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Data in movement: the social movement society in the age of datafication

Stefania Milan  and Davide Beraldo 

ABSTRACT

Data has increased currency in contemporary activism and has become an integral part of the action repertoire of today's social movements. But data and data infrastructure are not only tools to support a movement's struggle: they are constitutive parts of the environment in which movements operate, and objects of contention in their own right. These developments challenge scholars of social movements and collective action. How are movements changing under the pressure of datafication? What 'new' mechanisms, actors and tactics meet the growing demand for citizen participation in an increasingly datafied society? Is social movement scholarship 'fit' to capture and interpret this evolution? This theoretical article puts social movement studies in dialogue with critical data studies with the aim of encouraging a much-needed cross-pollination. It advances the notion of 'datafied movements' to address the novel structural condition of contentious politics in the age of datafication and to explore the socio-technical, systemic effects of data and data infrastructure on movement dynamics. It reflects on how five key social movement dynamics, and the related elements in the conceptual toolbox of social movement studies – group formation, opportunity structures, action repertoires, meaning work, and collective identity – are altered by datafication and the advance of intelligent systems in society. In so doing, this article charts the building blocks of a future-proof research program in social movements.

Introduction

Using do-it-yourself open-source sensors, citizens of the Colombian capital Bogota have been collecting their own evidence on air pollution since 2017. They 'leveraged citizen data to participate in the public debate on air pollution' and 'challenged government data infrastructures through prototyping alternatives' (Barreneche & Lombana-Bermudez, 2023, p. 3639). In China, a group of activists crowdsourced an archive of sexual violence, using data-scraping tools to organize stories uploaded by ordinary citizens into a database in view of 'pressuring the government to reform outdated laws' (Sun & Yin, 2022, p. 8). Data contribute to 'fighting bias, building progressive movements, and

promoting civic engagement,' claims Data for Black Lives, a branch of the Black Lives Matter movement mobilizing around the slogan 'Data as protest. Data as accountability. Data as collective action' (Data for Black Lives, n.d.). These initiatives are amongst the many that 'rely on objectivity as the lynchpin to provide truthful accounts to decision makers and contest rhetoric and practices that oppress' (Meng & DiSalvo, 2018, p. 7). They expose how data has gained increasing currency in contemporary activism.

But social movements are also ever more interested in the infrastructure that enables the creation and analysis of data, henceforth data infrastructure. During the 2019 Hong Kong pro-democracy protests, activists were seen taking down 'smart lampposts' feared to deploy facial recognition technology (Wong, 2020). When the then US president Donald Trump threatened with deletion federal evidence on climate change, a coalition of scientists and volunteers embarked in an act of 'data resistance' self-archiving scientific information in danger of erasure (Vera et al., 2018). Not only are data and data infrastructure tools supporting movement narratives: they have become objects of contention in their own right.

We live in a datafied society, characterized by the transformation of many aspects of human and social life into machine-readable data – a process known as 'datafication'. Think of the quantification of emotions and friendships afforded by social media platforms, or the evidence-based policymaking touted by public administrations within 'smart city' projects. Datafication represents the last evolution in the 'computational turn' initiated in the 1950s. Computation has massively accelerated over the last two decades, with unprecedented volumes of information ('big data') being generated and processed to produce value. This shift is 'not merely technological, but also social and political, and it therefore confronts us with questions of power, agency and control' (Hintz et al., 2018, p. 2). Datafication is now firmly installed 'at the core of our culture and social organization' (van Es & Schäfer, 2017, p. 14). It alters the dynamics of political participation and mobilization, affecting social movements in significant ways, as the examples introducing this article illustrate.

These developments at the crossroads of the technological and the social dimensions of political participation pose several questions for scholars of social movements and collective action. How are movements changing under the pressure of datafication? What sort of 'new' mechanisms, tactics, actors meet the growing demand for citizen participation in an increasingly datafied society? Is social movement scholarship 'fit' to capture and interpret this evolution?

This article begins with the observation that if datafication changes the way in which people get together, what they can do and how they do it, it affects the very same foundations of organized collective action. Consequently, the discipline of social movement studies is at a crucial turning point. For one, datafication has multiplied the occasions for social actors to engage in the promotion of social change. For instance, 'open data' made available by public administrations allow social justice activists to scrutinize state output and direct their campaigning efforts (Torres, 2019). These developments facilitate the emergence of new coalitions, innovative campaigns, and original action repertoires (Gutiérrez & Milan, 2019). They contribute to making social movement studies relevant to novel audiences – including scholars of media, culture, political communication, political systems, and governance – promoting inter-disciplinary collaborations. On the other hand, social movement studies face a grand challenge: if the

discipline is to successfully navigate the ‘paradigm shift’ brought about by datafication (Kitchin, 2014), scholars can no longer ignore data-related dynamics, and their material (e.g., data-production mechanisms) and symbolic dimensions (e.g., meanings attributed to data by social actors). This might require updating and expanding the vocabulary of the discipline, making room for ‘better integration of the different intellectual traditions that are currently focused on the same set of empirical phenomena’ (Flesher Fominaya & Gillan, 2017, p. 383). This is precisely the goal of this article and the special issue of which it forms a part.

Exploring these claims, we put social movement studies in dialogue with critical data studies. Critical data studies is an interdisciplinary field of inquiry concerned with data as (power) relations. It investigates the premises and effects of data practices and infrastructures, rather than naturalizing them as a matter of empirical inquiry or as a methodological device (Iliadis & Russo, 2016). In promoting this exchange, we invite a much-needed cross-pollination of vocabulary and research programs.

This conceptual article is organized as follows. First, we explain what is at stake with datafication and how this represents a paradigm shift that goes beyond digitalization. Second, we argue that these developments affect social movements as a whole, not just the specific phenomenon of data activism (that is, activism taking a critical approach to data). We introduce the notion of ‘datafied movements’ to capture the novel conditions under which organized collective action unfolds today. Finally, we put this notion to use to identify five movement dynamics that are altered by datafication: group formation, opportunity structures, action repertoires, meaning work, and collective identity. We conclude by encouraging social movement scholars to pay closer attention to the effects of the materiality of data on mobilization dynamics.

From digitalization to datafication

Datafication refers to the ‘quantification of human life through digital information, very often for economic value’ (Mejias & Couldry, 2019). Albeit sometimes conflated, datafication differs from digitalization, or the transformation of organizational processes in virtue of the adoption of digital technologies, in that it is a ‘deeper’ intervention in the material and social foundations of reality. Datafication is an active intervention in the material and social foundations of reality—one *able to steer* such reality. The impact of the logic of social media platforms on users’ behavior is a case in point (van Dijck & Poell, 2013). What’s more, datafication is a pervasive process that leaves little room for disengagement and affects individual life and social relations far beyond media use. By way of example, think of platforms like TikTok or Instagram. Not only do they enable new forms of self-expression and media consumption; they also generate, accumulate and circulate data about the lived experiences of users, making room for new forms of value extraction, intelligence, and social engineering. A handful of tech firms like Google/Alphabet and Facebook/Meta constitute the engine of this socio-economic system based on the systematic exploitation of personal data (Srnicsek, 2016).

Datafication also increasingly permeates state functions and mediates state–citizen relations – with social consequences. One example is predictive policing enabled by algorithms, which targets citizens across a range of previously disconnected datasets and institutions, (re-)producing patterns of racial discrimination (Ferguson, 2017). Another

is the deployment of machine learning in evidence-based policymaking, which leaves people with fewer mechanisms for appeal and redress (López, 2020). Social inequality is amplified as mechanisms of social protection deploy statistical models and predictive algorithms that are often imperfect (Eubanks, 2018), rendering invisible many communities at the margins (Milan et al., 2021). As a result, democratic norms – including the autonomy of representative institutions and the safeguarding of individual privacy in public space – are challenged by the ‘distributed and largely uncontested new expression of power’ (Zuboff, 2015, p. 75) enshrined in the global architecture of data commodification. Public–private partnerships replace governments as the primary holder of the monopoly over information on the citizenry, eroding established mechanisms of democratic accountability and ultimately citizen agency.

Datafication has also changed what constitutes the public sphere and participation today. For instance, social media platforms both empower and jeopardize people’s ability to mobilize. They deploy recommender systems that cluster users based on their affinity, tailoring content to algorithmic predictions and increasing group homophily. But YouTube has been found to amplify extremist context online (Whittaker et al., 2021). And biometric facial recognition has a chilling effect on the right to peaceful assembly and protest (Zalnieriute, 2021) and resistance to it is on the rise (Madison & Klang, 2019).

Until recently, these developments have been invisible and unintelligible to the public. However, events like the 2013–2016 Snowden leaks (Hintz & Brown, 2017) and the 2018 Facebook-Cambridge Analytica scandal (Heawood, 2018) have contributed to bringing them under public scrutiny, creating awareness about the centrality of data and data infrastructure in our life. These incidents have laid bare the extent to which ‘data politics’ is rife with socio-political consequences (Ruppert et al., 2017).

In outlining an analytical approach to study collective action in the datafied society, we take the lead from the foundational article ‘Navigating the technology-media-movement complex’ by Flesher Fominaya and Gillan (2017). Attempting a similar ‘field-definition’ operation, we observe that movement engagement with datafication does not emerge in a vacuum. But contrary to the authors’ understanding of digitalization as an evolution in continuity with the past with respect to activists’ self-expression, network formation, etc., we argue that datafication as a pervasive social order breaks with the past. We contend that datafication represents more than a mere change in the media and communication channels through which movements speak (cf. Cammaerts et al., 2013). Data-mediated relations do not only entail what is commonly understood as (intentional) communication processes, as they are also generated as the subproduct of everyday actions (e.g., carrying around a geolocated smartphone) or administrative acts (e.g., being registered in a healthcare database). We thus encourage movement scholars to move beyond the understanding of infrastructure development as ‘mere background’ (Flesher Fominaya & Gillan, 2017, p. 386). This is because data introduce novel (power) relations between the lived experiences of people, including movement actors, and the complex socio-technical assemblages that mediate them. Derived from Science and Technology Studies, the notion of socio-technical assemblages (cf. Jasanoff, 2017) is also central to critical data studies. It stresses the entanglement between the social and the technological dimension of an artifact or social phenomenon. Think of movements using social media to mobilize supporters: the algorithmic environment of the platform influences who receives the message and in relation to what other content it is served. In this equation, movements

are empowered to reach out to novel audiences, but they are also stripped of control over the circulation of their messages. Moreover, data are not self-standing technological objects: they do not have a proper ontological status outside the processes, practices and technologies defining and distributing them. In other words, there are no data without devices, dashboards, algorithms, or data analytics; data are embedded in a complex assemblage (Mattoni & Pavan, 2018). Data invite us to adopt an approach to the study of contentious politics that is simultaneously systemic (i.e., not reducible to individual conditions) and socio-technical (i.e., waving together the social and the technological dimensions). From this we derive two observations.

First, today, data and related technologies are the inescapable backdrop against which social dynamics emerge and operate. Datafication is a ‘totalizing’ structural process (Couldry, 2020), which permeates social activity, including political contention, on a global scale and in more and more domains. Intervening also beyond people’s intentionality and/or awareness, data contribute to set the stage for opportunities and motivations to act. Not only do they inform activists’ tactics; they also provide new reasons to mobilize and reconfigure the space in which movements operate.¹ This is why in our study of social movements we ought to move beyond an instrumental relation to technology (cf. Treré, 2016), data and data infrastructure.

Second, data are at once material and cultural arrangements. On the one hand, data change the processes of aggregation and evolution of social formations at a very material level. The core mechanisms of datafication, e.g., algorithmic visibility, define novel ‘infrastructures of the collective’, that is to say ‘institutional arrangements that enable the convergence of a collective in the first place, that also organize the circulation of information, ideas and people’ (Dolata & Schrape, 2016, p. 5). This is exemplified by emerging data-mediated environmental activism in the Brazilian Amazon where environmental activists collaborate with ‘info-mediators’ to create meaning for the broader public (Rajão & Jarke, 2018). On the other hand, data and the associated dynamics are cloaked with an aura of objectivity and authority (or ‘dataism’, van Dijck, 2014) that affords them a distinctive rhetoric power in contemporary societies – which may influence movement framing and identity-making efforts.

In exploring these claims, we expose what is at stake for contemporary movements and their students.

The advent of datafied movements

In 1998, Meyer and Tarrow hypothesized the emergence of a ‘social movement society’, where social protest had become a routinized element within conventional politics in advanced industrial democracies. Movements, they claimed, are an ‘historical and not a universal way of mounting collective claims’, apt to articulate dissent ‘when the consolidated nation-state assured its citizens regular means of communication, created standard but fungible identities, and provided challengers with uniform targets and fulcra for acting collectively’ (Meyer & Tarrow, 1998, pp. 4–5). But what happens to movements when the background in which they operate is so dramatically altered by datafication? To tackle this question, we advance the notion of ‘datafied movements’ to indicate the socio-historical configuration of the social movement society in the age of datafication. Contrary to

notions like ‘media activism’, ‘digital activism’ or ‘data activism’, with datafied movements we do not aim to identify a particular subset of collective action. Our notion does not (only) relate to movements explicitly directed towards datafication as an issue of contention or incorporating datafied tactics in their action repertoire. Instead, it points to how virtually any type of social movement today evolves vis-à-vis the totalizing effects of datafication.

The state of the art we briefly review below reveals how social movement scholars have to date analysed separately the role of information and technology—two constitutive elements of ‘big data’. Concerning the role of information, we know that its strategic mobilization is central to a movement’s effort to frame its claims to stir collective action (Noakes & Johnston, 2005; cf.; Keck & Sikkink, 1998). Information allows movements to craft their media representation and their communication strategies (e.g., Mattoni & Treré, 2014; Neumayer & Rossi, 2016; Ryan & Jeffreys, 2019). The advent of social media represented a game changer (e.g., Barassi & Zamponi, 2020; Poell, 2020), and today movements favour a ‘hybrid’ engagement with the media landscape (Treré, 2019). They develop specific ‘movement media cultures’, defined as the set of tools, skills, practices, and norms developed by movement actors (Costanza-Chock, 2012). Furthermore, in relation to their use of information, movement actors have been approached as framing entrepreneurs (Snow, 2004), knowledge producers (Della Porta & Pavan, 2017) and bearers of ‘counter-public knowledge’ (Hess, 2016). From an infrastructural perspective, technologies of information production and dissemination have been of interest to scholars of media activism (e.g., Carroll & Hackett, 2006; Meikle, 2002) and digital activism (e.g., Milan & Barbosa, 2020; Pickard & Yang, 2017). The emergence from the late 1990s of global networks of counter-information like the Independent Media Center (Indymedia) contributed to the self-narrative of social movements and to the articulation of a novel ‘cultural politics of technology’ (Pickard, 2006, p. 315). Non-profit communication infrastructure like radio stations and servers created by tech-savvy activists served as the digital backbone of movements (e.g., Atton, 2004; Dunbar-Hester, 2014; Milan, 2013). Digitalization has resulted in the acceleration of protest cycles (Hardt, 2017), transforming mobilization and opportunity structures (Garrett, 2006; see also Kaun & Uldam, 2018). Scholars have exposed the ‘institutional role’ of technological infrastructures on social formations (Dolata & Schrape, 2016, p. 2; see also González-Bailón et al., 2011). They have noted how social media empower specific types of collective action, notably forms of ‘personalized’ public engagement such as ‘connective action’ (Bennett & Segerberg, 2012) and ‘cloud protesting’ (Milan, 2015a).

We contend that this literature, however rich, fails to grasp the dramatic transformation of public life promoted by datafication. First, social movement literature tends to adopt an instrumental approach to both information and technology, which privileges what movements do with it at the expenses of the sociotechnical mechanisms underlying their production and circulation. But this is increasingly untenable in the age of datafication. Second, information and technology taken together have received little attention. We claim that bracketing data as information (content) and data as technology (infrastructure) is a necessary premise, and the starting point, for a theory of datafied movements. We need to expand the boundaries of social movement studies if we are to grasp the relation between movements and their datafied environment, overcoming the dominant instrumental approach.

The notion of ‘contentious politics of data’, pointing to bottom-up initiatives that interfere with dominant processes of datafication (Beraldo & Milan, 2019), takes a step forward in this direction. It is visible in an array of data activism practices, where data are either constitutive of a novel action repertoire or mobilized as objects of struggle. Interpreting datafication as threat and/or opportunity, data activists seek to resist (‘reactive data activism’) or repurpose (‘proactive data activism’) data and data infrastructure (Milan & van der Velden, 2016). Examples include encryption activists training human rights defenders in protecting their communications (Kazansky, 2021), civic tech communities appropriating open data for social change (Wissenbach, 2020), or citizens re-elaborating official government data to change the official narrative around traffic accidents (see Muravyov, 2022, in this issue).

But while the heuristic of data activism can help us in understanding a certain type of engagement of movement actors with their datafied environment, it can only partially account for the broad transformations caused by datafication and impacting a movement’s constitution, evolution, and effectiveness. The paradigm shift brought about by datafication has consequences so significant as to alter the dynamics and meaning of citizenship, political participation, and by extension of organized collective action. In other words, data and data infrastructure are constitutive of ‘environments within which [people] move and that shape the structure of their perceptions, their forms of discourse, and their social behaviour patterns’ (Heise, 2002, p. 151).

To stress the systemic and socio-technical implications of datafication on social movements, we advance the notion of ‘datafied movements’. Datafied movements do not represent a particular class of activism (such as data activism), rather the latest ‘historical’ (Meyer & Tarrow, 1998, p. 4) evolution of social movements vis-à-vis the changing structural conditions of contentious politics in the age of mass surveillance and algorithmic mediation. To ‘give legs’ to this notion, we now proceed to reread five key social movement elements and dynamics – group formation, opportunity structures, action repertoires, framing and meaning work, and collective identity – that are challenged and changed by datafication, and that we see, separately or in combination, as archetypical of datafied movements. In making explicit the datafied foundations of today’s movements, we start outlining a research program of recalibration of classical social movement concepts.

Rethinking social movement studies for the datafied society

The recent history of the discipline has seen several attempts to reconceptualize collective action for a shifting (digital) media environment, retrofitting key concepts to future-proof them (see, among others, Bennett & Segerberg, 2012; Bimber et al., 2012; Kavada, 2016; Mortesen et al., 2019; Trottier & Fuchs, 2014). In this section, we add to this trend by reflecting on *the ways in which datafication intervenes in the structural, agential and symbolic dimensions of social movements*.

Algorithmic group making

The first significant change brought forward by datafication concerns group formation, including recruitment and coalition building. We speak of algorithmic group making to indicate the impact of the processes, some of which are detailed below, that affect the way people coalesce in a movement-like formation in the datafied society. Specifically, we observe three trends.

Platform-mediated recruitment and leadership

Non-human, datafied mediators like digital objects (e.g., hashtags) and procedures (e.g., algorithms) re-shape movement recruitment and leadership dynamics. The mechanisms of interpellation built in in social media (e.g., tags, mentions, recommender systems suggesting ‘friends’ or content one may like) allow activists to directly appeal to publics that were once harder to reach (Milan, 2015b). Known leadership patterns are complemented by the ‘choreography of assembly’ enabled by platforms, whereby ‘influential Facebook admins [...] become “soft leaders” or choreographers, involved in setting the scene, and constructing an emotional space within which collective action can unfold’ (Gerbaudo, 2012, p. 5; see also Poell et al., 2016). Moreover, non-human actors (cf. Latour, 2005) like hashtags play a novel role as brokers in movement networks (Beraldo, 2022b), calling for an update of human-centric network approaches to movement formation (see Diani & Mische, 2015).

Groups as algorithmic outcomes

As a result of the algorithmic mediation of the activist agenda, movements may approach algorithmic outcomes governed by the rules of visibility and aggregation dictated by corporate platforms (Milan, 2015b) – and their strategic re-appropriation by movements themselves. They can be seen as ‘calculated publics’ (Gillespie, 2014), or issue groups that are brought together by the automated procedures of platforms. These novel logics of aggregation are not merely the consequence of the empowering effect of the ‘costless’ technology of communication and organization, as the notions of ‘networked publics’ (Papacharissi, 2010), ‘mass self-communication’ (Castells, 2009), or ‘connective action’ (Bennett & Segerberg, 2012) seem to suggest. Rather, platform metrics (Beer, 2016), such as the real-time measurement of content popularity which determines the likelihood an item is displayed to users and its prominence on the users’ interface, play a crucial role in this process.

Accelerated mobilization and demobilization

Mobilization (and demobilization) dynamics are altered by the modified logic of visibility of an environment characterized by real-time metrics, chains of sharing, and algorithms rewarding virality. This can result in a scenario of the type ‘faster is different’ (Tufekci, 2011): the formation of a (visible) critical mass of participants, a precondition for successful mobilization (see Oliver & Marwell, 2001), is facilitated by the quantified, aggregated and visible feedback on group formation embedded in social media platforms. As a result, movement formation dynamics increasingly follow the logic of virality typical of datafied environments, characterized by sudden and unexpected bursts of activity. Acceleration, however, does not necessarily imply

a net positive effect on movements organizing, also considering that the same affordances are available to a movement's opponents (Sullivan, 2014). The same mechanism applies to demobilization, which is likewise hastened (see Kwok & Chan, 2022 in this issue). The result might be an acceleration of the 'cycles of contention' (Tarrow, 1998) and the rapid alternation of visible but volatile bursts in contentious activity. The Occupy protest wave is a case in point. Unexpectedly erupting in New York in September 2011, it quickly spread to the rest of the US and in dozens other countries worldwide, to lose suddenly momentum under the pressure of repression and strategic *impasse*. Whereas Occupy Wall Street has been described more as a 'moment' than a 'movement' (Calhoun, 2013), the meta-hashtag #Occupy[+something] has been periodically revived in the following years, contributing to the visibility of local protests worldwide (Beraldo, 2022a).

Socio-technical political opportunities

Over time, social movement scholarship has paid a great deal of attention to the broader context within which movements emerge. Popular notions include 'political opportunities', or the features of the political-institutional milieu that enable or prevent mobilization (McAdam et al., 1996), as well as 'discursive opportunities', which point to the cultural elements that might facilitate or constrain the attempts to frame an issue for collective action (Koopmans & Statham, 1999). The notion of 'mediation opportunity structure' stresses instead the role of media and communication as instrumental to realizing a movement's goals (Cammaerts, 2012). We note two main developments.

Data and data infrastructure as socio-technical opportunities

A novel class of political opportunities has emerged, consisting of technology-related disruptions such as data leaks (e.g., Cambridge Analytica), surveillance scandals (e.g., Snowden revelations), or technological advancement that results in the implementation of controversial digital solutions in society (e.g., facial recognition cameras in Hong Kong). These opportunities *change the focus away from the state* and into the corporate sector and the novel state-industry alliances that characterize surveillance capitalism (Zuboff, 2015). Furthermore, empirical evidence exposes how in the digital environment of data 'frames of opportunity appear with far less frequency than threat' (see Wright, 2022 in this issue). In other words, the datafied society in its corporate and state ramifications presents movements with a novel set of challenges that directly impinge on citizen agency and human rights – which may prompt mobilization. We can interpret this evolution as expanding the remit of political opportunities as they have been traditionally defined.

Novel transnational opportunities

Although sensitive to the local context, datafication creates a matrix for opportunity structures that impact social movements at the global level. This may result in novel opportunity structures that are transnational in nature. Like never before, individuals and communities around the world are united by their use of a set of corporate solutions including devices (e.g., iPhone) and platforms (e.g., Instagram, TikTok) and the 'culture of connectivity' (van Dijck, 2013) they promote, which create a sense of commonality

across latitudes, languages, geographies, and cultures (think of how the Arab Spring mobilization have hastily been named ‘Twitter revolutions’ (El-Nawawy & Khamis, 2012)). This commonality may propel a novel trans-nationalization of issue areas related to the data and technology realm and beyond. The #DeleteFacebook campaign, that swept across the internet in 2018 prompted by a criticism of the company’s data manipulation practices, is a case in point (Mills, 2021), as is the ‘against Googlization’ mobilization in Berlin and Toronto (Charitsis & Laamanen, 2022, in this issue).

Data-enabled action repertoires

Data have entered the movement’s action repertoire, adding to the tools available to activists to advance their goals (Beraldo & Milan, 2019). Movements mobilizing on issues like climate change or racism, among others, increasingly embrace data-enabled practices: they may ‘start counting’ (Currie et al., 2016) to gather independent evidence on social problems for advocacy purposes, as showcased by the examples introducing the article. Novel algorithmic-oriented tactics, such as algorithmic resistance by means of trending topic hijacking (i.e., gaming the rules of visibility of social media platforms) (see Treré & Bonini, 2022, in this issue), doxing (i.e., the online spread of private information about individuals or companies) (see Li & Whitworth, 2023, in this issue), distributed-denial-of-service (DDoS) attacks (i.e., the disruption of a website by overwhelming the service with abnormal traffic) and other ‘hacktivist’ practices (Jordan, 2015) are increasingly popular among a wide range of movements. Activists might also leverage the technological affordances, such as real-life voting, embedded in technology, such as Telegram (see Poon, 2024, in this issue). We observe three trends.

Novel skill-based partnerships

Unusual skill-based partnerships emerge as claim-making and direct action evolve to exploit the possibilities offered by data and related infrastructure. Innovative coalitions form around newly needed data skills and tactics when these are not readily available to a given movement, with, for example, environmental activists partnering up with data experts and programmers to advance their goals (Milan & Gutiérrez, 2017) or hacker collectives joining in to support of street protesters in disparate contexts (Beraldo, 2022a). This may have the effect of introducing novel divides along the dimension of technological skills.

Loss of control (and increased risk of profiling) due to proprietary data infrastructure

Data-enabled action repertoires typically rely on corporate platforms whose ‘inner’ mechanisms (i.e., proprietary algorithms whose workings are not apparent to platform users) are only superficially intelligible to activists, affording scarce control over means and ends of online communication and protest tactics. Movements organizing through Facebook groups, for instance, might suddenly see their structure dissolved due to the platform redefining the boundaries of admissible content or to context-insensitive automated moderation algorithms. And the dependence on proprietary infrastructure is linked with increased risk of activist profiling, online surveillance, and movement-counter movement dynamics (Leistert, 2013).

Repertoire adaptation and ‘translation’

Groups relying on pre-digital tactics **sometimes** seek to identify the ‘digital equivalent’ of their standard practices, translating them to fit the challenges of the datafied society. The environmental organization Extinction Rebellion offers its activists insights about how to exploit datafied platforms to multiply the visibility of their civil disobedience actions (Extinction Rebellion Present: How To Start A Revolution + Q&A, 2019). The interruption of web-based services of private companies via DDoS attacks, for example, has been compared by activists to acts of expression of free speech such as sit-ins (Karanasiou, 2014). In sum, not only does datafication introduce novel tactics and opportunities, but it may encourage movements to rethink the implications of existing practices considering the datafied environment in which they are deployed.

Datafied identity building

Promoting the reconfiguration of contentious agendas and group formation dynamics, datafication alters the context in which movements enact their subjectivity and negotiate their collective identity. Collective identity denotes the ‘common cognitive frameworks’ supporting collective action; ‘in part the fruit of emotional recognition’ (Melucci, 1989, p. 35), it is ‘interactive and shared’ and results from a ‘network of active relationships between actors’ (1996, pp. 70–71; c.f. Flesher Fominaya, 2010). Several scholars have sought to re-interpret the concept of collective identity in light of the changing media environment (e.g., Ackland & O’Neil, 2011; Buyukozturk et al., 2018; Kavada, 2015). McDonald noted how collective identity in the digital age approximates ‘the public experience of the self’, which is inherently fluid, at the cost of group solidarity (2002, p. 111). But how is this process affected by datafication? We identify two trends.

Volatile identities based on platform metrics

The emergence of contentious subjects in the datafied society is anchored to the logics of the attention economy (Tufekci, 2013) and the grammar of digital culture described above—e.g., the algorithmic configuration of issue publics. Specifically, the ‘politics of visibility’ (Milan, 2015b) prompted by the personal engagement with content production and platform metrics, centers the individual’s subjective and private experience, partly replacing the formation of a collective identity resilient to time. It makes it susceptible to continuous renegotiation, amplifying its ‘interactive and shared’ character, to revisit Melucci (Milan, 2015b) – however with the intervention of algorithms outside movement control. Collective identity then tends to be volatile and short-lived, but it is also flexible to accommodate multiple affiliations. Hashtag activism is a prime example of this phenomenon: the #MeToo marker connected personal experiences of sexual harassment allowed for ‘network acknowledgement’ (Suk et al., 2021), exposing how magnitude is a mechanism for validation of experiences and identities (Gerbaudo, 2022). This validation is however only possible based on minimum-denominator descriptors (Milan, 2015a).

Incoherence and exacerbation of a movement’s internal diversity

Contentious instances, as seen in relation to group formation, are reassembled by algorithmic processes into constellations that are contingent, temporary, and

(potentially) incoherent. Their fluid and transient nature can be masked by the bold, stable appearance of their semiotic interface, as social media platforms encourage the adoption of a standardized symbolism to partake in their ‘visibility game’. Recognizable ‘brands’ propelled by datafied measures of popularity (e.g., Anonymous, #Occupy, Black Lives Matters) represent the same, uniform face of diverse, and often incoherent assemblages (Beraldo, 2020, 2022a). If contradiction in movement formations is nothing new, as movement identities are naturally open for negotiation and internal conflict (Melucci, 1996), this tendency has been exacerbated by the personalization of contentious politics favored by digital communication networks (Bennett & Segerberg, 2012) and, moreover, by the platform dynamics implicit in datafied identity formation.

Machine-mediated meaning work

Meaning-making, or the activists’ ‘interactive process of constructing meaning’ for collective action (Gamson, 1992, p. xii), is at the core of movements’ activity (see also, *inter alia*, Melucci, 1996; Mische, 2003; Polletta, 2006). Because ‘issues do not have an independent life outside of people’s efforts to characterize them as such’ (della Porta & Diani, 2006, p. 65), it matters how movement actors assign meaning to their experience and whom they interact with to elaborate their definitions of issues (e.g., air pollution) to link them to a broader problem (e.g., climate change). The changing technological landscape affects the way meaning work unfolds within and around movements, primarily by changing the ways its material basis (i.e., information) is generated, distributed and consumed. Meaning work today is increasingly mediated by algorithms and AI-powered search engines and recommendation systems, including consumer-level Large Language Models (LLM), either as standalone applications or integrated into others. With two main outcomes:

Hybrid and biased info-scape

Because people’s ‘information diet’ is at the core of public opinion and values formation, the dynamics related to the production, circulation and consumption of information are constitutive of social movements in contemporary societies (see Castells, 2009). With the advent of datafication, these dynamics are increasingly the outcome of hybrid processes, where the human and the machine are intertwined. Algorithms filter, rank and rearrange information for users, allegedly augmenting political polarization, either by trapping users in echo chambers of homogeneous content, or by exposing them to positions outside of their bubble and reinforcing partisanship as the result of group interaction dynamics (Törnberg, 2022). And LLMs intervene not only at the level of curation, but also at the level of generation of information, further hybridizing the contribution of humans and machines in defining today’s info-scape. In other words, AI-operated agents become part of the constellation of players that contribute to the ‘sustained symbolic and cultural conflict between different actors’ (della Porta & Diani, 2006, p. 66): an add-on to the interpretative tools and cognitive apparatus (made of ‘cultural and ideational elements’) that enable people to make sense of their world (Swidler, 1986, p. 273). Whereas it is still early to appreciate the profound

transformations that ‘Artificial Intelligence’ capable of imitating the autonomy and creativity of human actors will bring about, these technologies stand in continuity with less advanced forms of algorithmic mediation of information in that they are characterized by intrinsic bias (cf., Kordzadeh & Ghasemaghahi, 2022) – a condition that contemporary social movements can no longer ignore and, occasionally, seek to resist (see the case of algorithmic transparency activism).

Data as rhetorical tools for framing

Cognitive praxis, e.g., the relentless production of cultural codes (Melucci, 1989), is a constitutive element of organized collective action. Today data are mobilized as part of the narrative strategy of certain social movements and, more broadly, as resources for their framing activity (see Benford & Snow, 2000). The climate justice movement is a case in point, as it oftentimes relies on statistics and data visualizations as tools to construct its diagnostic framing (cf., Vera et al., 2019). Data-solutionist movements such as ‘data science for the social good’ initiatives (e.g., Kinsella, 2021) incorporate data as part of their prognostic framing, while the emphasis on social media engagement metrics as a vehicle for recruitment and to demonstrate societal relevance testifies of how datafication can impact motivational framing.

Conclusions

This article asked how the ‘movement society’ (Meyer & Tarrow, 1998) is responding to the advent and challenges of datafication. We explored the tensions that big data (and, by extension, up-and-coming Artificial Intelligence applications) expose social movement research to. We started charting the building block of an emerging theory of datafied movements that brings the discipline in conversation with critical data studies. We argued that to understand social movement dynamics in the age of datafication we cannot look at data and data infrastructure in a merely instrumental way, e.g., as a methodological toolkit (‘big data research’), nor can we consider data solely in its guise of ‘information’. This is because datafication represents a fundamental paradigm shift with consequences on the way we exercise and understand citizenship, political participation, and collective action. It is also a totalizing experience that can hardly be avoided, as it deeply affects the context in which movements emerge and operate. Its consequences for social movements go well beyond what is captured by notions such as digital or data activism. To meet these challenges, we advocated for attending to the infrastructural and material dimension of the relation between movements and data, embracing a socio-technical perspective in studying datafied movements. We advanced the notion of ‘datafied movements’ precisely to capture these developments. Rather than indicating a novel class of activism, datafied movements stand in for the structural condition of contentious politics in the age of datafication: in other words, we are looking at a novel socio-historical configuration of the social movement society. Hence, we revisited five key elements of the conceptual toolbox of the discipline, namely group formation, opportunity structures, action repertoires, meaning work, and collective identity, in the assumption that social movement scholarship needs a makeover to fully understand the tensions within datafied movements. Algorithmic group making, socio-

technical political opportunities, data-enabled action repertoires, datafied identity building, and machine-mediated meaning work meet the demand for citizen participation today, presenting social movement action with novel challenges. More work remains to be done to future-proof social movement studies for the complex technological developments we live through. We thus encourage colleagues to pick up the challenge of better understanding the role of data and data infrastructure in re-mediating social movements dynamics amidst rapid technological innovation.

Note

1. Furthermore, movements might actively avoid or seek to minimize the effects of datafication on their mobilization strategies, withdrawing from the ‘matrix’ of datafication. But because datafication cannot be ignored but resisted, this case, too, exposes the grasp of datafication on social actors. Movements, then, will adapt their practices to minimize its reach, continuously re-negotiating their existence in an increasingly datafied society.

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