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Barbe A. Fogarty

Kutztown University, [barbefogarty@gmail.com](mailto:barbefogarty@gmail.com)

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“We Are Forgotten.”

Framing Disaster via Twitter in the Aftermath of Hurricane Maria:  
Implications for Social Work Policy Practice

A Dissertation Presented to  
the Faculty of the Doctor of Social Work Program of  
Kutztown University|Millersville University of Pennsylvania

In Partial Fulfillment  
of the Requirements for the Degree Doctor of Social Work

By Barbe Fogarty

March 25, 2020

This Dissertation for the Doctor of Social Work Degree

by Barbe A. Fogarty

has been approved on behalf of

Kutztown University|Millersville University

Dissertation Committee:

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Dr. Juliana Svistova, Committee Chair

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Dr. Janice Gasker, Committee Member

---

Dr. Keith Massie, Committee Member

March 25, 2020

Date

## ABSTRACT OF THE DISSERTATION

“We Are Forgotten.”

Framing Disaster via Twitter in the Aftermath of Hurricane Maria:

Implications for Social Work Policy Practice

By

Barbe Fogarty

Kutztown University|Millersville University, 2020

Kutztown, Pennsylvania

Directed by Dr. Juliana Svistova

This work presents a comprehensive study of the disaster discourses generated by key social media user groups in the aftermath of Hurricane Maria in Puerto Rico. Hurricane Maria, the third most destructive hurricane in American history, resulted in billions of dollars in damage and the loss of nearly 3,000 lives. Disasters result in widespread geophysical impacts as well as social, political, and economic upheavals for individuals, families, communities, and nation-states in the storm’s wake. The discourses that emerge on social media are significant in how they frame public narratives in the aftermath of disaster. The social construction of disaster points to the contested nature of these frames as they vie for dominance in the public sphere, including social media communicative spaces. The literature suggests that there are numerous key interpretive communities and narratives present at any given time. The current study explores six of these communities (individuals, government, military, media, nonprofits, and others) and their corresponding disaster narratives as communicated via Twitter. By utilizing a social constructionist/critical theoretical framework, the prevalent frames embedded in the disaster discourses are identified. These frames include the political frame, destruction frame, victim/hero frame, military/humanitarian aid frame, and counter-narratives.

*Keywords:* disaster, discourse, Twitter, social work, Hurricane Maria, Puerto Rico

Signature of Investigator \_\_\_\_\_ Date \_\_\_\_\_

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“We Are Forgotten.”

Framing Disaster via Twitter in the Aftermath of Hurricane Maria:

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### **Chapter 1: Introduction**

Disasters are complex events that combine natural forces and social realities. Over the last decade, disaster studies have increasingly focused on the social and political factors that contribute to the severity of disasters, not just physical and natural forces (Holm, 2012). As many observers have noted, there is no such thing as a natural disaster. “At all phases, up to and including reconstruction, disasters don’t simply flatten landscapes, washing them smooth. Rather they deepen and erode the ruts of social difference they encounter” (Smith, 2015, p. 3).

Institutional arrangements, the existence of vulnerable populations, and power dynamics are social realities that contribute to the severity of disasters. Not only is vulnerability to disaster disproportionately shared throughout a population based on socioeconomic, racial/ethnic, and gender differences (Ferris, 2010; Pyles, 2017; Zakour, 2008), but so too are resources unequally distributed in the aftermath of a disaster (Olson, 2000; Schuller, 2016). Because of these social realities, “disaster is always already present as a latent problem: only a tiny push is needed to trigger a manifest calamity” (Holm, 2012, p. 51).

#### **Statement of Problem**

The definition of disaster is, itself, contested. The Federal Emergency Management Agency (n.d.) differentiates between natural hazards (such as hurricanes, floods, and tornados) and anthropogenic hazards (the result of human action). Anthropogenic hazards may be non-intentional (the result of systems failures, accidents) or intentional (terrorism or mass shootings). The International Federation of Red Cross (n.d.) distinguishes natural hazards (naturally occurring physical phenomenon) and man-made/technological hazards that are caused by

humans and occur near human settlements (conflict, famine, pollution, industrial accidents). Faulkner (2001) suggested using a continuum of situations from crisis to disaster, where crises are caused by human action and disasters are sudden, unpredictable, catastrophic changes over which human have little or no control. However, the continuum suggests that even in the case of natural disasters, the damage experienced is often partially attributable to human action (or inaction). Definitions of disaster from a social science perspective include the underlying factors of risk and vulnerability. Disasters are defined “in terms of social characteristics of responses in crisis occasions that are part of social change” (Quarantelli, 1987, p. 24). The current study adopts this framework for understanding disasters as being the products of both natural and human processes. The impact of disasters may be worsened or mitigated by human action (or inaction), before, during, and after the event.

In responding to disasters, political systems must allocate material as well as intangible resources. Through their decisions and actions (or inactions), political systems also distribute values of safety, survival, and opportunities. These resources and opportunities are seldom, if ever, apportioned fairly between groups based on socioeconomic status, race/ethnicity, or gender (Olson, 2000). Embedded in these policy actions are socially constructed frames that define the nature of the disaster, including its causes, and appropriate responses to the human suffering left in its wake. The socially constructed meaning of disaster, response, recovery, and reconstruction are contested among different groups including policymakers, non-governmental and nonprofit organizations, and disaster survivors. The emergent disaster discourse, however, is not merely a “discursive practice about a disaster; it is also a discursive practice within a disaster. It is a way to act discursively in a disaster situation – by explaining, urging, soothing, arguing, mobilizing, criticizing, and so on” (Holm, 2012, p. 64). From this perspective, social workers engaged in

disaster research or providing disaster services assume a responsibility to act – by critically examining the impact of existing discourses and working to create discourses that reflect the professional social work values of advancing human rights and promoting social, economic, and environmental justice.

Of particular relevance to the study of disaster discourse and its impact on policy actions is the relation of power to the construction of those discourses. Language and discourse are not neutral artifacts of social reality. Rather, those with power in society have the ability to control language and discourse. Discourses, in turn, influence how people see the world. “Language promotes some possibilities and excludes others; it constrains what we see and what we do not see” (Howe, 1994, p. 522). Multiple discourse communities operate in the public sphere at any given time, each promoting a particular narrative to define and construct meaning (Yanow, 2000). In the case of Hurricane Maria, influential discourse communities include mainland media, local media in Puerto Rico, federal government entities and agencies (such as FEMA – the Federal Emergency Management Agency), Puerto Rican government entities, non-governmental organizations, and survivors. Each community engages in the production of discourses that frame the disaster event, both in understanding the near-term response phase and the longer-term recovery phase. Issues of power influence whose story counts, whose story is given voice, and whose story is silenced. Social workers, by virtue of their commitment to social justice and human rights, should be engaged with these questions of inclusion and exclusion in the search for solutions to pressing social problems, including disaster response and recovery.

### **Hurricane Maria**

On September 20, 2017 Hurricane Maria, a Category 4 storm, made landfall in Puerto Rico. The storm resulted in \$90 billion in losses (the third most costly hurricane in U.S. history),

including significant damage to homes and infrastructure, and an island-wide loss of electricity (DiJulio, Munana, & Brodie, 2018; Pasch, Penny, & Berg, 2019). The official death toll, initially set at 64 by government authorities, was later increased to 2,975. In addition, thousands were displaced as a result of the storm, many relocating to the mainland (Santiago, Shoret, & Kravarik, 2018).

According to a Kaiser Family Foundation survey conducted almost one year after Hurricane Maria (DiJulio et al., 2018), 83% of Puerto Ricans reported that they suffered immediate impacts from the storm, including the loss of electricity for four or more months, the total loss or severe damage to their homes, loss of employment, and worsened health conditions. Almost one year after Maria, 25% of respondents said their lives were still disrupted as a result of the disaster and 26% reported increased stress. Almost one-third (31%) still required assistance in repairing their homes (many of those respondents were low-income). Twenty-two percent (22%) said they or a family member had received mental health services related to the disaster, and 32% had faced challenges accessing health care (DiJulio et al., 2018).

Those residing in the interior of the island and the eastern region were hit hardest due to the path of the hurricane, which tracked from the southeast to the northwest, cutting across the middle section of the island. In the interior, 30% of residents were without power until March and 44% of the residents in the eastern region of the island were without power until March (six months after the hurricane). The on-going loss of electricity resulted in serious health-related challenges for residents such as difficulty storing medications and problems using medical devices that required power (DiJulio et al., 2018).

Regarding response efforts, over half (55%) of Puerto Rico's residents felt that rebuilding the island was not a priority for the federal government and 54% believed that the response to



Hurricane Maria was worse than the response to Hurricane Harvey in Texas (DiJulio et al., 2018). These perceptions were confirmed by studies that showed inequities in the level of aid allocated to Maria and Harvey. For example, although Maria caused more damage than Harvey in terms of loss of electricity and housing, it took four months for federal allocations to reach \$1 billion. Harvey survivors had received \$1 billion in funding in half that time. At the peak of federal involvement, 31,000 federal employees had been deployed to Texas versus 19,000 deployed to Puerto Rico. The amount of food, water, tarps, and helicopters sent to Puerto Rico was less and delivery slower than aid sent to Texas. As mentioned, the death toll in Puerto Rico, initially listed at 64, was eventually increased to 2,975. In Texas, the death toll was estimated to be 103 (Willison, Singer, Creary, & Greer, 2019).

### **Historical and Political Context**

A social constructionist perspective on the aftermath of Hurricane Maria requires a contextualization of the historical, political, economic, and social factors that influence how that event has been framed by various discourse communities (Payne, 2014). Puerto Rico's formal relationship with the United States dates to 1898 when the island became a U.S. territory as an outcome of the Spanish-American War, thus continuing a 500-year history of colonial domination that began with Spain's conquest in the 1500s. From the beginning, Puerto Rico's relationship with the United States has reflected an asymmetrical power dynamic based on economic and political dominance. During the first fifty years of U.S. rule, a modernization project was enacted with the goal of lifting the island out of its underdeveloped condition (Llorens, 2018). Beginning in the 1900's, a series of tax policies were enacted that served to attract mainland businesses to the island. Under Operation Bootstrap in the mid-20<sup>th</sup> century, the industrialization of Puerto Rico escalated, funded by outside investors, thus creating an economy

dependent on mainland interests. The growth of manufacturing and manufacturing jobs increased, coinciding with the loss of sugar, coffee, and tobacco production. The push toward industrialization resulted in the expansion of “dirty industries,” such as petrochemicals, pharmaceuticals, refineries, and coal-powered plants, which benefitted from Puerto Rico’s lax environmental regulations (Llorens, 2018).

The federal government’s decision to rescind corporate tax exemptions in the 1990s, coupled with the global recession of 2008, had a devastating impact on Puerto Rico’s economy. The Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA), passed by Congress in 2016, required the Commonwealth government to enact austerity measures in order to repay its \$72 billion debt. As a result, the public education, health care, and infrastructure systems have been severely cut (Fuste, 2017). PROMESA also limited the amount of funding the Puerto Rican government could allocate toward disaster response after Maria (Rodriguez-Diaz, 2018).

Politically, the status of Puerto Rico as an unincorporated territory has meant that residents, despite being citizens since 1917, lack full representation in the U.S. Congress. A non-voting Resident Commissioner serves in the House of Representatives. Puerto Rico is not represented in the Electoral College and Puerto Ricans, despite being citizens, cannot vote in presidential elections (although they may vote in primaries). As a territory, the ultimate governance of the island rests with the U.S. Congress and the President. Federal policies and mandates take precedence over Puerto Rican legislation in all aspects of governance (Rodriguez-Diaz, 2018).

In the aftermath of Hurricane Maria, much of the public discourse focused on the island’s pre-disaster economic situation, often blaming local elected officials and the Puerto Rican people, for their plight. Media narratives of Puerto Rico as poverty-stricken and dependent on help from the

global North have been echoed by statements from FEMA officials and President Trump. Requests for aid have been met “with reminders that the island is a debtor state and rapprochement of the island’s childlike dependency, too accustomed to having their problems solved from the North, and ultimately treated with callous disregard by the federal government” (Llorens, 2018, p. 150). These statements reflect the entrenched legacy of colonialism that continues to influence the construction of disaster discourses as the island and its residents grapple with the physical, emotional, economic, and political impacts of the storm. Bankoff (2001) suggests that terms such as First/Third World or North/South divide serve to reinforce global patterns of dominance, reducing non-Western countries to “a homogenized, culturally undifferentiated mass of humanity, variously associated with powerlessness, passivity, ignorance, hunger, illiteracy, neediness, oppression, and inertia” (p. 23).

Newer forms of colonialism and economic domination are manifested in the promotion of neoliberalism and disaster capitalism. Disaster capitalism (Klein, 2005), is the promotion of private, for-profit interests and free-market solutions to address post-disaster recovery and reconstruction needs to counter the perceived ineffectiveness of government. Government support of neoliberal principles, such as privatization of public services, is also common in the aftermath of natural and human-made disasters (Gotham, 2012; Pyles, 2017; Schuller, 2016; Tierney, 2015), including post-Maria Puerto Rico. Prominent examples of disaster capitalism include the awarding of no-bid contracts to politically connected corporations and the privatization of public services. Also aligned with neoliberal economic principles is the framing of disaster survivors as customers, clients, and consumers in a market-driven recovery (Adams, 2012). Disaster capitalism was evident in Puerto Rico shortly after the storm when Whitefish Energy, a company associated with then-Interior Secretary Zinke, received a \$300 million no-bid

contract to repair the power-grid. Though the contract was later rescinded, a subsequent \$200 million no-bid contract was awarded to Fortune 500 Fluor Corporation (Robles & Acosta, 2017).

The history of colonialism and economic dependency of Puerto Rico are key social realities that must inform any attempt to understand the conditions that exist on the island, post-Maria. This legacy is unique to the United States, and therefore, merits inclusion in this analysis of disaster discourses. Puerto Rico's "intermediate location between 'modern and pre-modern,' 'developed and underdeveloped,' 'first and third-world,' its anachronistic colonial condition, and its geographic location at the crossroads of Caribbean, Latin America, and the United States have played essential roles in the social, visual, and narrative constructions of the disaster" (Llorens, 2018, p. 145).

The following chapters will describe the theoretical framework that guided the study as well as the methodology and major findings of the qualitative and quantitative analyses of the data. Suggestions for future research and implications for social work will also be discussed.

## Chapter 2: Literature Review

### Theoretical Foundations

The theoretical framework that guided this study includes social constructionism, framing theory, and critical theory. The relevant elements of those theoretical perspectives will be discussed in detail in this chapter, as will results of the review of the literature related to disaster discourse and social media.

**Social constructionism.** Social constructionism (Berger & Luckmann, 1967) is an epistemological perspective that views knowledge of social reality as being negotiated and constructed through social interaction. Social constructions of reality are primarily created through language and shaped by particular historical, cultural, social, and local contexts (Payne, 2014). Social constructions are not constituted in a complete state of relativism. In other words, social constructions are themselves relational and contextualized. Like postmodernism, social constructionism acknowledges the importance of power dynamics in understanding how constructs are formed and take root in society. “Social constructions are relative to complex dynamics of power in the here and now, and to ritual filters that shape human perceptions and stories about some things in some ways to the exclusion of others” (Pfohl, 2008, p. 645). Epistemological dominance is a feature of the constructionist perspective, with some groups assumed to have advantages in constructing knowledge and defining social reality. Regarding the phenomena of interest, the social construction of disaster discourses occurs in particular social, cultural, and historical contexts. The definitions of disaster, response, and recovery are contested by multiple actors and produce particular worldviews and taken-for-granted realities. Social constructions that are especially effective in meaning-making can create opportunities for action. “When we act in the world on the basis of social constructions by which we picture the

world, the effects are material and sometimes long lasting. Social constructions may alert us to problems that, while real, may have never been put into words” (Pfohl, 2008, p. 650). Thus, the construction of discourses is worthy of research in that discourses contain the potential for shaping human action in response to particular ways of constructing meaning.

It is also possible for multiple discourses explaining the same phenomena to co-exist at the same time in society. In that case, it is necessary to examine the role of power in promoting certain discursive narratives and excluding or marginalizing others. Gramsci’s theory of hegemony is useful in this regard (Ives, 2004). Gramsci suggested that hegemony is a form of social power that relies on voluntary participation of people in an exploitative system. In the process of creating hegemonic systems, the norms and values of the dominant power group come to be accepted as social consensus or common sense. Hegemony involves a struggle between contested constructs and may result in a kind of uneasy balance, where individuals who are constrained by hegemonic power will nevertheless accept those limitations as taken-for-granted reality. The result is a kind of passivity or homeostasis in which hegemony is embodied in everyday, mundane activities. Civil institutions, such as the media, education, the church, and families produce and reinforce hegemonic power (Ives, 2004; Stoddart, 2007).

As an example, the legacy of colonial domination continues to shape the processes in which social constructions of reality are formed and imposed. The legacies of “colonial formations of power impact upon all other social processes – from definitions of success and pleasure, to ideas about value, cost-effectiveness, preemptive warfare, and pain” (Pfohl, 2008, p. 659). Some scholars suggest that the concept of coloniality better describes the long-standing patterns and power relations that were created under colonialism but continue to define culture, social arrangements, and the production of knowledge (Maldonado-Torres, 2007). In the context of

Hurricane Maria response and recovery efforts in Puerto Rico, any analysis of the construction of various disaster discourses must consider the impact of coloniality and the power dynamics inherent in the historical and political relationship between the mainland United States and the territory of Puerto Rico. Effective social work interventions at the micro, mezzo, and macro levels require a complete understanding of the underlying forces that influence the framing of problems and solutions in the aftermath of disasters.

**Framing theory.** Framing theory focuses on the creation of shared meanings contained in conceptual constructs, or frames, and, therefore, complements a social constructionist approach. As theorized by Goffman (1974), frames are abstract concepts that organize or structure meaning. Frames influence how individuals process information, or how we think about an issue, event, or person. Goffman (1974) suggested that there are two types of frames. Natural frames define events as strictly physical occurrences, without any social causes. Such events are “undirected, unoriented, unanimated, unguided...” (Goffman, 1974, p. 22). Social frames, however, define events as the result of social forces, driven by the goals, intentions, and manipulations of social actors. In the current study, the distinction between natural and social frames is relevant in how disasters are defined – as random acts of nature or as the result of human actions and inactions.

Chong and Druckman (2007) further define framing as a “process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue” (p. 105). Frames simplify complex issues such as disasters by selecting, emphasizing, and giving importance to some aspects of social reality over others (Nisbet, 2010). In this process, frames “promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation” (Entman, 1993, p. 52). The framing process results in the

construction of cognitive models or categories and often draws on metaphor, stories, cultural mores, slogans, and contrasts (Fairhurst & Sarr, 1996). Multiple frames, created by multiple groups in society, will compete for dominance. In the construction of frames related to disasters, for example, expert discourse, political officials' discourse, and survivors' discourse all interact in complex ways in the process of defining social reality (Gamson & Modigliani, 1987).

The social construction of frames occurs on two levels. At the cultural level, interpretive frames are created that contain and organize elements such as metaphors, catchphrases, visual images, moral appeals and other symbolic devices. These interpretive packages are revised as events change and their relative influence will grow and diminish over time. On most important issues or events there are a number of interpretive packages competing for the public's attention. On the cognitive level, individuals make sense of the same event by drawing on their own knowledge, experiences, and personal predispositions to interpret reality according to anticipatory frames (Gamson & Modigliani, 1987).

In order to maintain their dominance in the public consciousness, interpretive constructs require cultural resonance, sponsors, and media practices that promote certain packages over others. Cultural resonance occurs when the ideas and language used reflect larger cultural themes and are familiar to the audience. Sponsors promote certain interpretive packages such as utilizing experts and professionals as advocates, making speeches, writing articles, and giving interviews to the press. Journalists, likewise, engage in practices that may, unintentionally, give preference to some interpretive packages over others. Relying on relationships with official sponsors to gain information or uncritically accepting the underlying assumptions of interpretive frames are examples of such practices (Gamson & Modigliani, 1987). For example, news media tends to rely on expert voices that are authoritative. The dominant discursive voice in media



coverage presents a “hierarchy of credibility in which expert voices are privileged over those of local residents” (Cox, Long, Jones, & Handler, 2008, p. 401). For these reasons, it is important to view the media as a distinct discursive community when analyzing the construction of interpretive frames and how they contribute to the definition of disasters.

**Critical theory.** Key principles of the critical theory begin with a focus on social structures, including cultural, economic, and social systems as the root cause of inequality and oppression. Social structures, rather than the deficiencies of individuals, create and maintain social arrangements and practices that disadvantage some groups and advantage others. Crucial to this theoretical framework is an examination of the role of power and dominance in shaping social interactions. Oppression is manifest in multiple ways including marginalization (a failure to consider the interests of oppressed groups), exploitation (dominant group benefits by using resources of oppressed groups), powerlessness (oppressed groups are denied the ability to influence decisions that impact them); and cultural imperialism (the imposition of cultural norms and beliefs on oppressed groups). Given this reality, it is necessary for social workers to adopt a critical stance regarding existing social structures and assumptions about the social order if they are to understand the context in which their clients live (Payne, 2014).

Mullaly (2007) suggests that there are three requirements for critical theory. First, an understanding that inequality, exploitation, and domination, and oppression are rooted in existing social structures and related practices. Second, critical theory provides critiques of the existing social order and offers an alternative vision for a society free of inequality and injustice. Third, critical theory articulates a plan for social change that is accessible to those who are marginalized and oppressed.

Critical theory emerged from the writings of Marx (1959) and were further developed by the

Frankfurt School and the writings of Gramsci (1971) and Habermas (1981). In line with Marxist theory, critical theory advocates a dialectical approach. A dialectical analysis views society as containing contradictions that must be reconciled in order to progress. The existence of oppositional concepts creates a creative tension that can prompt change (Ife, 1999). Dialecticism rejects the binary choices or false dichotomies that are frequently reflected in public debate surrounding social problems. For example, the traditional dichotomy of the individual and society as separate entities obscures a more complex interrelationship. Individual problems cannot be separated from the social context in which people live and function. Social structure shapes the daily lives and experiences of individuals, but knowledge of structures can empower individuals to change social conditions. In promoting social change, it is therefore necessary to understand both the role of individual agency and the impact of structural forces. A dialectical analysis of the relationship between agency and structure allows for a broader insight that “the individual is both the creator of the social world and is created by the social world (Mullaly, 2007, p. 237).

In terms of social work practice, the dialectical perspective, grounded in critical theory, can help to resolve the persistent micro-macro divide.

The particular value of critical theory is that it values subjective experience, and hence affirms difference and the continual reconstruction of ‘reality’, while at the same time embedding this within a more macro analysis of structural disadvantage, or oppression. It is in the holding of these two apparently opposing positions, and in seeking to resolve that dialectic, that critical theory both poses intellectual challenges for social workers and others, but also suggests courses of action (or praxis) within the context of the uncertainty, fragmentation and ambiguity of a postmodern world (Ife, 1999, p. 219).

Aligned with critical theory, critical postmodernism emphasizes knowledge and power, but always in a specific context, and with a focus on decision-making processes “with all voices being heard and weighted and all outcomes being negotiated” (Fawcett, 2013, p. 153). Only through the full participation of all involved in decision-making can non-oppressive outcomes be achieved. Critical postmodernism provides an important perspective for understanding the phenomenon of interest. In framing disaster, it is crucial to examine accepted explanations or top-down, expert-driven assessments of disaster response and recovery efforts. Policies and practices that are applied uniformly in all disaster situations, regardless of specific contexts, should be viewed with skepticism. Instead, a postmodern perspective

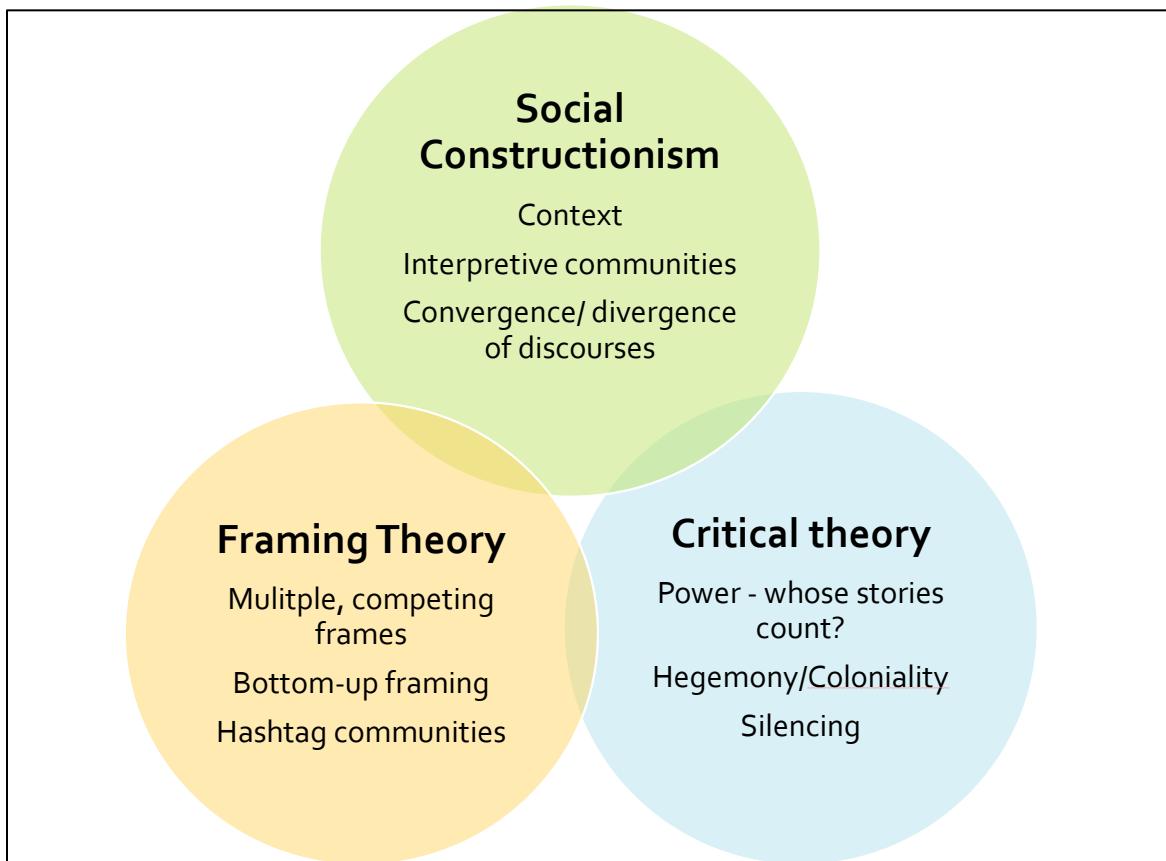
draws attention to all aspects of a situation and focus on inclusion and negotiation, the weighing of criteria in context, and the making of intercontextual links. These attributes can be seen to have an ongoing relevance for social work and its commitment to constructive critique, theoretically nuanced practice and the need for social workers to continuously differentiate between acceptable and unacceptable social practices in a variety of complex situations (Fawcett, 2013, p. 156).

A key component of postmodernist theory is the role of language, discourse, and power in creating and sustaining social structures. Foucault (1980) described discourse as a system of thought and knowledge that exists independent of the speaker. Pre-existing discourses are used to guide interactions, such as the discourse of academia used in educational settings or the discourse of medicine used by doctors and patients. Postmodernism is critical of the reliance on dominant, universalistic discourses that exemplify modernism and reflect and maintain structured power differences. Such discourses represent the “imperialism of an enlightened modernity that presumes to speak for others with a unified voice” (Mullaly, 2007, p. 221).

Rather, it is imperative that the discourses of diverse groups in society are acknowledged.

When multiple discourses explaining the same phenomena compete, it is necessary to examine the role of power in promoting certain discursive narratives and excluding or marginalizing others. Gramsci's theory of hegemony is useful in this regard (Ives, 2004). Gramsci suggested that hegemony is a form of social power that relies on voluntary participation of people in an exploitative system. In the process of creating hegemonic systems, the norms and values of the dominant power group comes to be accepted as social consensus or common sense. Hegemony involves a struggle between contested constructs and may result in a kind of uneasy balance, where individuals who are constrained by hegemonic power will nevertheless accept those limitations as taken-for-granted reality. The result is a kind of passivity or homeostasis in which hegemony is embodied in everyday, mundane activities. Civil institutions, such as the media, education, the church, and families produce and reinforce hegemonic power (Ives, 2004; Stoddart, 2007). As an example, the legacy of colonial domination continues to shape the processes in which social constructions of reality are formed and imposed. The legacies of "colonial formations of power impact upon all other social processes – from definitions of success and pleasure, to ideas about value, cost-effectiveness, preemptive warfare, and pain" (Pfohl, 2008, p. 659). Some scholars suggest that the concept of coloniality better describes the long-standing patterns and power relations that were created under colonialism but continue to define culture, social arrangements, and the production of knowledge (Maldonado-Torres, 2007). In the context of Hurricane Maria response and recovery efforts in Puerto Rico, any analysis of the construction of various disaster discourses must consider the impact of coloniality and the power dynamics inherent in the historical and political relationship between the mainland United States and the territory of Puerto Rico.

The adoption of critical theory can enhance social work practice at all levels in that it identifies the “ways in which concepts of power, oppression, and inequality influence interpersonal relationships, institutional arrangements, and individual self-concepts, and recognizes multiple ways of knowing and the role of human agency in personal and social change” (Jani & Reisch, 2011, p. 14). In understanding the process of framing disaster in the context of Hurricane Maria, it is necessary to examine the role of structured power relationships, the resulting policies and practices surrounding response and recovery efforts, and the impact of those actions in perpetuating the marginalization and exploitation of Puerto Ricans. Figure 1 provides a graphic representation of the theoretical framework utilized in the current study.



*Figure 1.* Conceptual framework: Constructing disaster discourse post-Maria

### **Review of the Literature on Discourse**

**Media discourse.** Disaster discourse (Holm, 2012), or the way disasters are explained, understood and made sense of, entails a collection of cultural artifacts including metaphors, scientific concepts, cognitive frames, and narratives. Taken together, these elements shape how we view disasters and what we fail to see, such as the social causes of natural disasters. During crisis situations such as natural disasters, the media assumes a significant role in collecting and disseminating information and promoting a particular crisis discourse (Seeger & Ulmer, 2002). The public demands information on the scope of the disaster, how it developed, response efforts, and how the crisis might affect them personally. Through their reporting, news outlets construct a particular narrative that contributes to a shared understanding of the disaster (Davis & French, 2008). Media narratives and discourses are potentially influential in ascribing disasters with “cultural meanings and politically consequential interpretations. Media... newspapers – construct disasters in terms of relationships of power, social values and attitudes, and even processes of global interdependence” (Taras, 2015, p. 69). Newspaper circulation indicates the scope of influence they still exercise in the present-day media environment. For example, the *New York Times*, the second largest newspaper in the United States based on circulation, reaches 1.27 million subscribers (*New York Times*, 2017).

Research suggests that news media shape public perceptions of disasters by emphasizing, or framing, some issues over others. For example, content analysis of 1590 print news articles (from local and national sources) in the aftermath of Hurricane Katrina indicated that the media emphasized the need for increased government responsiveness and accountability (Barnes, Hanson, Novilla, Meacham, McIntyre, & Erickson, 2008). Barnes et al. (2008) further noted that journalists tend to focus on the themes of conflict, loss of life, property damage, and accountability when reporting on disasters. Dhakal (2018) conducted a content analysis of 415

print news articles from four sources (one local and three foreign newspapers) in the one-month response period immediately following the 2015 earthquake in Nepal. Findings suggested that media reports of disasters tend to recycle familiar themes such as “emerging heroes and villains, human conflict and suffering, looting, panic, shelter, and shock” (Dhakal, 2018, p. 297).

Multiple studies have examined how media representations utilize particular discursive themes to describe the victims and survivors of disasters, as well as the disaster itself. Trckova’s (2014) content analysis of 180 print media articles focused on media coverage of four natural disasters (Indian Ocean Tsunami, Hurricane Katrina, Haiti Earthquake, and Japanese Earthquake and Tsunami). Three national newspapers were sourced (*New York Times*, *The Guardian*, and *The Globe and Mail*) for articles published in the two-week period following the disasters. Analysis focused on media representations of the natural disaster itself and the people affected. Dominant themes identified included natural disasters as animate beings (personification) and disasters used for scapegoating (ignoring man-made factors). People were represented as victims, heroes, or villains and were either impersonalized as a homogeneous mass or individualized to create human interest and a connection to readers. In addition, the theme of insiders versus outsiders was evident in media coverage (Trckova, 2014).

In the aftermath of Hurricane Katrina Davis and French (2008) analyzed 168 print media articles from three national newspapers (*New York Times*, *Washington Post*, and *USA Today*). Using critical discourse analysis, the researchers documented how media represented the “typical” victim in New Orleans as being black and poor. Victims were explicitly linked to criminal behavior such as looting. Giroux (2006) noted a similar discursive pattern in which media coverage reinforced the linking of race and poverty and compared New Orleans to a third world country. In the aftermath of the 2010 earthquake in Haiti, media accounts frequently

described survivors as “dysfunctional, childlike, dependent” (Balaji, 2011, p. 53) or “either hysterical or selfish” (Schuller, 2016, p. 58).

**Policy discourse.** Disasters are socially constructed. “Whether a hazard exists or a disaster has occurred is as much a social and political question as a scientific one” (Birkland, 1998, p. 54). The shared meaning of a disaster event is negotiated by any number of groups or individuals who have an interest in creating a particular narrative. Disasters serve as focusing events (Birkland, 1998), or “exogenous shocks” (Olson, 2000, p. 266), that can shape dominant discourses in the policy domain. Focusing events that are large in scope (depending on the number of people killed and the extent of damage caused) tend to trigger debates over how to define the event and how best to respond. In this context, focusing events present an opportunity by “drawing attention to ideas that were generally unformulated before the event, and may create the opportunity for a new look at policies previously considered politically unpalatable or unnecessary” (Birkland, 2009, p. 147).

Hurricanes, as a specific type of focusing event, constitute a distinct policy domain. Policy domains represent the “substantive subject of policy over which participants in policymaking compete and compromise” (Birkland, 1998, p. 66). These participants include elected and appointed government officials, disaster relief experts, NGO staff, academics, and survivors. Wyatt-Nichol and Abel (2007) examined this competitive process and the way in which emergency management was defined by various actors in post-Katrina New Orleans. A discourse analysis of print media, broadcast news, official statements by federal/state/local government, and White House statements demonstrated that the political and media discourses were successful in dominating the debate around emergency management post-disaster. Common frames included the portrayal of government officials as incompetent or overwhelmed



and government officials blaming each other for problems with the disaster response. Other discourses shaped expectations for disaster response and the appropriate role of public administration. For example, an emphasis on the extreme rarity of Katrina rendered it an unforeseeable event and thus limited the responsibility of government officials. The influence of the business community on public administration actions was evident in efforts to privatize public services and calls to downsize government to increase efficiency. The researchers concluded that “political leaders and media pundits are in a position of (qualified) dominance vis-a-vis both the victims of Katrina and public administration professionals as they enjoy the resources necessary to impose a particular discourse concerning emergency management upon the victims and the career professional alike” (Wyatt-Nichol & Abel, 2007, p. 582).

Related to the process of constructing disaster is the creation of causal stories that seek to attribute cause, blame, and responsibility for problematic situations (Stone, 1997). The construction of causal stories often results in political conflicts that reveal underlying power dynamics in the policy arena. Stone (1997) identifies four possible explanations or causal theories that are applied to the definition of problems including intentional, mechanical, inadvertent, and accidental explanations. These constructs derive from a basic question: is this situation caused by human actions (and therefore responsive to human intervention) or is it an accident or act of God (and therefore beyond human control)? Causal stories are employed to manage and shape the interpretation of events. “Political actors create causal stories to describe harms and difficulties, to attribute them to actions of other individuals and organizations, and thereby invoke government power to stop the harm” (Stone, 1997, p. 208). For example, causal arguments are used to protect established organizations, institutions, and interests; to assign blame and responsibility for fixing a problem; to identify and equip certain actors to fix

problems; and to create relationships with others who see themselves as suffering because of the problem (Stone, 1997).

Thus, causal stories related to disasters frame reality in particular ways and suggest courses of action. Policy actions, or the responses to an identified problem, are defined as “ongoing strategies for structuring relationships and coordinating behavior to achieve collective purposes” (Stone, 1997, p. 259). Causal stories are used strategically to construct the meaning of social reality, including the causes of disasters, and point toward particular actions or responses that serve the interests of individuals and groups in the political arena. Analyses of causal stories have been applied to earthquake risks associated with natural gas fracking operations (Fisk, Davis, & Cole, 2017) and the Deepwater Horizon oil spill (Birkland & DeYoung, 2011).

The narrative policy framework (NFP) provides an extension of the causal stories perspective and provides a theoretical tool to analyze the role of narratives in the public policy process (Crow, Lawhon, Berggren, Huda, Koebele, & Kroepsch, 2017; Jones & McBeth, 2010; Shanahan, Jones, McBeth, & Lane, 2013). Narratives contain certain elements including a setting in which the situation occurs; recognition of a policy problem; offering of a policy solution; and characters (defined as heroes, victims, or villains). The construction of narratives is often contested, with various issues and solutions being proposed by a variety of interested parties. “Advantaged or dominant groups attempt to contain issues by restricting participation in policy discussions and limiting the scope of conflict, while disadvantaged groups work to expand issues by widening participation to involve a greater number of actors...” (Crow et al., 2017, p. 642).

Crow et al. (2017) demonstrated the utility of using a narrative framework in analyzing natural disasters. In their study of two wildfires in Colorado, 876 print newspaper articles were coded

using the three narrative elements (definition of a policy problem; proposed solutions; and the presence and type of characters). In focusing specifically on disaster events, the researchers also included a chronological analysis of narrative construction that occurred before, during, and after the disaster. Results indicated that the most common problem definition focused on a lack of resources to fight wildfires. The most commonly cited solutions focused on additional regulations or government action. Heroes were identified as the community, fire crews and the Forest Service and victims were most often identified as homeowners. The wildfires were identified as the villains in most narratives. This may be unique to disaster narratives, where humans are often portrayed as powerless in the face of uncontrollable, animate forces (Trckova, 2014).

Theoretical frameworks can be helpful in drawing attention to those aspects of disasters that may go unnoticed in favor of taken-for-granted assumptions about causes and responses. Rather than defining disasters as simply policy problems that can be addressed through technical means, it is more productive to focus on disasters as “values problems and the closely associated issues of authority, power, interest, influence, and accountability” (Olson & Gawronski, 2010, p. 219). In an analysis of six global disasters from 1840-2015, researchers applied a framework to assess public reactions to government responses to disasters. Six dimensions were examined: capability, competence, compassion, correctness, credibility, and anticipation (titled the 5C+A framework). Results suggested that such a framework has cross-case applicability and provides a way to analyze the “substance, symbols, and subtleties of the political dimensions of disasters” (Olson & Gawronski, 2010, p. 219).

**Non-governmental organization discourse.** Humanitarian non-governmental organizations (NGOs) also represent a key discourse community in the social construction of disasters. NGOs

are early responders to large-scale disaster situations and apply extensive financial resources and personnel to address immediate needs for shelter, food, water, and other services (such as mental health services). For example, in 2017 world governments channeled \$4 billion to NGOs. NGOs also received \$5.2 billion in private donations in 2017. The International Red Cross Red Crescent alone received \$2.1 billion of government funding. In the same year, an estimated 201 million people in 134 countries needed international aid because of conflict, violence, disasters, forced displacements, and natural hazards (Development Initiatives, 2018). The largest humanitarian organization in the United States, the American Red Cross, reported \$1.58 billion in assets in 2017. In the same year the Red Cross dedicated \$777 million to domestic disaster services (24% of total expenditures) and \$87 million to international relief and development, or 2.7% of the total budget (American Red Cross, 2018).

Clearly, NGOs bring significant resources to bear on the response and recovery efforts in the aftermath of disasters. There is, however, disagreement as to the outcomes of the humanitarian efforts of non-governmental organizations. Because of the bureaucratic structure of international NGOs, it has been suggested that “well intentioned aid allocation does not guarantee outcomes that benefit recipients” (Buthe, Major, & de Mello e Souza, 2012, p. 600). Of particular concern are issues of appropriateness and equity in assessing the outcomes of humanitarian relief efforts. Appropriateness refers to the match between actual needs and the type of aid provided. Examples include services and resources “that are provided to disaster survivors that have effect on their ability to recover, such as donations that are out of line with actual victim needs, or that actually hamper the recovery process, such as programs that undermine the viability of local economies and livelihoods” (Tierney & Oliver-Smith, 2012, p. 134). Issues of equity pertain to the fair distribution of resources as well as transparency in resource allocation decisions. Aid

efforts that benefit some groups over others – regions, communities, social groups, organizations – would not meet the equity standard (Tierney & Oliver-Smith, 2012). At the root of decision-making regarding appropriateness, transparency, and equity are the policies and practices that have been established to channel the flow of money and other assistance to disaster-stricken areas. Therefore, an analysis of the discourse and policy narratives constructed by NGOs is crucial for understanding the key elements of those narratives and identify possible inconsistencies present in organizational discourse and actions taken in the field.

Humanitarian organizations employ multiple discourses of legitimacy to justify their existence as well as their policies and practices in disaster response and recovery (Hollis, 2014). By analyzing the texts of 21 foundational documents, conference proceedings, and charters from the humanitarian sector from 1755 to 2005, three distinct legitimacy frames were identified: the humanitarian ethics of care, scientific rationality, and respect/disrespect for sovereignty (Hollis, 2014).

The humanitarian ethic of care legitimizes action by providing the moral authority for intervention in disaster situations in order to help those in need. While providing a “presumed moral inviolability” (Schuller, 2016, p. 10) for humanitarian organizations, this mandate is also problematic from a critical perspective. First, the ethic of care tends toward paternalism and the perpetuation of a savior mentality (Barnett, 2005). Also, the humanitarian ethic, while claiming to maintain neutrality, cannot separate itself from the power relationships and political context in which it is applied. The existence of these contradictions serves to de-legitimize the ethic of care (Hollis, 2014).

Scientific rationality in the field of disaster response is characterized by an emphasis on prediction, measurement, and cost-benefit considerations as well as the increasing influence of

experts and expert knowledge. Rationality can become the dominant discourse in disaster situations and succeed in marginalizing other narratives (Hollis, 2014). The expansion of humanitarianism in the 1990s ushered in organizational forms and practices that were more professionalized, more bureaucratic, and more rational, thus giving primacy to the scientific discourse (Barnett, 2005). An unintended, and potentially delegitimizing, consequence of emphasizing objective measures of organizational outcomes and effectiveness is that it may “erode a central element of the humanitarian ethic: a desire to demonstrate solidarity with victims and to restore their dignity” (Barnett, 2005, p. 733). Because it is difficult to measure intangible factors such as solidarity or compassion, humanitarian organizations have little incentive to include the experience of aid recipients in their metrics (Barnett, 2005; Schuller, 2016).

The third discursive frame, respect/disrespect for sovereignty, assumes that the moral authority to save lives takes precedence over legal jurisdictions and the principle of non-intervention. This frame highlights the tension between state sovereignty and the ethic of care, or legal versus moral authority. The competition between these frames is important in defining what constitutes appropriate action in disaster situations (Hollis, 2014).

The social constructionist theory suggests that, at any given time, multiple discourses are present in the public domain and compete for prominence. In the context of disasters, the physical and symbolic environment in which discourses are contested and negotiated can be understood as the “humanitarian arena” (Hilhorst & Jansen, 2010, p. 1117). Based on extensive ethnographic fieldwork in two humanitarian settings (a refugee camp in Kenya and post-tsunami in Sri Lanka), the researchers define the humanitarian arena as a socially constructed nexus where “a multitude of actors, including humanitarians and the disaster-affected recipients of aid,

shape the everyday realities of humanitarian action” (Hilhorst & Jansen, 2010, p. 1117). The negotiation of humanitarian aid involves different strategies utilized by multiple actors (donors, NGO staff, government officials, the media, and recipients). Strategies may include coercion, written statements, or formal interactions between organizations, government, and recipients.

Actors in the humanitarian arena construct discourses to frame their relationships to one another and to the existing disaster situation. This “actor-oriented approach therefore pays much attention to the analysis of different discourses that actors draw on to advance their ideas or activities” (Hilhorst & Jansen, 2010, p. 1120). The arena perspective sheds light on the various motivations for humanitarian action beyond an ethic of care that may be reflected in the discourse of NGOs. “Political motivations may partly inspire humanitarian action. It can also be driven by organizational politics – the desire to continue operations and retain staff – or as a form of legitimization politics – showing the public that an agency is doing good work” (Hilhorst and Jansen, 2010, p. 1121). In other cases, organizations choose projects that will be covered by the media in order to promote themselves to donors (Schuller, 2016).

Competition over access to the humanitarian arena centers on questions of legitimacy and who will be included or excluded. For example, NGO staff with in-country experience are often pushed aside in favor of specialists from the outside. Local organizations find it difficult to enter the humanitarian arena due to the dominance of international NGOs. Intra-organizational conflicts also occur as front-line staff are excluded from the decision-making process or their local knowledge is devalued by organizational superiors (Hilhorst & Jansen, 2010; Schuller, 2016). Recipients, also, are often excluded from the humanitarian arena. Following the 2010 earthquake in Haiti, “one of the biggest problems with the aid response was that the word ‘actor’ usually did not include the Haitian people, and certainly not recipient communities... Haitian

people were shut out of discussions about humanitarian aid” (Schuller, 2016, p. 235). The unresolved issue of who is included or excluded from participating in constructing disaster narratives points to the importance of including survivors as an important discursive community.

**Survivor discourse.** In the social construction of disaster narratives, the definition of victims and the need for “salvation by external heroes comprise the main themes... the testimonies of the subjects in the scene are selected, and the information ordered in time, producing a narrative that guides what is said about the disaster, identifying the heroes and victims who enter the scene and describing how they act” (Marchezini, 2015, p. 365). These particular themes of victims and heroes are, in part, promulgated by NGOs who need beneficiaries in order to fulfill their stated missions. “The language of vulnerability is the vital twin of the humanitarian discourse. By vulnerabilizing people, agencies can legitimize their own intervention and claim the need for their expertise” (Hilhorst & Jansen 2010, p. 1132). Thus, including the survivors of disaster as a key discursive community is necessary in order to capture those perspectives that may be otherwise overlooked or defined by other actors. NGOs often have an incentive to ignore local realities and discourage input from local beneficiaries since these counter-narratives have the potential to undermine their own hero narrative (Schuller, 2016). In addition to the donor-driven priorities of NGOs, there are other factors that may discourage the inclusion of a local discursive community. “Language barriers, cultural differences, population movements, and difficult or dangerous access also hamper communication with local population groups... A conscious or unconscious Northern ‘expert’ bias to ‘know what’s best’ may also play a role” (Dijkzeul & Wakenge, 2010, p. 1140).

Ethnographic studies show that survivors demonstrate a range of behaviors and responses to humanitarian aid in the aftermath of disaster. While media discourse often portrays survivors as



either helpless victims or villains with criminal intent (Davis & French, 2008; Schuller, 2016; Trckova, 2014), the research paints a different, more varied and nuanced picture of aid recipients. As actors in the humanitarian arena, aid recipients may play a role in negotiating the allocation of assistance or constructing pro-active strategies to obtain resources. The concept of humanitarian space implies a setting where agencies seek out people in need. “However, we see the humanitarian encounter as an interface where aid providers and aid seekers meet each other. Aid recipients do not passively hang about until aid arrives but strategize to reach agencies and become eligible for their services” (Hilhorst & Jansen, 2010, p. 1132). In the aftermath of the earthquake in Haiti, Schuller (2016) described the “performances” required of Haitians in order to receive aid. These included the repeated requests for personal information from NGO staff, the media, and researchers or standing in lines for hours before being sent home without aid. In one extreme example of required performance, Haitians were asked to sing for an NGO video. Those who did express appreciation for humanitarian aid still recognized that the aid provided could not meet all the needs of the population (Schuller, 2016).

Survivors’ perceptions of humanitarian aid are often diverse, depending on the local context and needs (Dijkzeul & Wakenge, 2010). In comparing perceptions of humanitarian aid delivered by two NGOs, beneficiaries generally viewed aid as necessary and believed that NGOs were doing their best, even though those efforts were deemed insufficient to meet the needs of the populace. Other responses were more negative and framed NGOs’ inability to meet needs as proof of organizational incompetence at best and, at worst, corruption. The co-existence of these different narratives was ascribed to several salient points: humanitarian organizations are likely to be judged based on their ability to meet needs (however, needs are localized and not uniform, thus introducing complexity in resource allocation); some criticism of humanitarian aid will

always occur because NGOs address the effects, not the causes, of suffering; communication matters in managing expectations and rumors regarding the distribution of aid; and professionalism and empathy builds trust more effectively than the rhetoric of humanitarianism (Dijkzeul & Wakenge, 2010).

Often overlooked in the dominant disaster discourses that frame victims as helpless and passive are the acts of solidarity and mutual assistance that survivors provide to each other before outside aid arrives. Solnit (2009) described these instances of altruism, solidarity, and generosity in the midst of destruction and human suffering as a “paradise entered through hell” (p. 10). Stories of survivors providing shelter to their neighbors, preparing and sharing meals, and engaging in rescue and debris clearing efforts have been collected from disaster survivors in Haiti (Schuller, 2016), Turkey (Marchezini, 2015), and Puerto Rico in the aftermath of Hurricane Maria (Madrigal, Lowrie, Wilkie, & Fogarty, 2019).

**Social media.** The last decade has witnessed the growing influence of social media in shaping shared concepts of the public sphere and public communication. According to the Pew Research Center (2019), 72% of adults in the United States use at least one social media site, up from only 5% in 2005. Of those who use social media, 22% use Twitter as their primary platform. Of those, 64% are aged 18-49, 56% have some college or a college degree, and 42% use Twitter on a daily basis (“Social Media,” 2019). In addition, government entities, media outlets, and nonprofit organizations utilize Twitter to disseminate functional and informational communications. The advent of Twitter and other social media outlets has created a profound shift in our collective understandings of the public sphere and how public communication is adapting to new modes of technology. With the introduction of these platforms, “the boundaries between interpersonal communication have weakened and the identity of the institutions shaping

that communication has changed” (Matheson, 2018, p. 585). Twitter, for example, has evolved from its original purpose of sharing personal updates to a medium for sharing information, opinion, events, and news (Bozdag & Smets, 2017).

Twitter’s shared communicative space operates at multiple levels of interaction including the micro-level (communication between users), the meso-level (networks of followers and those they follow), and at the macrolevel (exchanges organized around hashtags). At the macro-level, users effectively construct “ad hoc publics” (Bozdag & Smets, 2017, p. 4048) that coalesce around particular issues or events. From a social constructionist perspective, Twitter becomes a shared platform for negotiating and creating discourses that both reflect and shape how actor groups define social reality in a disaster situation.

The use of Twitter in the immediate aftermath of traumatic events and natural disasters has become a focus for social science research as social media usage has grown. Literature on post-disaster Twitter usage suggests that the platform is widely used as a public forum, disseminating emergency information from official actors and organizing response efforts (Acar & Muraki, 2011; Eriksson & Olsson, 2016; Stewart & Wilson, 2016). However, Matheson’s (2018) analysis of Twitter communication in the aftermath of the 2011 earthquake in New Zealand found discursive patterns that were distinct from these crisis communications. First, Twitter was used to share information and practical advice as a way of bypassing official outlets or institutions such as local government. Instead, Twitter users engaged in “practical performance of helping and informing, shorn of any politicization or self-consciousness” that can be associated with the public talk used by government officials and politicians (Matheson, 2018, p. 592). Additionally, international expressions of concern and statements sharing insider information were also present in tweets in the immediate aftermath of the disaster. The most

widely used tweets expressed a sense of community, mutual aid, and shared experience. Later in the disaster cycle, there was evidence of “more political discussions and less mutual regard, as consensus gave way to frustration...” (Matheson, 2018, p. 596).

Tweets posted by ordinary users in disaster situations typically express emotions, support, and political content while official sources, aid organizations, media outlets, and celebrities use Twitter to post information about the disaster and relief efforts (David, Ong, & Legara, 2016). Takehashi, Tandoc, and Carmichael (2015) found that Twitter use during a disaster reflects certain themes such as discussing causes, criticizing government, requesting help, expressing well-wishes, and reconnecting community members.

Understanding how issues and events are framed in the context of social media, as opposed to traditional media, raises additional issues. Nisbet (2010), for instance, suggested that the study of frames in social media requires a shift from a top-down model of framing events (characteristic of traditional media framing) to a more “social constructivist, ‘bottom-up’ model of framing” (p. 75). A focus on bottom-up framing turns attention to everyday social media users who become “active contributors, creators, commentators, sorters, and archivers of digital news content” (Nisbet, 2010, p. 75). Research suggests that ordinary social media users can play an important role in framing disasters and political uprisings (Meraz & Papacharissi, 2013). For example, in framing political events, social media users selectively share content that is consistent with their beliefs. As Twitter users choose or discard content, “they collectively highlight facets of events or issues to promote a particular interpretation” (Arguete & Calvo, 2018, p. 480).

In the context of disasters, Twitter hashtags function as a form of frame alignment (Eriksson, 2018; Snow, Rochford, & Worden, 1986) in which users participate in the construction and

negotiation of meaning in the aftermath of extraordinary events. Hashtags that become popular in this bottom-up framing process function as

a public signal for the ad hoc framing of the event, and as a shorthand cue for enabling the public to understand the thematic frames of an issue as it unfolds in a dynamic fashion. These hashtags that gain widespread adoption thus enact, enable, and sustain the framing of select interpretations, aspects, or frames, to an event over time (Meraz & Papacharissi, 2013, p. 144).

Hashtags are one way for individuals and actor groups to communicate about events and, in doing so, move beyond their personal network to a wider social network organized around one or several hashtags. Because hashtags allow anyone (not just followers) to read a tweet, this form of communication constructs a network of users connected by an idea that is relevant to a large number of people (Matheson, 2018). Bruns (2008) suggests that this network is not a loosely bound set of isolated individuals. Rather, it is a “patchwork of overlapping public spheres centered around specific themes and communities which... form a network of issue publics that is able to act as an effective substitute for the conventional, universal public sphere of the mass media age” (Bruns, 2008, p. 69). Hashtag communities, or ad hoc publics, are user-generated, flexible networks that function like discursive communities, though perhaps not fulfilling all of the characteristics of a discourse community suggested by Swales (1988), for example. These characteristics include the sharing common public goals, shared terminology, and expectations for discourse. However, hashtag communities do exhibit a level of common interest through hashtags. Also, participants may share an awareness of each other online and engage in discursive exchanges (Bruns & Burgess, 2011). Similarly, Yanow (2000) defined interpretive communities as groups that share “thought, speech, practice, and their meanings” (p. 10). Like

hashtag communities, interpretive communities can be fluid, changing as issues change, and often exhibiting some overlap (Yanow, 2000).

The formation of hashtag-defined communities can result in the construction of alternative narratives that challenge elite or top-down discourses (Eriksson, 2018), but the consequent influence of hashtag communities remains a question. On one hand, social media platforms provide opportunities for more citizen-produced content and create “new possibilities for alternative points of view or for challenging social systems and power” (Bouvier & Machin, 2018, p. 180). Conversely, some researchers warn against the potential for citizen voices to be subsumed and commercialized by mainstream media to legitimize elite discourses (Bouvier & Machin, 2018).

### **Gaps in the Literature**

This review of the literature suggests that, while there is a robust body of disaster research in the social sciences in general, social work lags behind as a contributor to this field of study. For example, a search of the SocIndex database, using the keyword “disaster,” yielded 10,996 entries. Adding the keyword “social work,” resulted in only 1,437 entries since 1960. In the Social Work Abstracts Plus database, a search for articles with “disaster” in the abstract yielded only 274 entries since 1975. Furthermore, the focus of these articles tends toward micro-level interventions with disaster survivors and the impact of disaster situations on social work professionals who provide direct services in the immediate aftermath of disasters. In social work, despite an emphasis on “social justice, social change, and human rights in the social work literature, the role of social workers in post-disaster scenarios focuses almost exclusively on disaster management and crisis intervention” (Pittaway, Bartolomei, & Rees, 2007).

### **Summary**

In this review of the literature, the context of the current study was established through a complete analysis of theory and research related to disaster studies. First, the theoretical framework was presented, focusing on the relevant elements of social constructionism, framing theory, and critical theory. Research on various discourse communities involved in disaster situations, including the media, government/policy, non-governmental organizations, and survivors was examined. In addition, the issues pertaining to social media research in the context of disasters was discussed. Finally, gaps in the existing research on disasters from a social work perspective were identified.

### **Chapter 3: Methodology**

This chapter presents a summary of the study design as well as the methods used to collect and analyze the data. Both quantitative and qualitative methods are described in detail.

Limitations of the current study are also addressed.

#### **Purpose of Study**

The narratives that emerge on social media in the aftermath of disasters are significant in how they frame the disaster event and recovery efforts. The social construction of disaster points to the contested nature of these frames as they vie for dominance in the public sphere, including social media communicative spaces. The current study analyzed the Twitter posts of six social media user groups (individuals, government, military, media, nonprofit, and “other”) and the corresponding disaster narratives as communicated via the text and visual content of their tweets.

#### **Research Questions**

Research questions emerged from a review of the disaster literature and are rooted in the theoretical framework of social constructionism, framing theory, and critical theory. The research questions are designed to expand the knowledge base related to the role of social media in constructing disaster discourses.

R1: What disaster and recovery narratives are constructed in text and visual content by key user groups (individuals, government, military, media, nonprofit, and “other”) via Twitter using the hashtag #HurricaneMaria?

R2: How do the post-Maria disaster and recovery discourses produced by the six key user groups via Twitter converge and diverge?

#### **Study Design**



The research design is an instrumental case study of one event – Hurricane Maria. The case study will be bounded by location (Puerto Rico) and timeframe (from September 21, 2017 to September 21, 2018). As an instrumental case study, this analysis will focus on the issue of post-disaster social media, specifically Twitter (Creswell & Poth, 2018). Case study methods have been employed retrospectively to analyze the use of social media in crisis situations (Bruns, Burgess, Crawford, & Shaw, 2012; Karlsson, 2010; Oh, Agrawal, & Rao, 2010).

This study is based on a thematic content analysis of Twitter posts in the aftermath of Hurricane Maria. Social media content analysis utilizes a mixed-methods approach that combines the quantifying of data (for example, calculating frequencies or sentiment scores) with qualitative methods that provide a richer description of emergent themes in the data (Chew & Eysenbach, 2010; Heverin & Zach, 2011; McHugh, Saperstien, & Gold, 2019; Sutton, 2010). This combined quantitative-qualitative approach allows the researcher to “both embrace and cope with the volume and diversity of commentary over social media” (Andreotta, Nugroho, Hurlstone, Boschetti, Farrell, Walker, & Paris, 2019, p. 1766). This method has been applied to numerous social media studies (Oh, Agrawal, & Rao, 2010; Small, 2011; Sutton, 2010; Qu, Wu, & Wang, 2009) and “generates research that is valid, rigorous, reliable, and replicable” (Small, 2011).

Thematic content analysis further provides a methodological approach to address the discursive elements of situationality and intertextuality in relation to Twitter data (Goodman & Light, 2016; Gredel, 2017). Situationality refers to the meaning of the tweet as it is linked to a particular time and space when posted (Goodman & Light, 2016). In other words, it is important to establish the larger context to which tweets are connected. Hashtags, a convention of Twitter,

are one way to contextualize tweets. Hashtags enable users with a particular interest to focus their search for comparable online content. “In other cases, hashtags intensify evaluation and function as a tool that connects Twitterers who share a similar sentiment” (Rasmussen, 2015, p. 201). The focus on a single hashtag, such as #HurricaneMaria, makes it possible to “identify voices which may not be otherwise heard through more traditional approaches, such as semi-structured interviews...” (Andreotta et al., 2019, p. 1767). Bruns and Burgess (2011) likewise note the efficacy of highlighting a particular hashtag “as a means of coordinating a distributed discussion between more or less large groups of users, who do not need to be connected through existing ‘follower’ networks” (p. 1).

Intertextuality, or the way in which text takes meaning from the surrounding content, can be applied to tweets in several ways. First, embedded images, such as photos, videos, or graphics, are common elements of tweets and highlight the multi-modal form of social media communication. Other forms of intertextuality of tweets include the addition of links to external websites or reference to other tweets within a threaded conversation (Goodman & Light, 2016; Gredel, 2017).

The current study aims to address both situationality and intertextuality by analyzing the textual and visual content of tweets using a single hashtag (#HurricaneMaria) as produced by specific user groups, or discursive communities, in the aftermath of disaster. The meaning of disaster and recovery is a social construction, negotiated among any number of groups, each of which produces a particular narrative. It is the purpose of this study to examine how those relevant groups frame disaster and recovery through text and visual content.

### **Sampling**

Purposeful sampling was used to select tweets that could provide the greatest insight into the

phenomenon of interest (Creswell & Poth, 2018). In this case, tweets containing the hashtag #HurricaneMaria were determined to be the most germane to understanding how disaster narratives were constructed post-Maria. Historical tweets were accessed by searching the Twitter website, using the platform's search function. The inclusion criteria were defined by timeframe (tweets posted between September 21, 2017 and September 21, 2018), language (tweets in English), and hashtag (all tweets posted using the hashtag #HurricaneMaria). The hashtag #HurricaneMaria was selected as a search term to narrow the focus of captured tweets. This hashtag was included somewhere in each tweet (although additional hashtags may have been present). The timeframe of September 21, 2017 to September 21, 2018 was selected to include the one-year anniversary date of the hurricane's landfall in Puerto Rico. Duplicate tweets were excluded as well as tweets that did not focus specifically on the disaster situation in Puerto Rico (some tweets using #HurricaneMaria referred to the Virgin Islands, for example). A query of the Twitter online search engine, applying the aforementioned search parameters, yielded 1,296 tweets.

Although a majority of research studies utilizing Twitter data involve large datasets of 100,000 tweets or more (Zimmer and Proferes, 2014), a case can be made for research using smaller data sets.

Despite the growing interest in big data, many emphasize the continued importance of 'small data.' Depending on the research question, a closer analysis of a limited number of cases can provide information that cannot be gained by the study of millions of cases (Bozdag & Smets, 2017, p. 4051).

Small data studies have the advantage of allowing researchers to focus on specific groups and examine the relationships between those actors in a particular context (Bozdag & Smets, 2017;

Pal & Gonawala, 2017).

### **Data Collection**

Individual tweets were collected from the Twitter website ([www.twitter.com](http://www.twitter.com)) using the above inclusion/exclusion criteria. Changes to Twitter's developer policy in June 2017 restricted access to Twitter's API and requires that data collection be conducted contemporaneously with Twitter activity (Littman, 2017). Because the current study was retrospective (dating back to September 21, 2017), the researcher had limited ability to collect historical Twitter data for computer-assisted analysis. As a result, individual tweets were copied from the original Twitter feed on the Twitter website using a snipping tool. Individual tweets were then saved as png files on the researcher's personal computer. Optical character recognition (OCR) software was used to convert png files to txt files. Individual tweets were then re-saved in folders corresponding to the user group that produced the tweet (government, military, individuals, media outlets, nonprofits, and others). The user group designation was determined by checking the user's profile on the original tweet and saving the tweet to the corresponding file. The government user group was defined by the researcher as elected officials (such as members of Congress, the Governor of Puerto Rico or the Mayor of San Juan) and representatives of government agencies at the federal or local level (such as FEMA or the Department of Housing and Urban Development). The military user group was created to capture the large number of tweets produced by this particular subset of government and included representatives of the armed forces of the United States (Department of Defense, U.S. Army, U.S. Coast Guard, for example) and, in a very small number of observations, other countries (primarily Canada). The media user group included major broadcast networks such as CNN, NBC, PBS, and ABC, as well as print and online media organizations. The individual user group included persons identified by their

online profile as representing only themselves. The nonprofit user group included not-for-profit organizations of any size whose mission (as described in their profile) involves direct service to Puerto Rico in the aftermath of the hurricane. A category designated as “other” was reserved for those users whose affiliation did not fit into an existing category (such as for-profit businesses, political organizations, academic institutions, and advocacy groups) or whose affiliation was not clearly defined in their user profile.

The 1,296 individual tweets were uploaded into an Excel spreadsheet for analysis. The Excel file was converted to a csv file and imported into the R/RStudio software program for sentiment analysis. The Excel file of 1,296 observations was subsequently imported into NVivo 12 Pro for qualitative thematic analysis. All visual content embedded in tweets as photographs, graphics, or videos were captured as part of the png files initially saved on the researcher’s computer.

For the analysis of visual content, all tweets containing visuals were selected from the corpus of 1,296 tweets, resulting in a subset of 819 tweets (not all tweets contain visual content, thus accounting for the smaller number of tweets analyzed in this portion of the study).

### **Data Analysis**

**Thematic content analysis.** A qualitative analysis of the corpus of 1,296 tweets was conducted in NVivo 12 Pro using a thematic approach. Thematic analysis employs a constructionist perspective that “seeks to theorize the sociocultural contexts and structural conditions that enable the individual accounts that are provided” (Braun & Clarke, 2006, p. 85). The social constructionist theoretical perspective aligns with the research questions posed by the current study.

In the initial stage of analysis, the researcher familiarized herself with the corpus of tweets through repeated readings. Data was analyzed at the level of individual tweets (up to 280

characters each). One tweet equaled the unit of meaning for coding purposes in this study. Deductive coding was initially employed by using a set of *a priori* codes that emerged from the review of the literature on framing disaster discourse and social media discourse in crisis situations (see codebook in Appendix A).

As coding progressed, the researcher initiated an inductive method, with additional codes surfacing from the data and subsequently added to the codebook. Leech and Onwuegbuzie (2007) describe this iterative approach as abductive coding. Attribute coding (Saldana, 2016) was utilized to identify the user group that produced each tweet (individual, government, military, media, nonprofit or other). Simultaneous coding, in which two or more codes are assigned to a single unit of data, was also employed in the analysis of tweets (Saldana, 2016). The constant comparison method (Charmaz, 2008) was utilized in which the researcher simultaneously “codes and analyzes data in order to develop concepts; by continually comparing specific incidents in the data, the researcher refines these concepts, identifies their properties, explores their relationships to one another, and integrates them into a coherent explanatory model” (Taylor & Bogdan, 1998, p. 126).

After the initial coding, the prevalence of codes across the corpus of tweets was investigated using the NVivo matrix-coding function. All codes were cross-tabulated across all six user groups to produce a frequency table of most-coded items. The most prevalent codes were identified based on items being coded at least 50 times. The researcher chose to define code prevalence based on a quantitative approach as an intermediate step in highlighting the key elements of the corpus of tweets. As a third step, codes were combined into more coherent categories. In the fourth step, five prevailing themes, or frames, were identified using qualitative, interpretive analysis. Saturation was reached based on code saturation. Code

saturation occurs when “no additional issues are identified and the codebook begins to stabilize” (Hennick, Kaiser, & Marconi, 2017, p. 594). Code saturation was achieved through the refining of existing codes and the addition of new codes as analysis progressed. Memo writing was used to document those instances when codes were merged, or the definitions of codes were modified.

**Analysis of visual content.** Visual images embedded in tweets are critical conveyers of meaning and must be included in any analysis of social media text (Bouvier & Machin, 2018). On Twitter, visual content plays a key role in defining larger narratives and also contributes to the framing process by calling attention to particular aspects of an event or issue. The sharing of images or other visual content also serves as an act of bearing witness to events as they occur, in the tradition of citizen-journalism (Bruns et al., 2012). Thus, visual content can be employed to challenge official narratives in the same way that text can provide counter-hegemonic discourses. Sharing visual material (and text) demonstrates a user’s desire to participate in the public discourse by sharing particular content and, in doing so, make it visible to a larger online community (Neumayer & Rossi, 2018). The aim of analyzing visual material is, therefore, to examine users’ choices or intent in sharing images, to identify the thematic categories that emerge, and to explore visual discourses that convey meaning beyond written texts.

The 819 tweets containing visual content were analyzed in a two-step process as suggested by Neumayer and Rossi (2018). First, images were manually reviewed and assigned to each user group, utilizing attribute coding (Saldana, 2016). As a second step, concept coding was utilized to assign meaning to visuals that is “broader than a single item or action – a ‘bigger picture’ beyond the tangible and apparent” (Saldana, 2016, p. 119). The most frequently occurring subject matter was noted for each user group (for example, images depicting destruction, victims, politicians, etc.) and combined into themes.

**Quantitative content analysis.** The dataset of tweets was organized into a csv file with 1,296 observations across six variables including handle, name/source of post, date of posting, user group (which was determined by the researcher to include individuals, government, military, media, nonprofit, and other), text of tweet, and notes (other information associated with the tweet such as links to external sources or previously posted tweets). The researcher used the R/RStudio dplyr package to filter the data and isolate user groups for comparison (Silge & Robinson, 2017).

**Sentiment analysis.** A primary function of Twitter is to enable users to express their feelings to others (David et al., 2016). Thus, an analysis of the affective characteristics of tweets, measured in terms of sentiment, is methodologically sound. Tweets, at 280 characters, are an appropriate unit of analysis when applying sentiment lexicons (Silge & Robinson, 2017). In the current study, sentiment analysis was used to compare the extent of both positive and negative sentiments contained in tweets produced by the key user groups (individuals, government, military, media, nonprofit, and other).

Sentiment analysis was conducted using *sentimentr* (Rinker, 2019), a word-emotion association lexicon. *Sentimentr* is a software application that provides built-in functions for sentiment computation in the R programming framework. The *sentimentr* application calculates the sentiment of words, sentences, and text by applying a lexicon of 11,709 words, each associated with a particular value. *Sentimentr* also computes the influence of valence shifters such as negators (e.g., not or can't), amplifiers (e.g., absolutely, certainly), deamplifiers (e.g., barely, almost), or adversative conjunctions (e.g., although, but) when calculating sentiment values. The *sentimentr* program contains 140 valence shifters that are combined with individual words to calculate a sentiment score range of -1 to 1 (Rinker, 2019). Because *sentimentr*



specifically addresses the issue of valence shifters it is recommended for use with the R programming framework (Naldi, 2019).

Using `sentimentr`, the entire dataset of tweets was first analyzed at the individual word and sentence levels, with sentiment scores calculated for those discrete elements. Second, the individual elements and associated sentiment scores were recombined into the desired unit of analysis – a single tweet with its corresponding sentiment score. The `dplyr` package was utilized to remove stop-words such as “a,” “an,” or “the” prior to conducting the sentiment analyses. The dataset was mutated using `dplyr` to add the sentiment score outputs of the `sentimentr` analysis to the dataset. Boxplots were used to identify outliers (based on sentiment score) which were removed using the `dplyr` package, resulting in a refined dataset of 1,281 observations.

### **Limitations**

This study, while providing some insights into the social construction of disaster discourse on Twitter, is not without limitations. Most notable, the researcher’s ability to collect historical tweets for computer-assisted analysis was curtailed by recent changes to Twitter’s data collection policies (Littman, 2017). The need to manually collect tweets from Twitter’s website ([www.twitter.com](http://www.twitter.com)) resulted in a relatively small dataset with fewer variables for analysis. For example, it was not possible to examine patterns of retweeting or the geolocation of Twitter users. A second limitation concerns the use of only one hashtag to collect tweets. While this was a deliberate choice to focus the scope of the initial search, it is also likely that a number of relevant tweets may have been missed by omitting variations of #HurricaneMaria (or due to inadvertent misspellings of the hashtag). Collecting tweets with related hashtags may have provided additional insights into the research questions. Third, this study addresses social media discourse on only one platform, Twitter. The architecture of Twitter poses its own challenges in

that posts are limited to 280 characters. The brevity required of Twitter users may impact the content of their messages. Studies of other social media outlets, without these limitations, may uncover alternative uses of these platforms in constructing disaster discourse. Fourth, this study is limited to the narratives produced by those who use Twitter and therefore excludes the contributions of other actors, including those who are digitally isolated. Finally, due to time constraints, it was not possible to conduct a thorough intercoder agreement process to enhance the rigor of the findings. It is recommended that any future studies include an intercoder agreement assessment.

### **Rigor and Trustworthiness**

The use of computer-assisted methods, such as the sentimentr application used in the current study, can increase the reliability of sentiment analysis. Reliability is assured in that the application will produce the same results in a test-retest scenario (Young & Soroka, 2012).

Rigor was enhanced with NVivo query tools including word frequency query and matrix coding. These tools enabled the researcher to “audit findings and guard against excessive emphasis on rare findings that happen to suit the researcher’s preferred argument” (Houghton, Casey, Shaw & Murphy, 2013, p. 15). The NVivo matrix coding tool was utilized to compare multiple codes/nodes and the interrelationships that were suggested by the data (Houghton et al., 2013). Tracy’s (2010) framework for ensuring excellence in qualitative research was also applied to the current study, including the use of theoretical constructs and appropriate sampling to satisfy the criteria of rich rigor. The criterion of sincerity was achieved through self-reflexivity of the researcher and transparency in describing methods and challenges of conducting the research (Tracy, 2010).

Finally, concept memo-writing was used to document issues related to methods and sampling,

decisions about coding and analysis, challenges encountered in the research process, and personal reflections on the research experience (Charmaz, 2008; Peters & Webster, 2007).

Memos were logged as handwritten notes in a memo journal and in an online memo file that was saved on the researcher's personal computer.

### **Ethical Issues**

The current literature on social media research suggests that there is an absence of consensus among researchers and users regarding ethical guidelines (Golder, Ahmad, Norman, & Booth, 2017). Crucial ethical issues pertain to human subjects, informed consent and confidentiality.

Regarding research with human subjects, it was determined that the current study did not involve human subjects and, therefore, was exempt from the Institutional Review Board process at Kutztown University of Pennsylvania (J. Werner, personal communication, July 17, 2019).

Collecting data from social media platforms, such as Twitter, requires that issues of user privacy and confidentiality be addressed. Regarding privacy, the nature of Twitter is such that users have an expectation that their posts will be public. This implies, for example, "that the use of a popular Twitter hashtag during specific mass events... is aimed at public outreach, so that the user cannot reasonably expect to remain unobserved" (Fuchs, 2017). However, Golder et al. (2017) suggest that, while Twitter is viewed by both users and researchers as an inherently public forum, it is still necessary to take steps to eliminate identifying information from individual tweets. In the current study, confidentiality was preserved by eliminating any identifying information from tweets posted by individuals.

Ethical considerations in the analysis and reporting phases of the research project included reporting contrary findings, ensuring that sources were cited correctly, transparency in all decisions made in the research process, and disseminating findings to diverse audiences (Burke,

2007).

Padgett (2017) includes social responsibility as an ethical requirement of qualitative research. This requires “taking the larger structural context into consideration when interpreting and understanding the data” (Padgett, 2017, p. 95). For research that reflects a critical perspective, as this study does, the structural implications are present in all aspects of the research process.

### **Statement of Reflexivity**

The current study reflects a critical ideological interpretive framework. This perspective assumes that “sociohistorical factors interact in producing understanding and meaning” (Haverkamp & Young, 2007, p. 279). The goal of research rooted in this perspective is to uncover how social, political, cultural, and economic forces have had a “restrictive effect on individuals’ lives and perceptions” (Haverkamp & Young, 2007, p. 279). The role of the researcher emerges from this position of sociocultural critique and prompts the questioning of existing structures (Haverkamp & Young, 2007).

As a white, upper-middle class, college educated woman, I am aware of the privileges that have made it possible for me to pursue a doctoral degree. However, my experience as an undergraduate student of sociology and a community organizer in low income communities in the United States instilled in me a consistent personal and professional orientation toward social justice issues and empowerment practice. My theoretical home is in the conflict/critical ideological camp. Thus, I advocate for researchers to employ their skills, knowledge, and resources to challenge structures and systems that create unjust social conditions and, ultimately, contribute to changing those structures.

### **Summary**

The current study is an instrumental case study of the Twitter discourse of six key user groups in the aftermath of Hurricane Maria. A mixed methods approach is used, combining a qualitative thematic content analysis of text and visual content posted by the key user groups and a quantitative sentiment analysis of tweets. A corpus of 1,296 tweets was collected through purposeful sampling by selecting tweets with the hashtag #HurricaneMaria. Focusing on only one hashtag was done to narrow the search, but it also represents a limitation of the current study. In addition, studying only one social media platform, Twitter, is a limitation. Issues of rigor and the ethical issues related to social media research were also addressed. The following chapters will present the findings of the current study and offer points of discussion and implications of the results of this analysis.

## Chapter 4: Findings

This chapter presents the quantitative and qualitative findings produced by a three-part thematic content analysis of the dataset of tweets. First, a quantitative content analysis of 1,281 tweets (after eliminating outliers based on sentiment scores) was conducted using sentiment analysis via the *sentimentr* package in R. Second, a qualitative thematic analysis of the texts of the entire corpus of 1,296 tweets was performed, utilizing the NVivo Pro 12. Third, a content analysis of visual content in a subset of 819 tweets was conducted manually by the researcher. Thematic content analysis allows for quantitative analysis of qualitative data (Braun & Clarke, 2006; Wilkinson, 2000). The current study, for example, utilized frequency calculations and sentiment analysis as well as thematic analysis to answer the research questions. The findings from these analyses are reported in relation to the two research questions posed by the study.

### Research Question 1: Disaster Narratives by Key User Groups

The first research question was: *What disaster and recovery narratives are constructed in text and visual content by key user groups (individuals, government, military, media, nonprofit, and other) via Twitter using the hashtag #HurricaneMaria?* To answer to this question, thematic, interpretive analysis was utilized to identify predominant themes embedded in the text of tweets. To analyze the visual content, a subset of 819 tweets was manually reviewed to identify prevalent themes as portrayed in visual content such as photos and graphic elements. Not all tweets contain visual content, thus accounting for the smaller number of tweets in this subset. The individual, military, government, and media user groups posted the most tweets containing visual content. The distribution of tweets with visual content across the six user groups is summarized in Appendix B.

**Identifying frames of disaster and recovery.** A textual, thematic, constant comparative

analysis revealed five salient themes or frames that emerged from the corpus of tweets. For the current study, themes and frames are considered to be synonymous in that both function to organize ideas. Themes “function as framing devices because they are recognizable and thus can be experienced, can be conceptualized into concrete elements of a discourse” (Pan & Kosicki, 1993, p. 59). The five frames identified in the corpus of tweets include the political frame, the destruction frame, the victim/hero frame, the military/humanitarian aid frame, and the counter-narrative frame. These frames emerged through a multi-step qualitative, interpretive analysis.

***The political frame.*** This frame suggests that disaster and recovery be seen through the lens of power, partisan conflict, and the role of government in responding to the disaster. Embedded in this frame are numerous examples of criticizing and blaming, as well as attempts to assign responsibility for conditions in Puerto Rico immediately after the hurricane’s landfall and for the persistent problems that were still evident one year after the initial shock. The political frame was often contested between liberal (Democratic) and conservative (Republican) voices and, in turns, pointed to racism, corruption, and the territorial status of Puerto Rico as contexts for understanding the post-disaster situation.

Of the six groups studied, the individual user group was most involved in producing the political frame. The individual user group engaged in political framing that directly blamed President Trump for the loss of life, pointing to his perceived racist attitudes as an explanation for the lack of urgency in responding to the disaster.

*What are the nearly 3,000 lives of lowly brown people worth anyway, right, Trump? They should be grateful for the free paper towels you threw at them #morinton # TrumpRacist #HurricaneMaria #PuertoRico*

*C It is very simple: if your skin has any naturally occurring pigmentation, @realDonaldTrump values your life less than that of those who are white. #hurricanemaria #PuertoRicoDeathToll*

The individual user group also called attention to the territorial status of Puerto Rico as contributing to an erroneous belief that Puerto Ricans are not citizens of the United States. This misconception was cited numerous times as a way to make sense of a response judged to be an “unspeakable tragedy.”

*Replying to @realDonaldTrump*

*Dear #DonaldTrump, You do know that Puerto Rico is part of the US, right? Over 4600 people died during #HurricaneMaria in 2017. Today is the beginning of hurricane season, what are you doing to ensure this unspeakable tragedy doesn't happen again while you're playing golf?*

*#HurricaneMaria hit #PuertoRico on 9/20. Trump delayed waiving #TheJonesAct as he did for TX and FL until 9/28. Because even though #PuertoRicansAreAmericans they're brown & can't vote for President because PR is a commonwealth. #PuertoRicanLivesMatter #PuertoRicoRelief.*

The last example frames the disaster in Puerto Rico as emblematic of systemic inequality in terms of resources provided to mainland disaster situations in comparison to the response to Puerto Rico. Evidence suggests that the response to Hurricane Harvey in Texas was, in fact, faster and more robust than the response to Puerto Rico (Willison et al., 2019).

The political frame also utilizes the disaster as a rallying point for political action, including the need for Puerto Rican statehood to overcome the “second class” status of territories.

*Supreme Court rejects lawsuit seeking to give Puerto Rico residents the right to vote in federal elections. A reminder that these American citizens need statehood if they're to deal with a GOP-run federal govt that has left them to rot following #HurricaneMaria*

*And yes, I'm making a natural phenomenon a political issue. Because #HurricaneMaria destroyed us, but politics has put us through hell ever since September 21st.*

*It's sickening to contemplate the lives that may have been lost to Republicans' inaction after #HurricaneMaria. If you're as enraged as I am, tell your friends to commit to vote in 2018 so we can become a voice for our brothers and sisters on the island.  
wapo.st/2sg12j0*

Although most of the tweets posted by the individual user group were critical of President



Trump and the Republican party, there were a handful of tweets reflecting a conservative political frame:

*Would these people go so far as to hide hundreds of thousands of bottles of water from their own people just to make Trump look bad? The answer is yes #HurricaneMaria #PuertoRico #CarmenYulinCruz #SanJuan*

*Libtards want #HurricaneMaria 2b #Trump's Katrina but @POTUS has sent MilitaryAid & #FEMA already there #PuertoRico*

*The sick, twisted, demented left didn't get their "blame Trump for #HurricaneFlorence devastation" so they quickly pivot to the "Trump murdered 3000 people in Puerto Rico" Evil has a name... it is democrat #WalkAway #MAGA #HurricaneMaria*

The political frame produced by the individual user group also called attention to corruption and incompetence on the part of the Puerto Rican government as a cause of the post-disaster crisis.

*#RicardoRosello Any comments about the 4,600 #HurricaneMaria victims in Puerto Rico? You knew about it and YOU KNOW there are parts of the Island which STILL lack water and power . How could you allow this, in #complicity with Trump's Government ? #PuertoRicoCrisis*

*New CEO of #PuertoRico Electric Power Authority (#PREPA) to earn \$750K salary. Former CEO quit after controversy around his salary of \$450K +bonuses. So... \$450K was controversial, but \$750K isn't??? (p.s., PREPA has filed for bankruptcy) #HurricaneMaria*

*Replying to @ewwaldo*

*July 25th, 2018 it was reported that Puerto Rico finance director Victor Cruz Quintero and finance director, Angel Roberto Santos Garcia face public corruption charges in separate cases that involve a total of \$8 million in federal and local funds. Puerto Rico deserves better*

PREPA, the Puerto Rico Electric Power Authority, with responsibility for the operation of the electric grid on the island, was a frequent target of criticism and became a symbol for government incompetence and malfeasance.

Images posted by the individual user group also focused on the role of politicians in responding to the storm and highlighted the politization of the disaster response. These images

called attention to particular political figures and their roles in recovery efforts, assessed in both positive and negative terms. Political figures pictured in tweets included President Trump, Mayor of San Juan Carmen Yulin Cruz, and former President Obama (Figure 2, Figure 3)

**#HurricaneMaria**  
Remember when Carmen Yulin Cruz was shouting this from the rooftops during Week 1. She said over and over Americans were dying in PR & Trump admin numbers were false. The President demeaned her with sexist nicknames.

"I know there are Republicans who believe government should only perform a few minimal functions, but that one of those functions should be making sure that nearly 3,000 Americans don't die in a hurricane and it's aftermath"

Thx @BarackObama for speaking truth



Figure 2. Individual user group

Figure 3. Individual user group

Trump heads to Puerto Rico today to assess and give comfort to **#HurricaneMaria** victims. I wonder how the conversation will go with Mayor @CarmenYulinCruz @GrrrGraphics



WINNING In AMERICA 2020 🇺🇸 and 8 others

58 614 996

Figure 4. Individual user group

Figure 4 frames recovery through the lens of Puerto Rican dependency. In this cartoon, San Juan Mayor Cruz, is characterized as a spoiled child demanding aid from the federal government.

Within the government user group, elected and appointed officials focused attention on their own efforts and activities post-Maria, thus adding to the contested and politicized constructions of the disaster. These actions were either framed as correctives to the federal government's

perceived ineffectiveness (Figure 5) or, conversely, as evidence of the government's successful response efforts (Figure 6).



Figure 5. Government user group



Figure 6. Government user group

**The destruction frame.** The destruction frame suggests that Hurricane Maria be understood primarily in terms of the immediate physical damage caused by the storm. This included damage to communications systems, infrastructure (roads, bridges, dams), and the power grid. The slow restoration of electric service to thousands of Puerto Ricans became emblematic of a general lack of progress in recovering from the disaster over time. As an indicator of the importance of electricity and the power grid after of the storm, the word “power” was found to be the third most frequently used word in the corpus, coded 154 times.

The individual, media, and nonprofit user groups were most active in creating the destruction frame. In their tweet texts and visuals, these three user groups promote a narrative of total destruction and focus on the extreme conditions in the immediate aftermath of the storm.

*Gone. Everything is destroyed. This should be major news on every outlet. Humanitarian crisis. #HurricaneMaria #Maunabo #PuertoRico*

*#HurricaneIrma & #HurricaneHarvey were terrible costly & deadly #HurricaneMaria is a catastrophe for #PuertoRico Entire island is razed*

The individual user group, however, also focused attention on the lack of progress in restoring basic services such as electricity as the recovery dragged on. This lack of progress is further framed as negligence on the part of government authorities (“we are forgotten”).

*Signs around Corozal, Puerto Rico read... No power. We are forgotten. 6 months. Poles still need to be installed in this section. 140 days without power, we're still counting, how many more? #puertorico #HurricaneMaria #lifeaftermaria*

*100 days ago #HurricaneMaria hit #PuertoRico and we still are not whole in regards to water and power. google.com/amp/s/www.cbsn...*

*#day161 #hurricanemaria 1/2 million PPI still in the dark & govt inow rationing water in Puerto Rico E. Its what it sounds like - a humanitarian crises & intentional neglect & disregard for human life*

↑ Pics show the devastation from [#HurricaneMaria](#) in Puerto Rico. This is what [#climatechange](#) looks like [buff.ly/2xBxbp](https://buff.ly/2xBxbp)

[#ActOnClimate](#)



Figure 7. Individual user group

*“Pics show the devastation from #HurricaneMaria in Puerto Rico. This is what #climatechange looks like”*

A small number of tweets focused on long-term environmental impacts, but this theme was relatively weak. The phrase “climate change,” for instance, was found in the corpus of tweets only three times. Figure 7 illustrates one of the few times that the destruction of Hurricane Maria was framed as the result of climate change.

The media user group framed destruction by focusing on the extensive physical destruction resulting from the storm (Figure 8, Figure 9) as well as immediate dangers (Figure 10).



Figure 8. Media user group



Figure 9. Media user group



Figure 10. Media user group

Almost half of the images posted by the media user group focused on the physical destructiveness of Hurricane Maria. When pictured, victims were portrayed as overwhelmed and helpless.



Figure 11. Media user group



Figure 12. Media user group



Figure 13. Media user group

In Figure 13, the media user group employs the word “powerless” as a play on words, calling attention to the loss of electricity as well as the vulnerability of victims in the wake of the hurricane. Once again, survivors are framed as dependent on the assistance of outsiders.

The nonprofit user group posted the second fewest number of tweets with visual content. However, of those images, most focused on the physical destructiveness of the storm (Figure 14, Figure 15). The images of destruction also serve to justify the nonprofit’s presence in Puerto Rico and, potentially, to encourage donations from the public to continue their work (Figure 16). As mentioned previously, the most active accounts in the nonprofit user group included animal



Figure 14. Nonprofit user group



Figure 15. Nonprofit user group



Figure 16. Nonprofit user group

rescue organizations, such as the Humane Society and PETA (People for the Ethical Treatment of Animals), which had a prominent presence in the nonprofit Twitter discourse (Figure 17, Figure 18, Figure 19).



Figure 17. Nonprofit user group

The Humane Society of the United States @HumaneSoc... · 28 Sep 2017  
This is just one of the heartbreaking images of animals in need after #HurricaneMaria ravaged the island of #PuertoRico. 😞



Figure 18. Nonprofit user group

The Humane Society of the United States @HumaneSoc... · 28 Sep 2017  
Our Animal Rescue Team is on the ground to assess needs and provide supplies and care to animals impacted by #HurricaneMaria.



Figure 19. Nonprofit user group

**The victim/hero frame.** The victim/hero frame suggests that the people most involved in the disaster fall into one of two categories, either victims in need of help, or heroes who provide aid to those who cannot help themselves. The government user group, the individual user group, and the media user group were the most active in producing this frame post-Maria.

The government user group frequently referred to victims in their tweets. Most of these tweets were posted by federal agencies such as FEMA (Federal Emergency Management Agency), ICE (Immigration and Customs Enforcement), and CBP (Customs and Border Patrol) and promoted the frame of victims as unable to help themselves and in need of outsiders to provide aid.

*ICE's Homeland Security Investigations (HSI) is proud to work with @fema in #PuertoRico to help victims of #HurricaneMaria. Learn more about ICE's hurricane relief efforts: [ice.gov/features/hurri...](http://ice.gov/features/hurri...)*

The tweets from government users that did mention victims tended to place them in a secondary role in the narrative. These texts and images positioned federal agency personnel front-and-center, emphasizing their actions in providing aid (Figure 20, Figure 21). The hero frame was also extended to include a rescue dog (Figure 22).



**AmeriCorps NCCC** @AmeriCorpsNCCC · Feb 23, 2018  
 In Las Marias, Puerto Rico #FEMACorps Team Pine 4 served with @\_SomebodyCares and distributed care packages to #HurricaneMaria survivors in need of urgent supplies.  
 #BeTheGreaterGood #GetThingsDone



Figure 20. Government user group

**FEMA** @fema · Jan 10, 2018  
 "Anytime, anywhere." Through dedication & ingenuity, our partners at Homeland Security Investigations were able to reach remote areas of #PuertoRico following #HurricaneMaria. Here's a look at their story: [fema.gov/blog/2018-01-0...](http://fema.gov/blog/2018-01-0...)



Figure 21. Government user group

*In Las Marias, Puerto Rico #FEMACorps Team Pine 4 served with @\_SomebodyCares and distributed care packages to #HurricaneMaria survivors in need of urgent supplies. #BeTheGreaterGood #GetThingsDone*

*"Anytime, anywhere." Through dedication & ingenuity, our partners at Homeland Security Investigations were able to reach remote areas of #PuertoRico following #HurricaneMaria. Here's a look at their story: [fema.gov/blog/2018-01-0..](http://fema.gov/blog/2018-01-0..)*

**US Department of the Interior** @Interior · Oct 10, 2017  
 Meet a four-legged hero: Agua the dog 🐕 helps rescue a woman in Puerto Rico [on.doi.gov/2wyaU5c](http://on.doi.gov/2wyaU5c) #HurricaneMaria



Figure 22. Government User Group

*Meet a four-legged hero: Agua the dog helps rescue a woman in Puerto Rico [on.doi.gov/2wyaU5c](http://on.doi.gov/2wyaU5c) #HurricaneMaria*

As part of the government user group, elected officials also participated in constructing the victim frame, in many instances by focusing on the loss of life in the aftermath of Hurricane Maria.

*The official death toll from #HurricaneMaria has now increased to nearly 3,000 people. President Trump must own up to the shocking & inexcusable failure of his*

*administration's response. We can & must do more to help our fellow citizens in #PuertoRico recover.*

*A recent study found the death toll in Puerto Rico after #HurricaneMaria is over 4,600 - nearly 70x more than what the Trump admin's reporting. Yet, we hear nothing but crickets from FEMA & HHS. Ijoined @SenWarren in a letter demanding answers from them.*

These tweets also promoted the political frame by linking the hurricane-related deaths to a mishandling of response efforts by the Trump administration and demanding action to address those shortcomings.

The individual user group, however, framed victims differently by focusing on the stories of survivors in texts and images.

*Puerto Ricans are still dying six months after #HurricaneMaria.. We are the forgotten people. My friend lost her husband because he couldn't power his sleep apnea machine. The number of deaths in PR doubled since Maria: [cnn.it/21ve3cf](http://cnn.it/21ve3cf) #FridayFeeling*

*Residents beg for help. Meanwhile NO signs of government assistance. #HurricaneMaria #puertorico #CNN*

*Heed the cries of Puerto Rican people in crisis, work with Mayor Cruz, save the lives of our fellow Americans devastated by #HurricaneMaria*

These images focus attention on the human impacts of the storm by including the faces of those most affected rather than highlighting the physical destruction (Figure 23, Figure 24,

U.S Citizens in #PuertoRico SEEKING #HurricaneMaria relief.@POTUS BIGGEST WORRY?-#TakeAKnee #TheResistance #CNN #MSNBC



Figure 23. Individual user group

My Friends Can't Find & Have Lost Family Members To #HurricaneMaria. All That Is Happening Is Truly Heartbreaking ❤️



**Puerto Rico Strong**

I didn't even know where to begin with this campaign but I know that I can't just watch my beautiful island of Puerto Rico suffer such devastation and not

[gofundme.com](http://gofundme.com)

Figure 24. Individual user group

Why did it take so long? More than 100 days after Hurricane Maria, EPA warns of waterways contaminated by raw sewage-placing lives at risk. [thinkprogress.org/puerto-rico-wa...](http://thinkprogress.org/puerto-rico-wa...) via @thinkprogress #PuertoRico #HurricaneMaria #environmentaljustice #climatejustice



More than 100 days after Hurricane Maria, EPA warns of waterways cont. Federal response to Puerto Rico's disaster has been sluggish, to say the least. [thinkprogress.org](http://thinkprogress.org)

Figure 25. Individual user group

Figure 25). The individual user group offered a divergent hero frame by presenting survivors, rather than outsiders, as indigenous heroes who transcend the victim label.

*Resilient, strong, inspired. Met with teachers in rural Toa Baja today. Deeply committed to their students and the future of their community. And yet at nearly 6 months since #HurricaneMaria no internet at school. #LetsFixThis #PuertoRicoStrong*

*Her name is @CarmenYulinCruz She lost her own home to #HurricaneMaria & still helping her PPI. She is a #trueamerican and a #trueleader*

The individual user group, compared to other user groups, focused more attention on the victims who lost their lives as a result of the storm. Individual users more frequently compared the death toll in Puerto Rico to other disasters, such as Hurricane Katrina and the September 11<sup>th</sup> attack, to emphasize the lack of urgency in the federal government's response to Hurricane Maria.

According to a study performed by Harvard University, this is how many people died in Puerto Rico during #HurricaneMaria. Not 64, what the government has reported. My brother's father n law died & is a part of that number. My family, 9 months later still have no power. 🇵🇷



Figure 26. Individual User Group

*According to a study performed by Harvard University, this is how many people died in Puerto Rico during #HurricaneMaria. Not 64, what the government has reported. My brother's father-in-law died & is part of that number. My family, 9 months later still have no power.*

*Good. God! What was the death toll from Katrina again? The Trump admin owns this catastrophe and we can't let 4600 dead be brushed under the propagand revisionist rug. #PuertoRico #HurricaneMaria #AmericanScandal*

*My God. Now, we read death toll in Puerto Rico from #HurricaneMaria, was over 4,500 more deaths than was first reported. You think that would have been allowed to happen, and then go unreported in Texas or Florida? Puerto Ricans are Americans, damn it.*

*It's worth considering that the number of lives lost on #Sept11 is almost identical to the number lost in #HurricaneMaria, and that many of the deaths in the latter tragedy were avoidable but for the incompetence, corruption, and apathy of the @realDonaldTrump administration.*

The death toll following Hurricane Maria was frequently mentioned in the corpus of tweets.

This was the sixth most coded item in the entire corpus of tweets (coded 169 times), prompted in large part by discrepancies in the official death toll estimates. The initial death toll of 64 was revised by the Puerto Rican government to 2,975 following the release of a several studies suggesting much higher death tolls (Santiago, Shoiret, & Kravarik, 2018). By calling attention to government authorities' delayed acknowledgement of the victims who died, the individual user group frames this issue as another injustice inflicted on the people of Puerto Rico, essentially ignoring and minimizing the scale of human loss. As one individual user commented:

*Even in death they try to erase us. #Puerto Rico #HurricaneMaria*

The individual user group also memorialized victims of Hurricane Maria, particularly around the one-year anniversary of the storm.

Our #Humanity continues to erode under the #Trump Administration. Don't Give Him a Pass on #PuertoRico  
 The #president thinks the government did a fantastic job last year handling #HurricaneMaria. How is that possible when 3,000 US Citizens died?  
[nytimes.com/2018/09/01/opi...](https://www.nytimes.com/2018/09/01/opi...) #Resist



Figure 27. Individual user group

A walk to honor the Victims and Deaths of Hurricane Maria and it's aftermath.

This morning my family and I took off and walked for an hour towards the Puerto Rico Capitol building. [Read More raulcolon.net/honoring-hurri](http://raulcolon.net/honoring-hurri)

#NoSon64 #PuertoRicoDeathToll #HurricaneMaria



Figure 28. Individual user group

Figure 27 and Figure 28 depict an impromptu memorial where 4,645 pairs of shoes were placed outside the Puerto Rican capital building to symbolize those who died as a result of the hurricane.

One notable difference in the victim frame constructed by the individual user group was the inclusion of tweets that related to a specific individual or individuals (rather than the generalized referent of “survivors”). Several of these tweets provided information on the status of family members or the loss of loved ones.

*My parents just got the power back after 6 months without electricity due to #HurricaneMaria*

*My grandmother is missing in PR where she was evacuated to a shelter right before #HurricaneMaria*

*This is my mother, she is 75 and lives in PR. That's a generator my 80 yr.old uncle is helping set up. 6 MONTHS WITHOUT POWER. How would your elderly relatives hold up? #HurricaneMaria*

*Please don't forget about the humanitarian crisis in PR. My uncle died yesterday in a hospital waiting room. #HurricaneMaria.*

! Puerto Ricans are still dying six months after [#HurricaneMaria](#)..

"We are the forgotten people."

: lost her husband, , because he couldn't power his sleep apnea machine.

The number of deaths in PR doubled since Maria: [cnn.it/2lve3cf](http://cnn.it/2lve3cf)  
[#FridayFeeling](#)

*Figure 29. Individual user group*

However, in the corpus of tweets, these more personalized victim stories were limited in number. The individual user group, for example, posted less than a dozen tweets that focused on specific individuals. The government and media user groups together posted less than ten such tweets, focusing instead on the survivors as an amorphous group rather than individuals. This lack of survivor stories in the corpus of tweets suggests that Twitter, given its public nature, may not be the best platform for sharing such personal experiences.

The media user group also participated in constructing the victim/hero frame. Their framing of victims focused on individuals in distress, often in need of rescuing (Figure 30, Figure 31, Figure 32). Turning the media lens on these rescues enhances the sensationalized nature of traditional media coverage in disaster situations (Dynes & Rodriguez, 2010; McKinzie, 2017).

**Fox News** @FoxNews · 27 Sep 2017  
 An 8-year-old girl wades through a river with her family in Puerto Rico after [#HurricaneMaria](#) swept away the bridge. [fxn.ws/2wVL8qV](http://fxn.ws/2wVL8qV)



*Figure 30. Media user group*  
*An 8-year-old girl wades through a river with her family in Puerto Rico after [#HurricaneMaria](#) swept away the bridge. [fxn.ws/2wVL8qV](http://fxn.ws/2wVL8qV)*

**Brandi Hitt** @ABC7Brandi · 21 Sep 2017  
 Just in: Video showing flood rescues in Puerto Rico from #HurricaneMaria, including this little boy. Courtesy: Gov Rosello Office/Instagram



Figure 31. Media user group

*Just in: Video showing flood rescues in Puerto Rico from #HurricaneMaria, including this little boy. Courtesy: Gov Rosello Office/Instagram*

**Fox News** @FoxNews · 22 Sep 2017  
 @USCG and @RoyalNavy rescue a woman and two children from a capsized vessel after #HurricaneMaria



Figure 32. Media user group

*#USCG and @RoyalNavy rescue a woman and two children from a capsized vessel after #HurricaneMaria*

The media user group also framed victims as a single, undifferentiated group, a common theme in media discourse after disasters (Svistova & Pyles, 2018; Trckova, 2014).

*Yesterday marked one year since #HurricaneMaria struck Puerto Rico. NPR's @adrianflorido has been covering the aftermath on the island since last October, sharing powerful stories of how the Puerto Rican people have persevered.*

*Nearly 1,000 deaths were caused by the devastating #HurricaneMaria in Puerto Rico but the millions who survived are now left without electricity, homes, healthcare, and some even say hope.*

In the first example, victims are presented as a homogenous mass, all demonstrating the same remarkable resilience in the face of disaster. The second example combines all survivors into a single category of hopeless victims.

Also absent from the media user group tweets are survivor stories and examples of solidarity among residents in the immediate aftermath of the hurricane. Solnit (2009), for example, describes multiple examples of such mutual aid. “In the wake of an earthquake, a bombing, or a major storm, most people are altruistic, urgently engaged in caring for themselves and those around them, strangers and neighbors as well as friends and loved ones” (Solnit, 2009, p. 2). But these accounts often go overlooked. The silencing of survivors’ discourse is common in traditional news media, in which the framing of victims relies on depictions of helplessness and vulnerability (Trckova, 2014). As mentioned, only a small number of tweets posted by the media user group focused on the stories of individuals rather than an undefined mass of survivors or victims.

The nonprofit and “other” user groups also produced the hero frame, but to a lesser degree than the government, individual, and media user groups. The nonprofit user group framed volunteers as heroes and often included visual content to document volunteers’ response efforts in Puerto Rico (Figure 33, Figure 34).

*Looking good Team #RedCrossLA! The people of #PuertoRico will be so thankful for your help! #HurricaneMaria*





Figure 33. Nonprofit user group



Figure 34. Nonprofit user group

The user group coded as “other” also participated in the hero frame in an unexpected way. This user group posted the fewest number of tweets with visual content. However, a number of tweets posted by large corporations call attention to their involvement in sending aid to Puerto Rico, either by deploying their employees as volunteers or providing other assistance in the aftermath of the disaster (Figure 35, Figure 36, Figure 37). Corporations such as Google, Verizon, Home Depot, Sprint, and American Airlines cast themselves in the hero frame by calling attention to their humanitarian relief efforts and significant financial contributions (Figure 38, Figure 39).



Figure 35. Other user group



Figure 36. Other user group



Figure 37. Other user group



Figure 38. “Other” user group



Figure 39. “Other” user group.

**The military/humanitarian aid frame.** The military/humanitarian aid frame serves to legitimize the role of the military in responding to the disaster and the resulting humanitarian needs. The military is framed as an organization that is uniquely suited to engage in disaster response due to its specialized capacity, equipment, trained personnel, and logistical resources (Tierney, Bevc, & Kuligowski, 2006). This frame was most evident in the texts and visual content produced by the military user group. Some of the most active Twitter accounts in the early days of the disaster, for example, were military users, including the Department of Defense, the U.S. Army, and the U.S. Coast Guard (the most active accounts for each user group are summarized in Table 2). The military user group posted 141 tweets, more than three-quarters of

which included images of equipment or personnel. As evidenced in these tweets and images, the military user group promotes a narrative that emphasizes its unique role in responding to disasters and providing humanitarian aid, including the use of specialized equipment such as helicopters and cargo planes (Figure 40, Figure 41, Figure 42, Figure 43).

*@USArmy helicopters handing out food and water in #PuertoRico today @fema #HurricaneMaria*

*Special delivery! #201stAirliftSquadron offloads 3K lbs. of donated supplies in #SanJuan, #PuertoRico, #HurricaneMaria, #ReliefEfforts*

**U.S. Northern Command** @USNorthernCmd · Oct 6, 2017  
 @USArmy helicopters handing out food and water in #PuertoRico today @fema #HurricaneMaria



Figure 40. Military user group

**U.S. Dept of Defense** @DeptofDefense · Oct 20, 2017  
 Watch as @USCG delivers @FEMA aid to people in #Jayuya. The aircrew searched remote areas impacted by #HurricaneMaria. #ReliefEfforts



Figure 41. Military user group

**U.S. Dept of Defense** @DeptofDefense · Oct 2, 2017  
 Special delivery! #201stAirliftSquadron offloads 3K lbs. of donated supplies in #SanJuan, #PuertoRico. #HurricaneMaria #ReliefEfforts



Figure 42. Military user group

**U.S. Air Force** @usairforce · 28 Sep 2017  
 #Airmen from the 821st & 921st Contingency Response Squadrons during their prep for #HurricaneMaria relief efforts in Puerto Rico.



8 221 561

Figure 43. Military user group

The U.S. Army, one of the most active accounts in the military user group (see Table 2), posted a series of graphic representations in the first week of the disaster cycle to share information on the extent of their operations (Figure 44, Figure 45).



Figure 44. Military user group



Figure 45. Military user group

The militarized response narrative is also reflected in tweets that specifically point to the security role played by the military in disaster situations. Images of armed soldiers suggest the need for a military presence to ensure safety after the hurricane. Again, the military/humanitarian aid frame suggests that the military possesses the capacity to respond to humanitarian needs on a large scale and maintain order in disaster situations that are presumed to be dangerous (Figure 46, Figure 47).

Charles E. Summers, Jr. @ChiefPentSpox · 28 Sep 2017  
 #PuertoRico @USNationalGuard supports police to provide security at different gas stations in four regions. #HurricaneMaria #ReliefEfforts



Figure 46. Military user group

*#PuertoRico @USNationalGuard supports police to provide security at different gas stations in four regions. #HurricaneMaria #ReliefEfforts*

U.S. Dept of Defense @DeptofDefense · 28 Sep 2017  
 Gas Station Security. @USNationalGuard #soldier provides security, augmenting Puerto Rico Police during #HurricaneMaria #ReliefEfforts.



Figure 47. Military user group

*Gas Station Security. @USNationalGuard #soldier provides security, augmenting Puerto Rico Police during #HurricaneMaria #ReliefEfforts.*

The heroic role of the military is advanced in the following tweets, while survivors are again portrayed as passive recipients of aid (Figure 48).

*Welcome home to the members of the 1483rd Transportation Company, from their recovery efforts in #PuertoRico . They conducted more than 120 missions, moved 780 tons of food and water and delivered items to approximately 67,500 families! #NationalGuard #HurricaneMaria*

U.S. Dept of Defense @DeptofDefense · 21 Sep 2017  
 The #DoD is working to support @fema and authorities in #PuertoRico and #USVI to provide vital support to those affected by #HurricaneMaria.



Figure 48. Military user group

**Counter-narratives.** Counter-narratives are defined as frames that present alternative understandings which challenge the dominant or taken-for-granted narratives. In the context of Hurricane Maria, counter-narratives suggest that the reality on-the-ground in Puerto Rico is the result of unjust treatment by the government, the legacy of colonialism, and the result of disaster

capitalism. These counter-narratives were essentially absent from the Twitter discourses produced by the six user groups examined in the current study. When identified in the corpus of tweets, counter-narratives were primarily produced by the individual user group, but in very low frequencies.

*Epic Human Rights violations - not 64, but thousands of Puerto Ricans died are dying because of #HurricaneMaria & the colonial policies of austerity, neglect & disaster capitalism. In any other country this would be considered criminal*

*Today marks 100 Days Since #HurricaneMaria devastated #PuertoRico Today #OurPowerPRnyc the NYC Puerto Rican Diaspora gathers to DEMAND a #JustRecovery #ClimateJustice #JustTransitions #NotoDisasterCapitalism*

*This Friday #OurPowerPRnyc reminds everyone that it will have been 100 days since #HurricaneMaria abs Puerto Rico is still in the dark. Stand against disaster capitalism and for a #JustRecovery with @UPROSE and camaradas.*



Figure 49. Individual user group

*119 years ago today (1898) #PuertoRico became part of the #USA after the signing of the #TreatyofParis. Today, more than 100 days after #HurricaneIrma and 81 days after #HurricaneMaria 70+96 of the island still w/o #ElectricPower. #SecondClassAmericanCitizens w/o #ElectricPower. #SecondClassAmericanCitizens*

These tweets illustrate how the reality of response and recovery in Puerto Rico after Hurricane Maria were framed as injustice (“epic human rights violations”) and as the outcome of colonialism dating back to 1898. The last example calls attention to the territorial status of Puerto Rico and the resulting unequal treatment of Puerto Ricans as “second class citizens.”

These tweets also point to disaster capitalism as a newer form of colonialism and a continuation of injustices imposed on the island.

### **Research Question 2: Comparison of Narratives by Key User Groups**

The second research question focused on the following: *How do the disaster and recovery discourses produced by the six user groups converge and diverge?* The findings related to this question emerged from both quantitative analyses and are exemplified in patterns of Twitter activity among the six user groups and sentiment scores of tweets posted by the six user groups.

**Overall Twitter activity.** The Twitter activity of the six user groups (individual, government, military, media, nonprofit, and other) was analyzed by documenting the total number of tweets posted in the one-year time period, and the number of active days (defined as at least one tweet posted in a day). These results are summarized in Table 1.

Table 1

#### *Twitter Activity by User Group*

User Group	# of tweets posted over 1-year period	% of all tweets in corpus	# and % of active days out of 365 days
Individuals	508	39%	170 (47%)
Government	228	18%	90 (25%)
Media	173	13%	87 (24%)
Military	141	11%	57 (16%)
Other	127	10%	75 (21%)
Nonprofit	119	9%	67 (18%)
Total	1296	100%	

The individual user group was the most active overall, based on the number of tweets posted in the one-year time frame and percentage of total days in which this user group was active. The Twitter activity of the individual user group was more than twice that of the next most active user group. Individual users tweeted a total of 508 times in the time period from September 21,

2017 to September 21, 2018 and were active on 170 days of the 365-day time period (47% of the time period).

The user group coded as government was the second most active, posting a total of 228 tweets over the one-year time period. The government user group was active on 90 out of the 365 days recorded (25% of the time period). The most active government accounts during the one-year period were FEMA (Federal Emergency Management Agency) and CBP (Customs and Border Patrol). A summary of the most active Twitter accounts over the one-year period is presented in Table 2.

Table 2

*Most Active Twitter Accounts*

User Group	Account	Total # tweets posted
Military	Dept. of Defense	50
Military	U.S. Coast Guard	13
Military	U.S. Army	10
Media	LatinoUSA (NPR)	5
Media	Fox News	4
Media	AMJoy (MSNBC)	4
Government	FEMA	17
Government	CBP	9
Nonprofit	Humane Society	5
Nonprofit	Rotary International	4
Nonprofit	Team Rubicon	4
Other	Corporate accounts	21
Individual	Individual account #1	14
Individual	Individual account #2	7
Individual	Individual account #3	7

*Note.* To preserve anonymity, individual account names will not be used.



The user group coded as media was the third most active with 173 total tweets posted in the timeframe. The media user group was active 87 days out of 365. This represents activity on 24% of the days studied. The most active media users were LatinoUSA (National Public Radio), Fox News, and AMJoy (an MSNBC cable news show).

The user group coded as military was the fourth most active with 141 total tweets over the one-year time period. Military users were active on 57 days (16%) of the one-year period. The most active military accounts were the Department of Defense, the U.S. Army, and the U.S. Coast Guard.

The user group defined as other was the fifth most active, with 127 tweets posted over the timeframe. The “other” user group was active on 75 out of the 365 days recorded (21% of the time). The most active accounts defined as “other” were corporations such as Sprint and American Airlines.

Nonprofit users were the least active group, posting 119 total tweets over the one-year period. Nonprofit users were active on 67 days (18%) of the one-year period. The most active accounts over the one-year period were the Humane Society and Rotary International.

**Twitter frequency over one-year timeframe.** An analysis of Twitter activity (using the hashtag #HurricaneMaria) over the one-year time period reveals variations in patterns of activity for the six user groups. All six user groups demonstrated increased activity in the days and weeks immediately after Hurricane Maria made landfall. However, by mid to late October, approximately four weeks after landfall, all user groups showed a decrease in tweeting activity.

The government user group (Figure 50) and individual user group (Figure 51) exhibited the most activity over the course of one-year.

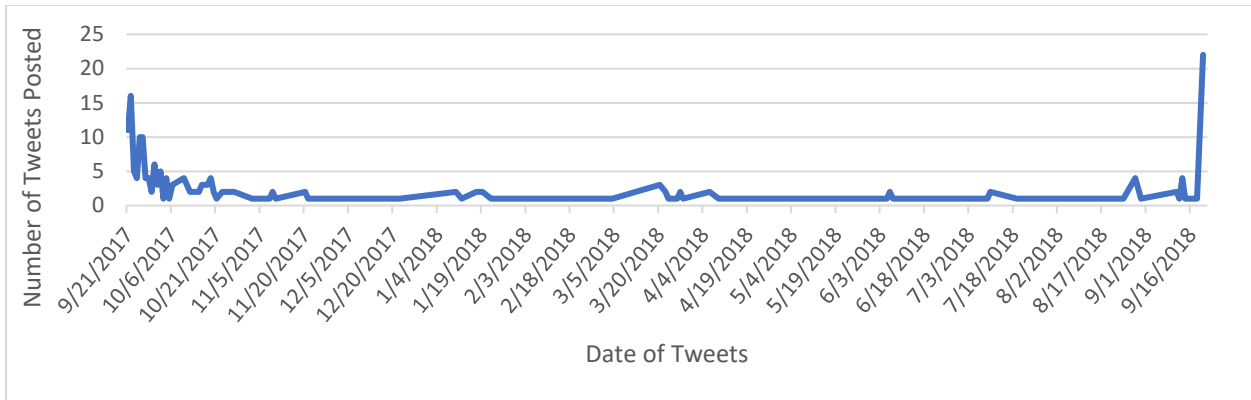


Figure 50. Frequency of tweets by government user group over one year.

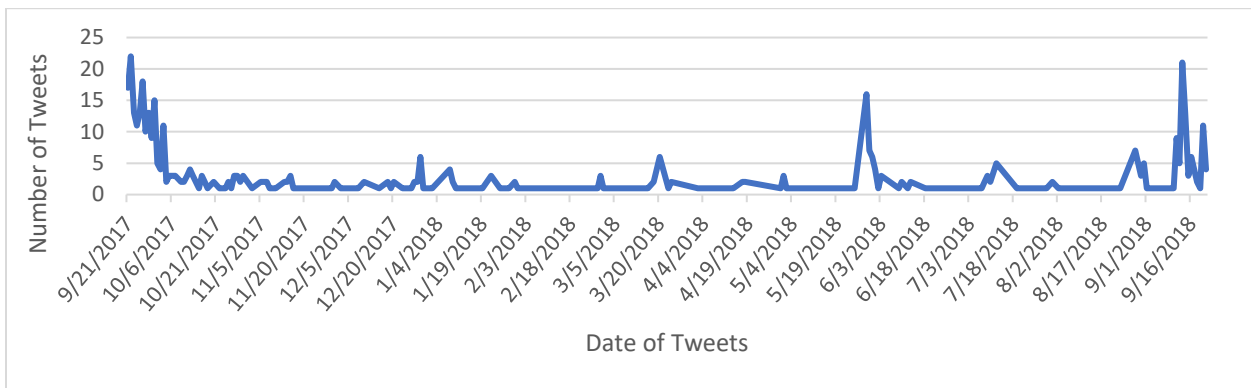


Figure 51. Frequency of tweets by individual user group over one year.

Following the initial weeks of the disaster cycle, the media user group (Figure 52), military user group (Figure 53), nonprofit user group (Figure 54) and “other” user group (Figure 55) showed little activity for the remaining time period (October 2017 to September 2018). Twitter activity by the military user group, for example, ceased in early August 2018.

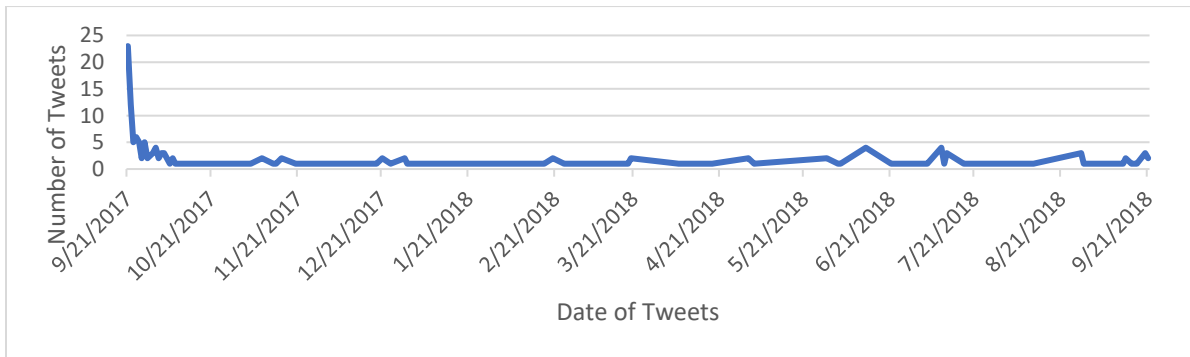


Figure 52. Frequency of tweets by media user group over one year.

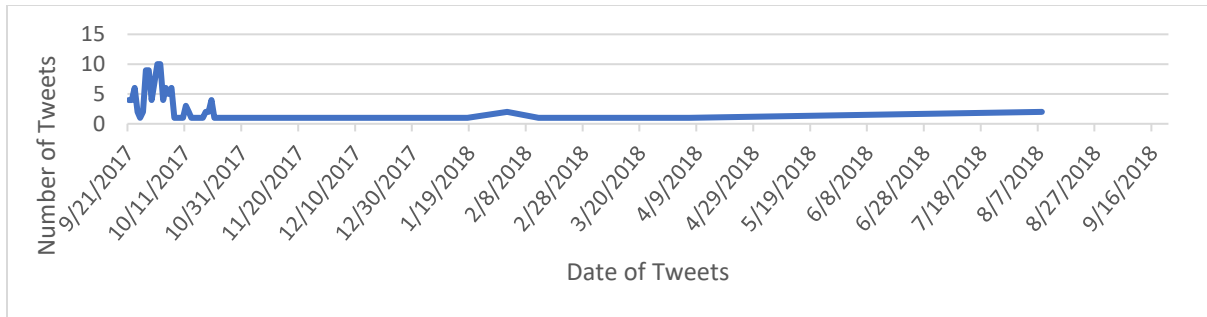


Figure 53. Frequency of tweets by military user group over one year.

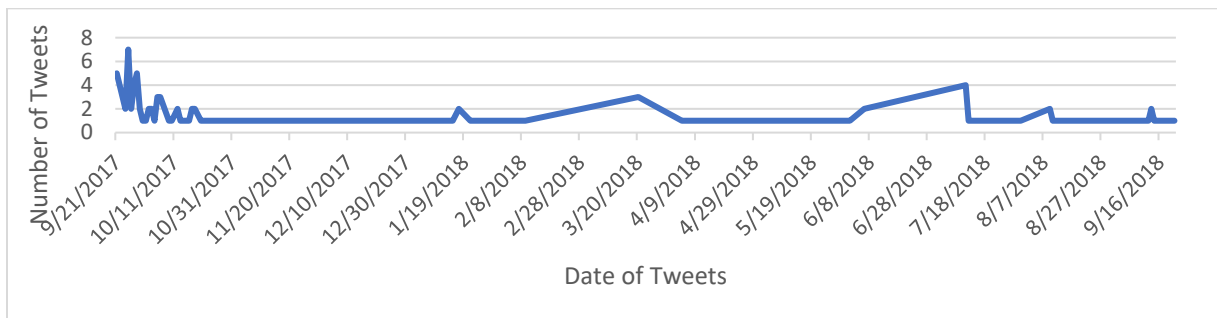


Figure 54. Frequency of tweets by nonprofit user group over one year.

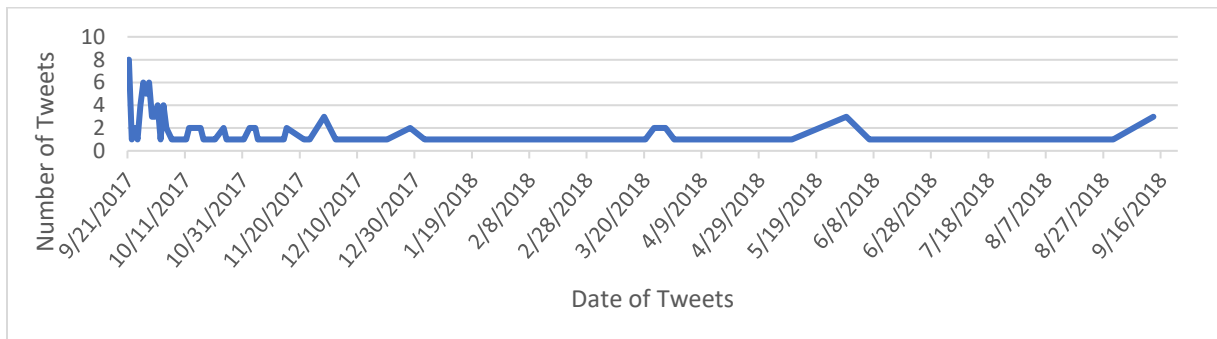


Figure 55. Frequency of tweets by “other” user group over one year.

**Peaks in Twitter activity.** A quantitative analysis of the corpus of tweets indicated increased Twitter activity at three points during the one-year timeframe. As mentioned, all six user groups were active during the initial days of the disaster event (see Appendix B for summary). A second spike in activity occurred at the end of May 2018. This spike was associated with the release of the first of two studies that significantly increased the Hurricane Maria death toll from 64 to estimates of 2,500 or more (Kishore et al., 2018). Only the individual user group demonstrated a spike in activity during the period of May 29-31, 2018, with a total of 29 tweets

posted (Figure 25). Finally, at the one-year anniversary date of the hurricane's landfall (September 20, 2018) there was increased activity for the government and individual user groups. Individuals posted 18 tweets from September 18-21, 2018 while government users posted 22 tweets on September 20, 2018 alone, representing the largest number tweets posted on a single day for this user group (Figure 50).

**Sentiment analysis of tweets.** Sentiment analysis involved the sorting of tweets by sentiment score followed by the isolation of four quartiles based on sentiment score: low, middle-low, middle-high, and high. Median, mean, minimum, and maximum sentiment scores were calculated for each quartile. Results are summarized in Table 3.

Table 3

*Descriptive Statistics for Six User Groups*

User group	Min. sent score	1 <sup>st</sup> quartile	Median sent score	Mean sent score	3 <sup>rd</sup> quartile	Max. sent score
Govt	-0.40396	-0.07066	0.05222	0.05441	0.18132	0.49720
Military	-0.43995	0.02782	0.12532	0.12451	0.22005	0.49497
Inds	-0.448191	-0.133597	-0.004803	-0.014255	0.097014	0.49315
Media	-0.43913	-0.16550	-0.04088	-0.03819	0.06577	0.42485
Nonprofit	-0.43750	-0.04904	0.04473	0.06799	0.18870	0.49167
Other	-0.36056	-0.06063	0.02690	0.03842	0.15196	0.43750
All Groups	-0.44819	-0.09682	0.00625	0.02205	0.14534	0.49720

In the context of #HurricaneMaria, positive messages emphasized concern for survivors and efforts to help Puerto Rico. Negative messages focused on destruction and loss. Noteworthy in these results is the median sentiment scores of the media user group. A median score indicates that over half of the tweets produced by the media user group included negative expressions or

attitudes toward a topic, person, or event related to Hurricane Maria. These results also show that, on average, tweets produced by the media user groups were negative in tone while the military user group demonstrated the highest mean sentiment score, indicating a positive tone overall.

A closer examination of sentiment scores shows divergence among the six user groups. Tweets produced by the user groups coded as military and nonprofit were overwhelmingly positive in tone. The mean sentiment score for the military was 0.125, the highest of all six user groups. Similarly, the mean sentiment scores of tweets produced by the nonprofit user group was second highest among all groups at 0.068. The user group defined as “other” trended slightly higher in positive sentiment than the remaining groups with a mean sentiment score of 0.038. Over half of the tweets produced by the government user group were positive (0.05 median sentiment score), particularly in the initial stage of the disaster.

*To find loved ones who marked themselves as safe after #HurricaneMaria or to FEMA register yourself, visit: [safeandwell.communityos.org/cms/](http://safeandwell.communityos.org/cms/) @RedCross (posted 9/21/17)*

*#CBP #AMO agents in Jacksonville assist with rescue and relief efforts, delivering supplies to Puerto Rico after #HurricaneMaria (posted 9/24/17)*

Elected officials, as part of the government user group, did express negative sentiment, most evident in relation to the one-year anniversary of Hurricane Maria’s landfall (the sentiment scores of Twitter spikes are summarized in Appendix C).

*1 year ago #HurricaneMaria hit #PuertoRico, changing its landscape forever. 3,000 Americans died. The disaster was aggravated by negligent & inhumane response from feds. @NYCCouncil calls on Trump to create commission to determine what went wrong. (posted 9/20/18)*

*In January, I traveled to Puerto Rico and saw firsthand the devastation caused by #HurricaneMaria. I saw fellow US citizens facing incredible challenges—power lines in the street, water that was making people sick, and children left homeless. (posted 9/20/18)*

The user groups coded as individuals and media skewed slightly negative in terms of the mean sentiment score of all tweets (-0.014 for individual user group and -0.038 for media user group).

As shown in Table 3, the tweets posted by the military user group tended to be overall positive in tone. In the context of disaster, positive sentiment is expressed in terms of providing relief, expressing compassion and concern for victims, and in narratives of helping, donating, or volunteering to assist those who are suffering. These tweets produced by the military user group in the initial stage of the disaster were found to have some of the highest positive sentiment scores in the entire corpus of tweets.

*Check out the latest images of @DeptofDefense service members providing #HurricaneMaria support to @fema to assist citizens of Puerto Rico (posted 9/23/17)*

*Providing care. @USNavy #sailors perform surgery aboard the hospital ship #HurricaneMaria #ReliefEfforts #USNSComfort in #Arecibo (posted 10/13/17)*

In these examples, military intervention is framed in positive terms, utilizing words with positive sentiment scores such as *care*, *safe*, and *support*.

Low sentiment tweets frame the disaster in terms of the loss and destruction, using words such as *suffering*, *death*, and *neglect*. Individual users posted some of the most negative tweets, expressing their feelings and observations about the recovery efforts in the strongest of terms, particularly in relation to the one-year anniversary.

*Can I ask a simple question? When someone says they did an "unappreciated great job" on #HurricaneMaria that killed 3,000 #PuertoRicans, is it denial, lying, or something more sinister? (posted 9/12/18)*

*Replying to @realDonaldTrump  
I say again, FUCK YOU #Trump. How dare you deny the deaths of these 3000 Americans. How dare you so cruelly insult their living family members. You're a sick twisted sociopathic evil monster. #PuertoRico #HurricaneMaria (posted 9/14/18)*

*He simply is unable to grasp the human suffering that his neglect and lack of sensibility have caused us. 3000 people died on his watch and his inability to grasp that makes him*

*dangerous." San Juan Mayor Carmen Yull'n Cruz on President Trump #HurricaneMaria #PuertoRico (posted 9/14/18)*

*The long lines of desperate AMERICAN CITIZENS trying to get supplies and power. The frustration by the slow recovery. The cover up of death toll. #PuertoRico one year later. Never forget #HurricaneMaria #PuertoRicoSeLevanta (posted 9/20/18)*

The media user group also produced tweets with high negative sentiment scores both early in the disaster cycle and at the one-year anniversary. The media user group was the only group to post overall negative tweets in the early days of the disaster.

*Left in the dark. A stunned Puerto Rico seeks to rebuild after #HurricaneMaria (posted 9/21/17).*

*Woman desperate to reach mother who was in Maria's path. #HurricaneMaria (posted 9/21/17)*

*#BREAKING Puerto Rico 'obliterated' by #HurricaneMaria, Trump says (posted 9/21/17)*

These tweets promote the destruction frame by focusing on the devastation and human suffering left in the wake of the hurricane, using words such as “obliterated” and “desperate.”

**Patterns of Twitter use by key user groups.** Although not included as a research question in the current study, analysis using the NVivo matrix-coding function uncovered differences in how the six user groups utilized Twitter in the aftermath of Hurricane Maria (Table 4).

Table 4

*Most Frequently Coded Items by User Group*

Code	# of Times Coded for Each User Group						Total
	Ind	Govt	Mil	Media	NP	Other	
Sharing information	142	75	57	93	38	41	446
Expressing opinion	222	45	0	18	8	24	317
Expressing emotion	110	37	9	21	20	20	217
Taking action	57	48	6	22	40	36	209

The results of this analysis showed that the most prevalent uses for Twitter in the aftermath of Hurricane Maria were sharing information (coded 446 times), sharing opinions (coded 317 times), expressing emotion (coded 217 times), and taking action (coded 209 times).

*Sharing information.* The user groups coded as individuals, media, and government were most active in sharing information. Sharing information was defined as the sharing of factual information pertaining to the nature and extent of the disaster as well as sharing information produced by various media outlets. The latter includes news reports, media updates, press releases, and information from official sources (Bruns et al., 2012). This function of Twitter was most evident in the corpus of tweets, with 446 instances of information sharing (evident in fully 35% of all tweets examined). Information sharing was most evident in tweets posted by the user groups coded as individuals and media outlets. These two user groups posted over half of all tweets that included either the sharing of factual information or directed readers to information compiled by media outlets. The individual user group posted 142 tweets that included information sharing (32% of all information-sharing tweets) and the media user group posted 93 such tweets (21% of all information-sharing tweets).

Tweets posted by the individual user group tended to share information related to opportunities for making donations to relief efforts. Often, individual users suggested specific organizations or websites, in effect assuming the role of influencer by identifying and endorsing particular organizations. Not only is information shared on specific organizations, but users also include personal affirmations that validate the effectiveness of those organizations. For example, individual users offered the following recommendations:

*mariafund.org supports the people who are the most affected by #HurricaneMaria in Puerto Rico. If you can, give! #PuertoRicoStrong MariaFund People mariafund.org*



*Good organizations where you can contribute to help PR during these difficult times: romper.com/p/how-to-help-... #HurricaneMaria*

*The @nytimes is reporting what people in #PuertoRico have been saying: #HurricaneMaria death toll more than 1,000.*

In the last example, individual users assumed the role of information curators, pointing readers to particular sources of information that call attention to specific aspects of the storm's impact, such as the death toll.

The media user group posted the second highest percentage of information sharing tweets (93 or 21% of all information sharing tweets). These tweets tended to act as promotional messaging, directing the audience to stories produced by the same media outlet.

*heartbreaking effects of doctors, especially pediatricians, leaving #PuertoRico after #HurricaneMaria @SarahVarney4 of @KHNews has a disturbing report @NewsHour tonight*

The media user group also performed the role of government watchdog, directing readers to media stories focused on the shortcomings of the government response to the storm, such as inconsistencies in reporting the official death toll.

*New: Puerto Rico's Gov. Ricardo A. Rossellé has ordered a review of deaths possibly related to #HurricaneMaria. Current death toll is 64, but investigations by CNN & others have revealed number could be much higher.*

*BREAKING: Puerto Rican government agrees to turn over thousands of death records following #HurricaneMaria today after fighting the release. This according to a source inside the negotiations.*

As demonstrated in these examples, the media user group tended to emphasize the more sensational aspects of the story, including governmental mishandling of the situation.

The government user group posted the third highest number of information sharing tweets at 75 (17% of the total information sharing tweets). The government user group was defined as including elected officials, including members of Congress, local elected officials, and elected

officials in Puerto Rico, as well as representatives of government agencies. Elected officials used Twitter to report on their own activities related to the impact of Hurricane Maria. Not surprisingly, tweets posted by elected officials tended to highlight either the federal government's effectiveness or ineffectiveness, depending on political affiliation.

*WATCH LIVE as @SenatorMenendez, @gillibrandny join groups and displaced families from #PuertoRico to commemorate the one-year anniversary of #HurricaneMaria and call for a full accounting of the Trump administration's response.*

*BREAKING #HurricaneMaria O @PressSec Sarah Sanders At @ricardorossello request, @POTUS has authorized the Jones Act be waived for Puerto Rico. It will go into effect immediately.*

The first tweet was posted by a Democratic senator while the second was posted by the Trump administration.

The remaining 30% of information sharing tweets were posted by the military user group (13% of the total information sharing tweets), the user group coded as other (9% of the total information sharing tweets), and the nonprofit user group (9% of the total information sharing tweets). Military users employed Twitter to provide frequent situation updates to the public. For example, these tweets offer updates on personnel levels as well as specific military operations focused on rescue and response efforts.

*About 13,700 #DoD personnel are now in #PuertoRico E & the #USVI after #HurricaneMaria ravaged the region: [go.usa.gov/xnCCa](http://go.usa.gov/xnCCa)*

*Watch @USACEHQ install 2 generators at a #ToaBaja, E power plant. Once functional, they'll power 11K homes. #HurricaneMaria #ReliefEfforts*

*Another video from yesterday in eastern Puerto Rico. Our Red Squad 1 was there conducting search and rescue operations. #HurricaneMaria*

Tweets posted by the military user group in the early weeks of the disaster event tended to be positive in tone and emphasized the effectiveness of the military in providing rescue and response support.

*Opinion sharing.* The second most prevalent function of Twitter, as represented in the corpus of tweets, was opinion sharing. This code was defined as including opinions and commentary on the actions of government, individuals, or organizations in the context of the disaster (Qu, Wu, & Wang, 2009). Of the six groups, the individual user group posted the majority of opinion sharing tweets (222 or 70% of 317 total opinion sharing tweets), most of which were critical in tone. The primary targets of criticisms were the federal government in general and certain government officials, including President Trump, FEMA Administrator Brock Long, and Puerto Rican Governor Ricardo Rosello.

*WHAT RESPONSE? They've maliciously & unforgivably SAT ON THEIR HANDS before, during & after #HurricaneMaria devastated #PuertoRico*

*A @fema director should be direct, honest and accountable. To downplay the death toll and continue to hide the real number of casualties while you spin for Trump in order to keep your job is despicable, Brock Long. Lives are at stake. #HurricaneFlorence #HurricaneMaria*

Fully 25% of tweets posted by the individual user group specifically included criticisms of President Trump and were overwhelmingly negative in tone.

*Your daily reminder that #PuertoRico is part of America and more than 4,500 Puerto Ricans died in #HurricaneMaria and the POTIJS hasn't said a single word about that news since it was announced yesterday. But he did lead a chant of #LockHerUp last night in Nashville.*

A handful of tweets did express support for the President and the administration's disaster response while leveling criticism at liberal detractors.

*@realDonaldTrump right re #PuertoRico-Electric Grid was dysfunctional mess before #HurricaneMaria -Still people must be helped by #Fema & us*

Finally, some individual users provided critical commentary on the role of the media role in reporting on the disaster:

*60% more deaths in #PuertoRico than Hurricane Katrina & barely anyone is discussing this on TV this morning. It was an avoidable tragedy & this Admin's efforts to confront &*

*address it were abysmal. We should all be livid over the senseless loss of life.  
#HurricaneMaria*

*This is an outrage. A complete failure of liberal media & conservative media. 4645  
Americans are dead due to government and media apathy. Y'all care more for ratings  
than human life. Where is the accountability??? Meanwhile—Hurricane season started  
this week #HurricaneMaria*

The government user group posted the second highest number of opinion sharing tweets at 45 (14% of all opinion sharing tweets), far behind the number posted by individual users. Most evident among these tweets were posts by elected officials of the Democratic party expressing their criticisms of the Trump administration's response to Hurricane Maria.

*We grieve for each and every person who lost their life as a result of #HurricaneMaria.  
The Trump administration's lackluster response failed our fellow Americans in Puerto  
Rico. Now, we must do everything we can to help Puerto Rico recover from this terrible  
tragedy.*

*In the 10 weeks since #HurricaneMaria, the Administration's response has been anemic  
and inadequate — a national disgrace that betrays all Americans.*

The remaining four user groups (media, military, nonprofits, and other) posted a combined 16% of the total opinion-sharing tweets (50 out of 317 tweets).

**Expressing emotion.** The third most prevalent usage of Twitter was expressing emotion. Within the corpus, 217 tweets contained expressions of emotion. This code was defined as including both expressions of personal feelings such as sadness, anger, or grief and expressions of support, comfort, and concern. Of the 217 tweets reflecting this code, fully 70% (151 of 217 tweets) contained articulations of personal feelings and 30% (66 of 217 tweets) demonstrated emotional support for those most impacted by the hurricane. Among the six user groups, individual users were most likely to express emotions in their tweets.

*Our hearts go out to you #HurricaneMaria #PuertoRico #ThursdayThoughts  
#LastDayofSummer #PeaceDay BLESS YOU PUERTO RICO AND OUR ISLAND  
FRIENDS*

*It's working! It's working! #puertorico #hurricanemaria landed- filled with water and medical supplies. Today they will be distributed in the small town of Manati. Thanks to all, who not only donated, but have helped spread the word. It's working! It's working! <https://www.crowdrise.com/o/en/>*

*We've been through the most catastrophic hurricane in —100 years. Extremely grateful of those who are kind and supportive. #HurricaneMaria*

Although fewer in number, some individual users chose to use Twitter as a way of thanking undefined publics who responded to the disaster in emotional and material terms, as the last two tweets demonstrate.

Emotion sharing tweets from the government user group were less evident in the corpus (37 tweets or 17% of all emotion sharing tweets). Government users expressed personal feelings of sadness and gratitude in almost equal proportion to expressions of support, concern, and the offering of thoughts and prayers for the survivors (51% of tweets). Unlike the five other user groups, however, government users did express emotional support slightly more often than personal feelings.

*As Puerto Rico continues to recover from the devastation caused by #HurricaneMaria, my thoughts and prayers remain with my fellow Americans*

*#HurricaneMaria has devastated Puerto Rico, and we are ready to help. @NYCMayor*

The remaining four user groups (media, military, nonprofits, and other) posted 32% of the emotion sharing tweets, most of which expressed personal feelings in response to the disaster, such as offering gratitude to first responders.

*Big thank you to the service men and women out there helping rescue those affected by #HurricaneMaria. [dvidshub.net/feature/Hurric...](http://dvidshub.net/feature/Hurric...)*

**Taking action.** Findings suggest that Twitter was also used to report on actions taken in response to Hurricane Maria. The “taking action” code included both proposing particular actions in response to the disaster event and reporting on the actions taken by individuals or

groups in the disaster context. The individual user group was most likely to use Twitter in this way, with 57 (27%) of the total action tweets. Of the tweets posted by the individual user group, 30 (53%) focused on proposing particular actions while 27 (43%) included reports of actions taken by individuals or groups. For example, individual users proposed actions, such as making a donation, in response to the disaster.

*Our brothers & sisters in #PuertoRico are suffering. Please pass this info along & please help financially too! #HurricaneMaria*

*FEMA's careless response to #HurricaneMaria put lives in danger. Join us on 3/20 @FEMA headquarters to demand @femaregion2 @FEMA Brock step up the pace and Congress investigate what went wrong. #Power4PuertoRico*

In some instances, individual users promoted political actions such as protesting, contacting Congress, or voting, as effective responses to the disaster.

Tweets posted by the individual user group also included reports on actions taken by themselves or others in the aftermath of Hurricane Maria.

*Since we can't rely on Trump to help the people still suffering from the aftermath of #HurricaneMaria I will be donating \$15 in honor of the 3000 people who died as a result of the storm. If you can't afford that please donate something #TuesdayThoughts unidosporpuertorico.com/en/*

*Some @MarianJniv students take alternative spring break, serving at @CampCaribe in #PuertoRico, nearly 6 months after #HurricaneMaria devastated the island.*

These reports tended to call attention to individuals or groups responding to humanitarian needs by making donations to relief efforts or by volunteering to support response and recovery operations.

The government user group ranked second in their use of Twitter to report on actions taken in response to the disaster. Government users posted 48 action tweets (23% of the total action tweets). Of these, a majority of 36 tweets (75% of total) reported on actions taken by individuals or groups while 12 tweets (25% of action tweets) proposed actions.

*Puerto Rico is trying to rebuild after #HurricaneMaria, but it's being crushed by debt. I introduced a bill to give US territories that have suffered a major crisis a route to comprehensive debt relief and a chance to get back on their feet.*

*Joined my Congressional colleagues to request @SecretaryCarson @HUDgov @FHAgov extend the moratorium on housing foreclosures in #PuertoRico + #USVI to allow more time for recovery after the devastation caused by #HurricaneMaria @RepJenniffer @StaceyPlaskett @RepDarrenSoto*

Most of these tweets were posted by members of Congress and called attention to legislative actions they were personally taking in response to the disaster.

The user group coded as nonprofit primarily used Twitter to highlight actions taken by individuals or groups. The nonprofit user group posted the third most action-oriented tweets, with 40 (19%) of the total action tweets posted by all user groups. Of these tweets, 28 (70%) reported on actions taken by individuals or groups while 12 tweets (30%) proposed particular actions in response to the disaster.

*Our team in #PuertoRico is helping serve 35K meals a day to #HurricaneMaria survivors plus providing supplies & access to resources.*

*Today marks the 6 month anniversary of #HurricaneMaria, @SavetheChildren is on the ground helping kids in #PuertoRico get back to learning and overcome their trauma.*

The overall narrative of these tweets positively highlighted the work being done by nonprofit relief organizations to provide humanitarian aid. The nonprofit user group, like government and military users, used Twitter to call attention to the effectiveness of their particular efforts in responding to the disaster.

The remaining three user groups (media, military, and other) posted relatively few tweets reflecting the theme of taking action. The “other” user group posted 36 action tweets (17%), media users posted 22 tweets (11%), and military users posted 6 tweets (3% of total). The majority of the tweets posted by these three user groups reported on actions taken by individuals and groups as opposed to proposing particular actions (43 tweets or 67%).

## Summary

Thematic content analysis of the corpus of tweets utilized both qualitative and quantitative methods. Thematic, constant comparative analysis of the text identified five key frames embedded in the corpus of tweets: the political frame, the destruction frame, victims/heroes frame, military/humanitarian aid frame, and counter-narratives. These frames functioned to organize concepts related to disaster and recovery in the aftermath of Hurricane Maria.

A manual content analysis of visual content in tweets revealed that the six user groups utilized images in ways that supported the key frames. For example, the individual user group posted tweets with images of victims of the storm; the government user group promoted the political frame by posting images of elected officials; the military user group posted tweets with images of equipment and military personnel, supporting the military/humanitarian aid frame; the media user group posted images of destruction and victims of the storm; the nonprofit user group portrayed volunteers as heroes in the images it posted; and the group coded as other posted images of providing aid, including financial assistance.

Quantitative content analysis found that the individual user group was the most active in using #HurricaneMaria over the one-year time period, followed by the government, media, military, other, and nonprofit user groups. Regarding sentiment, or the tone of tweets, the military and nonprofit user groups posted the most positive tweets over the one-year period. Conversely, the media user group posted the most negative tweets over the course of one year. The individual user group posted messages that were quite negative in response to the release of information that revised the death toll to nearly 3,000 persons in May 2018.

Qualitative thematic analysis of the text also revealed differences in how the six user groups utilized Twitter. For example, the individual user group used Twitter to express opinion; the



user groups coded as government, media, and other used Twitter to share information; the military user group used Twitter to highlight the federal government response to the disaster; and the nonprofit user group used Twitter to highlight individuals or groups taking action.

The following chapters will provide interpretations of these findings and their relation to the current literature. The implications of this research for the social work profession will also be addressed.

## Chapter 5: Discussion and Conclusions

This chapter will reexamine the research questions, review evidence of the emergent frames constructed by the six user groups, address points of convergence and divergence in relation to the Twitter discourse of the six user groups, and comment on the relevance of the current findings to the existing body of literature on disaster discourse. In addition, implications for social work policy practice and future research directions will be discussed.

### **Disaster and Recovery Narratives by Key User Groups**

Thematic constant comparative analysis of the text identified five key frames embedded in the corpus of tweets: the political frame, the destruction frame, victim/hero frame, military/humanitarian aid frame, and counter-narratives. These frames functioned to organize concepts related to disaster and recovery in the aftermath of Hurricane Maria.

**The political frame.** Findings suggest that the individual user group was the most active in producing the political frame, calling attention to competing political interests, criticizing the Trump administration for perceived injustices, and blaming the federal government for the resulting death toll in Puerto Rico. Qu, Wu, and Wang (2009), in their study of social media discussions in the aftermath of the 2008 Sichuan earthquake, found that individual users posted personal opinions, criticisms of government, and assessments of response efforts in almost a third of online discussions (second only to information sharing posts). The researchers concluded that these expressions of opinion and criticism served to influence the viewpoints of other users as well as the larger public.

Similarly, in their study of Twitter discourse following three campus shootings in the United States, Heverin and Zach (2012) concluded that the sharing of opinions about the event, the response, and news coverage of the event, were important elements in making sense of a chaotic

situation. The findings presented in the current study likewise point to the construction of a political frame to understand the post-Maria situation in Puerto Rico. The majority of tweets posted by the individual user group, for example, could be described as politically liberal (Democrat leaning) in content. These users defined the disaster and recovery in the context of the current hyper-partisan political climate in the United States, leveling significant criticism at the Trump administration and blaming President Trump personally for a deficient response to the hurricane.

**The destruction frame.** The current study found that the individual user group and the media user group were most active in constructing this frame (defined primarily as the physical destruction caused by the storm). A closer reading, however, uncovered differences in how these two user groups viewed the destructive impact of Hurricane Maria. The media user group tended to focus on physical destruction and immediate dangers. These findings support other studies on media framing in disaster situations. Dynes and Rodriguez (2010) suggest that media outlets focused on the story-of-the-moment in the aftermath of Hurricane Katrina, seeking out stories of damage, death, providing help, and villains.

Media narratives also tend to focus on the immediate aftermath of disasters, as opposed to their long-term impacts (Deves, LeTexier, Pecout, & Grasland, 2019; Houston, Pfefferbaum, & Rosenholtz, 2012; McKinzie, 2017). In the current study, media activity on Twitter was shown to peak in the early days after Hurricane Maria and decreased precipitously after week three (Appendix B). The disaster framing of traditional media sources also tends to “focus on the ‘spectacular’ – sheer devastation – and dismiss entirely the social aspects of ‘natural’ disasters” (McKinzie, 2017, p. 4). In the current study, the media user group was found to highlight physical destruction in both texts and visual content (Figure 7, Figure 8, Figure 9).

The individual user group, in contrast to media users, framed the destruction in terms of the longer-term impacts of the storm, such as limited or no electrical service months after the hurricane. Individual users criticized the federal government's lack of urgency in responding to Puerto Rico's needs as the disaster stretched on. This criticism persisted over the course of the year following Hurricane Maria's initial impact. In contrast, the media user group was virtually absent from the Twitter discourse after the first few weeks. This pattern reflects the importance of the attention economy in social media communication. The attention economy (Schwartz, 2018) is a phenomenon in which the producers of social media content seek to capture the audience. Digital products, businesses (including media outlets), nonprofits, and political campaigns, for example, compete for the attention of social media users (Kane, 2019). Media outlets rely on sensationalized stories of victims, rescues, and destruction to capture audience attention before it shifts to the next eye-catching story, in a literal sense. Joye (2015) suggests that the media's use of emotional images of suffering victims are effective in capturing the audience's attention and foster a connection to a distant other. Such an emotional connection may encourage public responses in the form of donations and volunteering. However, there is a danger that this media framing of victims and saviors can reinforce ethnocentric and paternalistic attitudes on the part of the audience (Joye, 2015).

Biases in media coverage of disasters also reflect geopolitically privileged relationships. For example, Western media prioritize some disasters as being more newsworthy if they occur in nations that have political and economic ties and cultural similarities with the West (Cottle, 2013; Jeong & Lee, 2017). As noted earlier, the frequency of tweets posted by media outlets showed a pattern of increased activity in the early days of the disaster event, followed by a decrease in activity for much of the year following landfall.

**The victim/hero frame.** This frame was advanced by the government, media, and individual user groups but in varying forms. The government user group tended to focus on government responders as heroes in text and visual content. Even when victims were mentioned, government personnel were pictured in the forefront photos rather than survivors (Figures 19 and 20, for example). The media user group constructed frames of both heroes and victims that coincided with other research on disaster discourse in the media (Trckova, 2014; Dhakal, 2018). For example, the media user group framed victims as passive and dependent on the help of outsiders. Also evident in texts produced by media users was the impersonalization of victims, describing survivors as a single, homogenous group (Svistova & Pyles, 2018; Trckova, 2014). The victim/hero frame constructed by the individual user group, however, diverged from that of the media and government user groups. Individual users did focus on individual survivors in text and visuals and provided the only examples of framing survivors as indigenous heroes, capable of responding to the needs of their communities. Solnit (2009) refers to the examples of altruism and solidarity among survivors that occur immediately after a disaster as a “paradise that arises in hell” (p. 7).

The individual user group also contested the victim frame by focusing on the government’s failure to acknowledge the extent of the loss of life after Maria. Official recognition of the death toll became a dominant theme of texts produced by the individual user group. The release of much higher estimates in May 2018 was a triggering event for the individual user group within the larger disaster cycle, resulting in a spike of Twitter activity. The tweets posted by the individual user group served to re-frame the victim narrative, focusing on the loss of human life and the injustice of ignoring those lives. Individual users also linked the devaluation of Puerto

Rican lives to their status as “second class citizens,” evidence of the legacy of colonialism (Llorens, 2018).

The presence of this counter-narrative produced by individual users serves to challenge the pattern of “othering” that takes place in disaster narratives, particularly those constructed by the media (Jamieson & Van Belle, 2018). The process of othering emphasizes the differences between groups of people and the characteristics of affected communities that are not shared by the local audience. Othering is seen in efforts to blame the victims of disasters by referring to the existence of “social disorder, a lack of preparedness, a troubled history, poverty, corruption, or poor infrastructure” in the affected communities (Jamieson & Van Belle, 2018, p. 64). Additionally, the othering construct supports a paternalistic view of victims in need of saving. Media coverage furthers the process of othering by portraying disaster victims as “distant, their lives and experiences viewed as remote and as having little in common with the reader” (Soloman & Henderson, 2019, p. 1661). Similarly, Balaji (2011) points to a pattern of racialized media framing, evident in the coverage of Hurricane Katrina and the Haiti earthquake, that serves to reinforce the definition of disaster survivors as “other.”

However, it is possible to deconstruct the othering narrative (Olausson, 2014), as evidenced in posts by the individual user group. Tweets that reinforced the status of Puerto Ricans as American citizens challenged the label of otherness promoted by the media user group and some individual users.

Van Hulst and Yanow (2014) suggest that conflicts over frames also involve actors’ sense of their identity and the relationships between actors.

At issue is an understanding of identity as more than a surface layer that can be put on, taken off, or otherwise altered at will. Reframing in such circumstances is not always

easily done; actors need to find ways in the new framing of giving expression to what is meaningful to them (Van Hulst & Yanow, 2014, p. 102).

Disaster discourses play a role in the construction of identity and the creation of perceived communities, either promoting an “us” versus “them” narrative or an imagined community of “we” (Joye, 2009). The alternative victim frame constructed by the individual user group illustrates this process. By rejecting the perceived othering and definition as “second class citizens,” individual users instead framed the identity of survivors as equal to that of any other American.

One unexpected finding of the current study involved the role of corporations in producing the hero frame. Coded as the “other” user group, large corporations were active in promoting themselves as heroes in responding to Hurricane Maria. Verizon, Sprint, Home Depot, and American Airlines, for example, produced texts and visual content to publicize their contributions of volunteers, supplies, and financial resources to relief efforts in Puerto Rico (see Figures 37, 38, 39). This narrative exemplifies disaster opportunism, or the profiteering by large corporations in the response and recovery stages of disaster (Wisner, 2009). While pernicious, these practices should not distract from the larger, systematic processes in which disasters are used as opportunities for “advancing the political, ideological, and economic interests of transnational capitalist elite groups” (Schuller & Maldonado, 2016, p. 62). In post-Katrina New Orleans, for example, “some of the largest recipients of Iraq reconstruction funds—politically connected firms such as Bechtel, Blackwater, and Halliburton—also found themselves with billion dollar no-bid contracts following Katrina” (Schuller & Maldonado, 2016, p. 63).

***Silencing voices.*** Related to the victim/hero frame is the absence of survivor stories or narratives of solidarity among survivors of the storm. Instances of people helping one another,

acting as true first responders, rarely receive media attention. In the aftermath of the Haiti earthquake, for example, media coverage created a disaster narrative by “systematically ignoring the everyday heroism and solidarity of tens of thousands of ordinary people... framing them outside the story...” (Schuller, 2016). In the current study as well, the voices of survivors were essentially absent. Those few survivor stories evident in the corpus of tweets were primarily posted by the individual user group and generally overlooked by the media and government user groups. Silencing represents a second victimization of survivors, depriving them of the ability to articulate their needs and hopes for the future. As Button (2010) suggests, “disaster victims and their communities struggle not only to regain control over their lives but to refute the ‘objective’ frames offered by experts and mirrored by the media” (p. 168).

The online discussion surrounding the death toll in Puerto Rico also suggested another kind of silencing. Schuller (2016) noted similar disputes over the death toll following the Haiti earthquake. In the case of Hurricane Maria, the individual user group saw the significant undercounting of fatalities as evidence of the inequality produced by a history of colonialism. The reality of being “second class citizens” is concretized in the government’s failure to acknowledge the lives lost after Hurricane Maria. In Puerto Rico, as in Haiti, it appears that “not all deaths – just as not all lives – are given the same value. The fact that there could have even been a debate about the death toll highlights that some lives literally don’t count...” (Schuller, 2016, p. 55).

The silencing and marginalizing of Hurricane Maria survivors are consistent with prevalent narratives found in media coverage of disasters internationally. A comparison of disasters in Australia, the United States, Pakistan, and Indonesia found that media coverage reflects “global hierarchies of place and human life” (Joye, 2009, p. 45). Western news coverage of non-



Western nations focuses on dramatic events, conflict, and violence, thus creating negative stereotypes and, potentially, negative public perceptions of those countries. This pattern of bias is also evident in cases where the destruction and death toll of disasters in Western nations are relatively low in comparison to non-Western nations (Cottle, 2013). Furthermore, “the presence of Western victims is an important predictor for a disaster’s newsworthiness” (Joye, 2009, p. 47).

The media coverage of disasters that occur in Western countries also depicts survivors as “considerably more human and are presented as individuals instead of a mass of silent and passive people...” (Joye, 2009, p. 53). For example, in studies of wildfires in Canada and Colorado, researchers found that the voices of affected community members dominated media coverage (Cox et al., 2008), in contrast to the findings of the current study. However, disaster narratives constructed by the media also depicted heroes (especially emergency responders) more often than in other issue narratives (Crow et al., 2017). This finding is consistent with the current study in which heroes were frequently placed in the forefront of narratives, in text as well as visual content.

**The military/humanitarian aid frame.** This frame was evident in the texts and visual content produced primarily by the military user group. This frame, defined as discourses that provide justification for a significant military presence in disaster situations, has become more prominent in the public discourse since Hurricane Katrina (Tierney & Bevc, 2010). The military/humanitarian aid frame views the military as the most capable and effective organization to respond to large scale disasters. In the current study, the military user group constructed this frame in texts and visual content that called attention to their specialized equipment and trained personnel (Figures 41, 42, and 43). The military user group also affirmed the presence of armed security forces as necessary for maintaining safety immediately after the hurricane (Figures 46

and 47). Tierney, Bevc and Kuligowski (2006) suggest that this trend toward a militarization of disaster response reflects “an ideology that places ultimate fate in the ability of the military and armed force to solve problems in the international and domestic spheres” (p. 78).

Calhoun (2004), in an analysis that is relevant to disasters, discusses how “a discourse of emergencies is now central to international affairs. It shapes not only humanitarian assistance, but also military intervention and the pursuit of public health” (p. 376). Humanitarian emergencies such as Hurricane Katrina, the Indian Ocean tsunami in 2004, and the Haiti earthquake, all saw similar military responses. Following the tsunami, for example, the U.S. military presence included 16,000 troops, 24 warships, and 100 aircraft (Bello, 2006). In addition, the U.S. military exerted its influence coordinating relief efforts with other countries, essentially circumventing the United Nations (Bello, 2006). In New Orleans, there were “more military personnel involved in the Katrina response than had ever been mobilized for any other U.S. disaster, but their missions were also much broader” (Tierney & Bevc, 2010, p. 43). The military fulfilled a role in providing relief, conducting search and rescue, evacuating residents, and clearing debris. However, they also assisted local law enforcement, participated in enforcing curfews, and provided additional security at the Superdome (Tierney & Bevc, 2010). Discourses of emergency and the need for security serve to justify militarized humanitarianism “even if greater military involvement will do little to enhance response effectiveness, and even if such involvement will cause the costs associated with disaster mobilization (including those associated with hiring military contractors) to rise” (Tierney & Bevc, 2010, p. 52).

As evidence of the ideology of militarism, the military user group received virtually no criticism in the corpus of tweets. In contrast, the federal government (FEMA in particular), President Trump, the Puerto Rican government (e.g. PREPA, Governor Rosello, Mayor Cruz),

liberals, conservatives, and the media were all targets of strong criticism. Public opinion surveys support the overall positive assessment of and trust in the military as an institution. For example, 85% of Americans have confidence in the military to act in the best interests of the public, according to a recent Pew survey (Rainie, Keefer, & Perrin, 2019).

**Counter-narratives.** There was a notable absence of counter-narratives in the disaster and recovery discourses produced by the six user groups. The few examples of counter-narratives present in the corpus of tweets were promoted by the individual user group. The themes of these alternative narratives included the role of neocolonialism and disaster capitalism in exacerbating the short and long-term impacts of Hurricane Maria. Colonialism is defined as the establishment of political control and jurisdiction over another country. That control can be extended over time through economic domination (Cruz-Martinez, 2019). Disaster capitalism refers to the promotion of private, for-profit interests and free-market solutions to disaster response and recovery efforts (Klein, 2005). Just as Hurricane Katrina revealed the inequality that created the conditions for a social tragedy in New Orleans (Tierney, 2015), so did Hurricane Maria bring into focus the inequities that define the territorial status of Puerto Rico and the impact of neocolonialism. Individual users frequently referred to Puerto Rico's being treated unfairly by the government and receiving less in federal disaster aid than Texas or Florida. Subsequent actions taken by the Trump administration support that perception. For example, new restrictions were placed on federal aid to Puerto Rico by the Trump administration in January 2020, just days after the island experienced a 6.4 magnitude earthquake (Fadulu & Walker, 2020). Similar conditions were not placed on aid for mainland states (like Texas or Florida) also recovering from disasters. In August 2020, the federal Department of Housing and Urban Development (HUD) appointed a financial monitor to ensure proper management of disaster

relief funds designated for Puerto Rico. The nine mainland states that have received HUD funds in the last two years do not have such oversight (Fadulu & Walker, 2020).

It is not surprising that the individual user group was the most active in constructing counter-narratives. According to Van Hulst and Yanow (2014), framing acts as a form of storytelling, selecting and naming certain features of an event, and “explaining to an audience what has been going on, and often, what needs to be done – past, present, and future...” (p. 100). Counter-narratives call attention to overlooked aspects of a situation as a way of explicating the larger context that may be glossed over by other actors. The media, for example, tends to ignore and “dismiss entirely the social aspects of ‘natural’ disasters” (McKinzie, 2017, p. 4), such as neocolonialism and social inequality. Media framing, rather than fostering counter-narratives, tend to both “reflect and reinforce broader societal and cultural trends... and hegemonic discourse practices that support the status quo and the interests of elites” (Tierney, Bevc, & Kuligowski, 2006, p. 62).

Some research suggests that social media in general, and Twitter in particular, is potentially an effective platform for disseminating counter-narratives by sharing those narratives “in a much more instantaneous way, essentially creating even more immediacy in the framing process” (Burch, Frederick, & Pegoraro, 2015, p. 413). As Qu, Wu, and Wang (2009) suggest, the sharing of counter-narratives via Twitter can re-frame Hurricane Maria in a more contextualized way, creating the space for discussion on the impact of colonialism and disaster capitalism in creating disaster situations. While counter-narratives were scarce in the current study, it is conceivable that individual users were able to construct an alternative account of events through their sustained posting of messages, long after other key user groups had exited the communicative space created by #HurricaneMaria. However, it is impossible to draw

conclusions as to the relative influence of these counter-narrative tweets. An analysis of retweets, for example, was not within the scope of this study.

**Impact of visual content.** A manual analysis of visual content in the corpus of tweets revealed that the six user groups utilized images in ways that supported key frames. For example, the individual user group posted tweets with images of victims of the storm; the government user group included images of government personnel or elected officials; the military user group posted tweets with images of equipment and military personnel; the media user group posted images of the destructiveness of the storm; the nonprofit user group portrayed volunteers in the images it posted; and the group coded as “other” posted images of providing aid, including financial assistance.

Bruns et al. (2012) reported that image sharing was one of the most popular uses of Twitter in the aftermath of the Queensland, Australia floods. One in every five tweets contained visual content or a link to visual content. The current study found that the rate of sharing visual content far exceeded that in the Queensland flood situation. Of the 1,296 tweets included in the corpus, 819, or 63%, contained visual content such as a photo, video, or graphic (one tweet may contain multiple visual elements). Of the six key groups studied, the individual user group posted the most tweets with visual content with 252. The military user group posted the second most visuals with 157. A summary of visual content posted by the six user groups is provided in Appendix B.

Research confirms the significant role that visual content plays in constructing frames of meaning on social media. This is especially true in a media ecosystem where “audiovisual material tends to be more widely viewed and shared than plain-text updates, and thus have a greater potential to influence viewer’s interpretations of an event” (Bruns & Hanusch, 2017, p.

1122). Crisis events, like natural disasters, “can be intensely visual, and it is often through images that we come to know and remember them...” (Vis, Faulkner, Parry, Manyukhina, & Evans, 2014, p. 385).

Bruns and Harnusch (2017), in their analysis of visual content on Twitter in the aftermath of two terrorist attacks in Europe in 2015 and 2016, concluded that the affective content of visuals (displaying support, solidarity, and emotion in response to a crisis) is powerful in creating shared understandings of significant events. Social media participation “enables online publics to act as eyewitnesses whose accounts are not framed by mainstream media,” thereby changing the public’s understanding of crisis events (Bruns & Harnusch, 2017, p. 1124). Image sharing on social media in the aftermath of a crisis can enhance a sense of emotional connection and “engage audiences through authenticity and affectivity” (Bruns & Harnusch, 2017, p. 1124) and contributes to collective sensemaking in times of crisis and uncertainty (Bruns et al., 2012; Liu, 2008).

The affective meaning carried by images also plays a role in advancing counter-narratives. Online publics connected through shared affect or sentiment can produce “disruptions/interruptions of dominant political narratives by presencing underrepresented viewpoints” (Papacharissi, 2016, p. 318). While the current study showed a large number of tweets with visual content, the evidence of counter-narratives (in text or visual) was limited. Five of the key user groups (government, military, media, nonprofit, and “other”) used visual content to support dominant frames of destruction, heroes and victims, and militarization. The individual group, however, was more likely to use visuals to challenge those dominant frames. For example, individual users focused on survivors rather than first responders (Figures 22, 23, 24).

### **Comparing Disaster and Recovery Narratives**

Quantitative content analysis found that the individual user group was the most active in

using #HurricaneMaria over the one-year time period, followed by the government, media, military, other, and nonprofit user groups.

**Patterns in Twitter activity.** Quantitative analysis of Twitter activity showed that, overall, all six user groups were most active in the early stage of the disaster and then decreased sharply after the first month. The only exceptions to that pattern were evidenced by the government, individual, and media user groups, which showed spikes of Twitter activity around the one-year anniversary of the hurricane. The individual user group also experienced a spike in activity at the end of May 2018 when updated estimates of the death toll were released to the public. McKinzie (2017) identified a similar spike in interest at the one-anniversary after a tornado.

Patterns of Twitter activity have been shown to reflect the temporal stages of a disaster (Eriksson, 2015; Stone & Pennebaker, 2002). Disaster phases have been variously defined as preparedness, response, and recovery (Huang & Xiao, 2015); pre-event, event, and post-event (Houston et al., 2014); and anticipatory phase, core event, and aftermath (Murthy & Gross, 2017). The findings of the current study support studies that have shown peaks in Twitter activity during the core event followed by declines in activity after the event (Murthy & Gross, 2017; Sylvester, Healey, Wang & Rand, 2014).

Similarly, the social stage model of collective coping (Pennebaker & Harber, 1993) suggests that the sharing of feelings, thoughts and anxieties with others, including strangers, is common in the first three weeks immediately after a traumatic event, including disasters. However, after the initial period of “social sharing” the level of interaction tends to decrease as people adjust to post-event conditions (Stone & Pennebaker, 2002, p. 174). David et al. (2016), in their study of Twitter activity after Typhoon Haiyan, also found that, in terms of frequency of tweets, “... the

issue attention cycle peters off after about 17 days” (p. 8). The findings of the current study support Pennebaker and Harber’s model (1993) and the Haiyan study (David et al., 2016).

**Sentiment and Twitter activity.** Social media platforms are seen by users as “appropriate spaces for social sharing of emotions and pursuing empathetic concerns” (Neubaum, Rosner, Rosenthal-van der Putten, & Kramer, 2014, p. 28). Crisis situations, in particular, evoke both positive and negative emotions which are subsequently communicated to larger publics via Twitter. On one hand, a social crisis “naturally evokes negative sentiments as the public mourns lost lives and as people grow anxious about the uncertain future” (Xu & Zhang, 2018, p. 200). However, positive emotional expressions of concern and caring are also evident in the aftermath of disaster (Boulianne, Minaker, & Haney, 2018; Neubaum et al., 2014). Papacharissi (2016) also noted the importance of affective bonds in bringing ad hoc publics together on social media platforms like Twitter. Ad hoc publics, such as those that formed around #Hurricane Maria are “affective, convening across networks that are discursively rendered out of mediated interactions. They assemble around media and platforms that invite affective attunement, support affective investment, and propagate affectively charged expression” (p. 308). The affective nature of tweets produced by the six key user groups supports this description of Twitter as promoting the affective aspects of messaging. Emotion sharing was found to be one of the more frequent uses of Twitter by the six user groups (Table 4).

The framing of disaster on Twitter promotes understandings that are both substantive (content-based) and affective, or sentiment-based (Meraz & Papacharissi, 2013). Regarding the sentiment, or tone, of the corpus of tweets, the military and nonprofit user groups constructed overall positive tweets. The military user group produced the most positive tweets in terms of tone and sentiment. Those tweets promoted the military/humanitarian aid frame and focused on



the role of the military as heroes. Conversely, the media user group posted the most negative tweets over the course of one year. The media user group expressed negative sentiment in reporting on the destructiveness of the storm in the early days of the crisis. The sentiment of tweets posted by the individual user group were neutral in tone overall, however, individual users did post tweets with very negative sentiment regarding the death toll and the government's response to the storm. Findings of the current study support Xu & Zhang's (2018) analysis of Twitter use in a crisis situation and the expression of negative emotions.

**Peaks in Twitter activity.** Thelwall, Buckley, and Paltoglou (2011) suggest that spikes in Twitter activity, indicating events that capture the public's attention, tend to be associated with increases in negative emotion. In analyzing the three periods of increased activity related to Hurricane Maria (based on the number of tweets posted), sentiment score results were mixed. The mean sentiment scores (all groups) for the first seven days after landfall (September 21-27, 2017) were positive for each day. Qualitative analysis of tweet texts revealed messages of support and solidarity during the initial days of the disaster. This finding runs contrary to the conclusions of Thelwall et al. (2011). Conversely, the combined mean sentiment score for the one-year anniversary date of September 20, 2018 was negative. These findings support Thelwall et al. (2011) as well as the outcomes of Matheson's study (2018) which found that over time, disaster-related tweets exhibited "more political discussions and less mutual regard, as consensus gave way to frustration" (p. 596). In the current study, sentiment scores confirmed this trend from positive affect early on to more negative affect as the timeframe extended to one year.

**Functions of Twitter.** Qualitative thematic analysis of tweet texts also revealed differences in how the six key groups used Twitter in the aftermath of Hurricane Maria. For example, the individual user group primarily used Twitter to express opinion. This finding supports Thelwall

et al. (2011) who found that “Twitter is used by people to express their opinions on events and that these posts tend to be more negative than average for the topic” (p. 413). The user groups coded as government, media, and “other” used Twitter to share information. The military user group primarily used Twitter to highlight the federal government response to the disaster and the nonprofit user group used Twitter to highlight individuals or groups taking action.

These findings are in line with the current research on social media use in disaster situations. Qu, Wu, and Wang (2009) identified four distinct discussion threads following the Sichuan earthquake including information sharing, opinion sharing, action related, and emotion related. Similarly, Palen and Liu (2007), in their study of citizen communications in crisis situations found that response-relevant information, relief assistance, and emotive/evaluative communications (including expressions of anger or grief as well as political statements) were most prevalent. The findings of the current study support the presence of political statements in the aftermath of a disaster. In addition, a preponderance of tweets in the current study were found to fulfill the function of information sharing (Bruns et al., 2012; Heverin & Zach, 2012; Takehashi et al., 2015).

The findings on the prevalence of information sharing suggest that Twitter is perhaps better suited to this function rather than as a platform for discussion, debate, and the type of communicative interactions that contribute to the social construction of disaster and recovery. For example, contrary to the conclusions of Qu et al. (2009), Thelwall et al. (2010) contends that

Twitter displays a low reciprocity in messages between users, unlike other social networks, suggesting that its primary function is not as a social network, but perhaps to spread news (including personal news) or other information instead... there is considerable evidence that even though Twitter is used for social purposes, it has

significant use for information dissemination of various kinds... and this may be its major use (Thelwall et al., 2010, p. 407).

On this point, it is clear that more research is needed to better understand the role of social media in constructing discourses, not just around disasters but in regard to any number of social issues.

### **Implications for Social Work**

The purpose of the current study was to investigate the social construction of disaster and recovery discourse on Twitter among six key user groups. Given this topic, the pertinent questions for social workers might be: why study disasters and why study social media?

Disaster research, theory, and practice are becoming more important as the frequency and impact of disasters, both natural and human-created, increase (Wallemacq & House, 2018). Attending to psychological well-being and ensuring access to essential services are necessary in disaster settings. However, much of social work practice and research has focused on the provision of direct services in the immediate aftermath of disasters (Pyles, 2007). By overlooking the long-term structural issues surrounding disasters, such as the political nature of response and recovery efforts, the impact of inequality, and the historical context, social work runs the risk of weakening its commitment to social, economic, and environmental justice; human rights; and the empowerment of communities.

Disasters and other social shocks create the conditions for change. On one hand, the powerful can exploit the disorganization to enhance their social, political, and economic position. In crisis situations, government and humanitarian decision-makers have substantial power to allocate resources and may, in effect, augment a process of recolonization following disasters (Donini, 2008). Conversely, disaster situations create spaces for resistance in which powerful interests are challenged and alternative understandings of social reality can take hold (Lavellete, 2011).

The 1985 earthquake in Mexico City, for example, resulted in profound social and political changes, including the end of the governing party's 71-year hold on power and the emergence of grassroots, anti-corruption citizen groups (Adler, 2015). In the aftermath of Hurricane Katrina in New Orleans, grassroots social movements formed to advocate for basic services, jobs, housing, and health care (Luft, 2006). Research also suggests that disasters can result in changes to historical patterns of gender inequality and foster women's empowerment (Drolet et al., 2015; Moreno & Shaw, 2018).

For social workers who are functioning in crisis situations, these conflicting outcomes represent a tension. "Professional social workers have to decide what their priorities should be (and who should decide them) and how their professional skills can help the aid process... who should they listen to? And, ultimately, whose side are they on?" (Lavellete, 2011, p.15). Findings from the current study, interpreted according to the theoretical framework presented in Figure 1, provide some insights for social work practice in disaster contexts.

The social constructionist perspective suggests that the frames identified in the Twitter discourse do matter in terms of influencing perceptions, attitudes, and actions toward events and groups. The six key user groups included in this study constructed multiple frames of disaster and recovery, offering particular narratives that suggest how we should think about the disaster (Campbell & Wiggins, 2015). For the media user group, Hurricane Maria is a story about the destructive force of the storm. The media gaze focused on short-term impacts, ignoring the deeper, structural issues of political and economic inequality that contributed to the disaster. The military user group tells the story of Hurricane Maria as a tactical operation, highlighting their role in deploying the equipment and personnel needed to take control of the disaster scene, provide aid and ensure security and safety.

Government users framed Hurricane Maria as a narrative of success for agencies and personnel responding to the disaster. For elected officials, a different narrative emerged, one of a badly mismanaged disaster response by the government, couched in partisan and pointed criticism of the Trump administration. Nonprofits constructed a narrative of the destructiveness of the storm as an opportunity for mainlanders to respond to the needs of “distant others” (Joye, 2009) through financial donations or volunteering. Corporations, representing the “other” user group, constructed a narrative of corporate goodwill and social responsibility, publicizing their significant financial contributions to relief efforts in the aftermath of Hurricane Maria.

The individual user group, the most active group in terms of number of tweets and activity over one year, defined Hurricane Maria as primarily a political conflict between the Trump administration and the people of Puerto Rico. For the individual user group, Hurricane Maria was also the story of individual survivors and their struggles in the aftermath of the storm.

From the perspective of critical theory, these multiple frames compete for dominance in the public discourse. Amid the various narratives of disaster and recovery, whose story counts? Whose story is heard? The military and media user groups constructed frames that were relatively consistent in their emphasis. The individual user group offered more diverse messaging and promoted multiple frames (political, destruction, victims/heroes, counter-narratives). Of the six user groups, the individual user group reflected a critical perspective most often, emphasizing power differences between the federal government and the status of Puerto Rico as a territory, resulting in Puerto Ricans being relegated to the status of “second class citizens.”

The critical perspective also calls attention to the absence of survivors’ voices in the Twitter discourse. This absence may be the result of limited or no access to communication service on

the island after the storm, but it may also point to the limitations of social media in giving voice to the marginalized in society. Some researchers, for example, question social media's ability to foster citizen participation in shaping public discourse and instead suggest that it is more likely to reinforce political, social, and economic inequalities (Fuchs, 2017; Lageson, 2017).

In terms of policymaking in the aftermath of disasters, social workers have an ethical responsibility to advocate for those who have been marginalized. The silencing of survivors has implications for the success of response and recovery efforts. Ignoring these voices can “undermine alternative discursive frames of explanation and preclude analysis of catastrophes in a way that would fully allow unpacking the politically powerful world of social relations in which catastrophes and the calamity that follow are grounded” (Button, 2010, p. 168). If, as the current study suggests, the voices of survivors are essentially absent from Twitter discourse, it is important for social work professionals to consider how the experiences of those most directly affected by the disaster can be included in public discourse. A social work approach, based on a strengths-perspective and the promotion of human rights, can ensure that disaster response and recovery efforts address the needs of individuals and communities most impacted by disasters.

Policy actions, broadly defined as any actions taken by authorities to achieve their goals (including government, federal agencies, media outlets, or corporations), are not just rational calculations of costs and benefits. They also involve judgments about values, beliefs, and what people deem as meaningful (Yanow, 1996). Thus, there is always the likelihood that gaps will arise between what is intended or produced by policymakers and the various meanings that are constructed by other groups, including those most directly affected by a situation, issue, or crisis. In considering the realm of disaster policy actions, the current study has demonstrated that key user groups do construct competing narratives of disaster and recovery via Twitter. It is

necessary to understand how elite actors, such as the government, military, media, and corporations, participate in and seek to influence public discourse on social media.

It is evident that in the social construction of narratives, social media has become a significant communicative space for debating social issues and the related policy actions offered by authorities. It is therefore an appropriate and timely topic for social work research. In terms of the person-in-environment perspective, social media is an important element of the social environment that impacts individuals. For example, social media can affect consumer choice through targeted advertising and the collection of personal information and shopping preferences. Recently, social media platforms have come under scrutiny for their role in influencing voter behavior. In Puerto Rico, public protests, largely organized through social media sites such as Facebook and Twitter, resulted in Governor Rosello's resignation in August 2019 (Romero, Robles, Mazzei, & Del Real, 2019). College students also identify social media as an important element in their social environment (Dr. Juliana Svistova, personal communication, January 2020).

In the context of social work practice, it is becoming increasingly important for professionals to be social media savvy, which includes developing an awareness of how social media shapes public discourses, and potentially, policy actions and decision-making. Social workers must adopt a critical stance toward the discourses, policies and practices of governments and organizations that, intentionally or not, reinforce structured power relationships between dominant and marginalized groups and, ultimately, do harm to vulnerable persons, groups, and communities. This requires adopting a professional approach that questions the efficacy of expert-driven, top-down discourses and responses to community needs (Dominelli, 2013). By understanding the impact of those discourses, social workers are in a position to advocate for and

construct alternative frames of understanding that reflect a commitment to social justice and a concern for human relationships.

### **Future Research**

The current study looked at the construction of disaster and recovery narratives on only one social media platform, Twitter, and focused on only one hashtag - #HurricaneMaria. Future research on the topic of disaster framing on social media should consider how narratives are or are not constructed on other social media platforms (such as FaceBook). Also, including a wider range of hashtags, as well as a larger dataset of tweets, related to a particular disaster event would provide additional insights into how discursive publics are created online. Such research may also shed light on how and when the voices that have been silenced in disaster contexts may be elevated. Within the social work profession, researchers are in a unique position to “determine whose story counts as worthy of being told and decide which group of people will be subjected to the research gaze” (Dominelli, 2009, p. 248). Focusing on multiple discourse communities, including the discourses of those who have been repeatedly silenced or marginalized, can reveal how narratives are constructed but also the processes by which narratives are deemed worthy of telling.

### **Conclusion**

The current study points to the crucial role that social media has come to play in shaping the social environment, including discourses that contribute to how we understand important events such as disasters. The expansion of digital communication and what has come to be known as Web 2.0 impacts all aspects of society, including the social work profession. The American Academy of Social Work and Social Welfare, in recognizing the impact of the digital revolution on society, has stated that “a grand challenge for social work is to build the capacity to deploy



these powerful digital resources to discover and apply social solutions to benefit society” (Coulton, Goerge, Putnam-Hornstein, & de Hann, 2015). Data from a variety of sources, including social media, have the potential to become rich sources of information for understanding social problems and improving social work practice, in direct service, policy development, and research. To respond to this challenge, schools of social work will need to train students in new ways. Currently, few social work programs “offer education on large and complex data sets. Social work masters and doctoral programs will need to incorporate special training in data science” (Coulton et al., 2015, p. 12).

The current study is an example of an interdisciplinary approach that can provide social work students an opportunity to obtain specialized skills for analyzing these data resources. The digital revolution will have implications for social work education and leadership today and for years to come. Current and future social work students and professionals will need new knowledge, skills, and tools if they are to meet the challenge of addressing complex social issues, including disaster response and recovery.

Given the potential magnitude of disasters and the destruction left in their wake, it is not surprising that social work professionals have developed a specialized body of knowledge by investigating the wide-ranging impacts of disasters on human beings and social systems (Padgett, 2002). Social workers, by virtue of their professional responsibility to promote social, economic, and environmental justice and the well-being of individuals and communities, are well suited to analyze the ways in which humans respond to disasters on the micro, mezzo, and macro levels (Richardson, Plummer, Barthelemy & Cain, 2009). Because at-risk populations tend to be more adversely affected by disasters, social work professionals can use their positionality to respond to the needs of vulnerable communities through practice, advocacy, research, and by providing a

platform for the voiceless members of communities affected by disasters. The exercise of power by some groups to exclude or silence others from the public domain, and marginalize their narratives, is a direct challenge to the value of social justice. Both naming and addressing these instances of social and economic injustice are relevant to the social work profession if we are committed to challenging systems of oppression and exploitation.

Reisch (2012), in arguing for a new politics of social work, suggests that social workers have become hesitant to confront structures that are antithetical to our professional values. It is a mistake to believe that social work is apolitical or can operate outside of the political sphere. Social workers have a unique, multi-focal vantage point in the on-going debates about how best to respond to human suffering. Our collective voice is sorely needed in the public sphere today. Social work can “reframe contemporary discourse – from managing the consequences of economic globalization, demographic shifts, and technological developments – to a critique that emphasizes new forms of justice and social inclusion” (Reisch, 2012, p. 1145). It is from this standpoint that the current study seeks to contribute to a reframing of the contemporary discourse surrounding disasters and social media from a social work perspective.

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## Appendix A

## Partial Codebook with Definitions (most frequently coded items)

Name	Description
User Group-Govt	Elected officials; representative of federal agencies
User Group - Military	Representatives of armed services
User Group-Individuals	Persons representing only themselves
User Group-Media Outlets	TV and Cable outlets, print media, online media
User Group-Nonprofits	Non-profit humanitarian orgs. and other non-profits providing direct aid to Puerto Rico
User Group-Other	Businesses, political organizations, description unclear
Colonialism	Unequal economic and political relationships between US & PR -Evidence of US policies and impact on PR (eg. Jones Act)
Communications	Impact of hurricane on various modes of communication; Limited cellphone use -Loss of landlines -Inability to contact loved ones/friends
Death toll	References to the direct or indirect deaths attributed to the disaster; official estimates of death toll
Destructiveness of the storm	Physical destruction resulting from the storm – flooding, buildings damaged, environmental impact
Disaster capitalism	Examples of disaster capitalism (Klein, 2007); calls to privatize public services
Displacement	Individuals and families forced to leave their homes and find alternative shelter; internal displacement (on the island) or external displacement (off island)
Donating/fundraising	Encouraging others to donate money or supplies to relief organizations; providing suggestions for making donations
Electricity/Power grid	Loss of electricity and strategies to adapt; Role of PREPA and PR govt. -Communities without electricity for weeks or months -Electrical infrastructure and power grid



Name	Description
Expressing emotion	Personal feelings -My heart is bleeding for my island (Takahasi et al., 2015) or expressions of concern, support
Expressing opinion	Personal statements on disaster situation – critical or complimentary -FEMA is moving too slowly (Qu et al., 2011); assigning blame
Federal government response	Response efforts by the federal government; includes coordination among federal agencies
Forgotten	Reference to those not counted or forgotten
Heroes	Person who is admired or idealized for courage, triumph over challenges (Trckova, 2014) -First responders
Lack of progress	Comments related to continuing problems weeks and months after landfall (e.g. extended power outages; lack of basic services)
Loss	Deaths directly or indirectly related to the hurricane -Drowned in flooding - Died due to inability to access medical care; loss of homes/belongings/pets
Memorializing losses	Reflecting on personal or shared losses -Let’s remember... (Takahasi et al., 2015)
Militarized response	Various roles that military can take during disasters -Rescue, delivering aid, policing; focus on equipment, personnel, capacity of military
Providing Humanitarian aid	Providing material aid – food, water, shelter, medical aid
Sharing information	Sharing personal information or passing on information that can benefit the public - My family is fine -Water is being distributed in this location... (Qu et al., 2011; Sutton, 2013)  Sharing media information, news stories, etc.
Taking action	Proposing actions - Call your representative; make donation (Qu et al., 2011) or reporting on actions of individuals or groups
Trump	Any mention of President Trump or the Trump administration
Victims	Person harmed, injured or killed as a result of a disaster (Trckova, 2014) Hurricane survivors as passive victims, needing rescuing

## Appendix B

## Distribution of visual images posted by key user groups

*Visual Images Posted by User Group (n = 819)*

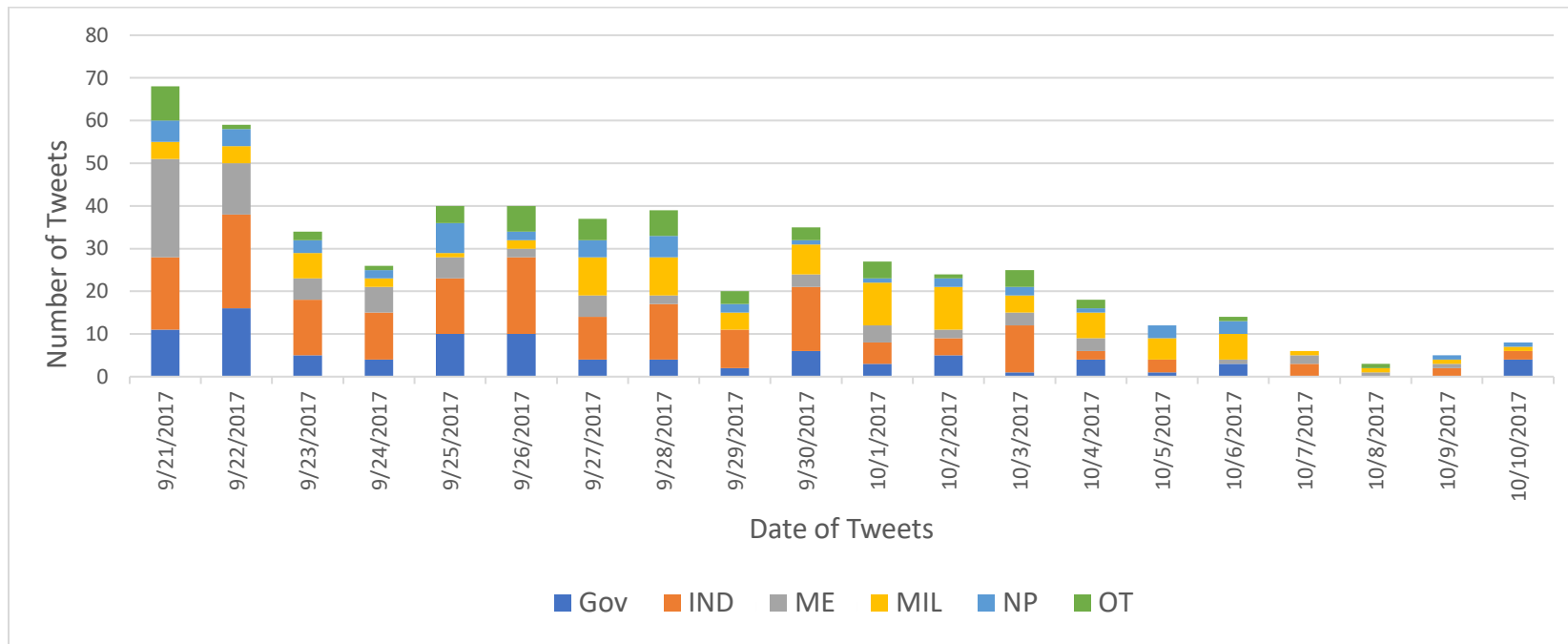
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User group	# of images posted	% of total images posted
Individual	252	31%
Military	157	19%
Government	119	15%
Media	122	15%
Nonprofit	86	10%
Other	83	10%
Total	819	100%

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Appendix C

Frequency of Tweets in First 3 Weeks of Disaster



Appendix D  
Sentiment Scores for Peak Activity

*Sentiment Scores of Peak Twitter Activity by User Group*

User group	Dates of peak activity	Avg. sent score of tweets posted
Government	9/21/17 – 10/21/17	0.109998
	9/16/18 – 9/21/18	-0.01678
Individuals	9/21/17 – 10/21/17	0.013104
	9/16/18 – 9/21/18	-0.01431
	5/29/19 – 5/31/18	-0.31352
Media Outlets	9/21/17 – 10/21/17	-0.02357
	9/16/18 – 9/21/18	-0.07349
Military	9/21/17 – 10/21/17	0.126308
Non-profit	9/21/17 – 10/1/17	0.089533
Other	9/21/17 – 10/6/17	0.04418