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Social Movement Sustainability on Social Media: An Analysis of the Women's March Movement on Twitter

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Abstract

Social media has emerged as a powerful medium to organize and mobilize social movements. In particular, the connective action of social media builds associations and allows for the continuity of social movements. Yet there is a lack of research on how connective action emergent from social media messages sustains long-term social movements. Accordingly, in this study, we concentrate on Twitter messages related to Women's March protests held in 2017, 2018, and 2019. Using an interpretive analysis followed by the topic modeling approach, we analyzed the tweets to identify the different types of messages associated with the movement. These messages were classified using a set of categories and subcategories. Furthermore, we conducted a temporal analysis of the message (sub)categories to understand how distinct messages allow movement continuity beyond a specific protest march. Results suggest that while most of the messages are used to motivate and mobilize individuals, the connective action tactics employed through messages sent before, during, and after the marches allowed Women's March to become a broader and more persistent movement. We advance theoretical propositions to explain the sustainability of a long-term social movement on social media, exemplified through large-scale connective action that persists over time. In doing so, this study contributes to connective action research by providing message categorization that synthesizes the meaning of message content. The findings could help social movement organizers learn different ways to frame messages that resonate with broader social media users. Moreover, our approach to analyzing a large set of tweets might interest other qualitative researchers.

Keywords: Social Movement, Framing, Mobilization, Connective Action, Movement Sustainability, Social Media, Interpretive Analysis, Topic Modeling, Temporal Analysis

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1 Introduction

Women's March (WM), which originated after the 2016 US presidential elections, is one example of a contemporary social movement that uses social media to organize action (e.g., George & Leidner, 2019; Leong et al., 2019; Vaast et al., 2017). The WM movement started

on Facebook when a retired Hawaiian woman named Theresa Shook set up an event page calling on women to stage a peaceful protest in Washington DC the day after the presidential inauguration (Agrawal, 2017; Carson, 2017). The protest was mainly aimed at the Trump administration and the threats some perceived to women's and minority rights.¹ The event received 10K

¹ <https://www.history.com/this-day-in-history/womens-march>

RSVPs overnight. Soon after, other women across the US started setting up similar event pages. The outcome of this grassroots organizing was evident on Jan 21, 2017, a day after President Trump's inauguration, when over 500K people arrived at the nation's capital to stage a protest. This massive protest march has been repeated annually since and continues to be a global movement advocating for a range of issues, especially on social media.

While protest marches allow people to make their disapproval heard, a movement that aims to bring any substantive social or political change requires activists to engage in a series of contentious episodes sustained in time (Ayres, 1999; Tilly, 2017). As Tarrow (1994, p. 7) notes, "social movements that have left the deepest mark on history have done so because they sustained collective action against better-equipped opponents." However, at the same time, it is not always in the best interest of society for social movements to continue, especially those that lead to societal division, civil strife, and violence. This calls into question how the use of social media allows certain movements, such as WM, for better or worse, to be sustained over time.

The extant research notes the challenges in sustaining movements on social media (Leong et al., 2020), especially grassroots-led movements that lack formal organization and leadership (Tufekci, 2017). Information systems (IS) scholars have recently begun to examine the emergence and sustainability of social movements through an alternate logic of organizing referred to as *connective action*, wherein users create and share personalized content on social media (Bennett & Segerberg, 2012; Vaast et al., 2017). Movement sustainability is conceptualized as the resurgence of connective action on social media (Langer et al., 2020). However, there are two gaps. First, there is a lack of research on how connective action through personalized messages is sustained. This is important for extending the theoretical understanding of connective action that is not only limited to the use of social media features (Vaast et al., 2017) but also emerges from the meaning and discourse in which they are situated (Bennett & Segerberg, 2012; Pond & Lewis, 2019). Such messages, referred to as personal action frames, "are inclusive of different personal reasons for contesting a situation that needs to be changed" and require little persuasion to bridge differences with how others may feel about a situation, leading to large-scale connective action formation (Bennett & Segerberg, 2012, p. 744).

Second, there is limited research on the sustainability of long-term social movements on social media. By long term, we mean a social movement that exhibits continued momentum by staging repeated protests over time, as in the WM case. The existing research has examined the use of social media at the peak of an event, when the message frames are highly visible (e.g., Oh et al., 2015; Vaast et al., 2017) and during the

abeyance phase, when participation tends to decline (Leong et al., 2019). However, we argue that examining movement sustainability requires a longitudinal analysis to enhance the understanding of the distinct repertoire employed for the mobilization and sustainability of the movement (Leong et al., 2019; Taylor & Crossley, 2013). Thus, this study examines how long-term social movements can be sustained, exemplified through large-scale connective action on social media that persists over time. Specifically, we address the following research question:

RQ: How do social media messages sustain a long-term social movement?

We collected Twitter data related to the WM movement from January 1, 2017 to December 31, 2019, during which three marches were held. Informed by the social movement framework (McAdam et al., 1996), we analyzed the meanings of the tweets to categorize the types of messages communicated on social media. We followed up with the temporal analysis of meanings and frequencies of message (sub)categories to understand how connective action through movement messages sustained the WM movement on social media beyond a single protest march. The results suggest that distinct connective action tactics were employed through movement messages sent before, during, and after the protest marches to motivate, mobilize, and sustain the movement.

Based on our findings and theoretical predispositions, we advance a set of propositions to explain the sustainability of connective action in a long-term social movement. In doing so, our study extends the connective action research that has thus far focused on analyzing the use of social media features such as retweets, hashtags, and notifications (Leong et al., 2020; Vaast et al., 2017). This study also complements the research that has analyzed network features for movement sustainability (Langer et al., 2020; Leong et al., 2020). Additionally, we answer the calls for classifying information types using social movement theories (Young et al., 2019) and conducting exploratory content analysis to understand the evolution and sustainability of movements on social media (Leong et al., 2019; Oh et al., 2015; Vaast et al., 2017). The insights can help social movement leaders and participants be more effective when framing and articulating their messages. Moreover, our approach of analyzing a large set of tweets might interest other qualitative researchers.

In what follows, we present a review of the social media and social movements literature and discuss the theoretical underpinnings of our study. We then discuss the research context and our data analysis approach. The results section presents the hierarchy of movement messages and their temporal dynamics.

Next, we present eight theoretical propositions to explain the sustainability of long-term social movements. We discuss our contributions to theory and practice and note some limitations of this study and future research opportunities.

2 Background Literature

This section first discusses social movements and sustainability, followed by a review of IS literature examining social media-enabled social movements.

2.1 Social Movements and Sustainability

A social movement is defined as “a network of informal interactions, between a plurality of individuals, groups and/or organizations, engaged in a political or cultural conflict, on the basis of a shared collective identity” (Diani, 1992, p. 13). The notion of “informal interactions” emphasizes the networked and nonhierarchical structure of social movements as they often link heterogeneous individuals, groups, and organizations to promote “broader systems of meanings” (Diani, 1992, p. 8). Furthermore, a social movement is not a single event or performance but rather a series of contentious episodes sustained in time to make their claims heard by their target groups, including governments, elites, or corporations (Ayles, 1999; Schneiberg et al., 2008; Snyder & Tilly, 1972; Tilly, 2017). Such sustained movements exhibit recurring cycles of protest activity through marches, demonstrations, drives, alliances creation, and media communication (Della Porta & Diani, 2020; Tarrow, 1993). The protest emerges in response to a social or political conflict, reaches its peak activity, and eventually declines (Tarrow, 1989). While periods of emergence (or rupture) and peak emphasize movement mobilization, the decline (or abeyance) period provides an opportunity to sustain movements in a nonreceptive social and political environment and provide continuity from one protest event to another (Taylor, 1989; Taylor & Crossley, 2013). In particular, scholars note that several dimensions characterizing the abeyance period can sustain a social movement: *temporality* (length of time a movement organization can hold personnel), *commitment* (willingness of people to participate regardless of the personal rewards or sacrifices), *exclusiveness* (retaining supportive members), *centralization* (consolidation of power), and *culture* (elaboration of alternative cultural frameworks to support those who remain committed) (Taylor, 1989). These dimensions are consequential for future mobilization upsurges through the survival and promotion of activist networks, a repertoire of goals and tactics, and collective identity.

In recent years, multiple protests related to several contemporary movements such as MeToo and Black Lives Matter have been organized through social media, indicating a rapid emergence and peak followed by a decline in social media activity. Social media has become an increasingly relevant tool in the US for political and social activism as the platform is difficult to censor or control (Tufekci & Wilson, 2012). A 2018 survey by Pew Research Center reports that 69% of Americans believe that social media is important for getting politicians to pay attention to issues² Furthermore, 67% of Americans feel that these platforms are important for creating sustained movements for social change. Importantly three characteristics of digital and social platforms sustain action (Bennett & Segerberg, 2012; Garrett, 2006). First, the low cost of maintaining online ties could mean that even fewer supporters are required to keep the contention alive. Second, the global reach of social media means that supporters worldwide can be mobilized to be a part of the movement. Third, the digital footprints that persist online provide records, sustain connections, and accumulate repertoire that can be utilized in subsequent mobilization events. Thus, in this study, we aim to examine the cyclical dynamics of a digitally enabled movement incorporating recurrence, temporality, and latency and offer novel theoretical insights into the sustainability of social movements on social media and how they relate to future mobilization events.

2.2 Social Movements and Social Media

This study aims to understand the sustainability of social movements on social media. Accordingly, we reviewed the social movement and digital activism literature published in the IS discipline. We scanned the literature using a combination of keywords, including social media, social networks, social movements, digital activism, movement sustainability, collective action, and connective action. Table A1 in the Appendix provides a summary.

Overall, we synthesize the existing literature into two research streams. The first stream examines the *use of social media for organizing and mobilizing action* (George & Leidner, 2019; Harlow, 2012; Oh et al., 2015; Selander & Jarvenpaa, 2016; Tarafdar & Ray, 2021; Van Laer & Van Aelst, 2010). Social media are structurally emancipatory because they allow broader participation and enable new digital action repertoires (such as online petitioning, leveraging the reach of celebrities, and coordination of protest logistics) (Harlow, 2012; Miranda et al., 2016; Tarafdar & Ray, 2021). Social media provides a space for users to create and distribute messages expressing their beliefs or

² <https://www.pewresearch.org/internet/2018/07/11/activism-in-the-social-media-age/>

feelings about the repressive social or political conditions and encourage current members to continue participation and enroll new ones (Hwang & Kim, 2015; Lotan et al., 2011; Tufekci & Wilson, 2012; Van Laer & Van Aelst, 2010). The users engage in collective sensemaking “manifested as the communication behaviors of active information seeking, offering, and sharing among like-minded groups of people” (Oh et al., 2015, p. 212). The content affects viewers at different levels, including cognitive, emotional, and operational (George & Leidner, 2019), and persuades them to participate in acts of bravery and courage and thereby develop an identity of activists and create a collective identity of a social movement (Stewart & Schultze, 2017). However, these platforms could challenge the values of social movement organizations, hegemonize them through dominant ideology, and disrupt discourse and participation through trolling (Bharati et al., 2019; Miranda et al., 2016; Selander & Jarvenpaa, 2016).

The second focus area examines the *evolution and sustainability of movements on social media*. In one of the earliest longitudinal studies, Selander and Jarvenpaa (2016) examined the affordances of social media that challenge as well as stabilize organizational values and broaden the interactions between supporters and professional groups. Others have analyzed the chronological evolution of movements by conducting episodic analysis, where each episode is characterized by a distinct cause or theme and unfolds over time (Vaast et al., 2017). Social media’s role in protest cycles characterized by short periods of intense activity has also been theorized (Tarafdar & Ray, 2021). While the studies mentioned above examine social movements in a temporal context, the focus is usually at the peak of the event when the movement frames are highly visible (Oh et al., 2015; Vaast et al., 2017). Recent research has begun to examine social movement sustainability during the latency period. Specifically, the use of social media features such as content subscriptions and notifications that support low cost and passive participation can sustain movements during the abeyance period (Leong et al., 2019). Others note that clustering and structuring individuals into groups and networks can sustain movements over time (Leong et al., 2020).

In summary, the existing research has enhanced our understanding of the use of social media for mobilizing and sustaining social movements. While movement mobilization emphasizes the emergence or peak of a movement, such as organizing and participating in a protest, movement sustainability manifests through recurring mobilization events separated by latency phases during which activities decline. Social network content and structures to link users for mobilizing movements have been well researched (Young et al., 2019). Research has also begun to examine how social

media network features can sustain movements (Langer et al., 2020; Leong et al., 2020); however, the role of social media content in sustaining movements has not received much attention. Although networks are critical for building connections among users and enlarging the boundary of movements, movement messages allow for the understanding of how protest events develop in the context of a wider belief system supported by a movement (Snow et al., 1986). Especially in digitally enabled social movements, the analysis of content offers an opportunity to examine different action frames used to communicate to potential participants the cause and goals of social movements and their impact on movement mobilization and sustainability (Bennett & Segerberg, 2012).

Additionally, the existing research has developed an understanding of the evolution of social movements in a temporal context; however, the analysis has thus far been limited to a single event or protest cycle (Tarafdar & Ray, 2021; Vaast et al., 2017). Further, these studies analyze user interdependencies and content dynamics at the peak of the event when the participation is high and do not necessarily examine the rise and decline of the event. Studies related to movement sustainability have examined more than one event; however, the focus is on the rise of events and not the latency period between the two events when participation declines (Langer et al., 2020). Analyzing the latency period is important to understand how movements are sustained in nonreceptive environments and how continuity between different mobilization events (Taylor, 1989) is provided. The only exception is Leong et al. (2019)’s study, which analyzes how the abeyance phase between two consecutive events can sustain a movement. However, this study focuses on the use of social media features for movement sustainability but not the meaning of social media messages.

Our study addresses the noted gaps by adopting a longitudinal perspective of social movements characterized by several bursts of protest events with longer periods of latency between two subsequent protests. Furthermore, we conceptualize that each protest event follows a cyclical pattern characterized by emergence, peak, and decline phases. This allows us to examine how social media content evolves during different phases of a protest and how this relates to the rise of subsequent protest events. Additionally, we interpret the meaning of social media messages to understand movement sustainability and contribute to the literature that has so far been limited to analyzing participation in protests and demonstrations (e.g., Harlow, 2012; Harlow & Guo, 2014; Oh et al., 2015; Selander & Jarvenpaa, 2016; Tarafdar & Ray, 2021). Our study complements the existing research that has examined the use of social network features for sustaining social movements (Langer et al., 2020;

Leong et al., 2020). Furthermore, several IS scholars have made calls to conduct exploratory content analysis and classify information types (Young et al., 2019), especially to understand the evolution and sustainability of movements in a temporal context (Leong et al., 2019; Oh et al., 2015; Vaast et al., 2017).

3 Theoretical Underpinnings

This section discusses the theoretical underpinnings of this study. Informed by connective action logic, we analyze how grassroots organizing by sharing personalized messages on social media enables the sustainability of a long-term social movement. To identify the connective action tactics emerging from social media messages, however, we build on the social movement framework as a theoretical lens to interpret the meaning of the content of tweets and classify them into message categories and subcategories. Furthermore, the social movement framework provides a basis to analyze the change in messages in a temporal context and thereby understand the sustainability of a movement over time.

3.1 Connective Action, Social Media, and Movement Sustainability

Early social movements research, at its core, emphasizes the logic of collective action (Benford & Snow, 2000). Conceptualized initially by Olson (1965), collective action happens when individual actors collaborate to achieve some shared goal or purpose. Collective action is often conceived of as involving a range of group activities, such as marches, demonstrations, and strikes, and individual actions such as signing petitions, donating money, and participating in elections. The logic of collective action underscores the role of institutions and membership groups to motivate individuals to overcome the resistance to joining action where participation costs outweigh the benefits (Bennett & Segerberg, 2012). Through the use of digital technology, activists motivate participation by generating collective action frames to “negotiate[ing] common interpretations of collective identity linked to the contentious issues at hand” (Bennett & Segerberg, 2012, p. 750). However, sustainable and effective collective action is resource intensive and puts higher demands on the formal organization. In particular, activists face challenges in brokering and bridging differences between different individuals and groups, which requires resources beyond communication technologies (Benford & Snow, 2000). IS research has also suggested that the affordances of social media technology pose challenges to organizational goals and values (Selander & Jarvenpaa, 2016). This has led scholars to propose an alternative logic of organizing referred to as connective action (Bennett & Segerberg, 2012;

Pond & Lewis, 2019). Table B1 in the Appendix summarizes the two logics along several dimensions.

Connective action research focuses on street protests that are comprised of physically decentralized networks of loosely connected individuals who are related by their shared political interests and use of social media rather than membership or affiliation to formal organizations (Bennett & Segerberg, 2012; Harlow & Guo, 2014; Van Laer & Van Aelst, 2010). In this grassroots-led action, digital technology serves as an organizing agent (Bennett & Segerberg, 2012). Furthermore, characterized by low-cost and high-speed digital mobilization, connective action involving protest activities requires little to no formal organizational involvement or coordination (Bennett & Segerberg, 2012, 2013). Participation in connective action often develops “out of personalized reactions to political issues” (Papacharissi, 2015, p. 17). Individuals participate in social movements by finding common ground in personalized political actions, such as hashtags or digital activism, to express their indignation in personal ways rather than posting or amplifying messages determined by formal organizations (Bennett & Segerberg, 2013). Participation in connective action thus becomes self-motivated personal expression as individualized content is created and shared with others. The interpersonal networks characterized by this logic may scale up rapidly through the combination of easily spreadable personal action frames and affordances of digital technology. The resulting action thus resembles collective action yet without the need for formal organizations acting as brokers and for individuals to be organizational members or share ideological frames determined by formal organizations.

Recent IS research has enhanced our understanding of how connective action happens through social media. In one of the earliest studies, Vaast et al. (2017) observed that users engaged in connective action during the Gulf of Mexico oil spill case by taking on roles of advocates, supporters, and amplifiers through the use of Twitter’s features—hashtags and retweets—for content creation, sharing, and tagging. Another study demonstrated that connective action happens through different forms of continued associations on social media (Leong et al., 2019). Furthermore, the connective action processes sustain a social movement by using features such as social media subscription and content notification that allow passive participation and persistent connection, especially during the abeyance phase. Additionally, through a combination of connective and collection action, the dispersed individuals on social media cluster into groups and networks and thus sustain the movement (Leong et al., 2020).

While the existing research has enhanced our understanding of connective action that happens and

sustains through the use of network features, there is a lack of research on how connective action through the use of social media messages sustains a social movement. The message frames represent another important element of personalized communication that “require little in the way of persuasion, reason or reframing to bridge differences with how others may feel about a common problem” (Bennett & Segerberg, 2012, p. 744). To that end, we apply the logic of connective action to understand how personalized messages posted on social media allow the sustainability of a long-term social movement. In doing so, we complement the existing research by going beyond network features that provide digital connections and abstract connective action from the meanings and discourse in which they are situated (Bennett & Segerberg, 2012; Pond & Lewis, 2019). Our study also responds to the calls to conduct further scholarship on “ways to analyze connective action formations [that] will give us more solid grounds for returning to the persistent questions of whether such action can be politically effective and sustained” (Bennett & Segerberg, 2012, p. 760). However, to understand how connective action through message frames is sustained on social media, we use the social movement framework as a theoretical lens to interpret the meaning of the messages, which we discuss in the next section.

3.2 Social Movement Framework and Social Media

To integrate the major developments in the social movement literature, McAdam et al. (1996) offered a social movement framework comprised of three factors: (1) opportunity structures, (2) mobilizing structures, and (3) framing processes. The purpose of the framework is to explain the emergence, development, and outcome of social movements. *Opportunity structures* refer to the conditions in the social environment that favor the movements’ actions. These structures refer to elite allies, the political configuration of alliances among elites, and the opportunity of the state to exercise repression (McAdam et al., 1996). These are different aspects of a social or political system that favor or hinder movement activities. *Mobilizing structures* refer to the mechanisms, including social structures and tactical repertoires, that individuals within the movement employ to organize and participate in collective action (McCarthy, 1996). Social structures may be formal, such as social movement organizations, or informal, such as friendship and activist networks. Tactical repertoires are forms of collective action that are familiar to activists. *Framing processes* refer to the

narratives for describing, disseminating, supporting, and contesting the movements (Zald, 1996). Per Benford and Snow (2000), there are three core framing processes: (1) *Diagnostic framing* establishes what is wrong and who is to blame. (2) *Prognostic framing* involves articulating a solution to a problem. (3) *Action or motivational framing* is a “call to arms” for collective actions and creates a vocabulary for motives and maybe symbols.

While the social movement framework was developed before the advent of digital and communication technologies, scholars have examined the relationship between the aforementioned factors and new ICTs,³ particularly social and digital media (see Garrett, 2006). In terms of *mobilizing structures*, social media reduce participation costs, promote collective identity, and facilitate community creation. Further, social media can extend the tactical repertoire—that is, the forms of protest and collective action that activists utilize (Selander & Jarvenpaa, 2016). In relation to *opportunity structures*, social media allow activists to refer to elites to enroll them or associate with them (Ayres, 1999). Elites can be powerful allies for strengthening the claims of a movement. Social media also provide an opportunity to bypass censorship. This was witnessed during the Arab Spring and Guatemalan movements, as governments find it difficult to regulate or censor activities on social media (Harlow, 2012; Tufekci & Wilson, 2012). However, the opportunity of bypassing censorship is only temporary, as governments can impose censorship (Ameripour et al., 2010).

Regarding *framing processes*, social media allow the dissemination of information along broad geographical areas and help a social movement reach a global audience. Likewise, by their emerging nature, social media can bypass editorial controls and relax authorship constraints that are traditional in mainstream media (Miranda et al., 2016). In addition, social media can facilitate framing to garner participants’ support and align their thoughts, behaviors, and emotions toward the movement. For instance, social media frames are used to recruit people and coordinate mobilization events and thereby increase support, membership, and geographical reach (Tarafdar & Ray, 2021). Framing can also establish the collective identity of a movement (Garrett, 2006). Collective identity is a perception among individuals that they are members of a larger community by virtue of the grievances they share. By its textual nature and reach, the framing of the collective identity of movements is an aspect in which we conjecture that social media would have a greater impact on sustaining movements.

³ Garret uses the term ICTs in their original work. However, when we refer to ICTs in this section we relate specifically

to social media. We kept the term ICTs in this section for the sake of faithfulness to Garrett’s original work.

To summarize, for this research, we drew on the aforementioned social movement framework as a theoretical lens to tease meanings out of the WM tweets. Accordingly, we interpreted the messages and established whether they refer to *opportunity structures*, *mobilizing structures*, or *framing processes*. We also conducted data analysis to identify new categories and subcategories of messages. While it was not our objective to contribute to McAdam et al.'s framework, we selected the framework because it is based on a well-established set of theoretical concepts to study social movements in the context of ICTs (see Garrett, 2006). Furthermore, McAdam et al. (1996) noted that messages evolve as the movement emerges, peaks, and declines. This is consistent with connective action research that notes that distinct repertoire and tactics are required for movement mobilization and sustainability (Leong et al., 2019). Hence, the framework provides a theoretical basis to analyze the sustainability of a social movement in a temporal context. Accordingly, we analyzed how specific message categories sent before, during, and after the protest marches enabled movement continuity. We discuss our approach to data analysis in the next section.

4 Research Methodology

We conducted a qualitative study that led to the formulation of a set of categories for classifying social media messages. We also conducted a temporal analysis to analyze the distribution of message categories sent during different phases of protest marches. To obtain fine-grained data, we focused on a single movement, which, for the purposes of our study, was the WM movement between January 1, 2017 and December 31, 2019 (Yin, 2003). The following sections present the research context and our data collection and analysis approach.

4.1 Research Context: Women's March (WM)

As per their mission statement, WM is a women-led movement that aims to advocate and organize action around a diverse range of societal issues.⁴ As noted before, the WM movement originated after the 2016 US presidential election. The first protest march was held on January 21, 2017, in Washington DC. However, given the movement's popularity, many sister marches emerged across the US and worldwide. According to media reports, the 2017 protest was one of the largest protests in contemporary US history, drawing a crowd of over 4 million people (Chenoweth & Pressman, 2017). On January 20, 2018, people across the US marched in the first-anniversary WM. Although there was a decline in the number of

protesters, millions of people participated across the nation (Arnold, 2018). For instance, the Los Angeles march drew the biggest number, where half a million people took to the streets (Morris, 2018). The second-anniversary march on January 19, 2019, was again a large day of protest when more than 700K people marched across various US cities (Chenoweth & Pressman, 2019). Although most protestors in three consecutive marches were women, people of different ages, genders, and ethnicities participated. Moreover, while there has been a decline in participation since the inaugural march,⁵ the size of the 2018 and 2019 marches suggests a certain durability and continuity of the movement (Berry & Chenoweth, 2018).

WM is an interesting case in which to analyze the role of social media in sustaining social movements. Unlike other high-profile US-based movements like Occupy Wall Street and Black Lives Matter, which focused on singular issues of economy and race, respectively, the WM movement does not dedicate itself to a single cause (Nicolini & Hansen, 2018). The movement primarily emerged as a protest against Trump's victory in the 2016 presidential election and later evolved as a broader movement by integrating discourses challenging men's power and privilege as a way to sustain itself. The broader focus of the movement was reflected in the protest signs at the inaugural march advocating for a wide range of issues, including those related to women, race, minorities, LGBTQ, people with disabilities, minimum wage, immigration, and the environment (Weber et al., 2018).

Additionally, while prior research has focused on a number of interesting contexts, feminist movements in the age of social media deserve specific attention. The WM movement is built on the legacy of women organizing (Berry & Chenoweth, 2018) through "the dissemination and expression of feminist ideas" using social media (Weber et al., 2018, p. 2293). Since the inaugural march, several digital campaigns such as #MeToo, #TimesUp, and #Shepersisted have emerged, indicating increased awareness of gender-based grievances and feminist-conscious awakening. Furthermore, like other digitally enabled movements, WM utilizes social media to organize and mobilize large-scale protests. Social media has helped WM evolve "from a mostly white, elite liberal feminist movement to broader-based intersectional march through various framing techniques and a process of coalition-building" (Berry & Chenoweth, 2018, p. 76). The organizers rely on social media to streamline march activities, coordinate logistics, and recruit participants and thereby keep the momentum going (Carson, 2017).

⁴ <https://womensmarch.com/mission-and-principles>

⁵ For example see <https://www.nytimes.com/2019/01/19/us/womens-march-2019.html> and <https://www.usatoday.com/>

[story/news/nation/2020/01/16/womens-march-2020-looks-re-energize-amid-dwindling-enthusiasm/4469139002/](https://www.usatoday.com/story/news/nation/2020/01/16/womens-march-2020-looks-re-energize-amid-dwindling-enthusiasm/4469139002/)

4.2 Data Collection and Analysis

In this study, we conducted a longitudinal analysis of the WM movement over the course of three years to understand the sustainability of a long-term social movement on social media. Using a customized Python script, we collected data from Twitter's premium API from January 1, 2017 to December 31, 2019, during which three protest marches were held. We closely followed traditional news outlets and social media sites to identify the generic hashtags (i.e., #WMMarch, #WhyIMarch, and #WomensMarch) and trending hashtags (i.e., #WomensMarch2017, #WomensMarch2018, and #WomensMarch2019) for data collection purposes. We also collected tweets posted on the official WM handle, @womensmarch. After removing duplicate and irrelevant tweets, our dataset consisted of 324,757 tweets.

Figure 1 summarizes our research approach. We started with an interpretive analysis of the tweets, which is appropriate to provide deep insights into “the complex world of lived experience from the point of view of those who live it” (Schwandt, 1994, p. 118). The interpretive analysis was key for the initial classification of the data into different categories. However, interpretive analysis can be time-consuming, especially in analyzing large datasets, as the researchers must read the data literally to make inferences. Thus, we followed up with the *topic modeling* approach to validate the message categorization that emerged from the interpretive analysis and to further identify (sub)categories from full data corpora (Blei, 2012; Blei et al., 2003). Combining interpretive analysis and topic modeling allowed us to manage the large dataset, reduce researcher bias, increase the depth of our understanding of the phenomena, and enhance the validity of the study (Debortoli et al., 2016; Renz et al., 2018). Furthermore, we conducted a temporal analysis of message (sub)categories to determine the distinct messages sent during different phases of protest marches. We discuss each of these approaches in the following subsections.

4.2.1 Interpretive Analysis

We adopted an interpretive approach to analyze the meaning of the content of tweets (Klein & Myers, 1999; Mayring, 2014; Walsham, 1995). Several IS studies examining social media-enabled movements have also adopted an interpretive approach to analyze social and digital data (see Table A1 in the Appendix). The current literature on social movements and digital activism served as a “sensitizing device” to understand the relation between social media and social movements (Klein & Myers, 1999). The interpretive approach allowed us to iterate between data and theory to identify emerging themes (Charmaz, 2006; Glaser &

Strauss, 1967). Specifically, we relied on McAdam et al.'s (1996) social movement framework as a theoretical lens to conduct our interpretive analysis. In doing so, we closely followed the tradition of using theory in an interpretive study (Walsham, 1995). The theoretical lens served as a guide for the research design and data analysis. The theoretical lens also allowed us to engage in iterative data analysis (Walsham, 1995). From McAdam et al.'s framework, we used three of the main concepts to explain the emergence and sustainability of social movements: opportunity structures, mobilizing structures, and framing processes. This was our a priori theoretical classification, which allowed us to interpret the data.

We began analyzing data as we collected it (Eisenhardt, 1989). Informed by the theoretical framework, the authors independently analyzed the hashtags for three protest marches and classified them into the three aforementioned theoretical categories. We then independently analyzed 700 tweets selected randomly for each category to further explore the emergent categories and subcategories. Following Mayring (2014), we engaged in an inductive approach to category development, where categories are seen as tentative and revised in a subsequent iteration. The qualitative analysis of the data was done using NVivo software. Using the Memo tool in NVivo, we wrote short notes conceptualizing the emerging categories.

Next, we examined the “underlying coherence” of our interpretation by juxtaposing the tentative nodes and explanations for each category. This allowed us to further define emerging subcategories. For example, we found five subcategories for the “mobilization” category: *symbolic association*, *organizing*, *inclusion*, *emotions*, and *elite coalitions*. These subcategories were identified after the second iteration, in which we further interpreted all the messages that were coded under the mobilization category. In proceeding to further data analysis, each round improved the clarity of explanations as we developed a better understanding of the data and emerging theoretical categories through inductive reasoning. We reiterated the analysis until we achieved theoretical saturation and agreed on the final categorization (Klein & Myers, 1999). To further identify the (sub)categories from the full data corpus and enhance the trustworthiness of the results, we followed up with the topic modeling approach discussed next.

4.2.2 Topic Modeling

Topic modeling is an automated approach that uses statistical techniques to generate latent topics from large bodies of text documents (Blei et al., 2003). A topic is a cluster of co-occurring words that represent a higher-order concept.

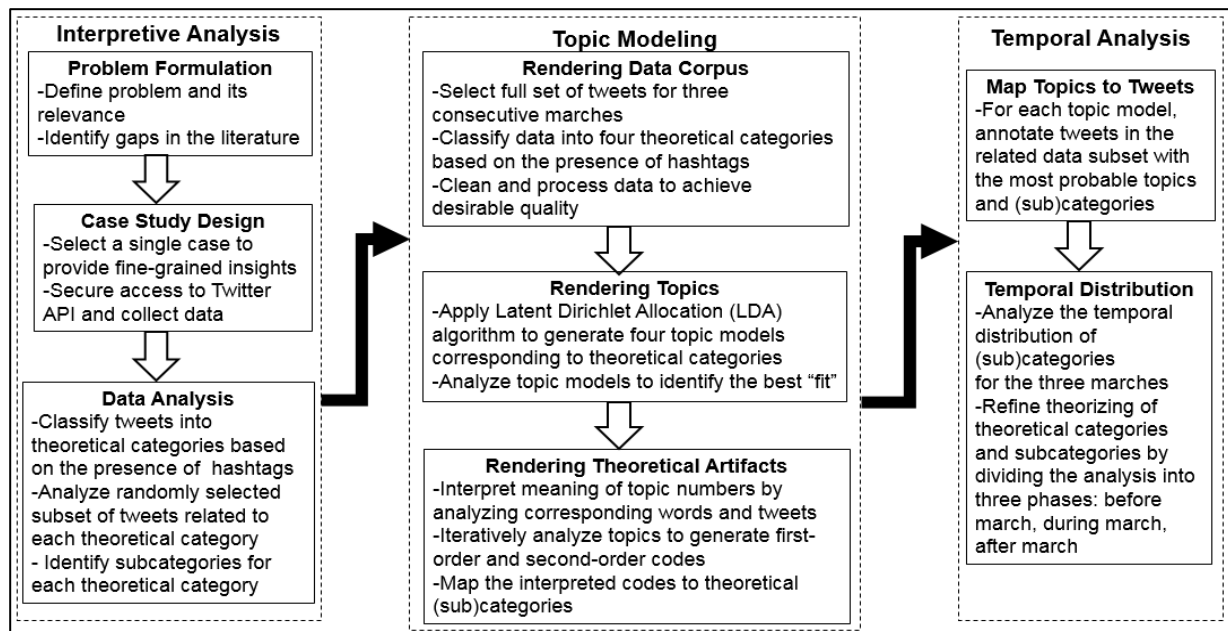


Figure 1. Summary of Research Approach

Per Hannigan et al. (2019), generating topics using statistical probabilities has three benefits: (1) It does not require predefined dictionaries or interpretive rules to classify the text, (2) it enables identifying hidden themes in the text that would otherwise not be discernible by humans, and (3) unlike dictionary-based text classification approaches that preclude polysemy (i.e., words with multiple meanings), topic modeling allows for polysemy as topics are not mutually exclusive. The same set of words can appear in different topics with different probabilities, and topics may overlap or cluster (DiMaggio et al., 2013). For instance, as presented in Tables C2 and C3 in the Appendix, hashtags and words such as *#resist*, *#lookbackmarchforward*, and *march* appear in both *resistance* and *global* topics. However, the meanings are interpreted in the context of other associated topic words and related tweets.

Following Hannigan et al. (2019), we followed a three-step process to iteratively create theoretically informed message categorization. In the first step—*rendering corpus*—we selected, preprocessed, and cleaned the data corpus. Consistent with interpretive analysis, we first classified the data into distinct subsets. Specifically, informed by the theoretical and empirical considerations, each author independently analyzed and classified the hashtags into four categories that emerged from our interpretive analysis: diagnostic

framing, prognostic framing, motivational framing, and mobilization.⁶ Next, we classified the tweets into four categories based on the presence of hashtags. We randomly selected 600 tweets to check the accuracy of tweet classification and attained a 93% agreement. This led to the creation of four separate data subsets corresponding to each category, which allowed us to conduct a fine-grained analysis of the most relevant tweets related to each category. Table 1 presents the summary of the data (subsets).

We used customized R scripts to clean and process the tweets for each data subset to achieve reasonable comprehension and quality. We sorted, disassembled, and trimmed the data by following the broader data cleaning and transformation processes (Hannigan et al., 2019; Kobayashi et al., 2018). Specifically, we converted all the tweets into lowercase letters, stripped white spaces, and removed stopwords (e.g., a, an, and the), punctuation, and special characters. We also performed stemming by reducing the words to their “stems,” for example, “march” is the stem of “marching” and “marched.”

In the second step—*rendering topics*—we subjected each of the four data subsets to the latent Dirichlet allocation (LDA) algorithm to generate an appropriate set of topics (Blei et al., 2003)⁷ LDA is widely used for analyzing social media data (e.g., Syed, 2019). It requires two inputs.

⁶ In analyzing the tweets, we did not find many that fell into the political opportunity category.

⁷ The detailed description of the LDA algorithm is beyond the scope of this study. However, interested readers may find Blei (2012) and Blei et al. (2003) useful.

Table 1. Summary of Data

Year	Diagnostic framing	Prognostic framing	Motivational framing	Mobilization	Tweets per year
2017	6318	3360	16939	57376	83993
2018	7949	23572	33266	135789	200576
2019	3880	1507	12290	22511	40188
Total	18147	28439	62495	215676	324757

Note: The cells represent the number of tweets for each category per year. One tweet may contain multiple hashtags; hence the same tweet may appear in more than one data subset.

First is a set of documents that can be represented as a document-term matrix with rows representing each document in the corpus, columns representing each unique word in the corpus, and cells representing the number of times each word occurs in each document. For Twitter data, LDA treats each tweet as a document (Zhao et al., 2011). Our purpose in rendering topics is to determine what is mainly discussed in the WM tweets and then relate the topics to the categories and subcategories that emerged from the interpretive analysis. As noted before, we classified the data corpus into four subsets corresponding to four theoretical categories that emerged from our interpretive analysis. Hence, we generated four topic models to refine and validate the findings from the interpretive analysis.

The second input to LDA is the number of topics to be estimated. Choosing an adequate number of topics—or fitting a topic model—is an important parameter for LDA. While choosing a higher number of topics may generate minimal distinct topics, choosing a lower number may constrain the exploratory analysis (Debortoli et al., 2016). We followed a two-step approach to determine the reasonable number of topics our models generate (Graham & Ackland, 2015). First, following Ponweiser (2012) for each of the datasets related to the four theoretical categories, we ran LDA several times with the number of topics ranging from 10 to 100, in steps of five, and finally selected a value that produced the maximum log-likelihood. For instance, the algorithm fitted a model with 90 topics for the motivational framing dataset. While this approach of fit is based on the logic of accuracy (Mimno et al., 2011), researchers can judge the inferred topics as semantically less meaningful (Chang et al., 2009). Thus, following the logic of validity, we again ran models with 15, 25, 50, 75, and 100 topics for each dataset. We then manually evaluated different models to identify the ones with meaningful, interpretable, coherent, and useful topics (Boyd-Graber et al., 2014). Specifically, our approach to selecting a model was driven by three criteria: (1) We focused on semantic validity so that the model meaningfully discriminates between the same or similar terms (Hannigan et al., 2019); (2) we focused on models with a lower number of topics that are interpretable by humans (Debortoli et al., 2016); and (3) while topic modeling algorithms allow for

polysemy—that is, the same words can appear in multiple topics (DiMaggio et al., 2013)—we selected mutually exclusive topics by manually inspecting the words for each topic. This was adequate to interpret what individual words mean in a topic and how they relate to other topics.

In the third step—*rendering theoretical artifacts*—researchers iterate between the theory and topics of the fitted model to build a new theory or extend an existing theory (Debortoli et al., 2016; Whetten, 1989). The meaning of a topic is interpreted by analyzing the most probable topic words and the associated most probable text documents (i.e., tweets in our case). One of the objectives of this study was to theorize about message categories that are both grounded in and sensitive to the dynamics of the WM movement while still being generalizable to other social movement settings. To achieve this goal, following Croidieu and Kim (2018), we first started with raw topics as descriptive codes. Second, we labeled these topics as first-order codes. We coded all topic labels individually as well as together as an author team, extensively discussed the results, and recoded the topics when necessary. We resolved the disagreements by reviewing and discussing the related tweets and literature references (Klein & Myers, 1999). Third, we grouped these topics into more abstract and second-order codes (see Appendix C for illustration). Fourth, to make sense of the codes against the theoretical background, we mapped the second-order codes to the theoretical categories and subcategories that emerged from the interpretive analysis. We refer to the second-order codes derived from our topic-model analysis as subcategories. We also paid attention when particular topics signaled any new category or subcategory. We repeated this procedure multiple times to ensure tight correspondence between raw topic models and message categorization. The results are presented in Section 5 and Appendix E.

4.2.3 Temporal Analysis

We conducted a temporal analysis of tweets for three consecutive years to understand how the meaning and distribution of tweets related to four theoretical categories and subcategories changed during different

phases of marches. Appendix D illustrates our approach. We first identified whether a tweet was posted before, during, or after a particular protest march. Thus, we chronologically sorted the tweets in each of the four data subsets related to four theoretical categories using the *CreationDate* of tweets. Each data subset contains tweets from January 1, 2017 to December 31, 2019, during which three marches were held. For each year, we defined three days as the “during march” (DM) phase that included the actual march day and the days before and after because we observed that users were more likely to tweet about participating in the march the day before or after the actual march. Other scholars also note that Twitter activity remains high for a few days before and after a protest (e.g., Salge & Karahanna, 2018). Accordingly, we defined the period between January 1 and the day before the march as the “before march” (BM) phase and the period between the day after the march and December 31 as the “after march” (AM) phase.⁸

Next, we annotated the tweets with the most probable topics. Specifically, we customized the topic model script in R such that after generating the topics, the script labels the tweets with corresponding topic numbers. The topic numbers allowed us to effectively map the tweets to a particular message (sub)category. We then quantified the frequencies of tweets related to the message (sub)categories during the three phases for each of the three years. This allowed us to analyze how different movement messages evolved between different years and during different phases in each year. For instance, as we discuss in the next section, we observed a decrease in tweets related to the mobilization category from 2017 through 2019. Furthermore, for each year, the number of mobilization tweets was higher BM and further increased DM and declined AM. Additionally, for each category and subcategory, we read the tweets several times to understand the change in the meaning of the messages during different phases. For instance, we found that BM and DM tweets related to *organizing* focused on mobilizing users to join the march, whereas AM tweets aimed to mobilize people to attend speaker events. Overall, relating the meaning and the frequencies of message (sub)categories helped us examine how connective action through the use of social media messages sustained the WM movement beyond a specific march.

⁸ Year 2017: The inaugural march was held on January 21, 2017. Before March (January 1 to 19); During March (January 20 to 22); After March (January 23 to December 31)
Year 2018: The first-anniversary march was held on January 20, 2018. Before March (January 1 to 18); During March (January 19 to 21); After March (January 22 to December 31)

5 Results

This section discusses the message categories and subcategories that emerged from our qualitative analysis. Figure 2 presents the different types of tweets we found according to their meanings. The categories correspond to our a priori theoretical framework that we applied to analyze data. In interpreting the meaning of the tweets, we did not find many that fell into the opportunity structure category. This is perhaps because of the nature of tweets, which are pieces of discourse directed to motivate actions or send specific messages. Table 2 presents descriptive statistics for each (sub)category per year. For all three years, most of the tweets related to the mobilization, followed by the motivational framing. The tweets related to diagnostic and prognostic framing are more or less the same in number but much lower than the number of tweets related to mobilization and motivational framing. This may suggest that, once a march begins, organizers are more focused on motivating and mobilizing people to participate rather than on framing the problems and solutions that led to the emergence of the movement in the first place.

Table 3 presents the longitudinal distribution of message (sub)categories (also see Figure 3). The percentage values (rounded) represent the normalized frequency of tweets related to a particular category. Overall, around 8% of tweets were related to each diagnostic and prognostic framing, 36% were related to motivational framing, and 48% were related to mobilization. Tweets related to all three types of framings spiked AM, whereas mobilization tweets spiked DM and declined AM. Furthermore, we observed two inverse relations between the message categories. First, the number of tweets related to the diagnostic and prognostic framing are inversely related such that if one increases, the other decreases, and vice-versa. For instance, in 2018, 6% of tweets were diagnostic framing, and 10% of tweets were prognostic framing, whereas in 2019, 10% of tweets were diagnostic framing, and 4% of tweets were prognostic framing. This could be because the movement that emerged after the 2016 US presidential elections aimed to build an identity and thus focused more on diagnostics in 2017. In contrast, the rise in prognostic framing in 2018 could be due to the 2018 US midterm elections.

Year 2019: The second-anniversary march was held on January 19, 2018. Before March (January 1 to 17); During March (January 18 to 20); After March (January 21 to December 31)

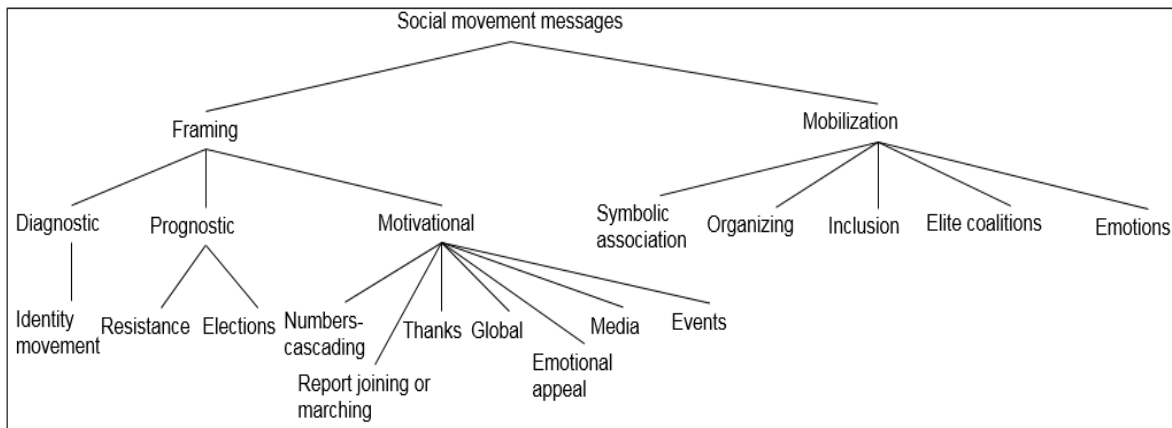


Figure 2. A Hierarchical Representation of Message Categories and Subcategories

Table 2. Descriptive Statistics

Message category	Total tweets*	Yr. 2017			Yr. 2018			Yr. 2019		
		# of tweets	Monthly avg.	SD monthly	# of tweets	Monthly avg.	SD monthly	# of tweets	Monthly avg.	SD monthly
Diagnostic framing	13049 (8%)	4698 (10%)	391.50	39.57	5433 (6%)	452.75	42.56	2918 (10%)	243.17	31.19
Identity movement										
Prognostic framing	12558 (8%)	2183 (5%)	181.92	26.98	9241 (10%)	770.08	55.50	1134 (4%)	94.50	19.44
Resistance	8433 (67%)	1787 (82%)	148.92	24.41	6035 (65%)	502.92	44.85	611 (54%)	50.92	14.27
Elections	4125 (33%)	3906 (18%)	33	11.49	3206 (35%)	267.17	32.69	523 (46%)	43.58	13.20
Motivational framing	60096 (36%)	15221 (34%)	1268.42	71.23	32596 (35%)	2716.33	104.24	12279 (43%)	1023.25	63.98
Numbers-cascading	6792 (11%)	1195 (7%)	99.58	19.96	4867 (12%)	405.58	40.28	730 (6%)	60.83	15.60
Report joining or marching	14048 (23%)	2654 (15%)	221.17	29.74	8776 (21%)	731.33	54.09	2618 (20%)	218.17	29.54
Thanks	2434 (4%)	978 (6%)	81.50	18.06	931 (2%)	77.58	17.62	525 (4%)	43.75	13.23
Global	5200 (9%)	354 (2%)	29.50	10.86	1845 (4%)	153.75	24.80	3001 (23%)	250.08	31.63
Emotional appeal	28267 (47%)	10529 (60%)	877.42	59.24	15975 (39%)	1331.58	72.98	1759 (14%)	146.58	24.21
Media	4842 (8%)	593 (3%)	49.42	14.06	3332 (8%)	277.67	33.33	917 (7%)	76.42	17.48
Events	10245 (17%)	1376 (8%)	114.67	21.42	5648 (14%)	470.67	43.39	3221 (25%)	268.42	32.77
Mobilization	79722 (48%)	44986 (51%)	1907	87.34	44748 (49%)	3729	122.13	12090 (43%)	1007.50	63.48
Symbolic association	13568 (17%)	3839 (13%)	319.92	35.77	7960 (14%)	663.33	51.51	1769 (13%)	147.42	24.28
Organizing	44015 (55%)	13543 (46%)	1128.58	67.19	24309 (43%)	2025.75	90.02	6163 (46%)	513.58	45.32
Inclusion	7954 (10%)	1887 (6%)	157.25	25.08	4093 (7%)	341.08	36.94	1974 (15%)	164.50	25.65
Elite coalitions	13279 (17%)	3970 (14%)	330.83	36.38	7610 (13%)	634.17	50.37	1699 (13%)	141.58	23.80
Emotions	20337 (26%)	5970 (20%)	497.50	44.61	12461 (22%)	1038.42	64.45	1906 (14%)	158.83	25.21
Total	165425	44986 (27%)	3748.83	122.46	92018 (56%)	7668.17	175.14	28421 (17%)	2368.42	97.33

Note: The total number of tweets per category is not the same as in Table 1 because the LDA algorithm discards a few tweets during the transformation and stemming process.

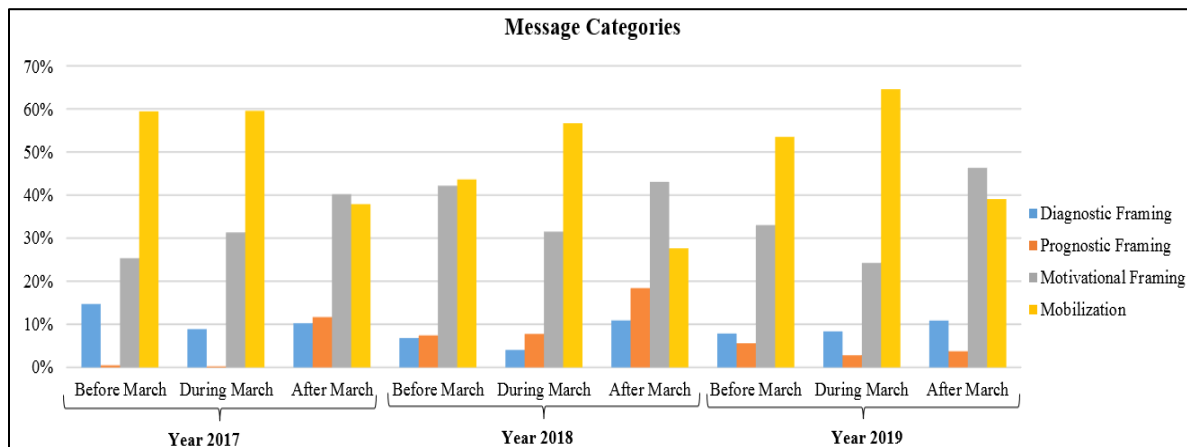


Figure 3. Longitudinal Distribution of Message Categories

Table 3. Longitudinal Distribution of Message Categories and Subcategories

Message (sub)categories	# of Tweets	% Tweets	Yr. 2017			Yr. 2018			Yr. 2019		
			BM	DM	AM	BM	DM	AM	BM	DM	AM
Diagnostic framing (Identity movement)	13049	8%	4698 (10%)			5433 (6%)			2918 (10%)		
			15%	9%	10%	7%	4%	11%	8%	8%	11%
Prognostic framing	12558	8%	2183 (5%)			9241 (10%)			1134 (4%)		
			0%	0%	12%	7%	8%	18%	6%	3%	4%
Resistance	8433	67%	74%	57%	83%	60%	62%	70%	38%	60%	59%
Elections	4125	33%	26%	43%	17%	40%	38%	30%	62%	40%	41%
Motivational Framing	60096	36%	15221 (34%)			32596 (35%)			12279 (43%)		
			25%	31%	40%	42%	32%	43%	33%	24%	46%
Numbers-cascading	6792	11%	12%	14%	2%	16%	20%	2%	11%	14%	5%
Report joining or marching	14048	23%	37%	23%	8%	13%	26%	38%	26%	30%	20%
Thanks	2434	4%	10%	9%	3%	3%	2%	4%	11%	8%	3%
Global	5200	9%	3%	3%	2%	6%	4%	10%	1%	1%	29%
Emotional appeal	28267	47%	54%	65%	77%	56%	59%	24%	50%	66%	8%
Media	4842	8%	7%	3%	3%	13%	9%	11%	5%	4%	8%
Events	10245	17%	8%	10%	9%	10%	20%	15%	9%	8%	29%
Mobilization	79722	48%	22884 (51%)			44748 (49%)			12090 (43%)		
			59%	60%	38%	44%	57%	28%	54%	65%	39%
Symbolic association	13568	17%	15%	14%	23%	18%	16%	32%	15%	14%	15%
Organizing	44015	55%	60%	60%	58%	56%	55%	48%	60%	61%	48%
Inclusion	7954	10%	8%	10%	6%	10%	10%	4%	9%	10%	19%
Elite coalitions	13279	17%	21%	19%	11%	17%	18%	8%	19%	18%	12%
Emotions	20337	26%	31%	29%	18%	28%	30%	16%	29%	25%	11%

Note: BM: Before March; DM: During March; AM: After March. The blue upward arrow indicates an increase in tweets for a message (sub)category compared to the previous year or previous phase. The red downward arrow indicates a decrease in tweets for a message (sub)category compared to the previous year or previous phase. For instance, the blue upward arrow for prognostic framing in 2018 indicates an increase in tweets compared to 2017. In contrast, the red downward arrow in 2019 indicates a decrease compared to 2018. Likewise, the red downward arrow for the resistance subcategory in the 2017 DM phase indicates a decrease in tweets compared to the 2017 BM phase. In contrast, the blue upward arrow in the 2017 AM phase indicates an increase in tweets compared to the 2017 DM phase.

Our observations are consistent with prior studies that note that the content of messages fluctuates in response to external events (e.g., Oh et al., 2015). Second, the number of tweets related to motivational framing and mobilization exhibits an inverse relation. While motivational tweets increased from 34% in 2017 to 35% in 2018 and 43% in 2019, mobilization tweets decreased from 51% in 2017 to 49% in 2018 and 43%

in 2019. It could be argued that when the number of participants in the march declined, it was necessary for the organizers to motivate the participants to sustain participation. Further, the organizers increased diagnostic and prognostic framing as a way to remind the participants of the reasons to march. We discuss the meaning of the message subcategories and their temporal characteristics in the following subsections.

5.1 Framing

Framing consists of articulating messages that convey meanings and extant ideas. Per Benford and Snow (2000), there are three types of framing tasks: diagnostic framing, prognostic framing, and action or motivational framing. We now present the subcategories for each of the three framing tasks that emerged from our research context.

5.1.1 Diagnostic Framing

Diagnostic framing establishes what is wrong and who is to blame (Benford & Snow, 2000). Our analysis of the WM tweets suggests that the social media messages called attention to the problems in society and the attribution of responsibility for the problems. The messages framed women as “victims” of the system and defined the actions of the political authorities as unjust. Examples: “*#thefutureisfemale #poweothepolls this isn't the contract we agreed to. This isn't representative democracy.*”; “*we are literally fighting for services that keep us alive dynah haube #alwaysforwardneverback @womensmarch pa*”; “*every woman is a precious gift from god and has the right to control her own body and reproduction. #womensmarch2018.*”

Furthermore, our topic model analysis indicated one subcategory referred to as *identity movement*. Table E1 in the Appendix presents the results. Similar to other identity-based social movements such as civil rights and feminist movements based on issues involving race, gender, sexuality, human rights, and ethnicity (Polletta & Jasper, 2001), our data show that the purpose of the initial diagnostic framing was directed toward establishing the identity of the movement. Specifically, women’s identity was framed as a collision of gender and politics and how women are fundamentally marginalized, displaying gender consciousness that scholars of women’s movements have found to be critical to women’s activism (Klein, 1984). The movements borne out of identity-related grievances are increasingly common in the era of cyberactivism (Benford & Snow, 2000; Stewart & Schultze, 2017). Our analysis is consistent with Benford and Snow (2000), who observe that members communicate and reinforce their identities in social movements. Garrett (2006) and Hwang and Kim (2015) make a similar assertion of how ICTs in social movements help in promoting a collective identity. The use of hashtags allowed the movement members to create an identity and frame the movement as largely related to women and minority grievances. Examples: “*No anti-abortionism cannot be part of #WomensRights. Illegal/restricted abortion leads*

to women's deaths. Fact. Promoting that or indirectly promoting it by contributing to the stigma around having an abortion is the opposite of fighting for women's rights. #WomensMarch”; “*great gathering in toronto in support of women and indigenous, racialized, lgbt people everywhere #womensmarch*”

5.1.2 Prognostic Framing

Prognostic frames communicate to the WM members the plan of action and the strategies for the action. As Benford and Snow (2000) note, the range of reasonable actions and strategies is constrained to the identification of problems and causes. Examples: “*marie main at #alwaysforwardneverback & co-org for #womensmarchpa: words do not matter so actions must*”; “*The British suffrage movement is celebrating 100 years of voting for women, and looks at what struggles still lie ahead. Heres our story. @NahlahAyed @MeganMcCleister #WomensMarch 2018*”; “*@uniteblue: #womensmarch2018 when they go low... we march and vote them out! #uniteblue and poweothepolls.*”

Our analysis of the topic model suggested two subcategories: *resistance* and *elections*. Table E2 in the Appendix presents the topic model. Prognostic framing increased from 5% in 2017 to 10% in 2018 and decreased to 4% in 2019 (see Table 3). For all three years, the tweets spiked in AM phase. Within the subcategories, most of the tweets were related to *resistance*, followed by *elections*. Furthermore, as shown in Figure 4, for 2018 and 2019, *resistance* tweets were higher DM and AM, whereas *elections* tweets increased BM. However, in 2017, *resistance* tweets were higher BM as the movement had just emerged and aimed to mobilize people to protest. Additionally, election tweets in 2017 increased DM as rejecting the outcome of the 2016 presidential elections was the movement’s primary goal.

Resistance implies behavior targeted toward rejection or circumvention of a social change (Benford & Snow, 2000; Snow, 2004). The resistance messages in the WM movement call for members to reject the ideology or actions of their target political group. In this case, it was mostly the resistance to the then US president Trump’s administration. Examples: “*you cannot silence us @boswomensmarch #notmypresident*”; “*@emcollective: silence has consequences. It's time to raise your voice. show your support for the #dreamactnow at @womensmarch this week... #theresistance*”; “*@lsarsour: new chant for this weekend's @womensmarch's. "whose shutdown? #trumpshutdown." say it loud. say it clear. #callandresponse.*”

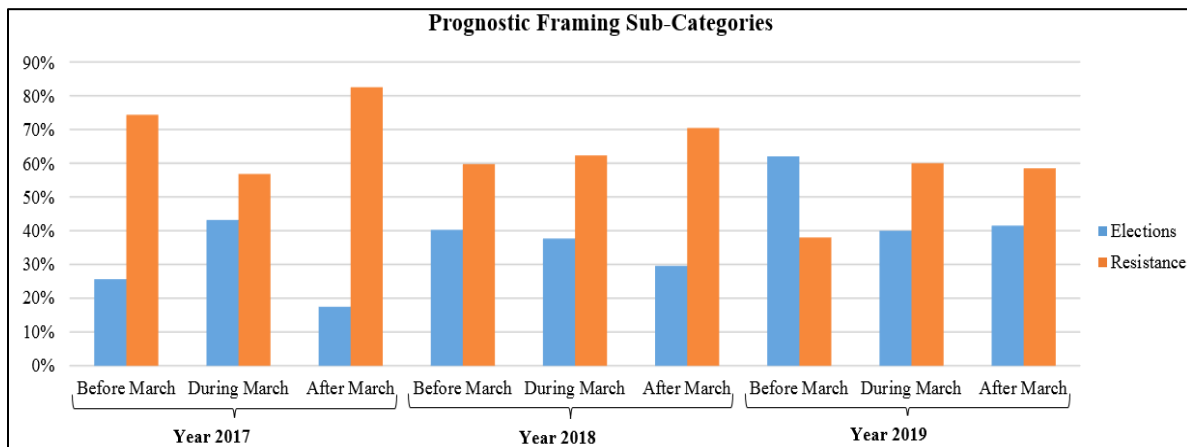


Figure 4. Longitudinal Distribution of Prognostic Framing Tweets

The other subcategory, *elections*, is consistent with what McAdam and Tarrow (2010) observe as a clear pattern of how movements emerge pre- and post-election situations. This is also related to the political opportunity factor, as noted by Benford and Snow (2000), Garrett (2006), McAdam and Tarrow (2010), Rasler (1996), and others. We observed many tweets calling members' attention to future electoral action. The messages aimed at motivating people to vote against the target of the movement and in favor of the candidates supported by the movement. Additionally, tweets encouraged women to run for office. Examples: "women's marches across the country will focus on the vote #poweothepolls"; "@realdonaldtrump @auctnr1 won't Happen. why? 2018 belongs to the people! #poweothepolls #bluewavescoming"; "we're coming for you and all your friends in the next election cycle"; "women must run for office or lift up women who are! #womensmarch2018 #reclaimingourstate #poweothepolls."

5.1.3 Motivational Framing

A motivational frame is one that calls for collective actions and the vocabularies of motive (Benford & Snow, 2000). In the case of the WM, we observed that movement supporters used social media to create vocabularies providing significant and compelling accounts to mobilize the public, engage others in collective action, and sustain participation. In particular, the motivational framing took the form of generating "catchy" symbols (e.g., notmypresident trump, pussyhat, nastywomen) or emotional hashtags (e.g., #loveislove, #lovewins, #girlpower, #lovetrumpshate). Individuals did this to indicate their actions supporting the movement and generate symbols, like *knitting pussyhats* and *stronger together*. We found that quite often, the motivation was for people to mobilize and participate. Examples: "you wear that #pussyhat with pride. we are proud of you! #pussyhatproject"; "what should my sign say?

#notmypresidenttrump #resistance"; "I've made 19 #pussyhats since Sunday. Michael's nearly sold out of pink yarn." Our interpretive data analysis suggested five subcategories of motivational vocabularies: *numbers-cascading*, *report joining or marching*, *thanks*, *global*, and *emotional appeal*. However, the topic model analysis revealed two additional subcategories—*media* and *events*. Table E3 in the Appendix summarizes the results.

Overall motivational tweets increased from 34% in 2017 to 35% in 2018 and 43% in 2019 (see Table 3). The tweets spiked AM during all three years. Most of the tweets are related to the *emotional appeal* and *report joining or marching* subcategories. This may be because messages during the actual events were more focused on motivating and mobilizing people to join a particular march. Tweets related to *numbers cascading*, *report marching or joining*, *emotional appeal*, and *media* spiked BM or DM, as shown in Figure 5. However, there was no significant pattern for *thanks* and *events* tweets.

Numbers-cascading refers to tweets that report a great number of people joining the movement or participating in the march. The purpose is to motivate others to join and trigger a cascade effect. Sunstein (2002) observed the cascade effect in social groups and contended that a large group of people tend to believe something, no matter whether it is true or false, due to other people believing it. The belief strengthens in so far as a larger number of people believe it. In such a situation, an individual will require a very strong personality to oppose the frames. Examples: "over 100k? #feminists at the @boswomensmarch #pride"; "@nycwomensmarch: our numbers keep growing! over 40k newyorkers marching."; "@sophiateague: huge crowds & brilliant signs at the @boswomensmarch #womensmarch #whyimarch #lovetrumpshate."

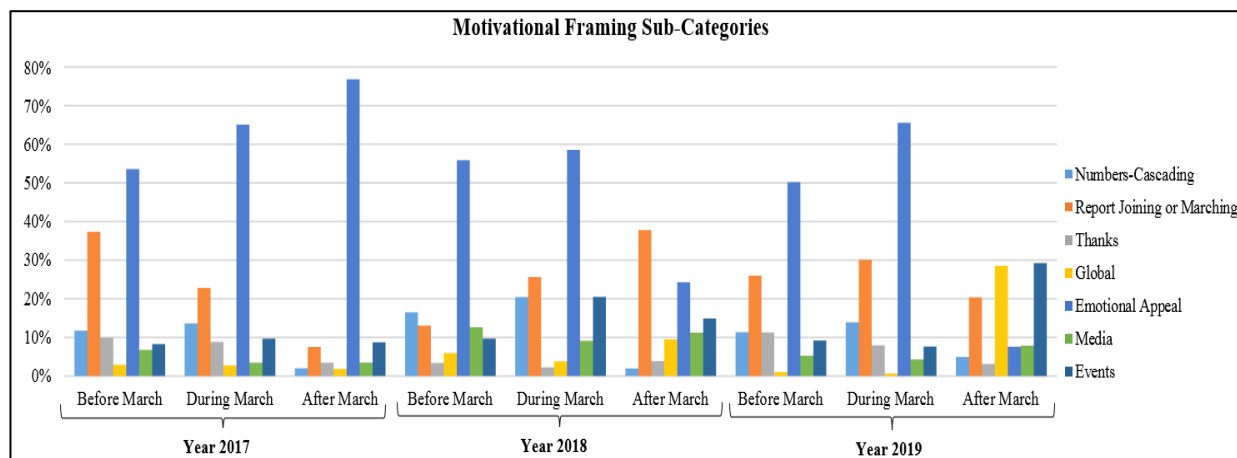


Figure 5. Longitudinal Distribution of Motivational Framing Tweets

Likewise, in the *report joining or marching* subcategory, the participants reported joining or marching in support of the movement. The intent was motivational to create a cascade effect for the collective action. Examples: “*I’m ready To go!! who else is coming?! #womensmarch #chicago #protest #notmypresident*”; “*walking to @boswomensmarch bc public transit is Packed. woman waves and smiles from window*”; “*@boswomensmarch: we are 4 women of 4 different generations who want to be seen and heard. ellen, jennie, jeremie and stella #whyimarch*”

Thanks is another type of motivational framing that is often a response to a previous tweet and that also is associated with retweeting. Thanking is often related to a celebrity or elite person who has supported the movement. It aims to reinforce the movement’s message, motivate people to participate, and convey an idea of importance through the reputation of the individual involved in the thanking message. Sunstein (2002) observed, for example, how reputation is relevant in the polarization of ideas in a movement because people tend to imitate the behavior of people with large reputations. Examples: “*thank you @ajenglish for presenting thought-provoking pieces! #whyimarch #womensmarch #alwaysforward neverback*”; “*thanks to all #menmarching in #solidarity thank you, Senator Casey! #istandwithpp*”; “*thank you congressman! #womensmarch wednesday*”; “*@womensmarchks: thank you @barackobama! just one of many reasons #whyimarch #womensmarch.*”

Likewise, messages in the *global* subcategory aim at mobilizing people in remote places and thus convey the idea that the movement has a global reach. In relation to social media and ICTs, Smith (2001) observed how the Seattle protests of 1999 turned into a global protest largely because of the utilization of the internet. In the literature, scholars have noted that transnational movements require framing messages

that resonate in diverse cultural settings (McCarthy, 1997). In the case of the WM, such messages expanded the notion of women and minority rights, aiming to find transnational allies. Examples: “*@womensmarchlv: when we march in las vegas we march with the world! #womensmarch #womensmarchlondon ?? these issues are global*”; “*@carmenn1955: @b52 malmet there is a #womensmarch2018 here in winnipeg, manitoba, canada is solidarity with our american sisters*”; “*@womensmarchlv: love to our family in sydney because on the 21st they march in the streets to show their love for us! #womensmarch*”

Another motivational framing is based on *emotional appeal*. Emotions are one of the central motivations and explanations of protests (Jasper, 1998). Jasper distinguishes between two types of emotions. One is a more permanent feeling often labeled as affective emotion or sentiment. For instance, love and attraction to members, loyalty to shared symbols and identity, respect and trust for leaders, and trust or mistrust of government officials, politicians, and leaders. The other is the transitional response to external events and information, referred to as reactive emotion. This includes anger, outrage, and indignation toward government actions and policies and movement demands. In the case of the WM, we found that messages were framed to create emotional affect and solidarity toward the members and movement. Examples: “*@womensmarchhd: take your broken heart and make a march. #womensmarch #sistermarch #hdwomensmarch #heidelberg #wmglobal #whyimarch*”; “*@pacifistriseup: #whyimarch because love is love #loveislove #lovewins @womensmarchlon @womensmarchpa*”; “*@tlfhouse hold: praying for all of you at the march!!! #marchforlife #prolife #womensmarch2018 <— yes we support women! amen! #pray*”

We also observed *media*-related messages that share informational videos and photos, providing a visual

alternative to the mainstream framing of the march (Neumayer & Rossi, 2018). Media messages mainly contained two different expressions: (1) *Eyewitnesses*: visuals that provided an account of an actual march and were usually shared by the protestors who witnessed or participated in the march. For example: “*apologies for the positioning of this video. but i'm so excited to be here! lol @womensmarchwpg #womensmarch...*”; “*a celebratory atmosphere on 42nd street among protesters @womensmarchnyc #womensmarch video by claire wiener/gss.*” (2) *Awareness*: media intended to inform the public and promote the movement. Sharing media such as videos, images, and books that provide a visible expression of dissent can help mobilize new members to collective action efforts (Youmans & York, 2012). For example: “*@womensmarchreno: check out our promotional video for the upcoming march! #togetherwerise #womensmarchreno*”; “*@wetalkwomen: on the day of the march, you can also follow @womensmarco for photos and live updates! #womensmarco*”; “*@womensmarchlv: those marching with us tomorrow in las vegas please tag us on your photos and use #womensmarchlv.*”

Finally, messages related to the *events* subcategory offered information about various activities and forums organized by the activists. The intent was to further the mobilization efforts by encouraging the public to participate in the events. Prior research has also noted that in Seattle protests, educational actions, including speaker panels and other events, were organized to educate the public about globalization and its effect on local economies (Smith, 2001). Smith stated that such low-cost, low-risk events provide an opportunity to recruit sympathizers or reinforce their involvement in the movement. Examples: “*@wmwindiana: thread: announcing our speaker lineup for #reclaimingourstate #poweothepolls! american legion mall: - kyra harvey, Leah...*”; “*we're excited to announce our speakers and entertainers for saturday's #womensmarchgvl2018*”; “*@womens march_dc: great discussion at the #togetherwerise book launch event. #womensmarch.*”

5.2 Mobilization

Mobilization refers to the process by which individuals organize and engage in collective action, including social movement organizations and tactical repertoires (McCarthy, 1997). In the context of ICTs, mobilization messages refer to information regarding how to join and participate in the movement (Garrett, 2006). Our analysis suggested five distinct subcategories of mobilization messages: *symbolic association*, *organizing*, *inclusion*, *emotions*, and *elite coalitions*. Table E4 in the Appendix presents the topic model.

Overall mobilization tweets declined from 51% in 2017 to 49% in 2018 and 43% in 2019 (see Table 3). For each year, mobilization tweets were higher BM, further increased DM, and declined AM. Most of the

tweets were related to *organizing* and *emotions* subcategories. Furthermore, as shown in Figure 6, *symbolic association* was low BM and further decreased DM, but increased AM. Tweets related to *inclusion*, *elite coalitions*, and *emotions* were high BM. Tweets related to *organizing* were also high BM but decreased DM.

In the *symbolic association* subcategory, individuals generate symbols or memes such as hashtags, catchphrases, and images to link their movement to another movement. They do so to associate the movements and expand the scope of their movement. Such symbolic associations allow the creation or promotion of collective identity, a perception that the individuals are members of a larger community who share common grievances (Garrett, 2006). The collective identity is then used to mobilize collective action (Myers, 2000). Examples: “*@boswomens march: “we have to step up as women and take the lead.”—beyoncé #womensmarch step up now and register to march!*”; “*#womensmarch #togetherwerise #girlpower #thefutureisfemale #nastywomenunite*”; “*packing up my pussyhat & poster and heading to haford ct to march tomorrow! 🍌❤️#1yearsincwomensmarch.*”

Another mobilization subcategory, *organizing*, provides information or status about the protests. The information can relate to pre-, during-, or post-march. As Garrett (2006) notes, ICTs reduce the cost of making movement information available, which leads to increased participation. Further, information is offered in various modalities, including text and links to images, documents, and videos to enhance information absorption. Examples: “*all the info you need for the March on saturday january 20th. #womensmarchyqr #lookbackmarchforward #whymarch*”; “*women's march los angeles is tomorrow at 10am! #jointheuproar #womensmarch2018 ???*”; “*Here's an attendee guide for tomorrow's March on the Polls! Get your signs ready and meet.*”

Inclusion messages aim to promote inclusivity among different segments of society and allow the diffusion of movement information globally. Research suggests that institutional movements are typically inclusive, expanding the scope of mobilizing the movement (Curtis Jr & Zurcher Jr, 1974; Jenkins, 1983). A feature of ICTs is their ability to accelerate and geographically extend the diffusion of movement information (Myers, 1994). Examples: “*@stormresist: love this thread- if you can't march in person, here's some things you can do instead!! #womensmarch2018*”; “*a guide 4 making meetings & marches accessible 2 people w disabilities is forthcoming; follow us @womensmarchpa on instagram stories and live*”; “*@ns_advocate: the need for rural women's marches #nspoli #ruralwomen #womensmarch2018.*”

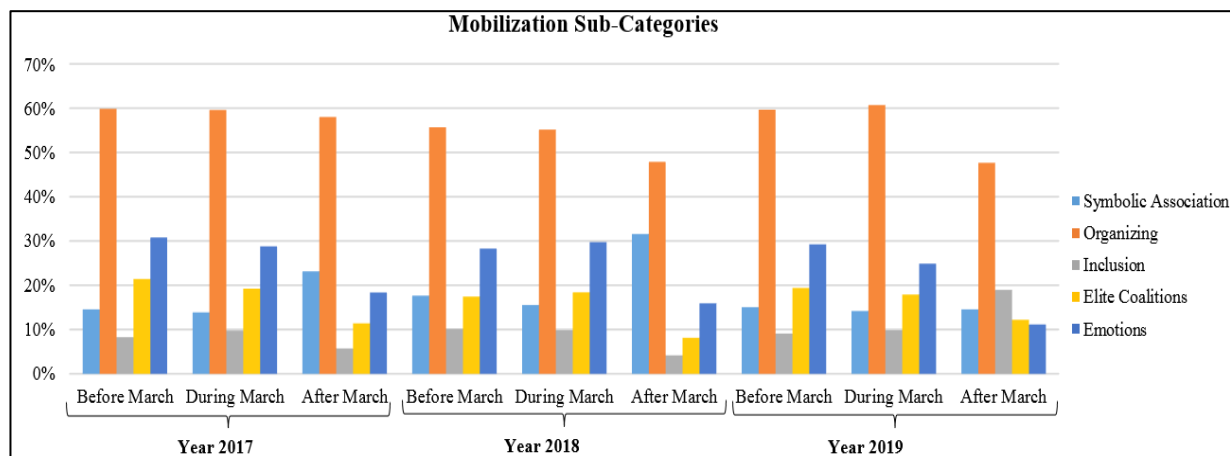


Figure 6. Longitudinal Distribution of Mobilization Tweets

Another mobilization tactic that we observed in our context is focusing on *emotions*. As noted before, social movements do not arise from mere political despair or distrust. They require emotional mobilization (Jasper, 2011). Emotions are the glue of solidarity and mobilize conflict (Jasper, 1998). In the WM case, messages expressed anger, outrage, and indignation toward politicians, administration, and their policies. Prior research has noted that women-based movements try to transform the negative feelings many women have because of their structural positions (Taylor & Whittier, 1995). Our analysis revealed several reactive emotional messages expressing anger, grief, sorrow, outrage, and indignation. For example: “RT @womensmarch: When they go lower than we ever could have imagined, we keep going high. Happy birthday to our shero, @MichelleObama!??:”; “ABOUT DAMN TIME! Been getting old waiting on this.... #GalPower! #PowerToThePolls #paperballots...”; “IT’S NOW OR NEVER: Time for Women to take their place in time! @womensmarch @MomsDemand ...”

Finally, several mobilization messages focused on forming *elite coalitions*. In the literature, the role of elites in movement mobilization has been noted. For instance, Jenkins (1983) states that social movement organizers tend to seek the patronage of select individuals who are more enmeshed in interpersonal networks, active members of organizations supporting social change, ideologically committed to social change, and available to participate. In the context of social media, such elite coalitions can help the diffusion of social movement frames. We found that WM messages were directed toward aligning with another movement organization or political and social elites. Examples: “@womensmarchpa: #merylstreep speaks on behalf of our broken heart? #beautifully said from a #beautiful soul #womensmarchpa thanks you”; “@womensmarchks: yes it does! We’d be honored if

you and @michelleobama would march with us, @barackobama #womensmarch #whyimarch”; “@womensmarchpa: @sofiavergara it would be amazing if you could give us a shout out tonight! #womensrigsarehumanrigs #goldenglobe.”

6 Discussion

In this study, we are interested in analyzing how social media messages sustain a long-term social movement. As noted before, a long-term social movement exhibits continued momentum by staging repeated protests or demonstrations over a long period of time. Especially on social media, such movements generate a large-scale connective action by creating and sharing personalized messages that persist over time. Our analysis of the meanings and frequencies of WM tweets suggests that distinct tactics were employed through movement messages, especially before and after the protest marches, to sustain the connective action and allowed WM to become a broader and more persistent movement on social media. Thus, informed by our findings and theoretical predisposition, we now present a set of propositions to explain the sustainability of long-term social movements on social media. Table F1 in the Appendix provides a summary of the propositions.

As stated before, diagnostics is a type of framing that addresses the problems the movement aims to solve. The diagnostic frames primarily focused on forging WM as an identity movement. The temporal analysis suggests that most diagnostic frames were posted BM and spiked AM during all three years (see Table 3). Communicating and reinforcing collective identity, especially before and after the protests, “can become an important symbolic resource for subsequent mobilizations” (Taylor, 1989, p. 772). Furthermore, the narratives focused on multiple causes and issues related to women and minorities, including equal pay,

LGBTQ, race, immigration, travel ban, abortion, and sexual abuse. We conjecture that pursuing multiple issues allowed movement supporters to interact with the broader political and social environment and build coalitions informed by intersectional motivations (Crenshaw, 1990; Fisher et al., 2017). Moreover, a movement pursuing multiple goals is not as vulnerable to extinction compared to one pursuing a single goal (McAdam et al., 1996). The personalized frames involving a diverse range of issues in WM resonated with the broader target audience (Benford & Snow, 2000; Bennett & Segerberg, 2012); resonance, in this sense, means that the messages have to be empirically legitimate to the target audience. This may be why several marches and campaigns, such as #metoo, #DisabilityMarch, or #MarchforScience, emerged out of WM, shaping WM as a broader and more persistent movement.

P1: In a long-term social movement, diagnostic frames reinforcing multiple and intersectional issues related to collective identity sustain connective action on social media.

The framing of diagnostics is very close to that of prognostics. Prognostics refers to movement messages calling members for particular actions. In the case of WM, we found messages centered on several forms of action. For instance, in addition to messages encouraging participation in the actual marches, we found messages calling for protesters to resist by participating in the forthcoming elections. Concretely, tweets asked people to vote against the incumbent government by contesting the 2018 and 2020 US elections. Resisting before or after elections is known to be part of the repertoire of actions of social movements (McAdam & Tarrow, 2010), as is the case for WM, which originated after the 2016 US presidential elections. As shown in Table 3, while *resistance* and *elections* tweets were higher DM and AM, the *elections* tweets spiked BM. In addition, several messages BM and AM aimed to encourage participation in events such as the “Together We Rise” book launch that brought activists and the public together, enabling dialogues about the movement. Such strategic frames seek to turn event-based mobilization into a long-term movement (Berry & Chenoweth, 2018). We may thus conjecture that the messages calling for various forms of action, including participating in future elections, running for office, and attending events, were intended to motivate the audience to participate in initiatives outside of the initial reason they may have chosen to engage with the movement and thus help maintain the movement’s momentum. Moreover, such action frames allow organizers to dramatize conflict, polarize identities in “us-versus-them” terms, and recruit sympathizers in the long run (Lipsky, 1968; McAdam, 2012; Smith, 2001).

P2: In a long-term social movement, prognostic frames calling for a recurring and cyclical repertoire of action (e.g., marches, elections, or events) sustain connective action on social media.

The purpose of posting motivational tweets is to encourage others to join and trigger a cascade effect. We found tweets related to *numbers-cascading* posted BM that reported increasing participation in the upcoming events. The motivating effect of a message that reports joining the movement is consistent with the political science literature that recognizes how individuals join a movement once they know others are joining. As previously noted, this phenomenon, known as social cascade, ropes in more participants to sustain the movement (Sunstein, 2002). Furthermore, prior research consistently notes that social media enables the globalization of social movements (Selander & Jarvenpaa, 2016; Van Laer & Van Aelst, 2010). We observed messages in which individuals *reported joining or marching* in other parts of the world. We argue that this allowed for the forging of the international connections needed to globalize and sustain the WM movement.

P3: In a long-term social movement, cascading collective action motivates participation and sustains connective action on social media.

Another motivational message that emerged from our analysis contained URLs to images and videos expressing dissent or providing updates about protests. Such processes can be understood through the concept of what Mortensen (2015) refers to as “connective witnessing,” a participatory, reflective act by individuals who, by creating and circulating media, including footage, invite “personalization, appropriation, and collaboration” (Bennett & Segerberg, 2013, p. 196). Connective witnessing serves several purposes, including documenting the course of events, protestor turnout, and conduct of authorities and fellow protestors. This could help activists recruit new members to collective action, as observed during the Arab Spring and Egyptian Revolution protests (Youmans & York, 2012). Furthermore, in the WM case, we observed an increase in *media* messages in AM phases, especially those reinforcing the idea of a movement built on women’s rights. For instance, we observed tweets providing links to pictures from the women’s suffrage movement and videos from past WM protests. This implies that the personalization of digital media functions as a way for social movements to reinforce existing ideas and gain public visibility, recruit more participants, and garner more support (Mortensen, 2015).

P4: In a long-term social movement, personalized digital media (i.e., videos, photos) that reflects and reinforces the movement’s cause and goals sustains connective action on social media.

Within the mobilization category, we found that several tactics were employed to sustain the movement beyond a specific march. McAdam et al. (1996) note that a movement's emergence depends on whether the activists have strong mobilizing structures available to get the movement off the ground. However, once the movement emerges, besides the availability of mobilizing structure, the profile of people who are associated with the movement is important for ongoing development. The importance of connections for social movement mobilization suggests the particular importance of those individuals who can marshal a large number or diversity of connections. In addition to regular citizens, we found that the mobilization messages were also directed at elites, especially in the BM phase (see Table 3). In our case, these elites were celebrities and political figures to whom messages were directed, asking them to retweet or join the movement. Although we did not find previous studies that report the use of social media for enrolling elites, the creation of alliances with elites is known to be a fundamental line of action of social movements (Andrews, 2001; McAdam & Tarrow, 2010; Tarafdar & Ray, 2021). We contend that the messages asking for elites' help are intended to obtain their support and to seek retweets that give original messages wider reach and extend the visibility of a cause through the connections of elites' social networks (Ellessor, 2018). In that sense, tactical repertoire, such as thanking elites for supporting a movement and its causes, could motivate more people to organize and participate in collective action (McCarthy, 1996). Additionally, seeking elite coalitions, particularly before and after protest marches, enhances movement credibility and diffuses movement messages widely through elites' networks (Bennett & Segerberg, 2012, 2013).

P5: In a long-term social movement, social network expansion through elite coalitions sustains connective action on social media.

As noted before, social media has allowed social movements to expand their repertoire of actions, which means that social media facilitate new forms of protests (Selander & Jarvenpaa, 2016; Smith, 2001; Van Laer & Van Aelst, 2010). We found that social media extended the repertoire of actions by facilitating virtual participation in the movement. By this, we mean that people tweeted that they were not able to join the march physically but they were participating virtually from their current location. Such *inclusion* messages spiked in BM and DM phases, as shown in Table 3. Such connective action opportunities are particularly relevant for citizens who may be excluded from participating in traditional protest events because of barriers due to distance, cost, or inaccessibility of physical spaces. The inclusive personal action frames are central to the success of connective action

movements (Bennett & Segerberg, 2013). It is also likely to affect the ability of connective networks to be "reformed and repurposed" (Bennett & Segerberg, 2013, p. 212) in the longer term as "broadly inclusive action frames that motivate participation" (Bennett & Segerberg, 2013, pp. 212-213).

P6: In a long-term social movement, an inclusive repertoire of action that broadens participation sustains connective action on social media.

Another type of connective action that emerged from mobilization tweets was classified as the *symbolic association* that included hashtags that linked the WM movement with other social movements. Specifically, we noticed an increase in the use of links and hashtags in the AM phases that would allow participants to connect with other resources and networks and increase the visibility of the movement. For instance, many messages offered iterations of "stronger together," which was the official slogan of Hillary Clinton's 2016 election campaign. These processes contributed to the crucial task of connecting different networks in a meaningful way. Through tweeting hashtags from other movements, protesters also provide identity to their actions and discourses. It is through these processes that, according to Bennett et al. (2014, p. 242), "technology-enabled crowds" demonstrate "coherent organization in the form of resource-allocation, responsiveness to external conditions, and long-term adaptation over time." Furthermore, the *symbolic association* also took the form of embracing symbols, like *knitting pussyhats* and *This pussy bites back*—a sign that featured an image of a "grumpy cat" as a meme. Knitted pink "*pussy hats*" also served as the unofficial visual brand of the movement. In studying hashtags during the Egyptian Revolution of 2011, Oh et al. (2015) found that hashtags were used as a means for collective sensemaking. Oh and his colleagues conceptualized hashtags as a way of identifying clusters of local themes and a form of synthesized information that provides identity and a sense of purpose. Thus, because of their synthetic nature, hashtags can define the unfolding movement by giving it a collective identity and specific goals. The category of *symbolic association* is, then, an example of how social media allows the personalized expression of identity and purpose that "help[s] garner and maintain momentum for the connective action" (Vaast et al., 2017, p. 1193).

P7: In a long-term social movement, symbolic association (e.g., through the use of hashtags, catchwords, and memes) allowing personalized expression of collective identity and purpose sustains connective action on social media.

Finally, the framing of emotional messages provides another tactic with which to connect the broader audience. This is also consistent with Taylor (1989), whose work on

the “abeyance structures” suggests that emotional ties have sustained American women’s rights movements. Emotions attract new recruits, sustain participants’ commitment and discipline, and motivate outsiders (George & Leidner, 2019; Jasper, 2011). In our study, we found that different emotions were persistently at play, especially in the BM phase. Specifically, tweets instigated a sense of fear, anger, and threat that demanded action from women and other supporters. Experiencing fear and anxiety in the midst of a protest “can be a strong force in creating a sense of collectivity and be an attractive force in collective actions” (Eyerman, 2005, p. 43). Such messages can create moral shocks by suggesting that the identity of women and minorities is threatened and can thereby be used to persuade others to join the movement (Jasper, 2011). Additionally, in our study, emotional mechanisms were employed to create collective solidarities that allowed for continued participation. Tweets framing WM as an identity movement aimed to create a sense of belonging among participants. Such collective identity tweets expressed emotions of love, pride, and excitement. Further, tweets expressed the hope that collective action can create change. As Jasper (2011) notes, hopeful anticipation of an impact can spur the greatest action.

P8: In a long-term social movement, emotional messages that create collective shock and hope sustain connective action on social media.

7 Conclusion

We now discuss the theoretical and practical contributions of this study. We conclude by acknowledging the limitations of this study and discussing future research opportunities.

7.1 Theoretical Contribution

Our study makes several research contributions. First, we provide conceptual clarity about the sustained long-term social movements on social media. While existing scholarship has built our understanding of connective action at the peak moments (Vaast et al., 2017) and abeyance stages (Leong et al., 2019), little research has examined how sustained connective action manifests on social media. Our analysis of the WM movement suggests that a sustained long-term social movement exhibits three distinct characteristics on social media, as illustrated in Figure 7: (1) *Recurrence*—meaning that a sustained movement exhibits recurring cycles of social media activity, where each cycle emerges in response to a collective grievance, reaches its peak, and eventually declines. We observed a recurrence in social media activity from 2017 to 2019, during which three marches were held. For each year, for instance, we noticed that mobilization tweets were higher BM, increased DM, and declined AM. (2) *Temporality*—meaning that a

movement has a temporal dimension during which its digital repertoire of actions evolves. Consistent with the social movement literature, we observed that social media messages evolved during the emergence, peak, and decline phases (McAdam et al., 1996), with the intent to mobilize and sustain the movement (Leong et al., 2019). For instance, messages posted BM and AM focused on the diagnosis and prognosis of the movement, whereas messages posted DM focused on mobilizing people to join a particular march, and messages posted AM aimed to motivate people to continue their support for the movement. (3) *Latency*—meaning that a long-term movement experiences a latency during which social media activity declines (Taylor, 1989). While the latency period may be longer, as illustrated by the long tail of the decline phase in Figure 7, it is temporary and succeeded by a new upsurge in social media activity. Nevertheless, the latency phase is critical to sustaining a long-term movement. As was observed in the WM case, messages posted BM and AM allowed activists to reinforce the grievances related to collective identity and accumulate the repertoire needed for a subsequent upsurge of mobilization events under the auspices of the same movement.

Second, we contribute by enhancing the knowledge about how connective action is sustained in a long-term social movement. Prior research has built our understanding of how connective action is afforded through the use of social network features such as hashtags and retweets (Oh et al., 2015; Vaast et al., 2017), allowing users to cluster into groups and networks that sustain the movement (Langer et al., 2020; Leong et al., 2020). Furthermore, social media subscriptions and content notifications enable passive participation and sustain connections, especially when a movement experiences declining action (Leong et al., 2019). However, connective action is not only limited to the use of social media features. While network features—the very affordances of social media that allow for creating, sharing, and linking messages—act as pathways through which messages propagate, messages contesting a situation that needs to be changed in their own right play an important role in large-scale connective action formation (Bennett & Segerberg, 2012). We contribute to this body of research by offering insights into how connective action by posting personalized messages that require little persuasion to bridge individual differences maintain the momentum of the movement beyond a single protest. Hence, our study goes beyond social media’s network features and explains how connective action emerges from the meanings of messages posted on social media (Bennett & Segerberg, 2012; Pond & Lewis, 2019). Such calls have also been made by network scholars who argue that network structure studies need to be complemented by research that looks at the content of messages (Borgatti & Foster, 2003).

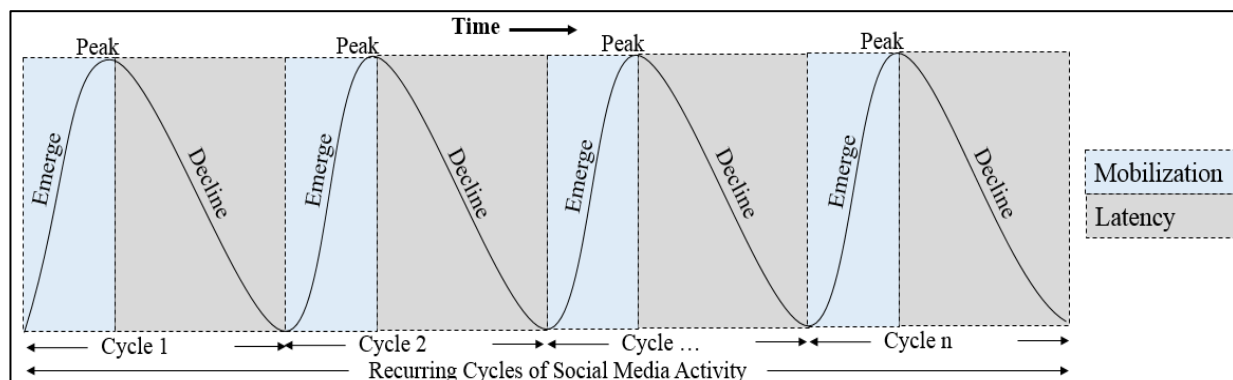


Figure 7: Sustained Social Media-Based Social Movements

To that end, we offer eight testable propositions focused on the conventional movement framing and mobilization processes that allow the sustainability of a long-term social movement on social media. This is perhaps the boundary zone that Bennett and Segerberg (2012, p. 745) refer to as “connective action [that] gives way to collective action.” In this sense, the propositions answer the call for further research on whether connective action can be sustained (Bennett & Segerberg, 2012). Scholars note that it is easier to stage a short-term event such as a march than to build a movement, especially one that involves diverse communities (Tufekci, 2017). However, WM demonstrated the ability of grassroots organizing to catalyze a durable movement. In particular, as summarized in Table F1 in the Appendix, we demonstrate the importance of social media for reinforcing collective identity, supporting an inclusive and recurring repertoire of actions, and expanding social networks, among other tactical affordances to link users (e.g., see Vaast et al., 2017) and sustain the connective action discourse.

Third, we contribute to the IS scholarship focused on the analysis of social media messages sent during protests and their effect on specific forms of political actions, such as participating in protests and demonstrations (Oh et al., 2015; Selander & Jarvenpaa, 2016; Tarafdar & Ray, 2021). Central premises in this area are that social media exerts a crucial influence on social movements by facilitating the mobilization of resources and providing a global dimension (Garrett, 2006). Moreover, research in this area has shown that contemporary social movements such as the Zapatistas, the Battle of Seattle, the Arab Spring, the Egyptian Revolution, and Occupy Wall Street would not have occurred without the support and influence of social media (Oh et al., 2015; Suh et al., 2017; Tremayne, 2014; Tufekci & Wilson, 2012). Our study advances this body of knowledge by providing empirical and theoretical content regarding the use of Twitter to not only motivate and mobilize participants but also to sustain social movements. Empirically, we

enrich the content in this area by analyzing the meaning of tweets transmitted during the WM movement. Theoretically, we provide a detailed set of categories that classify the tweets transmitted during the WM movement. The formulation of these categories enhances the understanding of the purpose of using social media during social movements. Our analysis of social media messages is informed by the social movement framework proposed by McAdam et al. (1996) and responds to the call for classifying information types using social movement theories (Young et al., 2019).

The proposed categories also add to the extant body of knowledge that examines how social media increases the action repertoire of social movements (Garrett, 2006; Selander & Jarvenpaa, 2016; Smith, 2001; Van Laer & Van Aelst, 2010; Walker et al., 2008). Before the advent of the internet, social movements relied on periodicals, radio, TV, and pamphlets to convey their messages and mobilize resources (Suh et al., 2017). In this sense, we contribute by identifying digital actions that consist of framing social movement messages through tweets (Benford & Snow, 2000). Digital messages constitute an addition to the action repertoire of social movements because they facilitate these movement protests by providing immediate communication, which in turn motivates and mobilizes people and permits virtual participation. Such tactical innovations are crucial for the long-term sustainability of social movements (McAdam, 1983).

Fourth, we contribute by conducting a longitudinal analysis of a social movement and responding to the calls to explore the social media content to understand the evolution and sustainability of movements over time (Leong et al., 2019; Oh et al., 2015; Vaast et al., 2017). Although message framings may change as a movement emerges, develops, and matures (McAdam et al., 1996), personalized messages on social media enable the building or maintaining of the connections required to sustain a movement in the long term (Bennett & Segerberg, 2013). It is these messages that

scholars argue pave the way for continued sensemaking, interest, and participation during the peak and declining phases of a movement (Leong et al., 2019; Oh et al., 2015; Stewart & Schultze, 2017). Specifically, in our study, personalized messages sent during different phases of protest marches facilitated organizing marches and mobilizing participants to join the marches. Further, the messages encouraged participation in initiatives outside of the initial reasons individuals may have chosen to engage with the movement and sustained the movement beyond the limits of a specific march. Our findings are consistent with other scholars who argue that a distinct repertoire is employed for movement mobilization and sustainability (Taylor, 1989), especially on social media (Leong et al., 2019).

7.2 Practical Contribution

Regarding the practical implications, our findings can help social movement leaders learn different ways to frame their messages on social media. In particular, social movement organizers might consider drafting and transmitting messages that address the diagnostics and prognostics of the movement cause. This, we argue, could help them make sure their messages better resonate with their target audience. Furthermore, the findings can help movement organizers strategize about the specific messages that can mobilize and sustain the movement. Specifically, the messages posted before and after protests are important for the survival of the movement. Moreover, as we show, social media can be used to enroll elites, including celebrities and politicians, which may enlarge the reach of messages.

We also found that, at least for the particular movement we studied, social media was not widely used for the prognosis or the articulation of political opportunities, as suggested by McAdam et al.'s framework. Instead, Twitter was used mostly for motivation and to call for mobilization. It is possible that the political opportunities for protesters were tacitly shared among the social movement members. Nevertheless, leaders of sociopolitical movements might consider using social media to identify political opportunities that their members could realize. Organizers using social media might consider sending messages calling their members to concrete actions related to the objectives of their movement. Given the reach of social media, those messages could increase the scope of influence beyond movement motivation and mobilization.

Finally, our approach to data analysis may be of interest to other qualitative researchers, particularly those analyzing large bodies of social media data. We started with the interpretive analysis that allowed us to analyze data within the purview of prior theories (Charmaz, 2006; Glaser & Strauss, 1967). However,

interpretive analysis can become costly due to the high number of person-hours and substantive domain knowledge required to analyze large bodies of text (Debortoli et al., 2016; Quinn et al., 2010). Thus, we followed up with topic modeling, an inductive approach that does not require the definition of dictionaries or coding categories a priori. It has a minimal start-up cost and can be applied to large corpora in a reasonable time frame (Quinn et al., 2010).

Interestingly, our topic model for the motivational framing category unveiled two additional subcategories—*media* and *events*—that did not emerge from our interpretive analysis. Hence, topic modeling can provide additional insights that may otherwise not be discernible from a relatively small dataset analyzed manually. However, the topic modeling approach is not without limitations. The resultant model consists of topics defined by a set of words. Since no substantive information is directly built into the model, the researchers have to spend more time analyzing and interpreting the meaning of words ex post (Quinn et al., 2010). In our study, we interpreted the meanings of the words by analyzing the related tweets. Also, the model does not provide correlated topics. Hence, researchers must manually analyze topics to generate higher-order themes. Nevertheless, the triangulation of methods overcomes researcher bias, increases the depth of the understanding of the phenomenon, and increases the validity of the results. Thus, topic modeling does not disrupt but rather augments and extends existing qualitative methods (Hannigan et al., 2019).

7.3 Limitations and Future Research

One of our study's limitations is that we did not analyze the images and videos shared via the URLs in tweets. Analyzing audiovisual content is necessary to fully understand the consequences of sharing rich media in a socially complex situation such as a political protest. Future research could explore how personalized audiovisual content leads to connective action, particularly by analyzing whether videos and images scale more quickly than textual content and by investigating their impact on movement mobilization and sustainability. However, this would require novel image and video analytics techniques to process the graphic content, which presents another opportunity for design science researchers. Another limitation of our study is that we did not analyze the network features in relation to movement messages. Large-scale action networks are characterized by both personalized messages and the technical affordances of digital media (Bennett & Segerberg, 2012; Vaast et al., 2017). Hence, future studies could draw on the theoretical insights of this study to understand how

social media messages and features jointly enable the sustainability of social movements.

Furthermore, our study concentrated on a particular social movement to provide deeper insights. However, this could raise a concern about the generalizability of the results. Informed by case study-based research, our purpose was to generalize from descriptions to theory (Lee & Baskerville, 2003). Further, contrary to studies with statistical generalizability, our goal in this study was to discover message categories and subcategories to build a theory and better understand the sustainability of the movement (Parks et al., 2017). Nevertheless, the theoretical propositions advanced in this study offer an opportunity to empirically validate those in other social movement contexts by employing different research methods that will generate more substantial theoretical insights (Orlikowski, 1993).

As discussed in the results sections, we observed a declining trend in mobilization tweets from 2017 through 2019. This could perhaps be due to declining participation in WM protests, as noted before. An empirical analysis of the factors such as weak opportunity structure or protestor burnout leading to the decline or eventual death of a movement presents another interesting research opportunity. Additionally,

the context of this study provides some potential limitations or opportunities in that it relates to the social movement framework. Although McAdam et al. (1996) focused primarily on political opportunity structures, much of the subsequent research on social movements has argued that opportunity structures are contextual. For example, Briscoe et al. (2014) looked at social movements associated with firms and corporate opportunity structure. Others have also identified gendered opportunity structures in the women's suffrage movement (McCammon et al., 2001). Therefore, it might be possible to identify the opportunity structure particular to the WM context. Nevertheless, what remains to be known is whether movements sustained on social media translate into any opportunity for a substantive social, political, or policy change.

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Appendix A

Table A1. Summary of Social Media and Social Movements Research

Study	Context	Data and analysis	Key empirical findings	Key theoretical insights
Ameripour et al. (2010)	Feminist One Million Signature (1 MS) campaign and Stop Stoning Forever (SSF) campaigns	The dataset included thirty famous Iranian weblogs from April-July 2007. Data was analyzed through interpretive analysis. However, the study does not focus on the temporal analysis of social media posts.	The counterpropaganda movement against feminist activists and state repression prevented the 1 MS campaign from reaching its goal. The SSF campaign has had some success. Although the campaign did not lead to the amendment of the Iranian penal system, technology helped spread the news and created international opposition, applying pressure on the Iranian authorities to adjourn some stoning cases.	Internet availability does not guarantee any significant changes toward accomplishing a convivial society. Internet conviviality is not an independent variable with deterministic outcomes on society; rather, it is shaped by ongoing economic and political forces.
Leong et al. (2019)	2012 Malaysia's environmental movement	Secondary data from Facebook groups and pages and YouTube videos initiated/created by individuals or community groups were analyzed to identify relevant probing questions for primary data collection through semi-structured interviews. Two key events in the movement were selected to represent periods of rupture and abeyance. Data was analyzed through interpretive analysis.	Social media acts as a mobilizing structure during periods of rupture and acts as an abeyance structure during the abeyance period. Furthermore, social media empowers by providing the ability to participate, influence, and control during these two periods.	Social media enables a power activation mechanism during periods of rupture, i.e., people are empowered through diversification of participation, the association-based spread of influence, and anticoagulation of control. Further, during the abeyance period, social media enables power accrual, i.e., people are empowered through the sustainability of participation, solidification of influence, and refinement of control.
Leong et al. (2020)	Bersih movement of Malaysia	Primary data was obtained from interviews and social media logs, and secondary data was obtained from archival sources such as news, reports, and magazines. Data was analyzed through qualitative analysis. Further, a sequence of events was examined as multiple rallies were held from 2007 to 2018.	Two types of emergences were observed: (1) clustering of dispersed individuals into dispersed groups around a common cause, and (2) structuring of dispersed groups into networked groups to ensure the sustainability of the movement.	While clustering emergence reflects the logic of connective action, the structuring emergence reflects collective action. Further, both types of emergences integrate cognitive, relational, and environmental mechanisms to explain the shift from connective to collective action.
McKenna (2020)	Alpha social movement on World of Warcraft, a virtual world gaming platform	Data sources included participant observation, discussion forums, chat logs, and screenshots (images). Data was analyzed using interpretive analysis.	The Alpha used the platform to achieve gameplay as well as social support for the LGBT community through community building and periods of activity. Further, several affordances, including memberships, guilds, and character movement, enabled achieving the goals. Although the authors note that, over time, convivial outcomes arose and discriminatory practices declined, the study does not focus on how the creative use of technology achieves one's goals and desires over time.	Social movements could exploit the affordances of virtual worlds to create a convivial outcome that enables online social movements to use them to achieve their specific goals. The term <i>convivial affordance</i> is forwarded, meaning users shape IT artifacts creatively to achieve their goals.
Miranda et al. (2016)	Stop Online Piracy Act (SOPA)	Analyzed newspaper articles, television transcripts, tweets, and YouTube videos related to the Stop Online Piracy Act case. Data was collected	The media content on lean and rich and social and traditional media was analyzed to compare three types of structural metrics (authorship, citation, and influence)	Social media are emancipatory with regard to structural constraints (authorship, citation, and influence) relative to traditional media

		between November 17 (after the House Judiciary Committee hearings of November 16) and January 18 (the day the “SOPA strike” protest occurred). The study examines correlations between authorship, citation, and influence across four periods marked by key events.	and three types of content metrics (frames, signatures, and emotions). The study reports that more anti-pro-SOPA frames were observed on social media. Motivational frames appeared only rarely on television but were prolific on social media. Lean social media (that is, Twitter) mitigated structural advantages but exacerbated content problems.	but hegemonic with regard to frames.
Oh et al. (2015)	2011 Egypt Revolution	Analyzed qualitatively and quantitatively various Twitter hashtags as indicators of collective action. Hashtag data was collected from January 12, 2011 (well before the Egyptian Revolution) to March 10, 2011 (after President Mubarak was removed). Hashtags peaks were observed on the day of the revolution and the removal of the president.	<i>Keynoting</i> , conceptualized as the emergence of hashtags, was observed as frequencies of hashtags such as #Egypt, #Tahrir, and #Jan25 increased on January 25, 2011, the day the protests occurred. Further <i>milling</i> , conceptualized as information about other events, was observed as fluctuating hashtags such as #Mubarak and #Tunisia before January 25.	Social media inseparably engages with users to shape collective sensemaking through <i>keynoting</i> and <i>milling</i> .
Sæbø et al. (2020)	Italian Five Star Movement	Data was collected through interviews of movement members and different social media platforms, including the official movement’s website, Meetup pages, Facebook, Twitter, and local groups’ websites. Data was analyzed by conducting an interpretive analysis of social media data and interview transcripts.	A typology of nine types of affordances for collective action is identified. The combination of affordances created preconditions, referred to as antecedents, for the collective action processes. However, the actualization of affordances does not follow a temporal or sequential pattern to create an antecedent for the collective action.	Social media affordances are actualized in combination with organizational affordances to support the three fundamental collective action processes: mobilizing, framing, and political opportunity.
Selander and Jarvenpaa (2016)	Swedish affiliate of Amnesty International	Conducted an inductive qualitative analysis of interviews and data published during 2009-2014 on Amnesty International’s Facebook page was collected. However, the study presents its analysis by focusing beyond short-term critical events and actions.	The digital action repertoire expanded the boundaries of SMO, illustrated by the dynamics between SMO values, design intent, and subsequent interaction and engagement between supporters and professional groups.	The boundary-crossing dynamics of digital action repertoires challenge the SMO values as well as introduce new values. Due to technology affordances, the digital action repertoires allow both stability and change in SMO values.
Tarafdar and Ray (2021)	New Delhi Gang Rape Case	Conducted qualitative analysis of data collected from Twitter, Facebook, YouTube, online blogs, and newspaper websites between December 17 and 25, 2012.	The material and expressive components of the three intra-actions intertwined in an emergent and ongoing way and reinforced one another. While each intra-action was dominant during the three phases, all three intra-actions were present during the entire period.	A social protest cycle comprises three groups of intra-actions and their constituent practices—consolidation (shared language, collective emotion, and solidarity), expansion (recruitment and coordination), and intensification (propagation and conflict).
Tim et al. (2018)	Malaysian environmental movement	Primary data was collected through semi-structured interviews, and secondary data was collected from Facebook and YouTube pages. Data was	Three affordances of social media—information democratization, network informed associating, and emergent organizing—were actualized by	While the actualization of social media affordances can help a movement achieve its goals, the unintended consequences of social media

		analyzed through interpretive analysis. However, the study does not focus on the temporal analysis of social media posts.	communities to resolve the challenges toward achieving environmental sustainability. Further, three unintended consequences—information cluttering, exclusion, and disorganization—stemmed from the increased use of social media that provided feedback to adjust the use of social media. Together, the actualization of affordances helped achieve the goals of community sustainability.	use provide feedback to readjust the use of social media.
Vaast et al. (2017)	2010 Gulf of Mexico oil spill	Twitter data was collected for three months, starting from April 20, 2010, when the leak started, until July 19, 2010, which constituted the apex of the spill. Mixed method analysis along with temporal analysis was used to analyze the tweeting behavior of user clusters that use similar features across three episodes of connective action.	Three episodes of connective action unfolded in the three emergent and interdependent roles—advocates, supporters, and amplifiers—and their participation via the use of microblogging features to post and amplify tweets. Advocates initiated, guided, and rekindled the connective action; supporters supported and followed the connective action; amplifiers scaled up and maintained the connective action over time by further circulating others' content.	Social media-enabled <i>connective affordance</i> is actualized when actors engage in collective endeavors. The actors are team interdependent as they take on emerging roles and display shared as well as distinct patterns of feature use.
Zheng and Yu (2016)	Case of Free Lunch for Children in China during 2011-2012	Data included the official Weibo account of Deng, who launched the campaign, FL4C official Weibo, other relevant Weibo posts, and comments. Data was analyzed through interpretive analysis; however, the study does not consider the temporal analysis of social media posts.	Collective action processes were realized through network construction, framing collective action, and establishing legitimacy. The network construction allowed participant recruitment, resource mobilization, and distributed collaboration. The framing processes allowed for agenda setting and issue framing. Finally, legitimacy was established by enhancing accountability, transparency, and scrutiny.	The functional affordances are socialized through collective action processes, which in turn gives rise to affordances-for-practice.

Appendix B

Table B1. Summary of the Logics of Connective and Collection Action

Dimension	Collective action logic	Connective action logic
Definition	<p>Collective action is any form of organized social or political act carried by a group of people who have a common or shared interest in achieving a collective good (Oliver, 1993).</p> <p>Originally conceptualized by Olson (1965), collective good is a benefit that cannot be withheld from another member if provided to one member. However, the “impossibility of exclusion” leads to a free-rider problem wherein rational individuals are motivated to free-ride on the contributions of others.</p>	<p>Connective action logic purports that individuals mobilize each other by sharing personal experiences on digital and social networks to build informal, decentralized, and leaderless movements that scale faster and are strategically more flexible (Bennett & Segerberg, 2012).</p> <p>Connective action emerges through new forms of engagement wherein multiple individuals adopt interdependent roles as they use different social media features for creating and sharing content (Vaast et al., 2017). The individuals may not equally identify with the cause, but they come together “spontaneously and informally....and engage in coparticipation and coproduction of content with the use of social media” (Vaast et al., 2017, p. 1180).</p>
Frames	<p><i>Collective action frames</i> are “action-oriented sets of beliefs and meanings that inspire and legitimate the activities and campaigns of a social movement organization” (Benford & Snow, 2000, p. 614).</p>	<p><i>Personal action frames</i> “are inclusive of different personal reasons for contesting a situation that needs to be changed” (Bennett & Segerberg, 2012, p. 744).</p>
Identity	<p>Individuals are consolidated into a <i>collective identity</i> so that their grievances are linked with who they are (McAdam & Tarrow, 2010; Polletta & Jasper, 2001).</p> <p>Collective identity is a prerequisite for social movements, as it provides “activists shared definition of their situation, the expressive character of all action, the affective bonds that motivate participation, the experience of solidarity within movements, and others” (Polletta & Jasper, 2001, pp. 284-285).</p>	<p>“...identity reference is more derived through inclusive and diverse large-scale personal expression rather than through common group or ideological identification” (Bennett & Segerberg, 2012, p. 744).</p> <p>Digital media in which “networked and condensed performance of the self” becomes possible, allow users to craft ideologically more diverse and polysemic identities “without compromising their own sense of who they are” (Papacharissi, 2015, pp. 99-100).</p>
Organization	<p>Collective action emphasizes the need for formal organizations with resources to harness and coordinate individuals in common action and overcome free-riding and help them shape collective identities (Bennett & Segerberg, 2012).</p>	<p>Connective action networks are “typically far more individualized and technologically organized sets of processes that result in action without the requirement of collective identity framing or the levels of organizational resources required to respond effectively to opportunities” (Bennett & Segerberg, 2012, p. 750).</p>
Digital and social media	<p>While digital and social media may help disseminate the message frames and reduce some of the financial costs (such as money to pay rent for organization offices, generate publicity, and hire professional staff organizers—McAdam et al., 1996) needed to enforce collective identities, collective action logic require resources beyond communication technologies to bridge the gaps or align different collective frames (Benford & Snow, 2000).</p> <p>Collective action frames “... hit barriers at the intersections of social networks defined by established political organizations, ideologies, interests, class, gender, race, or ethnicity. These barriers often require resources beyond social technologies to overcome” (Bennett & Segerberg, 2012, p. 747).</p> <p>Social media technologies do not change much the dynamics of collective action that “typically requires varying levels of organizational resource mobilization deployed in organizing, leadership, developing common action frames, and brokerage to bridge organizational differences” (Bennett & Segerberg, 2012, p. 751).</p>	<p>Connective action networks recognize the role of digital media as an organizing agent. The interpersonal network enabled by social media allows the coproduction and co-sharing of content (Bennett & Segerberg, 2012).</p> <p>“Action networks characterized by this logic may scale up rapidly through the combination of easily spreadable personal action frames and digital technology enabling such communication” (Bennett & Segerberg, 2012, p. 753).</p>

Appendix C

Table C1 illustrates the process of analyzing the topic model and the resultant first-order codes, second-order codes, and aggregate theoretical categories. Following Croidieu and Kim (2018), the first-order concepts are interpreted by analyzing topic words and related tweets. Second-order codes are derived by grouping together first-order codes with similar sounds or meanings. Finally, the second-order codes are interpretively mapped to theoretical factors. In our study, we refer to the theoretical factors as categories and second-order codes as subcategories.

Table C1. An Illustration of Analyzing Topic Model

Top ten topic words	Highly associated tweets	First-order codes	Second-order codes (subcategories)	Theoretical category
Women, march, Saturday, rsvp, huntsville, nation, big, park, global, lookbackmarchforward	@cain2018: saturday’s national women’s march in huntsville will focus on bringing #poweothepolls. to have a healthy democracy, we must march... @womensmarchcda: please rsvp: women’s march canada - calgary march #lookbackmarchforward #womensmarch #womensmarch2018 #canpoli @cain2018: i have my rsvp for saturday’s national women’s #poweothepolls march In huntsville. it stas at 11 a.m. in big spring park....	Attending the protest march	Resistance	Prognostic Framing
Signofresist, strongeogeth, resistance, incompet, forev, lookbackmarchforwar, stoppresidentbannon, resistrumptuesday, shepersist, blackouttrump	RT ‘@PsychBarakat: What happens when THE PEOPLE don’t elect the president? Daily protests. Copley Square Battery Park #StopPresidentBannon? Much like #WomensMarch #ShePersisted #ImpeachTrump @MoveOn: The ‘@RealDonaldTrump administration is ramping up attacks on our American values. We have to ramp up our resistance. That?s why?,11	Opposing the elected officials		
womensmarch2018, trumpshutdown, gopshutdown, releasethememo, time, year, last, read, tomorrow, sad	@Isarsour: new chant for this weekend’s @womensmarch’s. “whose shutdown? #trumpshutdown.” say it loud. say it clear. #callandresponse #p... #longbeach we are on our way to #womensmarch2018 #bluewave2018 #gopshutdown we’ll be joining the @womensmarchire today to stand up for reproductive rights across the globe #womensmarch #repealthe8th #womensmarch2018 hope ur marching for transparency & #releasethememo even if it means hrc gets in trouble	Reasons for marching		
Poweothepol, womensmarch, Uniteblu, flipitblu, well, vote, resistforgood, play, hear, bluewaveyes	“first we #march together. then we take action together. then we #Vote together. and together, we rise. #hearourvote...” @elizabethperkins: last year you heard our voice—this year you’ll #hearourvote! #poweothepolls #wmla2018 gather at 8:30 am pershing s... @uniteblue: #womensmarch2018 when they go low... we march and vote them out! #uniteblue and poweothepolls	Encouraging voting out the elected officials	Elections	
Hous, emergeamerica, democrat, retak, year, clear, emergenow, thank, excit, event	“@emergeamerica: in 2017, we marched—then, ran for office. this year, we’ll do it all again. #emergenow #womensmarch #poweothepolls ... @swingleft: feeling inspired after the #womensmarch2018? join the fig to take back	Garnering support for candidates		

	<p>the house! get involved in your nearest swing dist... “@emergeamerica: ““if democrats retake the house this year, it is clear they will have women to thank.”“ #emergenow #poweothepolls :...</p>			
<p>Poweothepol, get, people, come, vegas, excit, registr, look, park, vote</p>	<p>we have buttons! get yours tonight at the kickoff to our #poweothepolls 24-hour voter registration drive across ... “join @womensmarchlv this sunday @samboydstadium. voter registration booths, free parking, entertainment and more. #poweothepolls” @paradiseresists: the @womansmarch’s #poweothepolls event will be here in #vegas. come to help launch a national voter registration to...</p>	<p>Calling for voter registration</p>		

Appendix D

Table D1 illustrates how we conducted the longitudinal analysis of message categories. A customized R script for generating a topic model assigns the most probable topic number to each tweet in the dataset. As discussed in Appendix C, we analyzed a unique set of words corresponding to each topic to identify the message categories and subcategories. Thus, referring back to topic numbers mapped to the tweets, we could annotate the tweets with corresponding categories and subcategories. Furthermore, using the *creation date* attribute of each tweet, we were able to determine whether a tweet was posted before, during, or after a protest march. The inaugural march was held on January 21, 2017. Thus, we defined the periods between January 1 and 19 as Before March, January 20 and 22 as During March, and January 23 and December 31 as After March. The first-anniversary march was held on January 20, 2018. Thus, we defined the periods between January 1 and 18 as Before March, January 19 and 21 as During March, and January 22 and December 31 as After March. The second-anniversary march was held on January 19, 2018. We defined the periods between January 1 and 17 as Before March, January 18 and 20 as During March, and January 21 and December 31 as After March.

Table D1. An Illustration of Longitudinal Analysis of Topics

Tweet #	Tweet text	Creation date	Phase	Topic #	10 Topic words	Category (subcategory)
1	RT @KamalaHarris: We have already seen what it looks like when millions of Americans come together and demonstrate who we are. Keep it up.	February 20, 2017	After March	9	activist, million, american, thousand, raise, strong, register, present, nyc, commit	Motivational framing (numbers-cascading)
18	RT @MaketheRoadNY: Thousands + thousands pass Trump Tower 2 #DefendDACA! The diversity in this city makes it BEAUTIFUL! @UNITEDWEDREAM http...	August 30, 2017	After March	9		
30	time's new cover. a record number of women are running for office. @time #womensmarch2018 #timesupnow	January 19, 2018	During March	9		
62	@cnn & it was black american women who stood up w/power in numbers in alabama! #timesup	January 20, 2018	During March	9		
6800	#womensmarch2018... "@uniteblueco: fantastic turnout! over 50,000 people at #womensmarch2018 in downtown #denver! #uniteblue and bring #poweothepolls! t..."	January 21, 2018	During March	9		
392	ICYMI The 2019 Women's March was bigger than you think https://wapo.st/2D3hJzZ?tid=ss_tw&utm_term=.b2c59b765a82 @EricaChenoweth @djpressman #WomensMarch2019	February 2, 2019	After March	9		
7	@realdonaldtrump happening this weekend.. calling #theresistance we need to get #womensmarch2018 #womensmarch trend...	January 19, 2018	During March	3	Trumpshutdown, womensmarch2018, why, march, realdonaldtrump, theresist, stop, protest, global, join	Prognostic framing (resistance)
1230	suggestions for my protest sign for this saturday's women's march. #trumpshutdown #trumprussia #resist #womensmarch2018 @realdonaldtrump	January 19, 2018	During March	3		
7856	"time to celebrate #theresistance. time to take it to the streets and march against the inhumanity, corruption & racism..."	January 19, 2018	During March	3		
1001	RT '@PsychBarakat: What happens when THE PEOPLE don't elect the president? Daily protests. Copley Square Battery Park #StopPresidentBannon?	January 29, 2017	After March	3		
2216	Much like #WomensMarch #ShePersisted #ImpeachTrump	January 2, 2018	Before March	3		
2559	@MoveOn: The '@realDonaldTrump administration is ramping up attacks on our American values. We have to ramp up our resistance. That's why?	January 12, 2019	Before March	3	lookbackmarchforward, stoppresidentbannon, resisttrumptuesday, shepersist, blackouttrump	

Appendix E

The topic model is derived from the tweets related to the corresponding theoretical category. In the case of diagnostic framing, the topic modeling algorithm fitted a model with 12 topics. As illustrated in Appendix C, we then analyzed the topics to generate first and second-order codes (or subcategories). Table E1 presents the topic model for diagnostic framing. The first column lists the illustrative top 10 most probable terms or words that appear together in tweets. The second column lists the highly associated tweets based on the presence of topic words.

For prognostic framing, while the algorithm fitted a model with 22 topics, 13 topics related to the *resistance* subcategory and nine topics related to the *elections* subcategory. Table E2 presents the topic model.

Table E1. Topic Model for Diagnostic Framing

Illustrative top 10 topic terms	Exemplary highly associated tweets	Subcategory
now, leadership, time, act, whyimarch, womensmarch, women, let, loud, use	@womensmarchams: we matter, we're loud, we're organized and proud! #womensmarchams #whyimarch @womensmarch: please retweet. you have the power to #protectdreamers! @senschumer, the time To act is now. use your leadership and let's show this country that justice is still alive. @womensmarchnyc: ""we have to keep being heard. we have to be loud."" - @sandimarx #whyimarch #womensmarchnyc	Identity movement—a collision of gender and politics and how women are marginalized
why, march, solidarity, women, right, support, forward, strength, stand, hear	@womensmarchpa: @theellenshow we love all you do for LGBTQ rights. will you stand with us in #washington? #alwaysforwardneverback #whyimarch... @oliviawilde @womensmarch @womensmarco we're marching too! these issues are global #solidarity #equality #standup @womensmarchnyc: we must support NYC mothers. #womensmarchnyc #whyimarch I'm going because i have to stand up for my daughter's future. #whyimarch @nycwomensmarch	
Jewishresist, muslimbanprotest, womensrigsarehumanrig, pussyhatproject, maleprivileg, triumphateswomen, ablebodiedprivileg,, equalrig, mybodymychoic, marchforlife	#LosAngeles here's a reason to show up the #WomensMarch on January 20! #WomensRights #MyBodyMyChoice #RightToChoose @wmnsmarchla RT '@rolandsmartin: Hey '@realDonaldTrump! You saw @womensmarch last week and #MuslimBanprotest this week? We WILL #TakeOurCountryBack! Buckl... @harleyrouda '@womensmarch today's #marchforlife is what a real women's march looks like! Today's ally education is on #MalePrivilege! We appreciate that @MENofWM practice allyship by acknowledging their privilege. #AllsIsAVerb	

Table E2. Topic Model for Prognostic Framing

Illustrative Top 10 Topic Terms	Exemplary Highly Associated Tweets	Subcategory
lookbackmarchforward, resist, thisisglob, wmglobal, timesup, march, women, around, boswomen, action	@boswomensmarch #resist you cannot silence us @boswomensmarch #notmypresident i will be at the @nycwomensmarch sat January 21 to proclaim that love always wins #womensmarch #humanrigsdefender #equity #justice #resist "ladies, friendly reminder there are still men out there like this #womensmarch2018 #resist #equality #girlpower..." @nycwomensmarch: #21daysofaction for the #Nycwomensmarch. day1: reflect on the time you can commit to action each day/week & share at #resist...	Resistance—call for members to reject the ideology or actions of their target political group
womensmarch2018, trumpshutdown, gopshutdown, releasethememo, time, year, last, read, tomorrow, sad	@lsarsour: new chant for this weekend's @womensmarch's. "whose shutdown? #Trumpshutdown." say it loud. say it clear. #callandresponse #p... #longbeach we are on our way to #womensmarch2018 #bluewave2018 #gopshutdown we'll be joining the @womensmarchire today to stand up for reproductive rights across the globe #womensmarch #repealthe8th #womensmarch2018 hope ur marching for transparency & #releasethememo even if it means hrc gets in trouble	

<p>Trumpshutdown, womensmarch2018, why, march, realdonaldtrump, theresist, stop, protest, global, join</p>	<p>@realdonaldtrump happening this weekend.. calling #theresistance we need to get #womensmarch2018 #womensmarch trend... suggestions for my protest sign for this saturday's women's march. #trumpshutdown #trumpussia #resist #womensmarch2018 @realdonaldtrump "time to celebrate #theresistance. time to take it to the streets and march against the inhumanity, corruption & racism..."</p>	
<p>Women, march, Saturday, rsvp, huntsville, nation, big, park, global, lookbackmarchforward</p>	<p>"@cain2018: saturday's national women's march in huntsville will focus on bringing #powethepolls. to have a healthy democracy, we must march..." @womensmarchcda: please rsvp: women's march canada - calgary march #lookbackmarchforward #womensmarch #womensmarch2018 #canpoli @cain2018: i Have my rsvp for saturday's national women's #powethepolls march in huntsville. it stas at 11 a.m. in big spring park..."</p>	
<p>Signofresist, strongeogeth, resistance, incompet, forev, lookbackmarchforward, stoppresidentbannon, resisttrumptuesday, shepersist, blackouttrump</p>	<p>RT '@PsychBarakat: What happens when THE PEOPLE don't elect the president? Daily protests. Copley Square Battery Park #StopPresidentBannon? Much like #WomensMarch #ShePersisted #ImpeachTrump @MoveOn: The '@RealDonaldTrump administration is ramping up attacks on our American values. We have to ramp up our resistance. That's why?</p>	
<p>campaign, powethepol, weekend, womensmarch, America, nextgen, elect, protest, leader, voice</p>	<p>@elizabethperkins: last year you heard our voice—this year you'll #hearourvote! #powethepolls #wmla2018 gather at 8:30 am pershing s... @nextgenamerica: we need more women running the government, and we also need more women running campaigns. #powethepolls" "@realdonaldtrump, #powethepolls. we're coming for you and all your friends in the next election cycle."</p>	<p>Elections—calling attention to future electoral actions</p>
<p>Poweethepol, womensmarch, Uniteblu, flipitblu, well, vote, resistforgood, play, hear, bluewaveeyes</p>	<p>"first we #march together. then we take Action together. then we #vote together. and together, we rise. #hearourvote..." @elizabethperkins: last year you heard our voice—this year you'll #hearourvote! #powethepolls #wmla2018 gather at 8:30 am pershing @uniteblue: #womensmarch2018 when they go low... we march and vote them out! #uniteblue and powethepolls</p>	
<p>Right, trumpshutdown, thing, govern, done, pass, dream, act, clean, human</p>	<p>powethepolls @womensmarch voter's rigs are women's rigs are human rigs are voter's rigs are women's rigs... @womensmarch: if the government would have done the rig thing by passing a clean dream act, we would not have a #trumpshutdown." "humanity, dignity, equality. #dreamactnow #dreamact womensmarch #powethepolls #shepardfairey"</p>	
<p>Poweethepol, get, people, come, vegas, excit, registr, look, park, vote</p>	<p>We have buttons! get yours tonight at the kickoff to our #powethepolls 24-hour voter registration drive across t... "join @womensmarchlv this sunday @samboystadium. voter registration booths, free parking, entertainment and more. #powethepolls" @paradiseresists: the @womensmarch's #powethepolls event will be here in #vegas. come to help launch a national voter registration to...</p>	
<p>Hous, emergeamerica, democrat, retak, year, clear, emergenow, thank, excit, event</p>	<p>"@emergeamerica: in 2017, we marched—then, ran for office. this year, we'll do it all again. #emergenow #womensmarch #powethepolls ... @swingleft: feeling inspired after the #Womensmarch2018? join the fig to take back the house! get involved in your nearest swing dist... "@emergeamerica: ""if democrats retake the house this year, it is clear they will have women to thank."" #emergenow #powethepolls</p>	
<p>Poweethepol, get, reclaimingourst, vote, womensmarchlv, now, board, istandwithpp, women, work</p>	<p>@wmwindiana: it's never been easier to register to vote! text p2p to 788683! #powethepolls #reclaimingourstate get the word out! @i... women must run for office or lift up women who are! #womensmarch2018 #reclaimingourstate #powethepolls @lauralforbes: check out all these amazing women elected officials and candidates who will table at #reclaimingourstate #powethepolls..."</p>	
<p>notmypresid, alabamavote, midterm2018, Trumpresign, Midterm, impeachmentmarch, voteblue2018, voteangrynow, bluewaveis com, ripgop</p>	<p>'@realdonaldtrump '@gop you are holding citizens hostage! fix #daca no #governmentsshutdown #powethepolls stas now! #bluewaveiscoming '@mcspocky: grab 'em by the midterms #womensmarch #womensmarch2018 #trumpshutdown they made their choice we make ours in november vote out the gop! #trumpshutdown #gopshutdown #ripgop?</p>	

For motivational framing, the topic modeling algorithm fitted a model with 72 topics, 42 of which were related to *emotional appeal*. Fourteen topics related to *report joining or marching*, followed by *events* and *numbers-cascading* with 13 and nine topics. Six topics related to *media*, whereas *thanks* and *global* each had two topics. Table E3 presents the topic model.

Table E3. Topic Model for Motivational Framing

Illustrative top 10 topic terms	Exemplary highly associated tweets	Subcategory
timesup, number, turn, womensmarch, great, whyimarch, huge, crowd, ready, run	<p>@sophiateague: huge crowds & brilliant signs at the @boswomensmarch #womensmarch #whyimarch #lovetrumpshate</p> <p>@eimeark_: proud to be a pa of the great turnout for @womensmarchire in dublin today. #womensmarch #resist #lovetrumpshate ????</p> <p>time’s new cover. a record number of women are running for office. @time #womensmarch2018 #timesupnow</p> <p>@cnn & it was black american women who stood up w/power in numbers in alabama! #timesup #womensmarch2018...</p> <p>“@uniteblueco: fantastic turnout! over 50,000 people at #womensmarch2018 in downtown #denver! #uniteblue and bring #poweothepolls! t...”</p>	Numbers-Cascading—reports of a great number of people joining the movement or participating in the march
Today, boswomensmarch, istandwithpp, lovetrumpsh, one, sign, look, great, 2018, join	<p>@ppadvocacyma: one week from today, march with us in the @boswomensmarch: #istandwithpp”</p> <p>@drjencr: looking forward to marching with you and your family, @joekennedy! @boswomensmarch #istandwithpp”</p> <p>@repdonnabullock: can’t wait to join others at the #alwaysforwardneverback community event & the march.#lovetrumpshate strapping on my marching shoes today... let’s make some change! #boswomensmarch #1yearsincewomensmarch...</p>	Report Joining or Marching—reports about joining or marching in support of the movement
Pussyhatproject, pussyhat, womensmarco, come, womensmarchcpa, januari, stand, istandwithpp, activist, women	<p>@jsquaredink: @womensmarco jan21 12pm queenspark everyone come & stand up for women & minorities wear #pussyhat @pussyhatproject ...</p> <p>oh yeah, pussyhat ready! let’s do this! 2 days until #womensmarchla @womensmarchla #womensmarch2018</p> <p>@sfkcp: #togetherwerise Just arrived today! my #pussyhat and i are ready for this weekend. thank you for being strong, amazing, courageo...</p> <p>packing up my pussyhat & poster and heading to haford ct to march tomorrow!</p> <p>👉❤️#1yearsincewomensmarch</p>	
womensmarch2018, feminist, woman, make, join, walk, look, great, rig, whyimarch	<p>@daisycabreu: #whyimarch @nycwomensmarch because i’m a daughter of #immigrants #feminist #writer #ally #american let’s do this.</p> <p>almost a year ago in dc- now this saturday nyc! #womensmarchnyc #womensmarch2018 #feminist</p> <p>“walking to @boswomensmarch bc public transit is packed. woman waves and smiles from window, encouraging marchers #lovetrumpshate”</p>	
March, thank, you, womensmarch, alwaysforwardneverback, thought, resist, unity, move, power	<p>@womensmarchcpa: thank you @emilyslist.and @hardballchris women will #takebackourpower and move #alwaysforwardneverback #whyimarch</p> <p>thank you @ajenglish for presenting thoug provoking pieces! #whyimarch #womensmarch #alwaysforwardneverback...</p> <p>@womensmarchcpa: thank you @mmflint for supporting @womensmarch! #werise to resist oppression #whyimarch #alwaysforwardneverback</p> <p>@womensmarchcpa: @menofmwm thank you for marching with us! #unity #alwaysforwardneverback #strongegether #womensmarch</p>	Thanks—thanking a celebrity or elite person for supporting the movement
Timesup, join, London, weekend, lookbackmarchforward, rally, Saturday, womensmarch, see, love	<p>@womensmarchlon @stylistmagazine go. london! i hope other cities/countries around the world will rally too. #timesup #womensmarch2018</p> <p>shout out to all those marching in london canada this weekend from all of us in london uk rallying to say #timesup...</p> <p>@salenagodden: Inspirational speaker! love you ash!! @ayocaesar</p> <p>@womensmarchlon #timesup #metoo #womensmarch2018 london</p> <p>@im_ohne: join us at the #timesup ralley in london organised by @womensmarch</p> <p>👉</p>	Global—reporting global support for the movement
Poweothepol, resist, lookbackmarchforward, thisisglob, wmglobal, timesup, why, march, women, around,	<p>@womensmarchmil: stiamo preparando! we’re gathering!! #wmmilan2018 #lookbackmarchforward #womensmarchglobal #thisisglobal</p> <p>@womensmarchpar: on adore... merci pour votre présence ! we love this idea. #womensmarch2018 #thisisglobal #womensmarchglobal</p> <p>@womensmarchhd: take your broken hea and make a march. #womensmarch #sistermarch #hdwomensmarch #heidelberg #wmglobal #whyimarch</p> <p>@womensmarchhd: women are global. women are local #whyimarch #whywomen #wmglobal #womensmarchgermany 6/</p>	

	@wommarnor1: looking forward to marching with our global resisters on january 21st! #timesup #metoo #womensmarch2018	
Womensmarch, womanpow, ready, power, girlpow, great, make, saturday, office, work	really wish i was at the #womensmarch2018 this year. maybe next year.. 🦋 #weartheresistance #girlpower💕 . @womensmarch @womensmarchla #womensmarch #womensmarch2018 #girlpower dont forget your #pussyhat march on! i would sell my soul to go to the women's march in new york or washington 🍷🌸+ #womensmarch2018 #girlpower #female	Emotional Appeal— messages create emotional affect and solidarity toward the members and movement
Love, thank, heart, happy, sad, whyimarch, people, weekend, today, count	“@corybooker: my love goes out to the #womensmarch2018—i’m with you in spirit. #whyimarch because love is love #loveislove #lovewins @womensmarchlon @womensmarchpa @womensmarch #womensmarch... .. @kathygriffin we’re so happy to have you here with us! ??@womensmarchbay #womensmarch @realdonaldtrump refuses to see or hear these amazing people. sad! @boswomensmarch #womensmarch	
womensmarch2018 , poweothepol, today, honor, sister, word, hope, made, stand, lift	“@womensmarchpa: #whyimarch for my granddaughters, nieces & all females yet to be born. so they will be respected & honored bc women are...” @jesslocklier: i march because i still have hope. #whyimarch @womensmarchlv @womensmarch @flarefashion: hope not hate @womensmarco #womensmarch #wmwcanada #whyimarch @jenlongdon: i’m honored to be sharing the stage with these powerful women tomorrow. #poweothepolls #womensmarch @brethauer_jenna: in Honor of the #womensmarch2018. rise up sisters. this world is ours and we are catalysts of change. #poweothepolls...	
Share, tell, video, stori, photo, marc, join, tag, book, visual	@womensmarch: this video is for all of you. we shared our march stories; now share yours! use #togetherwerise to tell your women’s marc... @womensmarch: this video is for all of you. #togetherwerise, the definitive book of the women’s march, is out on January 16. pre-orde...” @womensmarchpa: the photo speaks for itself. we are proud to march together on 1/21 #whyimarch #alwaysforwardneverback #womensmarch @wetalkwomen: on the day of the march, you can also follow @womensmarco for photos and live updates! #womensmarco @ndrewschneider: 200,000 people showed up yesterday in the boston common drone video fama films #womensmarch @boswomensmarch so excited to share the video of my performance @womensmarchnyc so happy to have been a pa of this! #womensmarch “@deystreet: #togetherwerise, the official oral and visual history of the women’s march, is out now from @womensmarch and @condenast! get”	Media— informational videos and photos about the march
Speak, announce, tonig, activist, board, badass, launch, book, event, discuss	@wmwindiana: thread: announcing our speaker lineup for #reclaimingourstate #poweothepolls! american legion mall: - kyra harvey, leah...” @womensmarch_dc: women’s march dc board speaking tonig with these badass women and activists for the #togetherwerise book launch! #pow we’re excited to announce our speakers and enteainers for saturday’s #womensmarchgv12018 Details on tomorrow’s #WomensMarch2018 in #Wichita KS — times, location, topics, speakers. Focus is building momentum & turnout for 2018 elections, both federal AND local/state. @womensmarch_dc: great discussion at the #togetherwerise book launch event. #womensmarch	Events— information about different activities and forums organized by the activists

For the mobilization category, the topic modeling algorithm fitted a model with 22 topics, 12 of which were related to *organizing* and seven related to *emotions*. *Symbolic association* and *elite coalitions* each had four topics, whereas two topics were related to *inclusion*. Table E4 presents the topic model.

Table E4. Topic Model for Mobilization

Illustrative Top 10 Topic Terms	Exemplary Highly Associated Tweets	Subcategory
Amaz, poster, left, center, nycwomensmarch, sign, january, plan, love, now	<p>outraged? dismayed? speak out frankly with our hot dog #protest poster! 🍌🍌🍌</p> <p>#smallhands #womensmarch2018...</p> <p>meet me @ sing the queen city sign tomorrow!! i'll be passing out these buttons and posters at the #womensmarch2018...</p> <p>"it's 3 am and we've just finished posters!! "they tried to bury us, not knowing we were seeds." #womensmarch #togetherwerise"</p> <p>@womensmarchlon: today's #timesup event was amazing! some images below</p> <p>👏👏👏 #wearebettegether #womensmarch2018 #womensmarchlondon #...</p> <p>@womensmarchhd: only one of the amazing aworks created for the @womensmarch. we love the message & the color scheme! #hdwomensmarch #h...</p>	Symbolic Association—symbols or memes such as hashtags, catchphrases, and images to link the movement to another movement(s)
Sign, best, far, womensmarch2018, march, womensmarchdc, sing, like, confirm, poem	<p>sone of my favorite signs from last year's women's march. #womensmarch2018</p> <p>forgot to tag my poem. #resist #voice #Womensmarch2018</p> <p>pussy hat? yup. poem printed? yup. sign painted? yup. ready for</p> <p>#womensmarchpacifica #trumpshutdown...</p> <p>@lsarsour: "ain't gonna let the system walk all over me." sing it sisters 🙌</p> <p>#togetherwerise</p>	
womensmarch2018, poweothepol, tomorrow, join, resist, 2018, day, womensmarch, one, sign	<p>@uft: join us at 11 a.m. Today for the #womensmarch2018! sign up here:</p> <p>@lunaluvgood2017: sign up for text ales here for #womensmarchdc #womensmarch #womensmarch2018</p> <p>@momsrising: we call on all defenders of human rigs to join us on January 21!</p> <p>@womensmarch #womensmarch #keepmarching #poweothepolls t...</p> <p>"@therickydavila: can we just make this the winner today? i mean, come on! ❤️🙌</p> <p>#womensmarch2018 #resist"</p>	Organizing—information or status updates about the protest or movement
Event, check, find, resist, day, tomorrow, trumpshutdown, whyimarch, like, womensmarch	<p>"@settiwarren: i'll be in lowell today for the women's solidarity march, but there are more events celebrating the #womensmarch2018 aroun...</p> <p>@uniteblue: make sure to keep amplifying the impoant events in las vegas and around the country today! #womensmarch2018 #poweothepol</p> <p>@henricoblue: let's turn the energy of #womensmarch2018 into getting this good Woman elected - @goodforflorida! check her out here: ...</p> <p>women's march jan 20 & 21... check the date for your local march! #togetherwerise</p> <p>👏</p>	
Theresist, please, join, nycwomensmarch, proud, make, love, womensmarch, nyc, now	<p>"@amanda_dycus: protesting is cool and the #womensmarch2018 is great but also please remember these dates!!!📅📅📅 march 6, 2..."</p> <p>@jonessense: new from q on 1/21/2018 2:30pmest please share this as much as you can. #trumpshutdown #schumershutdown #womensmarch2018 #W...</p> <p>#womensmarch2018 was incredible! did You march? keep the momentum going. join #postcardstovoters to help #gotv by w...</p>	
Get, ready, theresist, Saturday, womensmarchnyc, count, womensmarch2018, stand, regist, rally	<p>"@piperperabo: if you're paicipating in #womensmarch2018 this weekend, help @womensmarch reach their goal of registering 1 million peop...</p> <p>@tweeteritweet: from hear our voices rally in st paul. #womensmarch2018</p> <p>@indivisible_saz: arizona is here and ready to march! #womensmarch2018 #womensmarchphx</p> <p>ready to take action following yesterday's #womensmarch2018? come to @swingleft blue wave tour comes in washington</p>	
Bus, event, sunday, pleas, schedule, shuttle, load, share, anniversary, free	<p>"@womensmarchnyc: so excited the @womensmarch is only one day away. if you'll be on a bus to dc, tomorrow! #womensmarchnyc #wmwa: @c..."</p> <p>.@kcmetrobus is dispatching extra buses and shuttles for tomorrow's #womensmarch2018 in #seattle:</p> <p>@lgbtfeedla: #weho is providing free shuttle buses from weho to the red line this saturday for the @womensmarchla #womensmarch2018 #dtl...</p> <p>@joshuasr35: i also noticed some getting ready to load up on this shuttle bus. end of the sunday #womensmarch2018 at sam boyd stadium th...</p> <p>@womensmarchlv: important day-of info & free shuttle details!! please share!!</p> <p>#poweothepolls #poweothepople #poderalascasillas #pod...</p>	
March, disablit, access, person,	<p>a guide 4 making meetings & marches accessible 2 people w disabilities is fohcoming. #alwaysforwardneverback @womensmarchpa @womensmarch</p>	Inclusion—promoting

<p>hope, hashtag, instagram, follow, join, saturday</p>	<p>@womensmarch_dfw: visit the wmw- disability caucus for the dc march accessibility and suppo! ??#womensmarch #m... @mrscottlads: @remember lads/lasses chers @ the #womensmarch2018 is tomorrow & sunday if u cant march then use the hasag all day the @womensmarchcpa: can't be with us in person for #Alwaysforwardneverback event today? follow us @womensmarchcpa on instagram stories and li... "@boswomensmarch: and if you can't go to d.c., join 20k (and growing) marchers in boston. #womensmarch #mapoli" @boswomensmarch: we hope you are joining us on saturday at the #womensmarch @bentwomencenter @bentleysplife @bentleylgbtq students repre... @kellieresists: not able to attend the #womensmarch2018 today? join #theresistance on twitter all day for a vial march! share your... can't be with us in person for #Alwaysforwardneverback event today? follow us @womensmarchcpa on instagram stories and live!</p>	<p>inclusivity among different segments of society as well as the diffusion of movement information globally</p>
<p>Womensmarch, weekend, year, excit, metoo, history, lovetrumpsh, great, girlpow, notmypresid</p>	<p>@ayocaeasar: courage is a muscle #timesup #womensmarch2018 #metoo @hereisgina: #womensmarch2018 #dreamactnow so proud and in awe of all the amazing women marching today. i love you. ❤️👏 "@sondra_bombels: ""justice, peace, & equality for all"" @womensmarchlv @womensmarch #womensmarch #nastywomenmakehistory ?????#dontgrabmypuss..." #poweothepolls 🌐🌐🌐... #womensmarch #lovetrumpshate #togetherwerise #pantsuitnation... @mccallemison: the government may shut down but this bitch doesnt. #nashvillewomensmarch #lovetrumpshate #womensmarch #womensmarch2018 wearing all black tomorrow & avoiding social media & the news. tomorrow i pray. saturday i march @nycwomensmarch #resist #notmypresident</p>	<p>Emotions—an expression of anger, outrage, and indignation toward the incumbent government and their policies</p>
<p>Story, halsey, like, rape, poem, assault, shout, thank, perform, leader</p>	<p>@halsey: here is my entire "a story like mine" poem from today's #womensmarch2018 in nyc tw: rape / assault. thank you @nycwomensmarch: we're thrilled to have kashish join us to perform "stronger together" at #nycwomensmarch!! via...@halseyinsider: halsey speaking at today's #womensmarch2018 in nyc "@cobraineymedia: #womensmarch2018 #womensmarchphx @michelleobama you are a leader here, too!" @Amyschumer can't wait to march w/ you in dc! please give #womensmarch a shout out at 2nite's #goldenglobes #hearourvoice @womensmarchcpa @senduckwoh @jljac1313 speaking #trutopower! thank you senator. ❤️ #trumpshuttdown #womensmarch2018</p>	<p>Elite Coalitions—messages directed toward aligning with another movement organization or political and social elites</p>

Appendix F

Table F1. Summary of Propositions

Proposition	Message (sub)categories	Supporting empirical results	Theoretical contribution
P1: In a long-term social movement, diagnostic frames reinforcing multiple and intersectional issues related to collective identity sustain connective action on social media.	Diagnostic framing; Identity movement	Table E1; Table 5; Figure 3	Extends the literature by demonstrating the use of personalized framing focusing on multiple and intersectional identity-related issues to provide broader resonance and prevent movement extinction on social media.
P2: In a long-term social movement, prognostic frames calling for a recurring and cyclical repertoire of action (e.g., marches, elections, or events) sustain connective action on social media.	Prognostic framing; Resistance; Elections; Motivational framing; Events;	Table E2; Table E3; Table 5; Figure 4	Extends the literature by showing that the use of different forms of protest actions in combination sustains connective action. Furthermore, there is a pattern to the calls for protest actions. For instance, election messages spiked before the march, and events were organized before and after the march. Thus, we extend the literature by showing the relation between the recurring and cyclical repertoire of action calls afforded on social media and the sustainability of social movement.
P3: In a long-term social movement, cascading collective action motivates participation and sustains connective action on social media.	Motivational framing; numbers-cascading; Report joining or marching; Global	Table E3; Table 5; Figure 5	Reinforces the ideas from existing literature that social media allows for the globalization of movements. At the same time, it extends the understanding of the motivating effect of the global and social cascade afforded on social media to sustain movements in the long term.
P4: In a long-term social movement, personalized digital media (i.e., videos, photos) that reflects and reinforces the movement's cause and goals sustains connective action on social media.	Motivational framing; Media	Table E3; Table 5; Figure 5	While existing research notes the use of social media to provide situational awareness, this proposition extends the literature by emphasizing the motivational role of different forms of media such as videos and photos shared on social media. Personalization through the use of different forms of media enables activists to reinforce movement ideas, motivate participants, and sustain connective action.
P5: In a long-term social movement, social network expansion through elite coalitions sustains connective action on social media.	Motivational framing; Thanks; Mobilization: Elite coalitions	Table E3; Table E4; Table 5; Figure 5; Figure 6	While this reinforces the ideas from existing literature that social media expand the boundary by enlargening connections, but also extends the literature by noting the importance of connecting with political and social elites that can marshal more connections on social media and sustain a long-term movement.
P6: In a long-term social movement, an inclusive repertoire of action that broadens participation sustains connective action on social media.	Mobilization: Inclusion; Organizing	Table E4; Table 5; Figure 6	Reinforces the use of social media to generate inclusive personal action frames that are central to movement sustainability. Furthermore, it provides clarity into various aspects of inclusion afforded on social media, including allowing virtual participation and providing information in different modalities to increase absorption.

<p>P7: In a long-term social movement, symbolic association (e.g., through the use of hashtags, catchwords, and memes) allowing personalized expression of collective identity and purpose sustains connective action on social media.</p>	<p>Mobilization: Symbolic Association</p>	<p>Table E4; Table 5; Figure 6</p>	<p>Reinforces the existing studies that note the use of hashtags for large-scale connective action, and extends the understanding that the personalized expressions afforded through the use of different symbols, including hashtags, memes, and catchwords, can maintain momentum and sustain the movement.</p>
<p>P8: In a long-term social movement, emotional messages that create collective shock and hope sustain connective action on social media.</p>	<p>Motivational framing: Emotional appeal; Mobilization: Emotions</p>	<p>Table E3; Table E4; Table 5; Figure 5; Figure 6</p>	<p>Reinforces the role of social media to utilize emotional messages for motivating and mobilizing individuals into action. However, it extends the understanding of employing specific emotions such as shock and hope to spur and sustain connective action.</p>

About the Authors

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