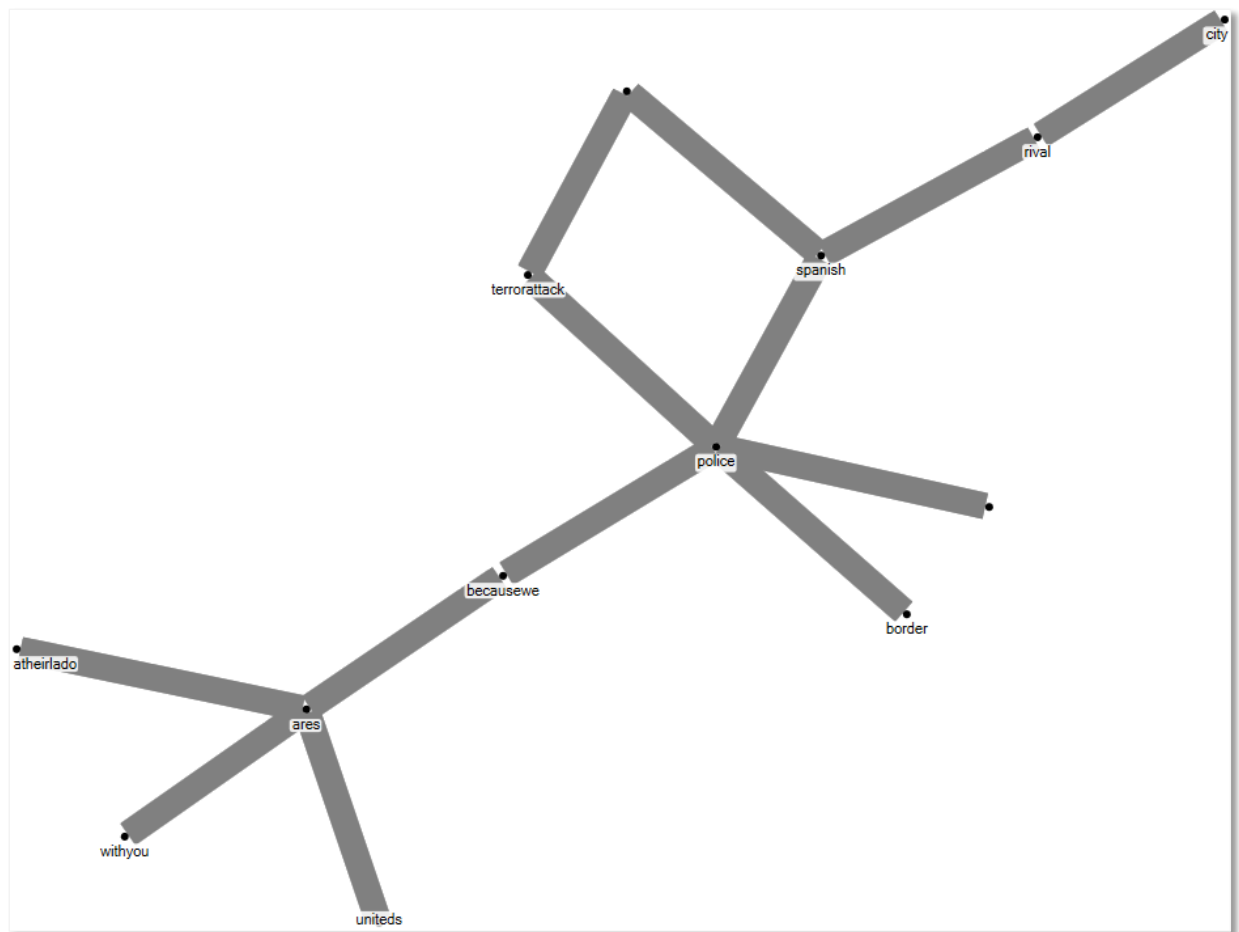


Figure 11. Barcelona terror attack cluster 4.

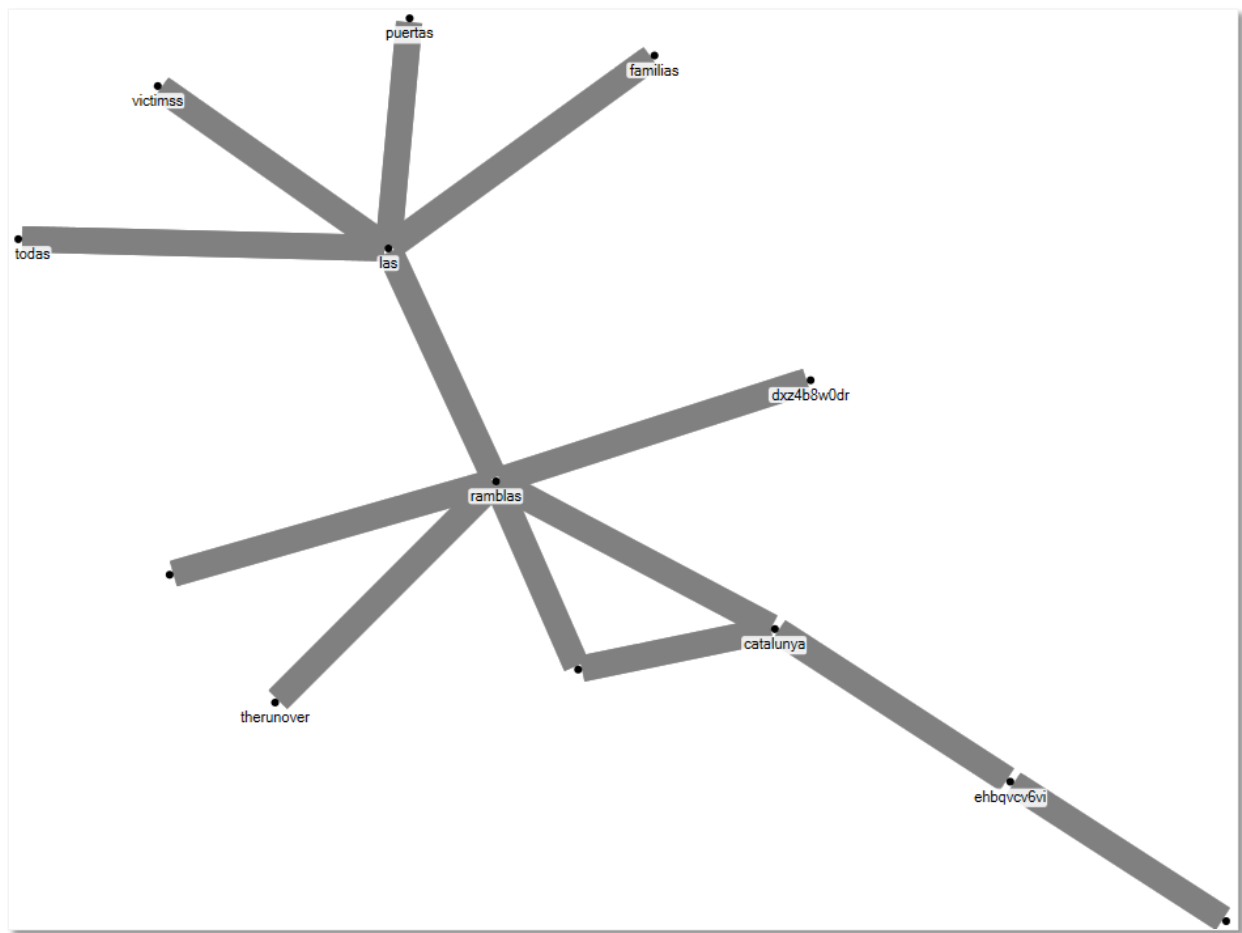


Figure 12. Barcelona terror attack cluster 5.

CHAPTER 5. DISCUSSION

This research examined how individuals use Twitter to respond to a crisis, using two separate terror attacks: the Paris terror attacks in 2015 and the Barcelona terror attacks in 2017. Themes in the dialogues in each attack seem to center on sharing news while expressing support and connection to community. The purpose of this research was to understand how individuals demonstrate coping and resilience on social media in the face of a crisis. Semantic network analysis and text analysis show that the dominant behaviors may be distributing information and expressing emotion while seeking to connect with community. These behaviors have particular implications for the role of social media engagement in crisis coping and resilience.

Information Distribution, Emotional Expression and Community

The central point for understanding resilience and crisis coping in the Paris and Barcelona terror attacks may be information distribution underscored by emotional expression toward building a sense of community. The underlying theme of most of the dialogue clusters in this study was emotional, with various displays of emotional expression. In the Paris text corpus many emotions were expressed, including peace, love, and mourning in Cluster 1, peace and religion in Cluster 2, and paying homage to victims in Cluster 4. Emotional expression takes even more of a focus when we come to Cluster 10. This may be due to a lag in responses, as it may be likely that sharing news is the dominant activity in the first hours following a crisis. Therefore, it may take time for individuals to process a crisis like a terror attack. One could draw the conclusion that the dominance of emotional dialogue in Clusters 10-15 (i.e., connections between “prayforparis,” “prayforpeace,” and “families”) is a result of the process to understand and make sense of events, which would make news and information sharing a central component of early stages of crisis response.

The Barcelona terror attack dialogues showed even more centrality of emotional expression throughout the dialogue clusters. Cluster 1 shows a connection between “Spain,” “overtaking” and “Jihadists,” an expression of power, as well as “signsyouroutoftouch” which demonstrates disgust or mistrust. Cluster 2 features connections between “iamnotafrail,” “friends” and “wakeupsain,” demonstrating hope, faith, and strength, as the discussion appears

centered on overcoming victim status in the terror attacks to depict strength. Clusters 3-5 add emotional connections not present in the first two clusters, including “horrific,” “condolences,” and “support”. Clusters 6-15 contain emotion words such as “strong,” “solidarity,” “respect,” “rigor,” and “remember”.

In many cases, the emotional expression is positive, especially in the later clusters, including words like “love,” “strong,” and “respect,” among others. In the pre-study (Smith, Smith, & Knighton, 2018), negative emotions were dominant, but this study’s text corpus, which goes beyond the pre-study’s 24 hour timeframe, shows that the emotional connections trend positive in expressing community and unity. This is not to say that negative word co-occurrences are insignificant in the data, but dialogue appears to be more positive in seeking change in later clusters.

Looking across both sets of terror attack clusters, the emotional words appear to be tied to declarations of community support and involvement. In the most dominant Paris cluster, words like “love” and “mourn” are connected with “we are united” (Cluster 1). In Cluster 3, the underlying theme is community, with words like “citizens” and “localizar” (locate), co-occur with “colaboración” (collaboration), “difunde” (spread) and “solicita” (request). Similarly, emotional expression is tied to community in the Barcelona clusters, including “viralize” and “listen” with “signsyouroutoftouch” (Cluster 1), “Barcelonacontigo” (Barcelona with you) and “todossomosbarcelona” (We are all Barcelona) with “iamnotafrail” and “notenemosfear (we are not afraid) (Cluster 2), and “terrorattack” co-occurring with “united,” “becausewe,” and “a su lado” (at their side) in Cluster 4.

Most of the emotion words imply a feeling of community. These above connections between emotional words and community show that users are striving to unite in a community communicating about the terrorist attacks in Paris and Barcelona.

Emotions and Crisis Coping

The significance of emotional expression and community in the dialogue clusters cannot be under-represented. Jin, et al.’s (2012) Integrated Crisis Mapping (ICM) model helps us understand the way emotion connects with coping. The ICM connects sadness and fright with cognitive coping behaviors, and anger and anxiety with conative coping strategies (Jin, et al., 2012). This study shows some consistency with the ICM, as sadness and sorrow correlate with

cognitive coping strategies including making sense of the attacks in Paris Clusters 1 and 11; and Barcelona Clusters 1 and 3. Furthermore conative strategies (including calls to action) seem to correlate with anxiety and anger in Paris Clusters 3, 4, and 12; and Barcelona Clusters 2 and 4. At the same time, however, there are a few departures from the ICM, including Barcelona Cluster 3, in which emotional expressions of anxiety and anger are tied to cognitive coping efforts and in Barcelona Cluster 2, where cognitive coping is tied to a lack of fear (i.e., “Iamnotafraid”).

More importantly, positivity presents a more extensive discussion regarding emotions and crisis coping. The literature in crisis communication focuses on negative responses, but this study suggests a focus on positivity following a crisis. In particular, this study shows a need to focus on the positive feelings that come from sense of community, including hope, love, unity, and solidarity. Therefore, we may say that efforts to feel or create a sense of community is a crisis coping behavior. According to the findings from this study, it may be categorized under the heading of cognitive coping, as invoking sense of community is used to make meaning of the impact of crisis events. In Paris Cluster 1, the sense of community statement, “we are united,” is tied to love and memorial. Sense of community should not, however, be considered a passive coping mechanism. In Barcelona Cluster 2, sense of community declarations like “BarcelonaIsWithYou” and “TodosSomosBarcelona” are tied to showing courage (i.e., “Iamnotafraid” and “notenemosfear”).

There may even be a level in which seeking a sense of community as a coping mechanism is tied to active behaviors that would characterize it as a conative coping strategy. For example, Paris Cluster 3 invokes community through collaboration, locating citizens, and spreading information. Barcelona Cluster 2 shows sense of community may be tied to calls to action like “wakeupspain,” “return,” and “prayforbarcelona”. Additionally, in Barcelona Cluster 6, sense of community terms like “familiaris” (“family” in Catalan) and “companyis” (“mates” in Catalan) co-occur with “donem,” (“let’s give” in Catalan), “support,” and “condolences”.

Resilience in the Paris and Barcelona Terror Attacks

Resilience is more difficult to evaluate than crisis coping behaviors because resilience is often unstated and may be easily mistaken for emotional expression. Although the data set contained news coverage and information sharing, resilience was evident in the emotional words

contained in the clusters. Whether dominant (cluster 1) or less dominant (cluster 15), emotions were expressed frequently in the text corpus. Not all were positive, but few were hopeless (as one might expect after a terror attack). In fact, some of the dominant emotions expressed reflected empowerment. Emotion words were used to express a sense of community, hope, and a desire for improvement. These are the types of emotions that are in the current literature on resilience, which emphasizes resilience as active rather than as a passive concept. In fact, resilience literature looks at passivity as a lack of resilience, and even positive emotions as a demonstration of resilience while negative emotions show a lack of resilience.

Therefore, looking across the Paris and Barcelona clusters, resilience may be evident in the expressions of positive emotions, sense of community, and the need to be united. If resilience is the ability to maintain stability in the face of difficulty (Brand & Jax, 2007), then positive emotional expressions would indicate at least a demonstration of resilience. In fact, the most dominant clusters in both terror attack responses on Twitter demonstrate high levels of resilience. In Paris Cluster 1, dialogue centers on peace, love, and memorializing the victims of the terror attacks. Barcelona Cluster 2 dialogue centers on showing no fear in the wake of the terror attacks. Looking across the clusters, dialogue with positive emotions appears to be connected to two main behaviors: demonstrating community and calls to action.

First, the role of community, a consistent theme throughout clusters, demonstrates efforts to show resilience. Most of the positive dialogue is connected with declarations of community, including “we are united” (Paris Cluster 1), “IAmParis” (Paris Cluster 10), “Barcelonacontigo,” (Barcelona with you) (Barcelona Cluster 2), “TodosSomosBarcelona” (Barcelona Cluster 2), and “with you united” (Barcelona Cluster 4). If resilience is the ability to rebound or bounce back after a crisis, this study suggests that that effort may be largely based on connection to community. The question is whether resilience is based on having a network of individuals who serve as resources to overcome diversity, as Walsh (1996) suggests, or whether simply a sense of community connection is enough to produce resilience. On the one hand, research has shown that resilience is dependent on physical resources like a community’s infrastructure and social systems (Xu, et al., 2015). However, that level of resilience may be more of physical resilience, or the ability to tangibly bounce back after a crisis through things like rebuilding affected facilities or finding places for individuals who are affected to recover from a crisis.

The type of resilience demonstrated online may be more emotional in nature, making the feeling of connection to others facing the same challenge an important factor and indicator of resilience. Therefore, social media may help increase resilience because of the connectedness between individuals that social media provide, which leads to an exchange of resources discussed in the literature (i.e., Holling & Gunderson, 2002). Whereas this exchange in the literature may refer to physical resources, in this study, the resources appear to be more reflective of moral support. The notion that social media increase resilience through moral support has not received much attention in the literature on resilience. Social media tend to be places for individuals to connect around shared beliefs, making platforms like Twitter a good place to build resilience. Therefore, this study indicates that social media as moral support should be explored more.

Calls to action through social media are another potential evidence of resilience. Buzzanell (2010) pointed out that resilience is a communication process and is formed through discourse and interpersonal interaction. While demonstrating shared beliefs is part of it (as discussed above), resilience depends on confidence and collaboration (Walsh, 1996), which are based on communication. In this study, calls to action and collaboration were evident throughout both sets of Twitter data. For example, Paris Cluster 3 called for collaboration and distribution of information. Paris Clusters 4 and 5 called for paying tribute to victims and warning others if individuals see anything suspicious, respectively. Barcelona cluster 1 calls for people, including “politicians” to “listen”. Cluster 2 features a connection between Islamic terror and “wakeupSpain”. The “prayfor” statements may also be considered calls to action, though their commonality of use on social media (especially by the time the Barcelona attacks happened) may mean that such statements are just included to follow tradition.

Finally, resilience is represented by the attainment of a new normal (Buzzanell, 2010; Xu, et al., 2015). New normals may be represented by ways individuals seek to define the story around a crisis event. The most dominant Barcelona cluster connects the attacks with “signsyouroutoftouch,” which suggests the need to change the way individuals see the events that occurred. The mentions of Charlottesville and PropheciesOfNostradamus in Barcelona Cluster 2 are similar. The other clusters that revolve around defining and redefining the cause of events and what should be done going forward are not as dominant but are still worth discussing here. For example, Paris Cluster 14 shows individuals seeking to deflect the connection between

Islam and terrorism (the muslimsarenotterrorists hashtag). At the same time, Barcelona Cluster 3 seems to assign blame to Islam.

Coping, Resilience, and Health Communication

Overall, this study suggests that resilience and crisis coping take place on social media and, therefore, can be examined and analyzed. In fact, these findings combined with previous findings in other studies suggest that social media may even increase resilience and facilitate crisis coping through the platforms' capacity to build community and facilitate action.

This study shows that social media engagement during a crisis like a terror attack is more than just a gateway for seeking and sharing information about the crisis as some have suggested (i.e., Liu, et al., 2011). Rather, social media engagement during a crisis may be about becoming part of the experience. This is consistent with recent research by communication scholars like Oh and Sundar (2016) and O'Brien (2016), who have taken an experiential approach to understanding social media engagement. According to their arguments, social media engagement is about becoming involved in the media experience, rather than just seeking information about the crisis.

The idea that individuals use social media for the experience is evidenced by the finding in this study that the most dominant clusters featured high levels of connection between informational and emotional content. For example, Paris Clusters 1 and 2 feature ties between emotional words like "love," "mourn," and "peace/religion" with reporting of events. Barcelona Clusters 1-4 similarly connect news with emotional expression. What remains to be understood, however, is the extent to which individuals are actually absorbed in their social media experience as their content activities suggest. The answer to this question falls outside of the capacity of this study but is worth exploring more. Future research could also explore how social media engagement factors like usability, appeal, and novelty (O'Brien, 2016; Oh & Sundar, 2016) play into the decision to participate in discussions surrounding a crisis.

Another purpose of this study was to understand how social media engagement might increase or decrease resilience. While this study does not offer conclusive evidence to one side or the other, this study does suggest that social media engagement might help facilitate resilience, and it's based in the notion that positive emotions are evidence of resilience. The precursor to this study (Smith, et al., 2018) showed that even within the first 24 hours, a positive response

was evident. The current study sought to see if this held true as time passed to see whether users maintain positivity (and by extension, become more resilient) as time passes. The assumption was that within the first 24 hours, an emotional response is likely, but if the conversation continues to be positive for a longer period of time, then this might suggest that social media may help develop resilience. The positivity that existed among the dialogues even after the first 24 hours of response suggests that resilience might build through social media engagement.

Resilience is often viewed as a communication process (Buzzanell, 2010), and Twitter provided a view of the discourse in a public space after each crisis. Twitter may even provide for some an infrastructure or social system that acts like a network of individuals or community to provide users social support. This framework might not be available to all offline. Hence, the importance of social media platforms like Twitter to allow for a community to foster a sense of competence, confidence, and collaboration that are vital to resilience (Walsh, 1996). The study of this crisis over time allows for a level of stability to manifest itself.

Of course, this research looks at resilience on a broad scale rather than at the individual level, and it would be short-sighted to make the claim that social media engagement leads to resilience based on two crisis data sets. However, it would also be shortsighted to overlook the possibility that social media engagement may increase resilience through the community and network connections and ability to share opinions and feelings that social media provide.

Implications for Public Relations and Crisis Communication

In public relations literature, social media have been praised for their capability to create connections and encourage interaction, especially between individuals and organizations (Waters & Williams, 2011). This study looks at the broad connection between individuals and other participants in social media. Though this study did not examine whether user accounts were individuals or organizations as a unit of analysis, it's likely that the Twitter dialogue in this study included a mix of individuals and organizations. Therefore, it can be said that this study shows a multiplicity of connection points between individuals and organizations with intersecting layers of interest, relevance, and connection (consistent with research by Capriotti & Pardo Kuklinski [2012] and Canfield [2007]). Through the Clauset-Newman-Moore algorithm used on each text corpus of the terrorist attacks in Paris and Barcelona, we can look at responses on Twitter as different types of dialogue.

Dialogue on social media, according to this study, may not be defined as many may expect. The assumption may be that dialogues are defined by hashtags, but in this study, one hashtag (i.e., #Paris or #Barcelona used in this study) may lead to multiple different types of dialogue, as evidenced by the findings. Even more specific hashtags like “#barcelonacontigo” (Barcelona with you) in Barcelona Cluster 2 yields different types of dialogue (i.e., “#WakeUpSpain” and “#PropheciesOfNostradamus”). Therefore, it’s important for organizations to look deeper into specific hashtags and other keywords, than to simply rely on the most trending hashtags to understand dialogue.

This study also has implications for crisis communication. The main social media model in crisis communication is the Social Mediated Crisis Communication (SMCC) model, which focuses on the notion that crisis information is disrupted through influencers on social media (Liu, Jin, Briones, & Kuch, 2012). This study shows that information around a crisis is not only distributed and shared by influencers but by anyone who uses a social media account (in this case Twitter). The SMCC makes the assumption that the distribution of crisis information is driven by influencers or social media users with the most following. While that may be true, this study shows that information distribution may be based on influential or what might be termed “trending” content. This study shows how Twitter users may create a community around a particular set of hashtags or keywords to discuss a crisis.

The question is the status of users within the dialogues around a crisis on Twitter, and whether equality is possible in a hashtag-based dialogue. In the data a few times a famous person would comment or would be mentioned, indicating their influence as part of the conversation, but influencers were not the only driving voice considering that other non-celebrity names showed up throughout the data streams. Therefore, this study showed that within the SMCC model, which suggests that information either flows directly (between creators and followers) or indirectly (between followers and inactives) (Lin, et al., 2012), that the latter may have been more representative across all clusters in the Paris and Barcelona data. Taking these findings a step further, it can be argued that the SMCC model could be expanded to include not just creators, but also co-creators of content on a social media platform.

Overall, this study shows the need to build crisis models around analysis of the ways that individuals discuss, share, and make meaning of a crisis, not just who posts information. The focus of this study adds to this area of research as it focuses on the nature of content and not just

the dissemination of content. Semantic network analysis combined with content analysis allow analysis of emotional response and the demonstration of coping behaviors and resilience.

Limitations and Future Directions

This study is not without its limitations. First, the results are representative of online postings and may not represent offline conversations or contexts. Making the direct connection to what individuals post online and how they actually feel or believe is a difficult one. This study takes social media content at face value, which leaves offline intentions and conversations out of consideration. Another limitation of using Twitter as a data set is that it is difficult to determine if Twitter users are responding to and interacting with each other or if they have alternate agendas. This study did not examine the connection between users, nor did it specify the connection between tweets (it only examined the connection between words). Therefore, it is difficult to see whether users in this study were responding to each other or making their own separate commentary.

Another limitation should be discussed regarding the dataset itself. The researcher used broad hashtags (#Paris and #Barcelona) to get the most comprehensive dataset possible. However, this may have led to superfluous data, including Barcelona Cluster 13, which discusses trade rumors about a European Football player. A more specific hashtag like “#PrayForParis” and “#PrayForBarcelona” would have yielded more specific and possibly relevant clusters, but would have also limited the depth of data, especially considering that the “prayfor” hashtags didn’t occur in the most dominant dialogues for Paris or for Barcelona. At the same time, it can’t be assumed that all the content surrounding Paris and Barcelona was included in this analysis. Though the program used to download tweets (Crimson Hexagon) gathers most of the Tweets, Twitter does not allow for a complete download of all content available. Finally, the nature of Twitter, itself, should be considered as a limitation. Compared to other social media platforms, Twitter may be more informational and less social in nature than platforms like Facebook or even Reddit. Analyzing data on other platforms might yield different results, though the extent of emotion, coping, and resilience evident in this study is promising considering Twitter’s focus on information distribution.

Future research should dig deeper into the emotional effect of participating on social media during a crisis. Perhaps most importantly, future research should examine individual

feelings regarding social media engagement through interviews or other in-depth methods to determine whether social media posts are actually reflective of feelings and emotions. Furthermore, similar research on other crises and terror attacks that play out on social media platforms like Twitter would add to the validity of this data set.

Conclusion

This study demonstrates an alternative way for communication professionals and scholars to use big data to understand behavior during a crisis. The most common approach may be to simply conduct a content analysis, but this study shows how semantic network analysis helps uncover and identify social media dialogues that occur around crises. This study helps to broaden public relations and health communication research in the areas of crisis coping and resilience, two areas that are likely to grow in research importance. Identifying the path of message dissemination is critical to understanding the effect of social media on a society, and therefore is equally important for communication professionals in public relations and health communication. This study shows how crisis coping and resilience may occur online following a crisis, and suggests the need to identify the different levels of messages and conversations that are associated with crisis response. In a big data world where researchers may try to understand behavior as a whole, results from this study show the importance of the nuances between different content and conversations online. The study also points to the need to further examine how social media stand to increase resilience and crisis coping through their connective capacity.

REFERENCES

- Austin, L., Liu, B. F., Jin, Y. (2012). How audiences seek out crisis information: Exploring the social-mediated crisis communication model. *Journal of Applied Communication Research*, 40, 188–207.
- Botha, E., Mills, A. J. (2012). Managing the new media: Tools for brand management in social media. In A. Close (Ed.), *Online consumer behavior: Theory and research in social media, advertising and E-tail* (pp. 83–100). Taylor & Francis.
- Brand, F., & Jax, K. (2007). Focusing the meaning(s) of resilience: Resilience as a descriptive concept and a boundary object. *Ecology and Society*, 12(1), Article 23.
<https://www.ecologyandsociety.org/vol12/iss1/art23/>
- Buzzanell, P. (2010). Resilience: Talking, resisting, and imagining new normalcies into being. *Journal of Communication*, 60, 1–14. <https://doi.org/10.1111/j.1460-2466.2009.01469.x>
- Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour Research and Therapy*, 44(4), 585–599. <https://doi.org/10.1016/j.brat.2005.05.001>
- Canfield, B. S. (2007). The dyadic complexity formula. *Family Journal*, 15(2), 116–118.
<https://doi.org/10.1177%2F1066480706297786>
- Capriotti, P., & Pardo Kuklinski, H. (2012). Assessing dialogic communication through the Internet in Spanish museums. *Public Relations Review*, 38, 619–626.
<https://doi.org/10.1016/j.pubrev.2012.05.005>
- Chang, E. C. (1996). Cultural differences in optimism, pessimism, and coping: Predictors of subsequent adjustment in Asian American and Caucasian American college students. *Journal of Counseling Psychology*, 43(1), 113–123.
<https://psycnet.apa.org/doi/10.1037/0022-0167.43.1.113>
- Clauset, A., Newman, M. E. J., & Moore, C. (2004). Finding community structure in very large networks. *Physical Review*, 70, Article 066111.
<https://doi.org/10.1103/PhysRevE.70.066111>
- Cleaver, F. (2005). The inequality of social capital and the reproduction of chronic poverty. *World Development*, 33(6), 893–906.

- Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and Anxiety*, 18(2), 76–82.
- Cook, S. W., & Heppner, P. P. (1997). A psychometric study of three coping measures. *Educational and Psychological Measurement*, 57(6), 906–923.
- Danowski, J. A. (1982). A network-based content analysis methodology for computer mediated communication: An illustration with a computer board. *Communication Yearbook*, 6, 904–925.
- Doerfel, M. L. (1998). What constitutes semantic network analysis? A comparison of research and methodologies. *Connections*, 21(2), 16–26.
- Earl, J., Kimport, K., Prieto, G., Rush, C., & Reynoso, K. (2010). Changing the world one webpage at a time: Conceptualizing and explaining Internet activism. *Mobilization: An International Quarterly*, 15(4), 425–446.
- Earl, J., & Kimport, K. (2011). *Digitally enabled social change: Activism in the internet age*. MIT Press.
- Feder, A., Ahmad, S., Lee, E. J., Morgan, J. E., Singh, R., Smith, B. W., Southwick, S. M., & Charney, D. S. (2013). Coping and PTSD symptoms in Pakistani earthquake survivors: Purpose in life, religious coping and social support. *Journal of Affective Disorders*, 147(1–3), 156–163.
- Fletcher, D., & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts, and theory. *European Psychologist*, 18(1), 12–23.
- García, S., Molinero, O., Ruíz, B., Salguero, A., Vega, R., & Márquez, S. (2014). Resilience in sport: Theoretical foundations, instruments and literature review. *Cuadernos de Psicología del Deporte*, 14(3), 83–98.
- Gerry, C. J., & Li, C. A. (2010). Consumption smoothing and vulnerability in Russia. *Applied Economics*, 42(16), 1995–2007.
- Gil, S. (2005). Coping style in predicting posttraumatic stress disorder among Israeli students. *Anxiety, Stress, and Coping*, 18(4), 351–359.
- Gonzalez-Herrero, A., & Pratt, C. B. (1996). An integrated symmetrical model for crisis-communications management. *Journal of Public Relations Research*, 8, 79–105.

- Habibov, N., & Afandi, E. (2017). Community-level social capital and household strategies for coping with global crisis in transitional countries. *Social Indicators Research*, 130(2), 687–710.
- Harlow, S., & Harp, D. (2012). Collective action on the Web: A cross-cultural study of social networking sites and online and offline activism in the United States and Latin America. *Information, Communication and Society*, 15(2), 196–216.
- Hermida, A., Lewis, S. C., & Zamith, R. (2014). Sourcing the Arab Spring: A case study of Andy Carvin's sources on Twitter during the Tunisian and Egyptian revolutions. *Journal of Computer-Mediated Communication*, 19(3), 479–499.
- Holling, C. S., & Gunderson, L. H. (2002). Resilience and adaptive cycles. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 25–62). Island Press.
- Hollstein, B. (2014). Mixed methods social networks research: An introduction. In S. Dominguez & B. Hollstein (Eds.), *Mixed methods social networks research: Design and applications (structural analysis in the social sciences)* (pp 3–34). Cambridge University Press.
- Howard, P. N., & Hussain, M. M. (2011). The role of digital media. *Journal of Democracy*, 22(3), 35–48.
- Igenhoff, D., & Koelling, A. M. (2009). The potential of websites as a relationship building tool for charitable fundraising NPOS. *Public Relations Review*, 25, 66–73.
- Jin, Y., & Liu, B. F. (2010). The blog-mediated crisis communication model: Recommendations for responding to influential external blogs. *Journal of Public Relations Research*, 22(4), 429–455.
- Jin, Y., Pang, A., & Cameron, G. T. (2012). Toward a publics-driven, emotion-based conceptualization in crisis communication: Unearthing dominant emotions in multi-staged testing of the integrated crisis mapping (ICM) model. *Journal of Public Relations Research*, 24, 266–298.
- Johnson-Cramer, M. E., Berman, S. L., & Post, J. E. (2003). Re-examining the concept of stakeholder management. *Unfolding Stakeholder Thinking*, 2, 145–161.

- Kang, M. (2014). Understanding public engagement: Conceptualizing and measuring its influence on supportive behavioral intentions. *Journal of Public Relations Research*, 26(5), 399–416.
- Kent, M. L. (2011). What is a public relations “Crisis?” Refocusing crisis research. In W. T. Coombs, & S. J. Holladay (Eds.), *Handbook of crisis communication* (pp. 705–712). Wiley/Blackwell.
- Kent, M. L., & Taylor, M. (1998). Building dialogic relationships through the world wide web. *Public Relations Review*, 24(3), 321–334.
- Kent, M. L., & Taylor, M. (2016). From Homo Economicus to Homo dialogicus: Rethinking social media use in CSR communication. *Public Relations Review*, 42, 60–67, <https://doi.org/10.1016/j.pubrev.2015.11.003>
- Koren, D. H. Y. (2002). A fast multi-scale method for drawing large graphs. *Journal of Graph Algorithms and Applications*, 6(3), 179–202.
- Lambert, N. J. (2017). Text mining tutorial. In A. Pilny & M. S. Poole (Eds.), *Group processes: Computational and data driven approaches* (pp. 93–117). Springer Press.
- Lazarus, R. S. (1991). *Emotion and adaption*. Oxford University Press.
- Li, M. H., & Nishikawa, T. (2012). The relationship between active coping and trait resilience across US and Taiwanese college student samples. *Journal of College Counseling*, 15(2), 157–171.
- Liu, B. F., Austin, L., & Jin, Y. (2011). How publics respond to crisis communication strategies: The interplay of information form and source. *Public Relations Review*, 37, 345–353.
- Liu, B. F., Jin, Y., Briones, R., & Kuch, B. (2012). Managing turbulence in the blogosphere: Evaluating the blog-mediated crisis communication model with the American Red Cross. *Journal of Public Relations Research*, 24, 353–370. <https://doi.org/10.1080/1062726X.2012.689901>
- Lotan, G., Graeff, E., Ananny, M., Gaffney, D., & Pearce, I. (2011). The Arab Spring, the revolutions were tweeted: Information flows during the 2011 Tunisian and Egyptian revolutions. *International Journal of Communication*, 5(31), 1375–1405.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562.

- Notten, G., & Crombrugghe, D. D. (2012). Consumption smoothing in Russia. *Economics of Transition*, 20(3), 481–519.
- O'Brien, H. (2016). Theoretical perspectives on user engagement. In H. O'Brien & P. Cairns (Eds.), *Why engagement matters: Cross-disciplinary perspectives of user engagement in digital media* (pp. 1–23). Springer.
- Oh, J., & Sundar, S. S. (2016). User engagement with interactive media: A communication perspective. In H. O'Brien, & P. Cairns (Eds.), *Why engagement matters: Cross-disciplinary perspectives of user engagement in digital media* (pp. 177–198). Springer.
- Papacharissi, Z., & de Fatima Oliveira, M. (2012). Affective news and networked publics: The rhythms of news storytelling on Egypt. *Journal of Communication*, 62(2), 266–282.
- Park, H., & Reber, B. H. (2008). Relationship building and the use of web sites: How Fortune 500 corporations use their web sites to build relationships. *Public Relations Review*, 34, 409–411.
- Perlmutter, D. (2008). *Blogwars*. Oxford.
- Rettberg, J. W. (2009). “Freshly generated for you, and Barack Obama”: How social media represent your life. *European Journal of Communication*, 24, 451–466.
- Rodriguez, J. (2018). *La Rambla*: Bearing the scars of jihad. *El Pais*.
https://elpais.com/elpais/2018/08/17/inenglish/1534503907_961650.html
- Sellnow, T. L., & Seeger, M. W. (2013). *Theorizing crisis communication*. Wiley & Sons.
- Smith, B. G., Smith, S. B., & Knighton, D. (2018). Social media dialogues in a crisis: A mixed-methods approach to identifying publics on social media. *Public Relations Review*, 44(4), 562–573.
- Smith, M., Ceni A., Milic-Frayling, N., Shneiderman, B., Mendes Rodrigues, E., Leskovec, J., & Dunne, C., (2010). NodeXL: A free and open network overview, discovery and exploration add-in for Excel 2007/2010/2013/2016. <http://nodexl.codeplex.com/>
- Taylor, M., & Kent, M. L. (2014). Dialogic engagement: Clarifying foundational concepts. *Journal of Public Relations Research*, 26, 384–398.
<https://doi.org/10.1080/1062726X.2014.956106>
- Tobin, D. L., Holroyd, K. A., Reynolds, R. V., & Wigal, J. K. (1989). The hierarchical factor structure of the Coping Strategies Inventory. *Cognitive Therapy and Research*, 13(4), 343–361.

- Van den Broeck, K., & Dercon, S. (2011). Information flows and social externalities in a Tanzanian banana growing village. *The Journal of Development Studies*, 47(2), 231–252.
- Walsh, F. (1996). The concept of family resilience: Crisis and challenge. *Family Process*, 35(3), 261–281.
- Waters, R. D., & Williams, J. M. (2011). Squawking, tweeting, cooing, and hooting analyzing the communication patterns of government agencies on Twitter. *Journal of Public Affairs*, 11(4), 353–363.
- Watkins, B. A. (2017). Experimenting with dialogue on Twitter: An examination of the influence of the dialogic principles on engagement, interaction, and attitude. *Public Relations Review*, 43(1), 163–171.
- Weinberg, M., Gil, S., & Gilbar, O. (2014). Forgiveness, coping, and terrorism: Do tendency to forgive and coping strategies associate with the level of posttraumatic symptoms of injured victims of terror attacks? *Journal of Clinical Psychology*, 70(7), 693–703.
- Wu, G., Feder, A., Cohen, H., Kim, J. J., Calderon, S., Charney, D. S., & Mathé, A. A. (2013). Understanding resilience. *Frontiers in Behavioral Neuroscience*, 7, Article 10. <https://doi.org/10.3389/fnbeh.2013.00010>
- Xu, L., Marinova, D., & Guo, X. (2015). Resilience thinking: A renewed system approach for sustainability science. *Sustainability Science*, 10(1), 123–138.