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# Dynamics of digitally networked leadership in #blacklivesmatter

## by Sander van Haperen and Justus Uitermark

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### Abstract

Using the hashtag #blacklivesmatter, activists have given new impetus to aspirations of ‘leaderful’ organizing. Disavowing the centralization of leadership and rethinking the history of the struggle for civil rights, many have sought to develop and revamp models of decentralized leadership. Digital networking features prominently in these models, but the literature suggests its role is ambiguous: while social media provide affordances for decentralized leadership, they may also induce the centralization of leadership. To examine such leadership dynamics, we adopt a computational approach. Drawing on a dataset of roughly 18 million tweets collected over a 30-month period, we examine two aspects of leadership dynamics: the concentration of leadership (*i.e.*, inequality in terms of centrality within networks) and the consolidation of leadership (*i.e.*, the degree to which central figures retain prominence over time). Engaging with the measurement of network inequality by differentiating temporal aspects of concentration and consolidation, we show that leadership dynamics fluctuate strongly over time. Aside from a select few individuals, there is little consolidation of leadership: new voices can consistently rise to prominence. Beyond providing an examination of online leadership dynamics within the Movement for Black Lives, this paper shows how computational analyses can be adopted in ways that do justice to the dynamic and diverse nature of movements.

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## 1. Introduction

The slogan “Black Lives Matter” and accompanying hashtag #blacklivesmatter has caught the attention of millions of people from around the world, who shared experiences of racism and police brutality on social media. Digital networks allowed communities to connect to events in Ferguson in 2014 and beyond. The widespread attention gave rise to a number of leaders who became very prominent. In this context, activists in the Movement for Black Lives have invoked the concept of a ‘leaderful movement’, suggesting that social media allow for the amplification of voices from local community-based leaders who might otherwise go unheard. Moving beyond the notion that leadership is inherently problematic, they argue that leadership should not be delegated to a single leader but distributed over a diversity of movement participants (*cf.*, Costanza-Chock, 2012; Raelin, 2005, 2003; Wood and Ladkin, 2008). In the words of the originators of the #blacklivesmatter hashtag, Opal Tometi, Alicia Garza, and Patrisse Cullors-Brignac:

There are important implications for the possibilities that this new layer of leadership can offer the movement as a whole. We create much more room for collaboration, for expansion, for building power when we nurture movements that are full of leaders, and allow for all of our identities to inform our work and how we organize. This then allows for leadership to emerge from our intersecting identities, rather than to be organized around one notion of Blackness. Because of this, we resist the urge to consolidate our power and efforts behind one charismatic leader. When we center the leadership of the many who exist at the margins, we learn new things about the ways in which state sanctioned violence impacts us all. (Tometi, *et al.*, 2015)

Although activists warn against the centralization of power, they do not reject leadership as such. On the contrary, it is vitally important for historically marginalized communities to bring forth leaders who can inspire, organize, and coordinate. This is especially true for groups that were pushed to the background as charismatic leaders took center stage, including women, LGTBQI communities, and other marginalized groups. According to this view, leadership is vital to the articulation of demands and the coordination of protest, leaders should not claim to speak for the movement as a whole and should not block others from rising to prominence and having their say. Ideally, then, leadership is shared, transitory, and distributed.

A conundrum of online organizing is, in short, that the very social media affordances that ostensibly facilitate egalitarian participation also potentially induce inequality. In this light, we aim to examine dynamics of leadership empirically. How does online leadership develop among people using the hashtag #blacklivesmatter on Twitter? While qualitative studies have begun to examine how competing tendencies towards centralization and decentralization play out (Bennett and Segerberg, 2012; Gerbaudo, 2012; Keucheni, *et al.*, 2021; Tufekci, 2017), we advance computational analysis to assess this dynamic. We adopt a relational approach to analyze how communities form online and to examine dynamics of leadership within them.

In the following, we first expand the discussion on leadership dynamics and develop a relational conceptualization of leadership within digitally networked communities. We examine leadership by distinguishing analytically between concentration and consolidation. The methodological section then provides details on data collection, the identification of communities, and measures of both leadership concentration and leadership consolidation. After presenting our findings, we conclude with a discussion of implications for theory development and activist practice.

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## 2. Digitally networked leadership in a leaderful movement

Millions of people from around the world have used the hashtag #blacklivesmatter in recent years. The hashtag represents one instance of digital networking among many related hashtags such as #ferguson and #icantbreathe (Bonilla and Rosa, 2015; Freelon, *et al.*, 2016; Jackson and Foucault Welles, 2016). These slogans were adopted by thousands to organize on the streets, with respective hashtags facilitating visibility on social media. Digital networking is only one, but important, aspect of the development of the Movement for Black Lives (Freelon, *et al.*, 2016; Ince, *et al.*, 2017; Khan-Cullors and Bandele, 2018; Mckesson, 2018). Although the movement is colloquially commonly referred to by the slogan “Black Lives Matter”, the Black Lives Matter global network is technically one of many organizations in the social movement for Black Lives (Blacklivesmatter.com, 2018). The Movement for Black Lives is a coalition of “more than 50 organizations representing thousands of Black people from across the country” (Movement for Black Lives, 2019). We start from the assumption that the affordances of social media, and more specifically Twitter, are conducive to specific types of leadership dynamics (Evans, *et al.*, 2017). This means that we do not conflate activity on Twitter with a social movement generally — leadership dynamics on other social media platforms and off-line are likely very different from what we study here.

### ***Digitally networked leadership***

Our understanding of digitally networked leadership extends efforts in social movement research to examine contention relationally. One recurrent theme in the literature is the disconnect between theories that stress the relational nature of contention and methodologies that rely on categorical data (Diani and McAdam, 2003; White, 2008). Although scholars of social movements have suggested to focus on the structure of relations among players in contentious politics (Duyvendak and Jasper, 2015), there is a ‘persistent tendency to treat social movements as aggregates of discrete elements (be they individual or organizational actors, or events), rather than systems of relations’ [1]. However, the advent of social media and the increasing availability of network data have given new impetus to relational approaches to social movements. A blooming branch of research employs network analysis to examine empirically how interactions among social media users generate topological structures (Barberá, *et al.*, 2015; Centola, 2010; González-Bailón, *et al.*, 2013) and facilitate information diffusion (Givan, *et al.*, 2010; Goel, *et al.*, 2012). We build on and contribute to this expanding body of work by proposing conceptualizations and methods to study digital leadership dynamics relationally.

### ***Leadership: Concentration and consolidation***

Traditional views of leadership seek to explain prominence in terms of individual attributes. A range of personal properties and skills such as charisma or eloquence allow leaders to inspire action by articulating what a movement stands for (Gusfield, 1966; Weber, 1946). The rise of New Social Movements in the 1960s and 1970s, which innovated with decentralized organization, prompted stronger emphasis on the context of communities to which leaders relate. For instance, researchers stressed that leadership requires knowledge of ‘local idioms, values, and practices’ to unite diverse groups into a mass base (Nepstad and Bob, 2006). The advent of network analysis in social movement studies has further reinforced the focus on leadership as fundamentally relational (Diani and McAdam, 2003). Understood relationally, leadership is not a personal attribute but a quality of a group whose members refer and defer to leaders. While analysis typically identifies leadership with particular persons, we need to attempt to ‘see through the personalities, to dissolve them into the network of processes which have brought them to our attention’ [2]. We build on this relational conceptualization by considering leadership as an emergent phenomenon that develops in ongoing interactions. In the online environment that we study — Twitter — such interactions take the form of follower relations, mentions, or retweets. While in bureaucratic organizations leadership is associated with formal authority, on social media platforms like Twitter leadership is first and foremost associated with centrality in chains of interaction. This is not to say that only centrality matters. For instance, Gerbaudo (2012) documents how activists who manage central accounts can use their administrative privileges to filter or push messages, a role similar to the connective leadership on Facebook described by Poell, *et al.* (2016), while Uitermark (2017) shows how hackers used their computer skills as well as secret chat channels to steer Anonymous activism. We restrict our analysis to only examine prominence, given the specific affordances of Twitter as one particular social media platform.

As mentioned earlier in the introduction, the patterns emerging from these interactions are far from trivial, as tendencies towards the centralization of leadership may interfere with philosophies of egalitarian democracy. We know that self-organizing networks are conducive to the concentration of power in the form of unequally distributed social ties (Barabási and Albert, 1999). Degree distributions of natural, technical, and social networks are often heavy-tailed, forming networks with few high-degree nodes and a majority of small-degree nodes (Broido and Clauset, 2019). On social media, too, network connectivity is generally highly uneven, also in the case of nominally egalitarian movements (Uitermark, 2017). Activists who operate the most central accounts — those with the most followers, subscribers, or friends — hold disproportionate power in setting the movement’s agenda and choreographing protest (Gerbaudo, 2012; Zhu and Lerman, 2016). As Zeynep Tufekci notes ‘ostensible leaderlessness does not stop *de facto* leadership from springing up, and *de facto* leadership is often composed of those with the most time, tenacity, energy, extroversion, pre-existing social status, and even plain aggressiveness’ [3]. In her study of the Chilean student movement, von Bülow (2018) found that social media use reinforced inequalities within the movement in spite of efforts by some groups of activists to mitigate such inequalities.

A number of scholars stress that there is not only power concentration at any particular moment in time but such uneven patterns persist over time due to preferential attachment or other mechanisms of cumulative causation (Michels, 1915; van de Rijt, *et al.*, 2014). A likely generating mechanism in the case of prominence on social media is preferential attachment (Barabási and Albert, 1999; Dorogovtsev and Mendes, 2002; Khamis, *et al.*, 2017). Nunes concisely describes such tendencies when he writes that networks generally ‘do not appear to self-organise their way *out of* power laws’ [4]. Thus, for at least two reasons, it is important to make an analytical distinction between the concentration of leadership at any moment in time and the consolidation of leadership over time. The first reason is that many activists themselves do not reject leadership as such, accepting or even endorsing leadership as a benign and necessary aspect of organizing for progressive change. Many do, however, attempt to mitigate the consolidation of leadership since this would fortify inequalities and foreclose the opportunity for new voices to gain prominence. Patrisse Khan-Cullors puts it as follows: ‘The consequence of focusing on a leader is that you develop a necessity for that leader to be the one who’s the spokesperson and the organizer, who tells the masses where to go, rather than the masses understanding that we can catalyze a movement in our own community’ [5]. A second reason for the distinction between concentration and consolidation is that social media activity is generally volatile: discussions develop at speeds well beyond 24-hour news cycles (Bruns and Burgess, 2012). It seems *prima facie* plausible that this would then also be the case for the prominence of individuals within those discussions.

For these reasons, we suggest two distinct dimensions of leadership centralization. We refer to uneven network connectivity as leadership *concentration*; a network has a high degree of leadership concentration when a large share of attention is directed at a small proportion of its nodes. In addition, we examine leadership *consolidation*. Consolidation occurs when prominent people retain their position over the course of time, transforming from *ad hoc* leaders into *de facto* leaders.

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### 3. Materials & methods

#### *Data collection: Twitter*

We use data collected from Twitter to analyze concentration and consolidation of leadership in networks. We obtained data from the social media platform Twitter by monitoring the streaming API for posts containing #blacklivesmatter, between 15 June 2015 and 15 December 2017. In collecting and reporting data that users have posted on Twitter, we observe the Twitter terms of service which stipulate how data and user information can and must be represented in research. We note that these terms, as well as many recent studies, provide mostly legal considerations about consent but little concern about risk of harm

(Moreno, *et al.*, 2013). Given the contentious nature of social movements and the potential vulnerability of activists, we adopt the framework proposed by Williams, *et al.* (2017) who show that, despite agreeing to legal terms, or not necessarily objecting, users tend to be unaware that their online behavior might be studied for scientific purposes. Accordingly, we report only aggregate patterns. We do not mention individuals not otherwise in the public domain and we do not present information through which individual users can be identified, such as the textual or visual content of posts.

In our network analyses, every unique user represents a node, each mention and retweet a tie. Our dataset includes 23,991,665 ties among 4,632,350 nodes. Because we conceptualize leadership relationally in terms of user prominence, we focus primarily on indegree, measured as the sum of the number of mentions received and the frequency of being retweeted. While mentions and retweets are qualitatively different, we reason both are indications of prominence in the limited attention space of Twitter.

### ***Identifying supporters and opponents***

While many studies equate the activity around specific hashtags with social movement activity generally, our methods acknowledge that many users who use the #blacklivesmatter are not supporters. Because we are interested in dynamics of leadership within the movement, it is vital that we distinguish between supporters on the one hand and opponents on the other hand.

In a first step, we draw a training sample from 18,501,785 unique tweets. We build the sample progressively, sampling 0.1 percent of each day, to make sure posts from throughout the period are selected rather than only the busiest days. These 18,501 tweets are coded manually as positive, negative, or unclear. Any uncertainty results in a tweet coded as ‘unclear’, so that only tweets unambiguously in support or opposition of #blacklivesmatter are coded as such. Using the coded tweets, we derive two lexicons from the training set: one with positive content and one with negative content, with n-grams including words, phrases, and URLs. These lexicons then inform algorithmic coding of the full dataset to determine whether users are supporters or opponents. Users with at least three coded tweets, of which at least two-thirds are coded as positive, are considered as supporters, while users with more than two-thirds negative tweets are considered opponents.

Following our procedure, we identify 89,203 users as supporters (2.1 percent of 4,632,350 unique users) and 144,630 users as opponents (3.4 percent). Not all of those supporters receive mentions: 20,849 users (0.5 percent) appear in the tweets of others in our dataset. The proportion of users classified as supporters or opponents is fairly low because of our decision to filter out users who tweet with #blacklivesmatter incidentally (fewer than three times) or whose tweets are neutral or ambiguous. Because we are interested in the development of online leadership, we opt for precision over recall, focusing on identifying leaders and their relations in our further analyses. Note that we take into account all mentions and retweets directed at these supporters, including attention directed at them by opponents.

### ***Measuring concentration and consolidation of leadership***

We measure concentration of leadership as the distribution of prominence, adopting the method proposed by Clauset, *et al.* (2009) to determine the power law exponent. Basically, a degree distribution that follows a power law is indicative of a scale-free network, in which a limited number of nodes account for a large share of relations (Barabási and Albert, 1999; Shen, *et al.*, 2014). We interpret increases in the exponent as increasingly uneven distributions. Thus, the exponent allows us to assess how prominence is distributed among supporters of #blacklivesmatter. More formally, the exponent  $\alpha$  captures the probability density  $p(x)$  of picking at random a fraction of nodes from the empirical network on day  $t$  with a degree lower than  $k$ . Further technical detail about the underlying procedure of fitting power law models to empirical distributions may be found in Clauset, *et al.* (2009). Practically, we fit power law models above an estimated threshold using the R *igraph* package (Csárdi and Nepusz, 2006).

We examine consolidation as the sustained prominence of leaders over time. We do so in two ways. First, we measure network consolidation using Spearman’s rank. This is an adapted application of a method used

to examine fame trends in traditional media (van de Rijt, *et al.*, 2013). We reason that consolidation occurs when prominent users continue to be prominent, diminishing the potential attention space for newcomers. To test this expectation, we calculate Spearman's rank correlations. More precisely, we evaluate the correlations between the indegree of users at different time intervals. The correlations indicate how strongly and in what direction the prominence of users in a particular period is associated with the preceding period. Or, more formally: if there is no relationship between early prominence and prominence in later periods, user ranks would be distributed randomly between two periods. After determining the indegree of all users for each month in the observation, we calculate Spearman's rank correlations for indegree at various time intervals for the same user, taking the first month the user appears in our dataset as a starting point,  $t_1$ . This is paired with the degree of that same user in the following month,  $t_2$ . Then,  $t_1$  and  $t_3$  are paired, *et cetera* (van de Rijt, *et al.*, 2013). The increase or decrease in the correlation between these pairs provides insight in prominence over time: A user who sustains a similar degree rank position over time contributes to higher overall correlation. Users are grouped in cohorts according to thresholds of average indegree. By reporting increases or decreases for different cohorts of prominence, we can compare tendencies towards more or less consolidation for both the leadership and rank-and-file.

While this measure usefully indicates correlations of prominence ranks, it comes with limitations: baselines are arbitrary, outliers cannot be identified, and individuals are not tracked over longer periods. First, baselines are arbitrary because they are determined by the first appearance of a user in our dataset. Second, outliers cannot be identified because the ranking obfuscates absolute values, while statistically non-significant values and outliers warrant further examination, exactly because they likely include the most prominent leaders. Finally, the measure accurately measures decay of prominence between days for various ranks, but not how specific leaders consolidate their prominence over extended periods.

Second, we therefore calculate a complementary measure of consistency over time, which addresses the limitations of the Spearman's ranking discussed above. Do the same people remain prominent or do new prominent voices arise as time progresses? To examine this, we compile a list of the 100 most prominent leaders during the entire period, and compare this to the top 10 most prominent leaders daily. For every day we determine a top 10 of users receiving the most mentions and retweets. We then determine the number of days that users are among the ten most prominent. We select the 100 users who are among the 10 most prominent leaders for the greatest number of days. We refer to this as the 'established leadership'. We calculate which percentage of the daily top 10 leaders are part of the established leadership, with a higher percentage indicating more consolidation.

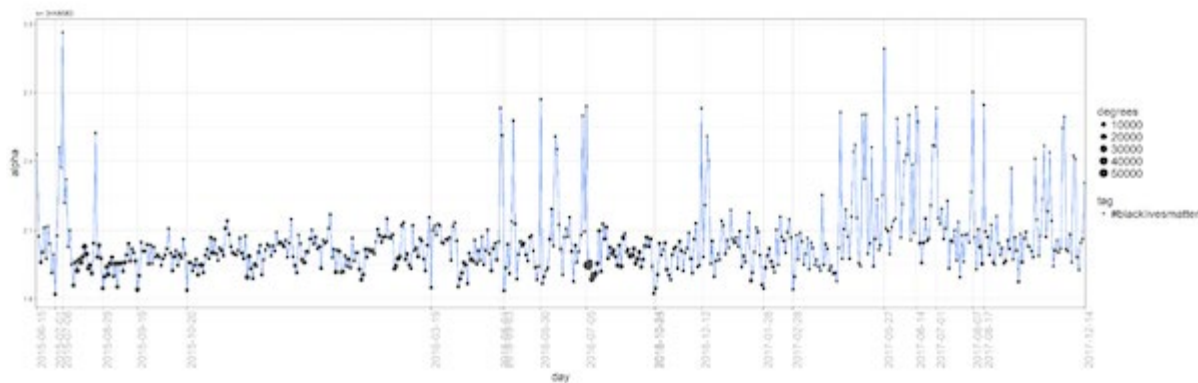
In short, Spearman's rank indicates how strongly prominence is correlated at various intervals for various cohorts overall, but doesn't allow for tracking the most prominent individual leaders over longer periods of time. To address those limitations, we also examine how consistently the same leaders remain prominent.



## 4. Results

### *The concentration of leadership*

Social media potentially enable many leaders to rise to prominence, but could also induce unevenness by concentrating most attention among a select few. People engaging in online activity with #blacklivesmatter have together generated and sustained attention for the movement over the years. How was attention directed at leaders online distributed? As explained earlier, we examine how unevenly attention is distributed among leaders at various times, by fitting power law models to empirical distributions ([Figure 1](#)).



Note: Larger version of Figure 1 available [here](#).

**Figure 1:** The concentration of prominence among supporters of #blacklivesmatter fluctuates on a daily basis. Power law exponents by day, among supporters. Point size indicates the intensity of activity as the absolute cumulative indegree. Note that the graph is based on a calculation of the power law exponent for daily slices of the network. It takes into account minimum sample size, estimation of lower power law thresholds, and Kolmogorov-Smirnov p-values for goodness-of-fit. Note that each point represents a cumulative degree distribution on a logarithmic scale: the distance between exponents of 1 and 2 is a factor 10.

Our findings suggest that attention on Twitter is generally concentrated among few leaders (but less so than comparable networks), and that this pattern is highly volatile over time. First, the power law models confirm that most attention is typically directed at a select few users of #blacklivesmatter on Twitter. These hubs in the network account for disproportionate shares of mentions and retweets received. We find a mean power law exponent of 2.08 among supporters. For similar digital networks of attention, this exponent ranges between two and three, for instance in networks of Instagram popularity (Ferrara, *et al.*, 2014), Wikipedia links [6], online videos (Avramova, *et al.*, 2009; Szabo and Huberman, 2010), music popularity (Hu and Han, 2008; Sinha and Pan, 2006), and online popularity [7]. Compared to such other networks, prominence is slightly more evenly distributed in the #blacklivesmatter network, although the differences are rather minimal. For instance, van de Rijt, *et al.* [8] found an alpha of 1.1 for traditional news media. In short, looking at the network of supporters as a whole, we find that the distribution of prominence is highly uneven, as can be expected from similar networks.

Second, how prominence is distributed varies greatly from day-to-day. The power law exponent ranges between 1.81 and 2.96 for supporters (compared to 1.99 and 3.16 among all users). During particularly volatile periods, the exponent changes by factor 10 or even 100 from day to day (note that the exponent's scale is logarithmic). In our estimations of the model fit, the range of the lower threshold falls between 1 and 5, with a mean of 2.34 and standard deviation 0.97, corresponding to 700,956 users (71.9 percent of all people receiving mentions, including both supporters and opponents). We also note that the power law models do not fit all parts of the network equally well and tend to increasingly diverge from the empirical network in the upper ranges of the distributions. Thus, while preferential attachment is commonly seen as the generative mechanism of power law distributions, our findings suggest that different generative mechanism may be at play for different ranks in the network. Our findings also do not suggest a significant trend in the direction towards more or less concentration. The development of concentration over time is too erratic to capture with a regression line, particularly so during the later period under observation.

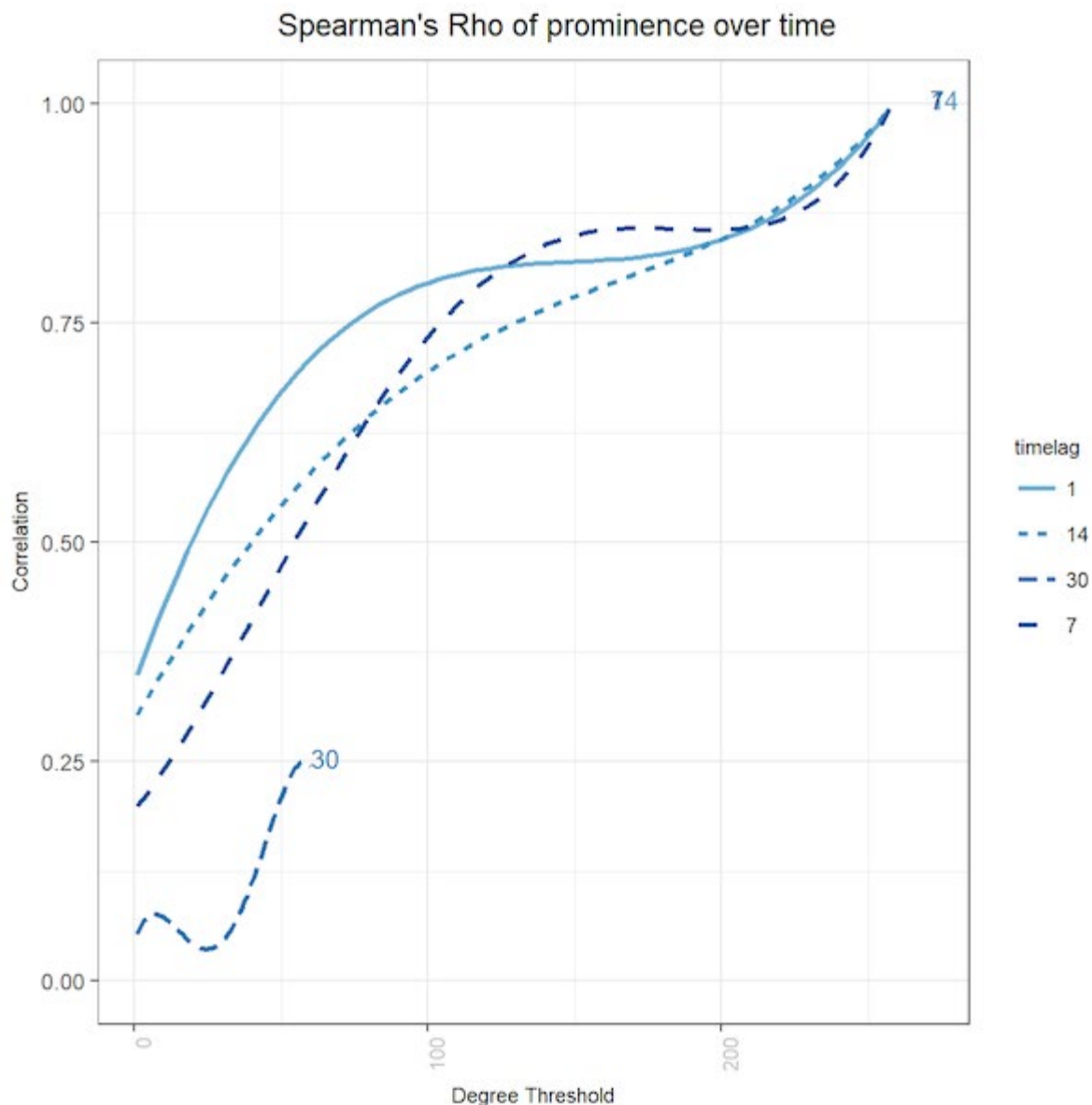
All in all, we find that (1) prominence is concentrated but slightly less so than in comparable networks, and



that (2) there is no clear trend toward more or less concentration over time, as the distribution of attention fluctuates strongly from day to day.

### *The consolidation of leadership*

While potentially allowing for the rise of new leaders to prominence, social media might also induce inequality by consolidating attention among the same people all the time. Is leadership in #blacklivesmatter on Twitter consolidated over time? First, we measure consolidation for different ranks of prominence. [Figure 2](#) shows the Spearman's rank correlation at various times, for users above a certain threshold of prominence. For example, the value 0.75 for users with at least 100 mentions indicates that out of all leaders with at least 100 mentions, 75 percent were already prominent a week before.



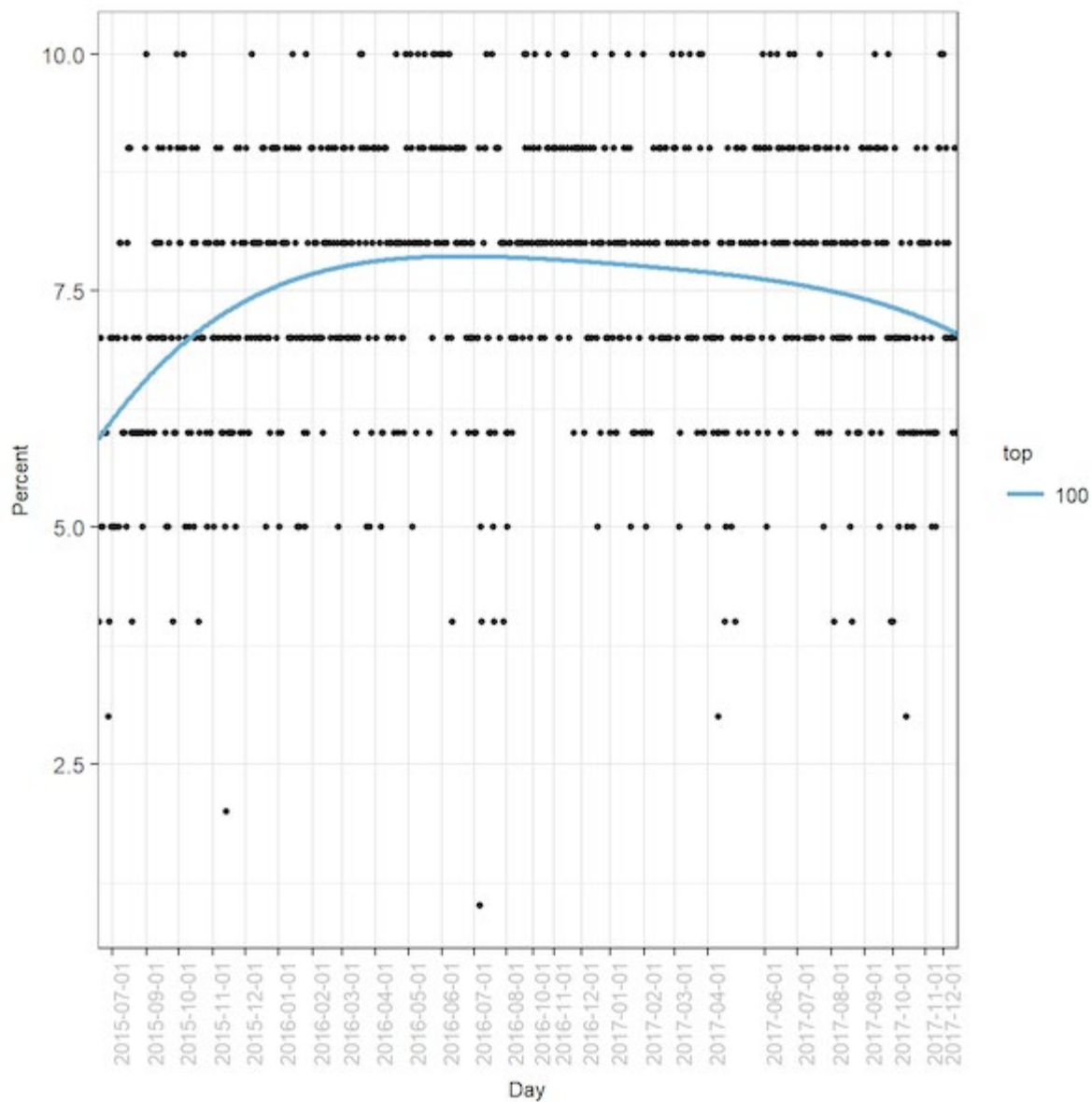
Note: Larger version of Figure 2 available [here](#).

**Figure 2:** Retention of prominence over time at different ranks. Spearman's rank correlation

(x axis) of prominence at different times, above varying threshold levels of prominence (y axis). Line type indicates the increase of days after initial measure of prominence. Note: only significant results are shown ( $p \leq 0.05$ ).

There is a marked difference in consolidation among various ranks: all but the most prominent leaders are replaced over time. This finding is consistent with other studies of media celebrity employing comparable methods, showing that only the most prominent individuals consolidate their positions, while ‘small fame quickly shrinks’ [9]. By comparison, among less prominent leaders, we find a weak to very weak correlation (20,035 users with an indegree of less than 10: about 96 percent of all 20,849 identified leaders, estimates ranging between 0.1 and 0.4,  $\rho \approx 0.5$ ). Results begin to diverge for the middle leadership cadre. Among this group there is a very weak to moderate correlation for being prominent the next day, but this effect quickly decays after more than a day (706 users with indegree between 10 and 50, or 3.4 percent of the leadership, estimates ranging between 0.2 and 0.7,  $\rho \approx 0.5$ ). The upper middle cadre, with an indegree between 50 and 100 mentions, we find moderate to strong correlations, even after more than a day (77 users, about 0.7 percent of all 20,849 leaders identified, estimates ranging between 0.4 and 0.8,  $\rho \approx 0.5$ ). For the most prominent leaders, those receiving more than 100 mentions or retweets on average per day, there is a moderate to strong correlation for consolidating prominence even after two weeks (31 users, or 0.1 percent of the leadership, estimates ranging between 0.5 and 1,  $\rho \approx 0.5$ ). In short, only the most prominent leaders consolidate their position over time. Consolidation increases with rank, and only 0.1 percent of the identified leaders retain prominence for anything more than a few days.

Second, we examine these outliers in more detail, to see whether leaders consolidate prominence consistently. While the measure discussed above allows us to compare degree ranks, this additional measure also allows us to examine specific leaders over time. This measure of consistency is calculated as the percentage of the established leadership that is prominent on any given day ([Figure 3](#)).



Note: Larger version of Figure 3 available [here](#).

**Figure 3:** The most prominent leaders are consistently prominent. The percentage of the established leadership that is prominent on a daily basis. The vertical axis measures the percentage: how many of the 100 most prominent leaders overall reappear in the top 10 of any day (y-axis). A decline in the trend indicates less consolidation among the most prominent users.

Many of the most prominent people on any given day are well-known leaders. On average, 7.5 of the 100 established leaders appear in the top 10 daily. This percentage ranges between 1 and 10, with a mean of 7.5 and standard deviation of 1.4. For instance, the value of 10 percent on 1 September 2015 indicates that 10 of the 100 established leaders appear in the top 10 of most prominent leaders on that day, or in other words, that the 10 most prominent users on that day are part of the established leadership. In short, a select few leaders do in fact benefit from retention of prominence over longer periods.

## 5. Discussion

The advent of social media has afforded activists with powerful new avenues for building decentralized movements. Such digitally networked movements would be less dependent on singular, charismatic leadership at the top of a hierarchy, promising instead a more diverse range of community-based leadership. Research examining digital networking often emphasizes these egalitarian aspirations (Centola, 2015; Conover, *et al.*, 2013; Goel, *et al.*, 2012; Rane and Salem, 2012) but also highlights the uneven nature of digital networks on social media platforms (Borge-Holthoefer, *et al.*, 2011; Shirky, 2003; van de Rijt, *et al.*, 2013). From our findings follow implications for further research on leadership in digitally networked movements.

First and foremost, we note the large number of people having engaged with the hashtag #blacklivesmatter over time (over four and a half million unique Twitter users). This large-scale and sustained online engagement sets the Movement for Black Lives apart among other recent digitally networked movements. In addition, a number of the movement's high-profile leaders have suggested that social media allow for the realization of 'leaderful' movements, warranting empirical examination.

Our findings suggest that the movement is indeed leaderful in terms of the number of prominent users on Twitter. But prominence is also unevenly distributed among them, in the sense that a small number of leaders receive a disproportionately large share of mentions and retweets. This inequality varies strongly from day to day, and only a select few of the most prominent leaders consolidate their position over time.

The methodological implication of our findings is that the modelling of power law distributions to describe relational structures in social movements warrants great caution. Our findings highlight at least two reasons for caution: variance over time and differences between concentration and consolidation. Power laws have been identified in a bewildering range of distributions ranging from citation networks to earthquake intensity (Broido and Clauset, 2019; Clauset, *et al.*, 2009) and social movement researchers have followed suit by observing power law distributions in digital networks (Borge-Holthoefer, *et al.*, 2011; González-Bailón, *et al.*, 2011). Contrary to the idea that power laws are inherent to digitally networked movements out of which they cannot self-organize (Nunes, 2014), our findings suggest that power laws are less than invariant when analysed over time. While indications of an overall power law distribution may tell us something about inequalities in what we might otherwise think of as strictly horizontal movements, aggregating all relations to a single snapshot of the network obscures major day-to-day variance. By examining the patterns and causes of fluctuating degrees of power concentration, we get a better understanding of how a movement's online network configuration changes over time.

Our findings further show that it is critical to distinguish conceptually between the concentration and the consolidation of leadership. Social media do not necessarily incubate decentralized and egalitarian movements. Prominence in the limited attention space of social media is not only distributed unevenly, it is highly ephemeral. We find strong correlations for the prominence of leaders at different times. The Spearman measure indicates that these correlations quickly wear off after a couple of days, for all but a few most prominent leaders online. On the one hand, this finding suggests that social media allow rank-and-file users a rapid but temporary rise to 'insta-fame' (Khamis, *et al.*, 2017; Marwick, 2015; Tufekci, 2013). In the volatile, competitive, and high-churn attention space of social media, only a few leaders manage to remain prominent. This ephemerality poses distinct challenges for social movements. Social media may have a democratizing effect in the sense that a large number of individuals can momentarily become prominent, potentially making it easier for voices to rise up, but that may come at the price of a potential lack of institutionalization (Tufekci, 2017). The high turnover of attention implies a lack of continuity: most leaders cannot build the recognition and trust necessary to guide protest beyond an initial phase of prominence.

On the other hand, while only a select few leaders consolidate their prominence for anything longer than two weeks, our additional measure indicates they do so consistently. This elite is made up of 0.1 percent (31) of all supporters. These well-known figures consistently receive a lot of attention from other people, starring frequently among the ten most prominent users on any given day, making them highly influential *de facto* leaders. Their prominence puts these leaders in a uniquely difficult position: they generate visibility for the cause, but due to that very visibility they bear the brunt of public scrutiny from both within and outside of the movement [10]. Their position may lead to an equally quick fall from favour, reinforcing rather than abating oligarchic tendencies. Even if allowing social movements to become less dependent on a single charismatic leader, the ephemerality of social media may reinforce, rather than alleviate, inequalities in social movements.

In interpreting these findings, it should be kept in mind that we look only at one specific setting, namely Twitter, and that we measure leadership in terms of retweets and mentions. As noted earlier, this provides a partial view of movement dynamics. We emphasize that the leadership on Twitter should not be equated with movement leadership, and leadership on Twitter does not necessarily take the form of a very large number of retweets and mentions but may also be more specific and qualitative (Centola, 2015; Khan-Cullors and Bandele, 2018; Mckesson, 2018). Part of our argument is that the specific qualities of social media generate leadership dynamics that are qualitatively different from what we would expect in organizations or local communities. In particular, it is likely that leadership on Twitter is comparatively transitory and volatile. Herein lie important avenues for integrating qualitative inquiry and computational approaches, which could help to understand how leadership dynamics on Twitter interact with leadership dynamics in other settings.



## 6. Conclusions


Leadership remains a key concern for social movements. The paradox of digitally networked leadership is that social media might facilitate egalitarian forms of leadership, while also inducing inequalities. For activists aspiring to leaderful movements, this means that a more diverse range of voices could rise up from communities in lieu of one or few figureheads.

We conceptualize leadership in digitally networked movements in relational terms, emphasizing relations over individual attributes. While not necessarily apprehensive of other important aspects of leadership, this understanding reflects that leadership is bestowed by others, being attributed recognition of one's voice. In the limited attention space that develops under the unifying hashtag #blacklivesmatter, prominence thus critically depends on relational dynamics. To study these dynamics of leadership empirically, we employed network analysis to a dataset of roughly 18 million tweets containing #blacklivesmatter, collected over 30 months. Our procedure allows for the discernment of supporters and opponents, and relational structures among them.

We find, in short: a large number of leaders, but also inequality among them in the form of strong concentration and little consolidation of prominence. We find concentrations of prominence, fluctuating strongly from day-to-day. Occasionally, there is a relatively even distribution of prominence among leaders, although attention online is typically dominated by few individuals. On the one hand, these leaders may form important chains in loosely connected digital networks, by facilitating the diffusion of frames between otherwise unconnected communities (Boler, *et al.*, 2014; Burt, 2004; McAdam and Rucht, 1993; Poell, *et al.*, 2016). On the other hand, such connective leaders potentially introduce network vulnerabilities (Baran, 1964), their prominence also marks them as a target for opponents, and a limited number of leaders may reinforce problematic dependencies on charismatic leadership as a “prerequisite for social movements” (Chatelain and Asoka, 2015; Cohen and Jackson, 2016).

We also find limited consolidation from all but a select few leaders. In terms of consolidation, the

leadership of #blacklivesmatter is consistently diverse, and new voices readily gain prominence. It is not the case that all conversations are led by the same people day after day. For the movement as a whole, 99 percent of the online leadership changes on a daily basis, and only a select few leaders consistently consolidate a prominent position. In sum, while we do find degrees of leadership concentration among supporters of #blacklivesmatter, there is very limited consolidation of such prominence in the highly volatile attention space of Twitter.

Methodologically, this project advances a computational relational approach that may complement qualitative accounts of leadership in social movements. Examination of degree distributions can be a useful way of measuring inequality in large-scale networks, although the prevalence of power law distributions is subject to debate (Badham, 2013; Broido and Clauset, 2019). We advance this debate by differentiating concentration and consolidation, assessing with multiple measures how inequality develops over an extended period. In doing so, our findings provide insight in today's digitally networked social movements, and suggest how computational methods can be employed in ways that take into account the dynamic and diverse nature of movements. 

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### Notes

[1](#) Diani, 2013, p. 145.

[2](#) Collins, 1998, p. 4.

[3](#) Tufekci, 2017, p. 79; *cf.*, Freeman, 1973.

[4](#) Nunes 2014, p. 32, emphasis in original.

[5](#) Cited in Cobb, 2016.

[6](#) Zlatić, *et al.*, 2006, p. 3.

[7](#) Ratkiewicz, *et al.*, 2010, p. 105; Shen, *et al.*, 2014.

[8](#) van de Rijt, *et al.*, 2013, p. 275.

[9](#) van de Rijt, *et al.*, 2013, p. 276.

10. Tufekci, 2017, p. 79.

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