

Governance by Data

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Abstract

Law and social science scholars have long elucidated ways of governing built around state governance of populations and subjects. Yet many are now grappling with the growing prevalence of practices of governance that depart, to varying degrees, from received models. The profusion of digital data, and the deployment of machine learning in its analysis, are redirecting states' and international organizations' attention away from the governance of populations as such and toward the amassing, analysis, and mobilization of hybrid data repositories and real-time data flows for governance. Much of this work does not depend on state data sources or on conventional statistical models. The subjectivities nurtured by these techniques of governance are frequently not those of choosing individuals. Digital objects and mediators are increasingly prevalent at all scales. This article surveys how scholars are beginning to understand the nascent political technologies associated with this shift toward governance by data.

1. INTRODUCTION

Technological change is happening faster and more pervasively than ever—or so it is incessantly reported. Virtually no domain of legal and social relations can claim to have been wholly untouched by advances in computation and digital technology, even as the force of that touch varies widely across fields and in different parts of the globe. Much—possibly too much (Lepore 2014)—has been written about innovation, disruption, and cognate terms. Yet comparatively little has been written about nascent transformations in political technology and ways of governing associated with the growing prevalence of digital technology. Analyses of the digital economy and its legal infrastructure abound, but many of those proceed by presuming or aspiring to an extension or intensification of preexisting ways of governing and holding to received rubrics for analyzing governmental power. Surveyed here is a selection of scholarly writings that, instead, try to confront nascent transformations in political technology associated with digital technology on their own terms, and to grasp their effect upon, or implications for, some of the traditional building blocks of law and social science analysis. These writings reveal a range of ways in which data are operating as vectors of governance and remaking its constituent elements and logics in the process (with data here referring for the most part to digital data).

2. WHAT GOVERNANCE EFFECTS DO DATA HAVE?

Whether or not one accepts the claim that data are media of governance depends in part on what one understands by the latter term. Exegeses of governance abound in law and social science scholarship, and some have appeared in the pages of this journal (e.g., Gunningham & Holley 2016, Huising & Silbey 2018, Shamir 2010). As Levi-Faur (2012) has explained, governance is a term encapsulating various modes of control over people, places, and things that constitute and direct without necessarily being hinged upon the state. Governance is wielded by and within states, as well as beyond, between, and against them. Governance denotes mechanisms of steerage that are institutionalized, regularized, systematized, or embedded but do not necessarily cleave to the agents, vocabularies, or appendages of government or manifest as formal law. Governance encapsulates power rising to a certain level of recurrence and influence at scale, without restrictive regard to that power's source or format.

Because of the diversity of formats that the term comprehends, governance is often chaperoned by adjectives. Algorithmic governance [or “algocratic governance” (Aneesh 2002)] is one illustration, signifying the eliciting, conditioning, and direction of human behavior by sequential computational procedures, often with self-modifying capacities, as implemented in a wide range of settings (e.g., Danaher et al. 2017, Yeung & Lodge 2019). Platform governance is another, meaning those technical protocols, ownership structures, laws, valuation practices, and other mechanisms of control that are characteristic of, and tend to reinforce the necessity of, digital platforms as sites of economic and social encounter, intermediation, and exchange (Cohen 2019). Infrastructural governance denotes the controlling effects of coupling or embedding information technology with or in physical infrastructure, in so-called smart cities, for example, or the effects of digital platforms operating as infrastructure (Luque-Ayala & Marvin 2016, Plantin & Punathambekar 2019).

This article surveys scholarship using all the preceding terms and approaches, as well as scholarship that starts from other points of embarkation in analyzing the governance effects of digital technology. It does so by inverting and making heterodox use of another composite term: data governance. Typically, data governance has referred to those mechanisms of corporate or bureaucratic governance concerned with defining who within an organization has authority over, and accountability for, maintaining and managing data and how those data may be used. In this

article, governance by data denotes instead the propensity for the gathering, assemblage, formatting, analysis, transmission, and storage of digital data to have governance effects without determinative regard to the policies and intentions of those charged with data management. To illustrate this, let us focus on three types of governance effects of which digital data have been shown, in recent literature, to be important vectors.

2.1. Data Govern by Constituting and Modifying Social and Legal Agents

First, digital data have been shown to constitute and modify social and legal agents, or to play a significant role in their qualification and effectuation. Amoore (2020, p. 66) has written, for example, of the “distributed and composite form of being” enacted through multiple humans’ “communion with algorithms” and with the often-irrecoverable streams of data that pass through and remake those algorithms, insofar as they incorporate machine learning. As Amoore has observed, it is frequently unclear where one could or should plausibly locate an authorial human agent amid the unending feedback loops traced by data processed through machine learning algorithms. Social and legal agency mediated by digital data is dispersed and alloyed in multiple configurations, some of which cannot, even speculatively, be explained by recourse to a model of a singular, directive agent. As well as making social and legal agency often difficult to attribute, this dispersal has called into question what we understand the enactment of agency to entail (Hildebrandt & O’Hara 2020).

Consider, for example, the digital technologies used, per Eubanks’s (2018) description, in New Zealand and the United States to try to predict children’s risk of exposure to maltreatment from the moment of birth and to inform child protection officials’ discharge of their legal responsibilities accordingly. A case study of such a system’s implementation in Pennsylvania (in Allegheny County’s Department of Human Services) observed that the risk score emitted by the automated system “help[ed] to inform, train and improve the decisions made by the staff” with each—the human and automated participants in decision making—“relying on very different information in assessing referrals” (Chouldechova et al. 2018, p. 137). In so doing, the automated screening system employed “ensemble methods such as random forests and boosted decision trees” (both of these being types of machine learning algorithm): methods that “make predictions in an opaque manner” (p. 10). This all took place under conditions in which “the call workers and supervisors”—both groups interacting iteratively with the automated screening system—“[we]re physically colocated and their observed decisions [we]re. . . intertwined” (p. 13). This, the study’s authors noted, was very different to the preexisting practice of “caseworkers gathering details about the adults and children associated with the alleged victim” according to “local practices and policies” and making a “decision. . . whether to investigate” on that basis (p. 1). Regardless of whether one favors one or the other model of agentive action—the analog “before” or partly digitized “after” of this account—it is readily apparent that the two are not equivalent. In Allegheny County, the mediating role of digital data brought into effect a continuum of agency shared between multiple human and nonhuman actors working in novel informational and physical configurations. The social and legal identity of the caseworker was transformed in the process; the actions open to a caseworker—the possible ways of performing the role—were newly conditioned. These new modes of subjectification are discussed further in Section 4.

2.2. Data Govern by Reshaping Social and Legal Relations

Second, digital data resituate, restage, and reshape social and legal relations. Despite the tendency of some scholars to try to translate digital data into analog forms for purposes of analysis—such

as speech (e.g., Wu 2013)—the relations that digital data elicit tend to exceed or belie those translations. Digitally mediated social relations are not just analog social relations represented otherwise (Fourcade & Johns 2020). Communicative relations are remade, for instance, when programs of affective computing or sentiment analysis lay claim to human intention or feeling by analyzing digital data emitted and collected unknowingly (Zuboff 2019). Relations of citizenship are restaged when reliance is placed on the classification of digital data for their activation and deactivation. Cheney-Lippold (2016) has described, for example, how the US National Security Agency (NSA) has created and acted on digital proxies for citizenship and foreignness. According to Cheney-Lippold, the NSA treated a user as foreign, for purposes of applicable regulation, if certain digitally recordable indicia traceable to that user were classified as foreign with at least 51% confidence. Such digitally assembled foreigners could then be surveilled, the NSA surmised, without regard to the guarantees of the US Constitution against search and seizure. So expressed, the state–citizen relationship is no longer rendered in switch-like terms (citizen/noncitizen) but rather spans a spectrum of intensity.

2.3. Data Govern by Expressing New Modes and Repositories of Power

Third, digital data give expression to new modes of control and new repositories of economic and social power. Pistor (2019) has shown that the power to “legally code” capital—that is, to render certain assets legally recognizable as capital—has been fundamental to the distribution of wealth in society. One of the latest extensions of this practice, Pistor highlights, entails the digital encoding of assets into capital, through the issuance of digital currencies, for example, and more recently, investment in non-fungible tokens (non-replicable cryptographic tokens representing something unique, such as an artwork or item of sports memorabilia). Relatedly, Fourcade & Healy (2017, p. 10) have explained how digital records combining data on people’s relative “financial responsibility, social network influence, healthy bodily habits or productivity at work” constitute a new “supercharged” form of capital, the distribution of which regulates individuals’ and communities’ access to other forms of social and economic capital. Elsewhere, data have been cast as a more pedestrian form of capital, distinct from, yet rooted in, economic capital (Sadowski 2019). Regardless of how one labels the capital at issue, it is certainly the case that platforms that hoard the highest volumes of digital data, and most effectively promote its production through user engagement with their interfaces and services, exert a “centripetal pull” of capital and power (Pasquale 2016, p. 315; see also Cohen 2019).

2.4. Why Data and Not Platforms or Algorithms?

To approach all the foregoing registers and routes of control as manifestations of governance by data (rather than, say, algorithmic governance) is to emphasize the mediation and mutability of power rather than its accumulation at any one time in particular platforms, or its modulation by specific algorithms. These storehouses and stoppages of power remain important, of course, and a focus on governance by data still permits us to grapple with them. Yet there are two reasons why a focus on governance by data, as distinct from platform or algorithmic governance, is analytically valuable.

First, platforms and algorithms are, at least in part, products of data: They are as much outgrowths of data as they are outcomes of design or investment. Digital data flows fuel platforms’ growth and, when redirected or reformatted, their demise. Digital data flows found the business cases for, and otherwise give meaning to, particular kinds of platform infrastructure, such as cables, satellites, and servers. Digital data flows likewise sustain the training and retraining of machine learning algorithms. Neither of these organizational forms—platforms or

algorithms—stands prior to or remains unchanged by data. In short, data feed, shape, and govern them all, albeit in varying degrees. This is one aspect of why contending conceptions of digital data—and different values with which we invest such data—comprise such intensely contested terrain (Viljoen 2020).

Second, there are many settings in which digital data are amassed in ways that have governance implications without necessarily being accompanied by sophisticated algorithmic analysis.¹ Municipalities, for instance, have in many places become avid collectors of digital data through sensors, cameras, and other smart city infrastructure. Some such municipalities do not, however, have the resources to build or secure by contract algorithmic prediction or data analytics capabilities, or may have diminishing means to do so over time (OECD 2020, pp. 14, 17). Even when they do, it may be the very fact of data collection—and of a particular place visibly laying claim to being smart—that shapes a city’s interactions with its inhabitants, irrespective of its operationalization for prediction. As Cardullo & Kitchin (2019, p. 7) have observed, “People can embrace a ‘smart lifestyle’ by becoming a resident in a smart building or district” regardless of how algorithmically informed the governing bodies in question turn out to be. Governance by data is usually entwined with and implicated in platform or algorithmic governance, but not necessarily so. For these reasons, this article proceeds by asking what digital data make of states, subjects, and populations, not what algorithms or platforms make of these traditional elements of modern law and social science.

3. WHAT DOES GOVERNANCE BY DATA MAKE OF STATES?

One of the primary building blocks of law and social science understanding upon which these governance effects bear is the state. Recent work in legal and social sciences scholarship has traced how digital technology is, in combination with other forces, rerouting and reconfiguring the work and organization of states and changing how states interact with their constituents and counterparts. Reconfigurations of this kind are apparent in national statistics, public welfare provision, public education management, criminal justice administration, intelligence and policing, environmental protection, humanitarian relief, emergency management, and diplomacy, among other areas.

3.1. Governance by Data is Changing States’ Composition

Public sector investment in, and adoption of, digital technology takes many forms and generally seems to be proliferating as more and more states pursue “digital government strategies” (UN Dep. Econ. Soc. Affairs 2020, p. 1). This is remaking the states in question from within (Fourcade & Gordon 2020, Johns 2019). In the process of having greater recourse to digital technology and data, state agencies are being recomposed and reoriented. Resulting changes in staffing profiles, budgetary allocations, and delegations within government are widely in evidence. Many countries’ governments now include chief information officer, chief technology officer, and chief innovation officer roles, as well as countless subordinate roles, such as the “e-governance champions” that India has sought to embed in line ministries and departments (UN Dep. Econ. Soc. Affairs 2020, pp. 168, 193). Digital technology increasingly mediates state agencies’ interactions with their employees and with members of the public through automated systems that often defy explanation (Calo & Citron 2020, Crawford & Schultz 2019). State data-collection infrastructure extends to all sorts of smart installations and remote-sensing technologies (Albino et al. 2015). Data scientists are now routinely involved in the production of official government statistics, as discussed further below (Grommé et al. 2018). Late-twentieth-century enthusiasm for public–private partnerships

¹I am indebted to Mariana Valverde for reminding me of this.

(recalling prior centuries' permutations of the same) has been renewed and redirected toward engaging technology leaders from the private sector in the performance of core state functions (UN Dep. Econ. Soc. Affairs 2020, p. xxxiv). This has seen a range of commercial actors become influential mediators of state service delivery and state use of force, the role of companies like Palantir in designing platforms for policing being one example (Brayne 2017). In these and other ways, the practice of digitizing government operations is making of states—key units of analysis for law and social science scholarship—something other than they have previously been.

3.2. Governance by Data Alters the Techniques and Logics of State Governance

With these changes in state workforces and budgets, the techniques and logics of state governance have changed and are changing. States' growing recourse to shifting streams of digital data for purposes of trying to understand the needs, wants, and circumstances of their constituents is giving rise to new ways of seeing and being as a state. No longer are techniques of simplification, legibility, and planning necessary preconditions to state action. In many instances, an early warning signal, or a "minimally viable" policy prototype, assembled from real-time digital data, will suffice (Johns 2019). Diplomatic work is increasingly conducted via digital channels, as diplomatic actors seek insights from online communities and work to extend or counter influence through digital platforms (Bjola & Holmes 2015). Third parties condition and mediate these efforts in politically impactful ways. States of the Global South in particular must contend with a litany of data doubles: digital representations of their politics, and social and economic conditions within their territories, assembled by commercial actors in parallel with, and sometimes in lieu of, national data (Taylor & Broeders 2015). This is not in itself new: States of the Global South have long had sovereignty tailored for them by those on a civilizing mission and had to contend with donors' and development practitioners' projection of better versions of their future (Anghie 2005). Nonetheless, the digital alter egos with which they must contend have proliferated. Such states are also increasingly engaged in the datafication of feedback loops between people and governments, a practice that has tended to redirect the logic of institutional reform away from transplantation (from North to South) and toward site-specific reflexivity and adaptation (Desai 2020). With these changes in the logics of state governance, the objects and subjects of state governance are being reconstituted.

4. WHAT DOES GOVERNANCE BY DATA MAKE OF SUBJECTS?

In Foucault's work from the late 1970s, techniques of subjectification—the making of social and legal subjects and their inculcation with certain characteristics and desires—were shown to be indispensable to governance. Governmentality came to depend on subjects understanding themselves to be free and obliged to conduct themselves in ways appropriate to that freedom, that is, in self-optimizing ways (Foucault 2008, pp. 291–308). The practices entailed in making free, aspirational subjects were many in Foucault's writings, yet among them were practices of statistical quantification, measurement, and comparison (even as those practices were typically oriented around populations rather than individuals). Statistics and their expression in policy and practice offered subjects mechanisms for understanding themselves as part of a society and for trying to make themselves more normal, productive, or optimal in that context.

4.1. Data Science Modifies How Objects and Subjects of Governance Are Assembled

Data science did not feature among practices of subjectification in Foucault's account, so what bearing, if any, might the advent of data science have had upon practices of subjectification central

to governance? Several features of digital data, and the science of its analysis, make distinctions between data science and statistics potentially significant for the shaping of social and legal subjectivity. These suggest that data science tends to “do” subjects in ways that differ from the statistical work of “making up people” (Hacking 2006). This is the case even though the two fields are not easily disentangled: Some argue that data science is a subfield of statistics, and some argue that statistics comprises a part of data science (Carmichael & Marron 2018).

On the question of its distinctiveness, data science has been characterized, quite banally, as “the science of learning from data” (Donoho 2017, p. 748). Much hinges, however, on what amounts to “learning” and “data” in this definition: Both are important areas of distinction vis-à-vis statistics. Learning in data science includes machine learning: the development and use of computer algorithms capable of spontaneously changing their approach to a given task through the experience of imbibing and processing data. Some machine learning algorithms implement statistical methods but deploy them without rendering internal relationships and values interpretable. And the data in question for data science are large volumes of messy, unstructured digital data—typically data encountered in the wild, or in the market, rather than data elicited by experiment or survey. Accordingly, Donoho (2017, p. 745) has suggested that data science comprises “a superset of the fields of statistics and machine learning.” The “super” in that superset reflects the impact of exponential increases in computational storage and processing capacity and associated growth in data’s profusion, variety, and availability for analysis.

Statisticians have, of course, long employed computation, but they have typically approached both data assemblage and learning differently to the approaches just described. Statistical work has conventionally entailed designing experiments or surveys to elicit data, estimating the parameters of a model encompassing those data, validating those parameters’ descriptive adequacy (by attention to discrepancies between expected and observed data), and, if necessary, revisiting estimations to improve descriptive accuracy and yield insights (indices, probabilities, inferences) judged statistically significant. Statistics typically assumes that data are generated by a given stochastic data model and seeks to fill out the parameters of that model (Breiman 2001). The aim of data science, in contrast, is not to fill out a preexisting data model but rather to come upon an algorithmic function that will operate on given data to generate sufficiently accurate predictions in the face of newly encountered data.

The disorderliness of the data with which data scientists grapple, and the nonreproducibility and noninterpretability of much machine learning from it, makes it very difficult to map onto data science a process comparable to statistical subjectification. Faced with the outputs of a statistical model (either directly or by their expression in law and policy), social and legal subjects may plot themselves or be plotted against available categories and values and understand more or less how those were generated. Statistics generates interpretable normalities that may inform conduct and judgment; Hacking (1990, 2006) gives the example of the changing measurement of societal obesity, for instance. Data science constitutes categories and rankings of subjectivity too, of course, but not in ways that conform readily to received accounts of subjectification.

4.2. Governance by Data Elicits Subjects Differently

Famously, Althusser (1971; see also Butler 1997) analogized subjectification to the scene of someone on the street hearing the “hey, you” of a police officer and turning around, at that moment becoming recognizable, and recognizing herself, as a subject of, and subject to, legal and social authority. Any hailing (or, in Althusser’s terminology, interpellation) of people mediated through digital data is, in contrast, multidirectional and multisource. Consider, again, the

situation of welfare claimants [discussed above, with reference to the work of Eubanks (2018) and US child protection agencies]. Raso (2017, pp. 78, 93) has recounted how an applicant for welfare in the Canadian province of Ontario will be hailed—made recognizable, or not, as a subject of entitlement—through a combination of caseworker discretion, “policy directives, forms, checklists, flow charts, [and] data management software” that requires them “to fit into preset menu options.” When digital data derived from social media platforms are added into the mix—as is increasingly the case, in governments’ efforts to detect welfare fraud (Headworth 2019)—the human and nonhuman agents from which the subject-evoking “hey, you” emanates, the forms that the calling takes, and the avatars of the person to which it is addressed become even more numerous and changeable or hard to pin down. Writing of persons recognized as refugees being subjectified by data extracted from their interactions with digital and financial technologies of humanitarianism, Tazzioli (2020, p. 14) has drawn attention to the ways that these constitutive dynamics diverge from Althusser’s account, suggesting that refugees emerge from these interactions as “subjects without interpellation.”

Furthermore, to a far greater degree than has previously been the case, subjects must now call themselves forth digitally to recognize themselves, and make themselves recognizable, within surrounding social and legal orders. This they must do by creating and emitting digital data, consciously and otherwise, out of which a continually shifting array of classifications may be assembled—classifications that, assembled through machine learning, often cannot be contemplated in advance (Fourcade & Johns 2020, Lupton 2016). To maintain their subjectivity, or to remain discernibly present in society, people are “invited to view [them]selves as longitudinal databases constantly accruing new content” and new classifications (Schüll 2016, p. 325). This is the case not just with individuals but with groups of subjects too. Local communities affected by natural disasters, for example, increasingly take to social media to try to establish, and insert themselves within, new categories of entitlement to relief, manifest digitally (Madianou et al. 2015). Protestors often work through social media to produce digital renderings of alternative futures and prefigure new political institutions, albeit with mixed results (Tufekci 2014). The archetypal subject that such practices evoke is no longer the inward-looking, self-regulating, entrepreneur-of-the-self characteristic of governmentality. Rather, that subject is an outward-looking tinkerer, an incessant maker and learner of digital data, ever searching for herself and projecting herself among the data shadows (Fourcade & Johns 2020, Johns 2019).

If recent work has shown social and legal subjects being newly assembled in data, as discussed above, it is important to try to clarify exactly what points of continuity and discontinuity become apparent. Subjects have always been called forth by distributed power. Subjects have always been mobilized to self-identify and self-educate. The hailing police officer of Althusser’s account was only ever a summit marker for a diffuse array of operations. In the context of policing, for example, the power to call up subjects has been constituted by courts, bureaucrats, uniforms, weaponry, fingerprinting equipment, surveillance cameras, crime fiction, and so on. That power has also been constituted by the conduct, attitudes, and experiences of the policed (Lacey et al. 2018). Nonetheless, it is apparent that the configuration and components of subjectifying power are taking novel forms. Especially significant, in this regard, has been the influx of machine learning and intermediaries like Palantir (mentioned above). Subjectification is mediated by data of unprecedented volume and variety, drawing upon data sources that have not previously been networked, many of them in private hands. Determination of subjects’ relative newsworthiness or value for governance purposes is increasingly guided by digital sensing and processing of which those subjects have no awareness—processes of determination often entangled with commercial activities and incentives (Johns 2017a). Subjects are sorted, and sort themselves, but into classifications that may become visible only *ex post* rather than *ex ante*. New technologies

of the self mediated by data assign subjects not so much the task of fulfilling their subjectivity as continually trying to render it machine detectable (Fourcade & Johns 2020).

5. WHAT DOES GOVERNANCE BY DATA MAKE OF POPULATIONS?

Just as the individual data subjects hailed by digital representations of the tasks and terrain of governance diverge from those called forth by earlier techniques of governance, so the aggregates in which governance trades have altered too, as already intimated above. Recalling Foucault's work from the 1970s once again, Rose et al. (2006) described how practices of modern governance became oriented toward the management and productivity of populations. Those practices persist, of course, all the more so in the face of a global pandemic (Liu & Bennett 2020). Yet at the same time, populations are not necessarily foremost among the objects of governance mediated by digital data.

5.1. Governance by Data Sublimates Populations into Digital Aggregates

Whereas traditional statistics entailed representing a population by certain forms of proxy—representative samples—for purposes of analysis, the analysis of digital aggregates that have not been purposively, systematically, or randomly sampled changes the rendering of human aggregates for governance. Bashford (2014, p. 17) has characterized international organizations' and states' engagement with population problems throughout the twentieth century as “experiments in globality, the imaginative activity through which the ‘daily work of human beings’ was linked to the idea of a global polity.” However, when governance is oriented around digital aggregates in the first instance—that is, around composites of digital data repurposed to shed light on people, places, and things for governance—the imaginative work encouraged is of quite a different order.

Think of the digital dashboards used across government, and in corporate decision making, at every scale (Bartlett & Tkacz 2017). The digital aggregates that they represent are typically composed of data from multiple sources, processed by a range of public and private mediators, spanning different spatial and temporal scales, but often incorporating real-time data. When taken as objects of governance, these digital aggregates are speculative in three senses of the term speculation. They are assembled through close—even rapt—observation of available digital traces. They are conjectural, in that their potency is based on inference and anticipation—anticipation, that is, of some remedial or other governmental action in real time or in the near future. And those who work with them look to dynamic interactions among data points in the hope of being able to realize some immediate gain in knowledge and capacity. Governments, international organizations, and their many private-sector partners are increasingly captivated by such speculative digital aggregates as expressions of the end, the object, and the appropriate field of intervention for governance work. Concern with populations in the statistical, actuarial, and biopolitical sense seems, at times, to kick in at a lower, later stage. Populations frequently appear beneath, behind, or embedded within the dazzle of the digital aggregate.

Illustrative of these shifts is the increasing use of (and widening aspirations to use) digital data to assemble official statistics at national and international scales, nurtured by initiatives such as the Global Working Group on Big Data for Official Statistics created by the UN Statistical Commission in 2015 (Daas et al. 2015). Data employed for this purpose—some experimentally and some, in the case of supermarket scanner data, for instance, quite routinely in certain countries (Melser 2018)—include anonymized mobile phone data to assemble migration and tourism statistics, supermarket scanner data to help generate inflation statistics, satellite surface reflectance data to assemble agriculture statistics, and social media data to infer levels of consumer confidence for

economic reporting purposes (Salgado & Oancea 2020). In such settings, conventional statistical populations, such as those made up of national survey respondents, are problematized, with emphasis laid on the expense, respondent burden, and lack of timeliness associated with conducting surveys (Cakici & Ruppert 2020). The object that comes into view instead, when attention is directed toward digital data sources in the hope of addressing these problems, is a composite, mobile aggregate. That aggregate is marked by whatever properties may be inferred from digital data incidentally generated by its online or remotely detectable activities.

By way of further illustration, consider some of the digital platforms that have been assembled to try to help governmental and nongovernmental agencies to direct aid where it is most needed in the aftermath of a disaster (Johns & Compton 2019). Consider how applications of social media data are being explored, and to some extent adopted, for purposes of emergency management (Luna & Pennock 2018). Consider how biometric data are being amassed and used in the governance of refugee protection (Lindskov Jacobsen 2017). Or consider how digital data and technologies are being deployed in disease surveillance and public health response (Cheung 2020). In all the aforementioned settings, the power of the digital aggregate manifests and is maintained both objectively (in the form of a model or visualization assembled to inform policy, for instance) and subjectively (in the perception of its authoritativeness in people's minds), much as the state retains authority in Bourdieu's (2014) analysis. Interaction with digital aggregates helps to render the world that they represent "a meaningful world with sense and values in which it is worth investing one's energy" (Bourdieu & Wacquant 1992, p. 127).

5.2. Governance by Data Rallies Collectives Privately and Opportunistically

In contrast to the way populations are typically rallied for governance (through some official or officially endorsed sampling, census, or survey), digital aggregates called up in these various settings tend to be assembled using data streams generated by or through interaction with commercial operators, e.g., Google Trends, Twitter postings, mobile phone calls, and the ceaseless orbiting of commercial satellites. State projects of enumeration and monitoring have, of course, been routed through nonstate actors before (Crawford 1997). Yet the latest instances of public-constituting data gathering being rerouted through private infrastructure go well beyond contracting out: Data collection now derives its animus and logic from the market. The data so assembled are typically not samples at all in a classic, statistical sense. The status of these data as proxies for the public is opportunistic. The potential of the digital data in question to aid governance is established only retrospectively, after the conditions of those data's gathering and processing have been established otherwise, for very different (i.e., profit-making) purposes. Moreover, it is the fact of the data's profusion and availability that often drives inquiry, rather than the other way around. Unlike the self-recording individual subjects discussed above, and unlike the would-be census participant of traditional official statistics (Kertzer & Arel 2002), those with a stake in the representation of such a digital aggregate are typically not in a position to contest the terms and conditions of its assemblage.

5.3. Governance by Data Disassociates and Segments the Population

Also noteworthy is the disassociated (or fleetingly associated) way in which elements within digital aggregates appear. Digital data are invariably expressive of particular, contingent social, legal, and economic relations. Nonetheless, these relations are often not well captured or represented in digital data structures designed for commercial segmentation and tailoring (in the case of mobile

phone, social media, or search data) or for remote comprehensiveness (when it comes to satellite data). Insofar as digital data do represent social and legal relations within aggregates, these are not relations marked by what Curtis (2002, p. 508) has argued is a key feature of the population in Foucault's account, namely its "dependen[ce], in the first instance, on the establishment of practical equivalences among subjects, objects or events." The aim of using digital data for official statistics is precisely to constitute a governmental terrain out of nonequivalence, or to extricate actionable data points from out of a "general regime of living beings" (Foucault 2009, p. 75). The use of digital data is often expected to yield greater precision or granularity than population statistics have previously exhibited. That is the case even if the precision in question may be "precis[e] inaccura[cy]," requiring validation against traditional data, because of the nonrepresentativeness of the digital data available (McFarland & McFarland 2015). Digital aggregates are not more artificial than populations as targets or topoi of governance; they are simply assembled according to different logics. Digital aggregation adheres more to logics of segmentation and modularity than it tracks the contours of biological life or political organization. So assembled, digital aggregates reshape the field of prospective intervention made available to those charged with governance.

5.4. Governance by Data Transforms the Field of Prospective Intervention

When the field of prospective law and policy intervention is represented digitally, its ambit may extend beyond the reach of traditional frameworks and rationales for governance. The prominence that such digital platforms give to multisource, multiscale, unstructured, or variably structured data means that they often do not support evidence-based interventions as conventionally understood [typically those "informed by rigorous controlled intervention studies and by systematic reviews or meta-analyses of these" (Rhodes & Lancaster 2019, p. 2)]. Rather, they may do more to encourage "evidence-making intervention[s]" that are "inseparable from the complex systems and contexts [they] see[k] to describe and adapt" (Rhodes & Lancaster 2019, p. 5). As Lindskov Jacobsen (2017) has shown in her work on humanitarian agencies' embrace of refugee biometrics, measures for which there is not necessarily a robust rationale are continually piloted, in the name of experimentation, based on their effects being observable in real time and potentially proving beneficial. In the face of budgetary pressures, worries about timeliness and risks of inaction, and an ever-increasing profusion of digital data sources as potential prompts for action, "good enough" digital data may suffice to trigger governmental intervention (on "good enough" governance more broadly, see Rocha de Siquiera 2017). Once again, these are not per se good or bad developments in terms of the quality of intervention that they may yield (which is hard to evaluate generically), but they do signify a shift in governing logic. Digitization implies indexation to "discrete elements with well-defined boundaries" (namely, particular sequences of ones and zeroes) rather than positioning along a contestable continuum of analogous elements (Galloway 2019, p. 97). And this shift may disarticulate governmental decision making from established mechanisms for reviewing and questioning the bases for law and policy decisions.

5.5. Governance by Data Redistributes Governmental Attention

Just as the field of prospective intervention may be reshaped by its digital representation (beyond the reach of conventional statistics and other technologies of modern governance), so too are the techniques invited by these representations modified. As noted above, digital dashboards are proliferating as decision support tools for government (Lock et al. 2020). These nurture a particular set of governance techniques in relation to aggregates. Tkacz (2015, p. 3, 5, emphasis in original)

has observed that dashboards characteristically elicit a “*distributed* form of attention,” the ideal mode of which is “continual but punctuated *glancing*” that may take different forms, among them “[m]onitoring, surveiling, mulling over and ‘drilling down.’” To pursue some governmental aim on the terrain represented by such a dashboard, an agent charged with governance responsibility is invited to disassemble aggregates into indicia at many scales, including drilling down to the smallest possible scale: records of divided perception (Deleuze 1992). Given the dynamism of the data displayed, she is invited to experience continuously shifting dissimilarity within the data, even while addressing the aggregate.

Moreover, the data features upon which governance is invited to act by a dashboard or other digital data visualization do not necessarily correspond to biological entities. A digital dashboard using mobile phone data to represent human migration in the aftermath of a disaster, for example, might seem to depict individual bodies in movement. However, each dot in such a visualization will actually represent a device from which data was recorded, so that any one human body may be distributed across several dots (see, e.g., Pulse Lab Jakarta 2019). The units of analysis brought to the fore in such visualizations are less biological bodies—the stuff of populations—than slipstreams in data, configured at the confluence of filtering parameters. They are lines of sight (Amoore 2009). In such settings, the constitution of a field of potential governmental action, or the narrowing or redirection of the aperture of governmental attention, may not require much by way of biosocial data. Sometimes an instrumentally engineered digital conflux of seemingly actionable data points will suffice to flesh out a field of potential action and direct governmental attention across it (at least for purposes of prompting a closer look).

In all these ways—by altering the imaginative work elicited by and for the task of aggregation; privatizing the assemblage of data for that task; disassociating and reassociating units of analysis within aggregates; changing the scope and techniques of governance encouraged by such assemblages; and directing governmental attention away from the statistical properties of a biosocial mass toward its episodic, conjectural representation—digital data constitute new ends of governance alongside, and sometimes in front of, populations.

6. CONCLUSION: WHAT DOES GOVERNANCE BY DATA IMPLY FOR LAW AND SOCIAL SCIENCE?

In one of the most widely cited articles of this journal, Rose et al. (2006, p. 84) highlighted the fecundity of Foucault’s analysis of the development of liberalism: that “art of governing that ar[ose] as a critique of excessive government.” As they noted, Foucault’s elucidation of this technology of government revealed the fruitfulness of asking certain questions of political power, among them, “Who governs what? According to what logics? With what techniques? Towards what ends?” (p. 85). Of particular prominence, in Foucault’s response to these questions, was the modern emergence of “a form of reason that took as its particular object the political problem of population” (p. 84)—the problem, that is, of how to activate and manage a population to ensure its security and productivity—and aimed at nurturing self-governing subjects (p. 89). Axiomatic to both was the rise of statistics (Hacking 1990).

In the years since that article, scholarly engagements with governmentality, and with the related logic of biopolitics, have proliferated. For decades, many have concurred with Deleuze’s [2018 (1986), p. 14] suggestion that we are inhabiting an “age of the biopolitics of populations.” Most recently, in the face of a global pandemic and widespread quarantine, scholars in law and the social sciences have made effective use of Foucault’s analytical repertoire (e.g., Roberts 2019). This article does not suggest that this repertoire is exhausted—far from it. Rather, it registers a shift in

prevailing political technology for which Foucault's repertoire did not and cannot fully account—that is, a shift in the logics, techniques, and objects of governance that law and social science scholarship is still in the earliest stages of grasping. Populations remain objects of governance, and statistical techniques are still ubiquitous. Subjects are still nurtured to be free in certain directions. Yet, interleaving these units of analysis, and interspersed with these techniques, are objects and mediators of other kinds. Specifically, we have seen the rise of digital objects and mediators, often not assembled or deployed in accordance with traditional statistical method or beholden to the will of individual human subjects.

Rose et al. (2006, p. 101) urged readers to learn from Foucault how to track the ceaseless “invention or redeployment of techniques and technologies” and to enact “a certain ethos of investigation, a way of asking questions, a focus not upon why certain things happened, but how they happened and the difference that that made in relation to what had gone before.” Let us now reflect on the last of these questions. What difference might the aforementioned shifts make in relation to what has gone before? What difference might these make, in particular, for law and social science? At least four prompts or reminders emerge from this analysis.

6.1. Study the Strange in the Now

The foregoing account offers a reminder, first, that legal and social scientific analysis must remain alive to the strange in the present and recent past. Analytics of governmentality and biopolitics—and the logic of neoliberalism, to which they are related—retain great purchase on contemporary phenomena. Brown (2019) has shown, for example, the value of tracing neoliberalism's latest manifestations and effects. Nonetheless, some political logics emergent and operative today are not well analyzed in terms of these or other received rationalities. Further elaboration and careful differentiation are required to investigate now-prevailing “styles of thought, their conditions of formation, the principles and knowledges that they borrow from and generate, the practices that they consist of, how they are carried out, [and] their contestations and alliances with other arts of governing” (Rose et al. 2006, p. 84).

6.2. Revisit Basic Units of Analysis

A second, related indication arising from the work reviewed above is that there is much to be learned from revisiting basic terms and units of legal and social science analysis and investigating how their make-up and operation may have been affected by the ubiquity of digital technology. All is not new in the now, of course. Yet that which walks and talks like a state today is not necessarily fungible with what we have known and expected of states to date. In addition to those archetypal objects of modern governance analyzed above (states, subjects, and populations), governance by data has a bearing on many other key terms of law and social science, in combination with other constitutive and regulatory forces, including security (Aradau & Blanke 2017), territory (Hildebrandt 2017, Johns 2017b), capital (Sadowski 2019), labor (Rogers 2020, Scholz 2016, Wood et al. 2019), money (Maurer 2012), bodies (Kloppenburger & van der Ploeg 2020), and race and gender (Benjamin 2019, McMillan Cottom 2020, Nakamura & Chow-White 2012, Noble 2018, Shah 2015).

Working with these terms, law and social science scholars have long investigated historically contingent ways of configuring society and structuring relations that have endured in the face of resistance—race is probably the most pernicious example. The work of reconstitution and reconfiguration underway that has been briefly surveyed here is in precisely that vein; that is, it may have something like the impact of the emergence of the modern idea of race in the eighteenth and nineteenth centuries. Aggregations and allocations of power to govern by data—no matter how

“black boxed” their operations (Pasquale 2015)—are being made in plain sight. Resistance takes many forms (e.g., Velkova & Kaun 2021) but does not always find its mark. Far from being just a matter of economic monopoly (as much as that is a matter of importance), data’s agglomeration troubles the fundamentals of legal and social representation and relation. In this light, it cannot be presumed that the key terms in which law and social science work has been conducted to date continue to mean the same thing or have the same purchase.

6.3. Enlarge the Repertoire of Questions

A third intimation of investigations surveyed in this article is to hint at the importance of enlarging the repertoire of questions that law and social science scholarship typically asks regarding digital technology. Questions by which many have lately been preoccupied—concerning bias, discrimination, privacy, surveillance, electoral integrity, disinformation, worker displacement, anticompetitiveness, and the digital divide—remain salient. Important work on these questions is ongoing, and justifiably so (e.g., Hirsch 2020, Hovenkamp 2021, Hu 2017, Johnson & Rostain 2020, Khan 2017, Land & Aronson 2020, Pasquale 2019, Susser et al. 2019, van Dijk 2017). Yet work revolving around these questions does not touch some forms of exploitation and domination mediated or compounded by digital data. In particular, it does not attend (for the most part) to the way relations of exploitation and domination may be implicated in the socio-technical constitution of subjects and objects of governance, both individually and in the aggregate, through the medium of data (Foucault 1982).

Furthermore, insofar as reformist questions frequently posed in legal and social scientific studies of digital technology tend to invite interim, technical corrections, fixation on those questions may extend and redouble the very political logics that they seek to confront. Take, for example, the measures that Google allegedly took to try to address racial bias in the training sets used to develop its facial recognition software: soliciting facial scans in exchange for coffee vouchers from persons of color, targeting the economically vulnerable and socially marginalized (Fussell 2019). Similarly, the prevailing emphasis on design solutions in law and social science—evident in work oriented toward, e.g., privacy by design, equity by design, or the design of data trusts—is yielding some important work. Scholarship in this vein is showing prospects for new forms of social and legal data repository, under diverse conditions and ownership structures (e.g., Delacroix & Lawrence 2019, Rahman 2018). Yet it remains important to develop ideas for dismantling and replacing institutions, as well as tinkering with or extending the reach of established models (e.g., Morozov 2019). There is much that cannot be bent to human will, but there is also nothing about global order as we know it that is a necessary preordained culmination of the many histories that have woven this moment.

6.4. Assume Complicity and Cut Anchors Loose

What becomes clear, also, in any investigation of the “mundane business of [data] governing everyday economic and social life” (Rose et al. 2006, p. 101) is that this requires the navigation of complicity from a posture of immersion in, and intermediation by, the phenomena under investigation. Techniques of external critique remain critical, alongside internal critique (Tomlins 2007), but the exterior vantage point that external critique demands may only be assumed virtually, as if it were possible to step outside of data.

The scholarship surveyed here could be taken to be trying to undo sociolegal scholarship’s favored fixation—on the social (Tomlins 2007)—and replace it with an anchorage in the digital. Yet to conceive of digital data as media of governance makes any such tether unreliable. Once digital data are cast as artefactual techniques and vectors of governance, as in the foregoing account,

data become more than digital: more, that is, than composites of discrete, differentiating units (Galloway 2019). Data operate as media of relation and contestation, patterning and continuity, distribution and organization. And who is to say how they may yet be redistributed and reorganized otherwise?

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