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Business Ethics and Quantification: Towards an Ethics of Numbers

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Abstract
Social practices of quantification, or the production and communication of numbers, have been recognized as important foundations of organizational knowledge, as well as sources of power. With the advent of increasingly sophisticated digital tools to capture and extract numerical data from social life, however, there is a pressing need to understand the ethical stakes of quantification. The current study examines quantification from an ethical lens, to frame and promote a research agenda around the ethics of quantification. After a brief overview of quantification research and its uses in state and market organization, I discuss quantification in terms of three core subprocesses—capture, specification, and appropriation, illustrating and identifying ethical concerns around each process. Linking these processes to the performative effects of measures, I present a working model of quantification from which the discussion builds ideas for developing a research agenda around quantification.

Keywords Quantification · Datafication · Technologies of control

> *A sociology of quantification is best regarded as a prolegomena to an ethics of numbers.*
> Espeland and Stevens (*2008, p. 431*)

Recent interest has surged around the social and organizational implications of quantification, defined as "the production and communication of numbers" (Espeland and Stevens 2008, p. 401). Much of this interest is around the ethical stakes of numbers, questioning the roles of quantification in worker control (Wilson et al. 2020; Mazmanian and Beckman 2018), ideological obfuscation (Chelli and Gendron 2013), or the "datafication" of life (e.g., Sadowski 2019). These critiques mobilize diverse ethical

conceptions to examine quantification, from consequentialist concerns around the consequences of numbers in social life (e.g., Baud et al. 2019) to deontological issues around the objectification of subjectivity (e.g., Urueña 2015). Some recent work extends such concerns to the ethicality of quantification in research (Zyphur and Perides 2017), arguing that quantification may divert recognition of the relational aspects of organizing.

In the meantime, issues of quantification have become increasingly pressing across diverse areas of social life. Particularly in the wake of the "big data" phenomenon (e.g., Mayer-Schoenberger and Cukier 2013) and the increasing use of digital platforms to collect quantitative data *en masse* (Sadowski 2019), understanding the ethics of quantification is a pressing social concern (Pink and Lanzeni 2018). Increasingly, quantitative data are not only used to inform managerial decisions but may constitute a form of management itself (Bruno et al. 2014a, b; van Dijk 2014), as critiques of "algorithmic management" explore the control possibilities of highly datafied workplaces (e.g., Beverungen et al. 2019, 2015). More recently, the implications of quantification and measurement has taken new life in the COVID-19 pandemic, where how, where and upon whom quantification takes place can be a matter of life and death (Taylor 2020). While not limited to these new contexts, seen in their light, quantification

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takes on a qualitatively distinct meaning, and old questions around numbers' representative and epistemological status are remade as questions about how social life is transformed in a digital age (Bruno et al. 2016; van Dijk 2014; Desrosières 1993).

Despite the growing interest and pressing need to understand the ethics of quantification, little work in business ethics currently exists although some have suggested preliminary steps toward establishing a research agenda around quantification (Pink and Lanzeni 2018; Espeland and Stevens 2007), particularly elaborating Foucauldian perspectives on measurement and governmentality (Wilson et al. 2020; Chelli and Genrop 2013). Drawing on but broadening from these perspectives, the current paper takes up this agenda in the context of business ethics to build theory in this area. Bringing together diverse quantification perspectives around an ethical focus, I organize these into a working model that can ground future empirical research. My hope is to move beyond critiques of quantification as such (e.g., Power 1997) to consider the complexities of quantification in its different phases, and thus to promote theory and practice around more ethical ways of dealing with the powerful technologies of quantification.

Because this study involves a broad survey of the possibilities of ethical theorizing around quantification, I do not adopt a single ethical standpoint to consider quantification in all its aspects. Rather, the goal of the paper is to show how distinct issues arise and different moments of quantification, from the choice to quantify, to the construction and deployment of metrics, to the use of numerical data. These different aspects bring up a wide array of ethical issues that can be understood according to diverse normative models. Thus, keeping a pluralistic orientation at this early point in the discussion aims to allow a space for emerging research across the gamut of ethical theorizing.

The rest of this paper will continue as follows: First, I provide an overview of quantification as it has been addressed in the social sciences. Next, I propose a three-fold schematization of ethical issues around the capture, specification, and appropriation of quantitative data, based on the overarching questions of *what should be quantified, how quantification creates social objects, and how these objects are socially distributed*. Elaborating on the specific ethical implications of each of these foundational questions, I build an agenda for research around the ethical study of processes of quantification. Finally, the discussion weighs the important social functions of quantification against its dangers. I do not argue for the rejection of quantification as such but rather for its modest use within a pluralistic epistemic toolbox that is tailored to the requirements of specific action situations. Indeed, in the discussion section, I describe how quantification can be essential to ethics when conducted reflexively as part of that toolbox.

Quantification as a Multi-Faceted Ethical Concern

Concerns around the sociology and ethics of quantification have appeared periodically across the social and human sciences, although these dispersed discussions have rarely been coordinated in a systematic way (Berman and Hirschman 2018; Espeland and Stevens 2008). Among these diverse areas are the history and philosophy of science (Desrosières 1993; Hacking 1990), sociology (Mau 2019; Espeland and Stevens 2008), accounting (Power 1997), and more recently digital and data studies communities (Pink and Lanzeni 2018; Dourish and Cruz 2018). From these diverse areas, some dialogue with the areas of business ethics and organization studies has been present (e.g., Baud et al. 2019; Zyphur and Perides 2019; Beverungen et al. 2015), although the diverse provenance of these ideas from different core literatures has rendered a coherent dialogue difficult. Running across the organizational adoptions, however, has been a concern with the ethics of quantitative representations (Zyphur and Perides 2017), with the datafication of workplace interactions (Stein et al. 2019; Mazmanian and Beckman 2018), with the social uses of numbers by organizations (Wilson et al. 2020; Boje, Gardner and Smith 2006), and with the exploitation possibilities of data-driven technologies (Beverungen et al. 2015).

Despite the broad sweep of influences feeding into quantification discussions, the ethical stakes discussed across these areas show some convergence, which could be characterized on two broad set of concerns. First, they involve epistemic/scientific concerns around numbers and their relation to social reality, representation, and the consequences of articulating complex qualitative experience as quantitative data. Such concerns involve the tension between the representative functions of numbers—i.e., their ability to model social phenomena—and their "performative" function—i.e., their ability to shape or constitute social phenomena (Mennicken and Espeland 2019; Desrosières 1993). Second, and relatedly, critical discussions have related quantification to social control, both by state and corporate actors who use numbers as technologies of governing (e.g., Thévenot 2019; Miller and O'Leary 1987), or by market actors who can capitalize on numbers by extracting economic value from quantitative data (e.g., Beverungen et al. 2015; Dean 2010).

Ethical issues of quantification related to representing and constructing social life and issues related to social control are deeply related, but can be discussed as analytically distinct to give a first pass at theorizing this broad array of literature. This first analytical separation will clarify some of the distinct ethical issues at stake, which will be teased apart then theorized in subsequent sections.

Numbers Represent and Construct Social Life

Quantification involves the articulation of aspects of people's individual and collective lives as numerical quantities, an operation carrying complex problems and ambiguities (Mau 2019; Espeland and Stevens 2008). Numbers are often used to represent dimensions of objects in the world, but they can also be used to group together phenomena under a common metric to construct new social objects (Desrosières 1993). For example, Hacking (1990) notes that concepts such as unemployment or disease rates become comprehensible through the construction of metrics, which involve "strenuous efforts to make and enforce definitions" (Porter 1995a, b). Furthermore, when quantification deals with aspects of intimate personal or social life, such as emotions, well-being, or social relationships, questions arise as to whether such phenomena can or should be quantified at all (Humphreys 2018). While related, these different aspects represent somewhat distinct discussions within academic literature.

Numbers as Representation and Constitution

Regarding the first broad set of concerns, scholars have recognized that numbers do not only represent social reality, but also influence that reality (Bruno et al. 2014a, b; Espeland and Stevens 2008; Desrosières 1993; Power 1997). Yet these two functions are often at odds (cf., Esposito and Stark 2019).

The representative function of numbers is based around a measurement paradigm that claims authority for numbers on the basis of "validity" (Alexandrova and Haybron 2016). Quantification, in this view, is valid to the extent that values correspond to their objects and represent them in reliable ways (Alexandrova and Haybron 2016). By contrast, numbers can "make" social reality by constructing descriptive or statistical categories by which they postulate "things that hold" (Desrosières 1993), in other words, statistical categories that form stable objects around which people act. The constitutive aspect of quantification, rather than depending on a supposed underlying "reality," establishes categories which are pragmatically useful and support social action.

Numbers and "Lived" Experience

Related to the point about the representation and constitution of social realities, quantification has often raised concerns over preserving a value-infused notion of what could be called "lived" experience (e.g., Humphreys 2018). The use of quotes here signals a recognition of the elusive nature of this concept (Toraldo, Islam and Mangia 2018), which is precisely the point of the problem; many have viewed quantification, particularly within a "digitally saturated environment" (Markham 2019, p. 2) as inappropriately fixing and objectifying experience in ways that denature human forms of living (e.g., Humphreys 2018).

To illustrate, Hornstein (1988) notes that quantification as a model for psychological knowledge has been controversial throughout the history of psychology, given its placement at the interface of subjective experience and numerical accounting. The discomfort with quantifying subjective experience has become more acute as the digitalization of social interactions translates lived experience into publicly accessible, statistically analyzable forms (Turkle 2011). People's everyday experiences are transformed by the datafication of memories and ongoing activities, rendering the private public (Espeland and Stevens 2019; Humphreys 2018). Some have argued that such technologies, by codifying and publicly displaying the ongoing flow of life, exteriorize inner experience (Sibilia 2008) and convert it into what Thévenot (2019) has called "intimate spectacles." In this context, scholarly interest has intensified around the limits of numbers in the "quantification of our lived experience" (e.g., Johns and Alexandrova 2018).

Numbers and Control: Between States and Markets

If statistics exert power through "objectivation" and the creation of knowledge (Bourdieu 1985), then the epistemic ambiguities of representing and constructing social experience also contain a power dimension. Indeed, the history of "scientific management" (Taylor 1911) has been described as a linking of so-called scientific objectivity with "administrative and political values" (Power 1994, p. 355). Consequently, concerns over quantification are often combined with political critiques of governing through numbers (e.g., Thévenot 2019).

At the same time, beyond its applications in scientific management and workplace control, quantification for social control has a long history of use by the state (Desrosières 1993) and the market (Dean 2006), and I examine each of these briefly.

Governing by Numbers

Quantification and the State. Historians of statistics have noted the central role of the emerging modern state in the construction of quantitative databases and the statistical tools needed to analyze them (e.g., Hacking 1990). Early state formation relied on constructing equivalent measures across diverse regions, as well as inventing inferential

techniques to estimate population parameters that were not readily observable (Desrosières 1993). The ability to infer population values from samples required conceptualizing diverse communities as "in the same urn" of probabilities, leading to conceptions of the "average man" as a citizen within the nation, and distinct form other nationalities (Desrosières 1993). The resulting forms of "seeing like a state" (Scott 1998) constituted a core process of nation building, as it allowed the mental construction of a unified territorial space and the "people" as an imagined community (Anderson 1983).

Debates over the status of numerical objects, although rooted in medieval arguments over nominalism and realism (Desrosières 1993), became central to statistical thinking in the early nineteenth century, with the consolidation of a social scientific enterprise of category building, linked to an emerging republican nation-state. For example, Desrosières (1993) notes how, in France, post-revolutionary administrations formulated measures of income and socioeconomic status to replace earlier divisions of society into incommensurable "estates" (nobility, clergy, merchants). In this way, philosophical debates about the nature of numbers became grafted onto the emerging field of social statistics, pulled in-between the epistemological task of representing reality and the political task of administering and governing a territory (Desrosières 1993).

Beyond state formation, gathering and tracking statistics has been instrumental to state functioning, from account-keeping to public health to economic growth (Bruno et al. 2016). Policing, for instance, has been deeply transformed by statistical methods, while the question of how numbers should be used and by whom has been an area of intense contestation (Didier 2018). Quantified surveillance has made it possible to centralize power and govern at a distance (Espeland and Stevens 2019). From early ideals of a mathematically perfect rational state to more recent cost–benefit forms of governance (Supiot 2015), quantification has been key to the formation, development, and functioning of the modern state.

Markets for Everything: Quantification and the Market

While historical literature has tended to link increased quantification to state power, research on present day quantification tends to focus on its role in capitalist market organizations, or on the role of capitalism within state processes (Mau 2019; Sadowski 2019). Although cognizant of historical milestones such as the emergence of book-keeping or the joint-stock company (e.g., Porter 1995a, b), quantification literature has also paid great attention to the question of *commodification*, that is, the extent to which non-economic aspects of social life can or should be brought into modes of economic calculation (e.g., Charitsis 2016; Zelizer 2005). Drawing from early critical discussions of the "quantification of life," quantification is seen as a commodification that leads to a "dull, uniformization of life" based on utility calculation (Löwy 1987, p. 892).

More recently, however, such views have been complicated by the recognition that commodification can, in some circumstances, impart social recognition or value, conferring status on persons or relationships through valuation (e.g., Zelizer 1994). In organizational contexts, some have argued that the ability to quantify value is fundamental for socially responsible goals such as social and environmental goals (Kroeger and Weber 2020). On the other hand, quantifying value, by establishing commensurability though reducing diversity to a common metric (Espeland and Stevens 2019), undermines the singularity and diversity of social life (Zyphur and Perides 2019). Particularly when applied to areas of human life such as well-being (Singh and Alexandrova 2020; Karjalainen et al. 2019) or social relationships (Gill and Pratt 2008), quantification has been seen as compromising the integrity of that which it measures by linking it to commodification.

Discussion of quantification in the context of market commodification has taken new life recently, however, with a surge of interest around "big data" and the mass quantification of unprecedented proportions of social existence (e.g., Humphreys 2018; Beverungen et al 2019; Dean 2010). Because of the ability of digital systems to extract and capitalize on small bits of information from seemingly innocuous online interaction, the conversion of daily life into "free labor" (Beverungen et al. 2015) has given rise to a wave of critical scholarship. Such scholarship has been concerned both with the intrinsic effects of so-called communicative capitalism (Dean 2006) on transforming social relations, and on the use of the resulting data by companies for surveillance, targeted advertising and encroaching control over consumer choices (Sadowski 2019).

Thus, quantification has been central to both processes of "seeing like a state" (Scott 1998) and to the marketization of social life (Gill and Pratt 2008). Recent scholarship around neoliberalism has noted that, in fact, quantification may lie at the nexus of state and market control (van Dijk 2014). Neoliberal governance by objectives, specifically, is a case in which quantitative indicators play a central role (Bruno et al. 2014a, b; Thévenot 2011). Particularly around basic social institutions like health care (Ruckstein and Schüll 2017), transport and traffic control (Shapiro 2018) or trade (Davis et al. 2012), state and market actors may converge around quantitative techniques that mix political and economic objectives (e.g., Mennicken and Espeland 2019). Some warn that such techniques give rise to technologies of surveillance, valuation and ranking (van Dijk 2014) that

combine the most draconian parts of states and markets in a hybrid of quantified governance.

In sum, this review, although brief, provides a background against which the ethical stakes of quantification should be understood as essential in the context of contemporary social organization. First, quantification is a multidimensional phenomenon, involving not one but several interrelated processes than can be teased apart for analysis. Second, the discussion around if and how numbers can be used to represent social reality is analytically distinct from, while providing a basis for, the issues of governance and control over numbers. That distinction should not be taken to be absolute, and the interlinking of the epistemic and political aspects is deep (cf., Bruno et al. 2016); yet each brings unique conceptual issues that will allow a further theorization.

Ethics Across the Quantification Process

From the above, it should be evident that quantification involves different dimensions with related ethical questions, from the question of how and whether to assign numerical values to experience, to how such values are considered with regards to social reality, to how the resulting numbers are used for governance or profit. This differentiated aspect of quantification has been noted in the social science literature; for instance, Eyraud (2012) differentiates between the different aspects of defining what "counts," quantitative embedding philosophies in metrics, and using numerical values in action. Similarly, Espeland and Stevens (2008) differentiate between marking objects, establishing commensuration and shaping objects in the environment. Not focused on ethics specifically, these discussions nevertheless acknowledge the differentiated work of quantification (Espeland and Stevens 2008). Below, I abstract from these specific discussions to present a three-part conceptualization of quantification—involving capture, specification, and appropriation—each with unique implications for ethics.

Capture: Definition and Illustrations

By "capture," I refer to how lived experiences and everyday interactions in social life are cast into quantified or quantifiable forms (Dean 2010). Considered prior to the economic exploitation of quantified life, capture is about the process of objectifying social phenomenon so as to express it as a numerical quantity. As Zuboff (2015, p. 76), describes it, capture transforms social life in that "nearly every aspect of the world is rendered in a new symbolic dimension as events, objects, processes, and people become visible, knowable, and shareable." Although some scholars have linked capture more narrowly to the extraction of free labor in a digital setting for economic profit (Beverungen et al. 2015), I discuss this aspect under "appropriation" below.

Practices of capture relate to the objects of quantification in various ways, with different implications for the phenomena which are quantified (Pink and Lanzeni 2018). In some cases, lived phenomena may seem to naturally *afford* quantification, for example, quantities of goods that are easily measured or discrete objects whose countability does not require extraction from entangled webs of other objects (cf., Shapiro 2018). Other aspects of social life may be made amenable to quantification only after high levels of processing, manipulation, or abstraction, such as the case with psychological variables like well-being (Alexandrova 2012) or sociological concepts such as class (Desrosières 1993).

To illustrate, Martin's (2007) ethnography of bipolar patients describes how these patients are encouraged to engage in the quantification of affect through mood charts which assigned daily quantities to their affect, allowing tracking and "performance measurement." Through such capture, these sensibilities could be mapped onto medical treatments to increase behavioral control over emotions. Arguing that these quantification practices constitute technologies of control, Martin notes that codifying affect in numerical forms creates what Williams (1977) called "structures of feeling," that is, vague sensibilities or affects that underlie popular culture but are difficult to pin down. Through quantifying structures of feeling, the patients were taught to objectify themselves to allow self-improvement.

While quantification in Martin (2007) involved psychological measurement, Scott (1998) examines the codification and enumeration of social productive processes by the state, and the resistance to quantification that it triggers. In this historical example, Scott describes how early states preferred grain crops such as rice, which could be easily quantified and measured and thus provided a basis of taxation. Such crops were visible because they grow above ground, are easy to transport, and have an even-timing of harvest, and thus were preferred stores of value and taxation for emerging state systems. Root crops, however, such as manioc and potatoes, were difficult to homogenize, less visible, and generally less "countable" than rice. Rebel groups adopted such crops, which resisted in their very physical composition the commensurability conferred by quantification. In this example, we can see the relation between the material properties of an environment, its quantification possibilities, and the political-economic ramifications for governance and resistance possibilities.

In both of these examples, quantification involves capturing a real but diffuse aspect of social life. In the case of Scott (1998), the material properties of crops and their amenity to quantification led to their selective uses for political ends, while in the case of Martin (2007), quantitative capture of diffuse feelings constituted therapeutic practices related to

governance of the self (see also Humphreys 2018; Sibilia 2008).

Ethical Stakes of Quantitative Capture

Quantification as capture involves ethical questions pertaining to the transformation of lived relations by framing those relations in quantitative terms (Mazmanian and Beckman 2018). Three interrelated concerns are of particular interest, focusing on the effects of quantification on experience and its potentially deleterious effects on the phenomenological embeddedness of subjects in their worlds.

First, quantification may have the paradoxical effect of dismissing the primacy of lived experience in the very moment such experience is valued numerically (cf, Elden 2006). From a phenomenological perspective, the circumscribing of lived existence into discrete and determinable quantities already mis-specifies the nature of human being (Elden 2006). While quantified empirical data derive their validity from their basis in observation, the expectation that only through quantification can experience become "scientific" risks dismissing experience as a source of knowledge in itself (Jay 2005). Because lived experience involves embeddedness in a "lifeworld" of interconnected meanings, quantification always requires a reduction of experience to one of its facets (Mau 2019; Elden 2006). Establishing quantification as an epistemic value risks valuing this reduced form over the holistic matrix from which it was extracted and substituting the part for the whole.

This dismissal of "raw" experience can have a second and related consequence of obscuring the multiple possible interpretations of experience. Because experience is open-ended and is not exhausted in its forms of codification, encoded knowledge can be revisited in the light of lived experience and reframed on the basis of evolving ideas. To this extent, quantifications of experience should be considered as provisional and not definitive (cf., Boltanski 2016). Even considered as such, however, the quantification process necessarily decontextualizes one facet of a lived whole, as noted above, drawing attention to the object of codification and away from the complex of background experiences.

One consequence of this displacement between experience and context is to obscure the active and practical nature of experience as a form of ongoing experience (Espeland and Stevens 1998). The open-endedness of lived experience means that a constant process of adjustment and calibration characterizes action, as actors build knowledge through their management of the flow of experience. The resulting "objects" of knowledge may be of relative stability, able to be measured or quantified. However, taking such measures as equivalent of their grounding experiences may obscure the active process of knowing, individual and collective, by which those objects are built and maintained.

Finally, obscuring the active nature of experience can lead to an alienation of experience, which comes to be seen as separate from the subjects of experience (cf., Jay 2005). By institutionalizing a process by which the products of knowing are recognized as epistemically valuable, while the labor of knowing is neglected, quantification as capture rests on the paradoxical situation of a knowledge that is both empirical (hence based on experience) and objective (hence independent from experience). This alienation of experience from itself becomes relevant in the economic process of data extraction and free labor, as we will see below, but for now, as capture, quantification involves an alienation of experience from its subjects, facing them with the objects of their own cognition in an alien form.

Specification: Definition and illustrations

Closely related to the question of what may be quantified and whether it should be, I term "specification" the process by which choices are made as to *how* something should be quantified. Namely, construct definition and validation are modes of framing reality (Alexandrova and Haybron 2016), during which choices are made around how phenomena should be grouped, compared, and defined. As Espeland and Stevens (1998, p. 314) notes, quantification is based on commensuration, that is, "transforming different qualities into a common metric," and this definitional process has effects on the world.

In a previously mentioned example, Desrosières (1993) describes how French administrators replaced traditional social "estate" distinctions with income-based quantitative measurements. The result was both to put the citizens of the new republic on a commensurate measure (income), while at the same time constructing the concept of economic inequality. The resulting population was conceptualized a uniform body of citizens with unequally distributed revenue, rather than an incomparable set of differentiated "estates," each with its own group identity.

A more recent example, the case of higher education measurement suggests how struggles over specification can reflect underlying tensions between logics of governance (Cussó 2016). Cussó explains how international organizations, from the 1980s, increasingly began to measure educational outcomes in terms of attainment, as well as return on investment. UNESCO, however, retained earlier measurement of educational outcomes in terms of the right to education and public expenditure, rather than cost–benefit type measures. This difference in the construction of measures reflected resistance to a move to more market-based education management, and an attempt to maintain the link between education and basic rights of citizenship (Cussó 2016).

In both of these examples, the question is not whether an aspect of social life (demographic information, educational outcomes) can be measured (i.e., capture), but in what form they should be measured (i.e., specification). In the example given by Desrosières (1993), the specification of persons on a single scale along the dimension of revenue established a new view of the political subject as equivalent to others in type, while framing them as unequal economically. Such techniques of subject-making are related Foucault's (e.g., 1988) descriptions of the birth of the state through the construction of new kinds of subjects. In Cussó's (2016) example, the aspect of education taken to be an object of measurement encodes an underlying assumption about the goal of education, as a basic right or as an economic investment. In both cases, measurement reconfigures social objects in ways that make certain policies possible while blocking alternative ways of organizing.

Ethical Stakes of Specification

Quantitative specification involves ethical questions involving the stakes of commensuration, which produces sameness out of difference (Espeland and Stevens 1998). Espeland and Stevens (1998) give the example of salary categories, where equal or fair outcomes depend on how categories are built. They note the inclusion, within university rankings, of faculty salaries, but not the salaries of administrative staff. The resulting human resource policies at universities tended to generously reward full-time faculty but not staff, who remained woefully underpaid.

In this example, what is tacitly assumed is that faculty are more definitive of the university community than staff—hence, their exclusive inclusion in the rankings metric. This example illustrates how processes of commensuration are built on judgments about inclusion and exclusion that then become obscured as the metric is consolidated. Such metrics become "black boxes" (Mennicken and Espeland 2019) whose inner diversity is obscured by the subsumption under a numeric value. While all categorization has this quality of connecting disparate elements, quantification takes this to the extreme, because the numerical value literally erases the qualitative traces in the category. While a qualitative category can be "unpacked" by examining the elements that compose it, once quantitative databases are constructed, these constituent elements are easily lost. This is ethically fraught because the traces of exclusions and possibilities for change around a given category are rendered opaque in this process.

Moreover, the commensuration processes involved in specifying metrics are deeply political and depend on the interests of the parties involved. Boje (2006), for instance, examines how the rhetorical aspects of financial performance metrics supported Enron's ability to deceive the public about its financial robustness. By including mark-to-market figures in its annual revenue figure, Enron was able to claim future profits in the present, framing commensurability between the present and future to give a false impression about its financial stability. The fact that such metrics are constructed in closed settings and without public debate gives some actors powerful tools of representation and social reality construction without social accountability.

By contrast, when statistics become public, they can have galvanizing effects, as they become mobilizing objects for social groups and justice demands. DeSantos (2009) uses the example of the publication of country-risk statistics in Argentina to show how "public numbers" become everyday talking points that fix attention, hold public servants accountable, and concentrate public opinion. Similarly, recent work on what has been called "statactivism" (e.g., Bruno et al. 2014a, b) has shown how reframing or constructing alternative statistics by community groups or activist academics has enabled the dislodging of taken-for-granted social facts. Examples of such dislodging include alternative wealth indicators to substitute GDP (cf., Ottaviani 2015) and community-based well-being measures to substitute standard psychometric "happiness" measures (Alexandrova 2017).

Implicit in the above examples is that the ethics of specification become evident when paying attention to who or what is excluded from the commensuration process. Specification is thus an inherently political process, and who is included in this process, and which access to what cognitive and conceptual resources, are ethically relevant questions. The opacity and apparent stability of numeric values bring particular urgency to these questions, because whomever succeeds in making their respective numbers "count" is legitimized in ways that may be difficult to undo or deconstruct, as compared to other techniques of constructing social reality.

Appropriation: Capitalizing on Numbers

While capture and specification are inherent processes that could be considered internal to quantification as such, what happens to numbers once they are assigned to phenomena is also a source of ethical concern (Sadowski 2019). Especially in the digital age, the question of the ownership, valuation, and use of numerical data is increasingly scrutinized by social scientists (e.g., Ruckstein and Schüll 2017; Neff 2013). I use the term "appropriation" to describe the processes by which numbers become the property or capital of specific actors. While all aspects of quantification are "political" in the sense that they are related to social power relations, capture and specification exert power through their epistemic qualities, i.e., that of knowing and defining the world, while appropriation draws economic and governance

power through its ability to exert exclusive rights to the mobilization and deployment of numbers.

In this context, quantification has been increasingly described as a form of "extraction" (e.g., Sadowski 2019; Charitsis 2016), whereby "gathering and extracting maximal value" (Boyd and Crawford 2012, p. 14) from numerical data is the goal of what has been called "life mining" (van Dijk 2014, p.200). This language of extraction is echoed in what Dean (2006, 2010, 2016) calls "communicative capitalism," in which the extraction of numerical data through social media interactions means that "our basic communicative activities are enclosed in circuits as raw materials for capital accumulation." (Dean 2016, p. 16).

While much has been said about the automated processes of numerical data extraction in algorithmic platforms (Sadowski 2019; Beverungen et al. 2015), it is also important to remember that more mundane, physical forms of labor are involved in quantification, and that appropriation can also involve the expropriation of the labor of making numbers. As Beverungen et al (2015) point out, the wage labor of maintaining equipment, coding, and selling advertisements is part of the datafication process, not to mention outsourced labor from the global periphery in monitoring and managing data. Similarly, Loveman (2005) notes the difficult work of collecting and compiling state statistics, which form a "primitive accumulation" that establishes state power.

One of the most insidious aspects of the appropriation of quantitative data is that the opacity of a numerical value tends to obscure and render invisible such labor (Beverungen et al. 2015). The ownership and control of numerical data as property is often unrelated to the work exerted in the production of numbers, and in the case of digital media, production may not even be perceived as economic value production or labor by users (e.g., Dean 2010), Users of digital technologies such as social media may experience their labor as entertainment or social interaction, and may pay for the opportunity to produce value for platforms and their owners. Whether the positive user experiences and social value from such platforms adequately compensates the abdication of control over the capitalized data thus produced is a question requiring ethical analysis.

To illustrate the ethical stakes of quantitative appropriation, Ruckenstein and Schüll (2017) focus on the health sector to examine how the datafication of health changes relationships between patients, healthcare providers and for-profit companies. Noting the tension between the openness of data and its private ownership, they argue that datafication leverages morally tinged "concepts such as 'sharing' and 'the public good' to promote voluntary giving up of data, which are then appropriated by technology companies seeking free access to their users' data" (Ruckenstein and Schüll 2017, p. 272). In response, they note how, faced with the private appropriation of health care data, "data activists" try to use medical statistics to promote justice in health outcomes, point out quality of life disparities for public attention, and promote user-centered solutions that shift power relations between patients and medical providers.

On a more personal level, Humphreys (2018) examines the role of property relations in the context of intimate relational aspects of the self that have been converted into online artifacts. For example, family artifacts such as wedding or child albums, once digitalized and posted on online platforms, become objects with ambiguous and complex property claims; those who made them, and to whom they hold personal value, may (consciously or not) agree to hand over economic rights to such datafied artifacts, which will be used for marketing, surveillance, or other purposes far different from their original social purposes.

In both of these examples, some form of "life mining" converts an intimate or personal aspect of life (health, intimate relationships, identity representations) into a commodifiable unit whose quantification renders it impersonal and economically exchangeable. In this sense, appropriation has some relation to capture; in both cases, quantification renders commensurable very different things (e.g., baby pictures, consumer advertisements, stock prices) and by doing so risks denaturing and rendering impersonal aspects of social life (e.g., Thévenot 2019; Sibilia 2008). However, while capture refers specially to the ontological/epistemological aspect of framing life as a knowable and quantifiable object, appropriation involves the question of distribution of such objects and their economic alienation. Capture highlights the denaturing of social experience, while appropriation highlights the fair allocation of social value.

Ethical Stakes of Appropriation

Stated in ethical terms, while capture questions the ethicality of describing life through quantities, appropriation questions the ethicality of how such quantities are distributed within an economy. The ethical questions raised by appropriation center around the justice of personal ownership and use of numerical data, as well concerns around the control aspects of data use. The latter concerns often involve questions of surveillance (and the value of privacy), as well as the propagandistic use of personal data (linked to the value of decisional autonomy).

First, as noted above, the denaturing critique of capture runs in parallel to the critique of appropriation as capitalization; both are concerned that essential features of social life are destroyed through commensuration, but that appropriation adds a further layer of economic commodification. As implied by the name, appropriation allows numerical quantities to become objects that can be distributed unequally, controlled by some but not others, and deployed in ways that

surpass their mere epistemic functions as representations of the world.

The question of who retains rights over the storage and use of numerical data has often been discussed in the context of surveillance (e.g., Zuboff 2019; van Dijk 2014). Whether surveillance involves state actors, bringing up questions of civil liberties (van Dijk 2014), or market actors, bringing up questions of privacy and corporate overreach (Fuchs 2012), it is the concentration of masses of data in the hands of large actors that enables numbers to become generators of unequal power. The appropriation of numbers creates diverse power-related asymmetries. Asymmetries of representation occur where some actors, such as states or large market actors, wield large amounts of data to build knowledge that is inaccessible to smaller actors (Ruckstein and Schüll 2017). Asymmetries of prediction occur where predictive capacity, such as those of large investment banks or insurance agencies, allow unequal access to market opportunities or risk avoidance (Boje et al. 2006). Asymmetries of legitimacy occur where, regardless of the "correctness" of data itself, the fact that some actors retain access to huge stores of information gives them a presumption of knowledge or credibility that allow them to act unobstructed or without debate (Thévenot 2019). In all of these cases, knowledge production is decoupled from social debate and an active public sphere and is privatized and leveraged for monetary gain.

The result of such processes is that social decision-making is distorted, and power concentrated, in non-transparent ways. Adding to this concentration of big data, the automatized and algorithmic features of data analysis raise ethical issues around the autonomy of decision-making. Earlier critiques of the massification of media and their propagandistic effects (e.g., Habermas 1989) are increasingly replaced by a concern with the manipulative aspects of targeted media based on personal data (e.g., Ingram and Bar-Tura 2014). Even targeted advertisements, however, leave a shell of choice at the moment of consumption, while more advanced algorithmic systems may deploy big data to engage in decisions which are largely opaque to those affected by them (Greenfield 2017). As Greenfield (2017, p. 217) notes about automatic data-driven systems, they render alien many of the aspects of life where personal autonomy would be considered fundamental to a well-lived life: "*We'll be offered jobs, or not; loans, or not; loves, or not; cures, or not. And the worst of it is that until the day we die, we'll never know which action or inaction of our own led to any of these outcomes.*"

In sum, appropriation raises ethical questions around property, justice, and personal autonomy, many of which are made particularly salient by the increasing monetization and use possibilities of numerical data.

The Performativity of Quantification

As suggested by the processes of quantitative capture, specification, and appropriation, quantification goes beyond representing aspects of the world and itself constitutes a force of change and action (Ustek-Spilda 2019; Mingers and Willmott 2013). One way of stating this point is to say that quantification is "performative" (Ottaviani 2015; Mingers and Willmott 2013); that is, it can produce the realities it purports to describe.[1] Combined with a Foucauldian concern for the performativity of *techniques* (cf., Raffnsøe et al. 2019), quantification scholarship has focused on how numbers constitute active forces that establishes practices and norms (Mennicken and Espeland 2019).

Specifically, quantification shapes social reality by introducing metrics that retroactively define a reality that is already presumed to exist (Appadurai 2016), which I term "retro-performativity." Quantification also shapes social reality by establishing "targets" towards which actors aspire to establish new realities (Esposito and Stark 2019; Greenfield 2017), which I term "telic performativity." In other words, quantification is performative both in its effects on framing the present, and in its setting guidelines and incentives for future action (Esposito and Stark 2019; Bruno et al. 2016; Desrosières 1993).

Because retro-performativity involves changing how current or past objects are understood by defining them numerically, it retroactively constitutes social knowledge. Telic performativity, by projecting numbers in the future, shapes ongoing and future action. Moreover, these two forms may be opposed, as in Goodhart's Law, which states that "when a measure becomes a target, it ceases to be useful as a measure." (Greenfield 2017, p. 205). However, they may be mutually reinforcing, where an instituted target becomes progressively aligned with social reality through a kind of feedback loop (Esposito and Stark 2019).

Retro-Performativity: Defining Backwards

I borrow the term "retro-performativity" from Appadurai (2016, p. 149), who defines it as an effect where signs "produce their own conditions of possibility by acting as if they already existed." Applied to quantification, retro-performativity describes how the process of attributing a numerical value (capture) to something based on a particular scalar dimension (specification) produces the impression that that thing always existed, waiting to be measured. Particularly in complex or abstract objects (e.g., unemployment, emotional intelligence, creditworthiness), the fact of having

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[1] For a description of the various (and sometimes opposing) conceptions of performativity, see Gond et al (2016).

a numerical quantity confers solidity onto an otherwise ephemeral object, which may not even have been considered an "object" at all previously to the measurement. In this sense, quantification "makes things that hold" (Desrosières 1993), by marking them numerically and thus establishing—backwards—that which they measure.

To give an example, Martin's (2007) anthropological study of mental illness, cited earlier, noted how measuring moods with scales is constitutive of domains of mental illness, whether done by professionals for diagnostic purposes or by patients as a daily therapeutic practice. Measurement is used to establish categories that are often contested (in the case of professionals), and to establish self-understandings of who one "really" is (in the case of patients) through diligent and exact measurement. While the ostensive purpose of measurement practices is to track an underlying and pre-existing condition, the ongoing forms of personal and social definition that are achieved through these practices shape understandings of what was, and thereby performatively construct the past and present.

As suggested above, retro-performativity is most intuitively connected to the processes of capture and specification, because it is through these practices that numbers come to consider their experience as an object (capture) and give it a specific form (specification). What is done with those numbers, however—i.e., their distribution, allocation, or use as guides for action—are a separate performative domain.

Telic Performativity: Defining Forwards

What I term "telic" performativity involves positioning a metric as a *telos* or goal; action is motivated to "make the numbers." As Campbell (1979) argues, quantitative social indicators, when used for policy making, exert pressure on the underlying social processes they were made to monitor, shaping those processes in the future. Jany-Catrice (2016) elaborates on this process, where quantification shapes realities in neoliberal governance by establishing targets which can then be attached to economic incentive systems. She argues, moreover, that such incentive systems encroach into ever expanding circles of activity, including environmental, health, and personal statistics that convert an initial focus on measurement into a lever for governance. Summarized by Bruno et al. (2016, p.28), "indicators retroactively influence the behavior of agents, as actors undergoing quantification. This idea supplements the notion of performativity that Michel Callon deploys in order to account for the changes to reality brought about by scientific theory."

To illustrate, Desrosières (2016) examines ongoing critiques of the slippage of uses of gross domestic product (GDP) as an economic measure. Originally created as a national accounting measure to be used internally (Vanoli 2005), this usage slipped over the next half-century to become a catch-all metric to describe the economic well-being of a nation (Desrosières 2016). Such uses underwrote attempts to target GDP growth as a goal of government and to direct public policy, in a way that would not have been conceivable in its original formulation.

In an example closer to the direct experience of business scholars, Mingers and Wilmott (2013) discuss the performative effects of journal rankings lists on business schools, where the adoption of common metrics establish incentive systems, which in turn shape the production of business knowledge. They argue that turning an ostensive measurement of quality into a target for academic attainment exerts a homogenizing effect on research, as well as replacing substantive academic contributions with the technical mastery to craft research to be compatible with specific journal norms. The article further reinforces the idea of a slippage between the valid measurement of a variable and the shaping of the social world so as to retrospectively validate the variable.

In sum, retro-performativity shapes social reality through providing measures that retrospectively reframe events and variables, while telic performativity projects quantitative targets that shape actions and incentives. In both aspects, numerical quantities are not merely more-or-less valid measurements, but actively shape social reality, and are thus to be evaluated not only on their methodological validity but also on the ethicality of their effects, in terms of consequences, principles or other ethical criteria.

Table 1 summarizes the subprocesses of quantification along with their ethical stakes and their relation to retro- and telic performativity. Below, synthesizing the different aspects of quantification, I elaborate on these ethical considerations and build an agenda around which the ethics of quantification can proceed.

A Working Model of Ethical Considerations Around Quantification

Based on the ideas of capture, specification, and appropriation, and their effects on social and organizational reality through distinct forms of performativity, we are in a position to build an initial theoretical model of quantification that can stimulate research around the its social and ethical impacts. I visually illustrate this model in Fig. 1 below.

In this conception, I begin with the idea of an imperfectly articulated social reality that susceptible to quantitative capture through technologies of measurement and quantification. I visualize this as a series of increasingly "concrete" circles that represent the progressive objectification of a phenomenon. The formulation and validation, and then the eventual acceptance and institutionalization of a given metric, would constitute progressive consolidation of the

Table 1 Quantification as capture, specification, and appropriation

	Quantitative Capture	Quantitative Specification	Quantitative Appropriation
Relation to phenomenon	-Concretizes and objectifies as a numeric dimension	-Shapes phenomenon through selecting and excluding relevant dimensions	- Extracts value from quantified values through com-modification, while shaping phenomenon through selective data deployment
Mechanism of action	-Articulating social experience into objectifiable forms - Framing experience as numerical valuation	- Selecting content dimensions through which social phenomena can be expressed - Assigning authority to certain agents who can select relevant measurement dimensions	-Extracting and saving numerical data from measured phenomena -Assigning property rights or distributional principles for control, use and purposes of data - Converting numerical values into economic values, prices
Illustrative examples	Martin (1997)—mental health- psychometric measurement as coding "structures of feeling" into technical–medical categories Scott (1998)—political economy—resisting tax col-lection through the cultivation of less easily count-able harvests such as root crops	Desrosières (1993)—public administration- reclas-sification of citizens based on economic revenue rather than nobility status as a step in building a republican order Cussó (2016)—struggle over educational outcome measures between liberal focus on attainment ver-sus humanitarian focus on right to education	Ruckenstein & Schüll (2017)—health care—ownership and control of health data concentrates power over the public good Humphreys (2018)—online social media- digitaliza-tion of social identity online leads to questions about the ownership of one's identity, and about the possibility for algorithmic control of psychological processes through data analytics
Social effects	- Confers solidity to social experience by making "things that hold"	- Shapes social reality into discrete categories while institutionalizing frames of those who control quantification	- Economizes quantification by turning it into market-able "data" and building legal and economic incen-tives around its use
Nature of performativity	Primarily Retro-Performativity—shapes ideas about the nature of the object	Retro- and Telic Performativity—shapes ideas about the qualities of the object (retro), while establishing features that become future targets (telic)	Primarily Telic Performativity—shapes incentives that lead object qualities to match legal and economic definitions of objects, values objects so as to shape social processes that affect object qualities
Ethical stakes	-Denaturing of social experience through capture may involve subjective harm -Quantitative capture of personal and social qualities may objectify the human -Danger of alienating experience through reification of objects of experience	- Commensuration processes erase differences, hiding social inequalities - "black boxing" of complex social processes reduces reflexivity - Specification processes are often politically moti-vated, leading to the concretization of self-inter-ested motives in constructed objects	- Question of ownership and use of quantitative data raises question of distributional justice - Issues of surveillance and control arise when agents wield control over large amounts of data - Distortions of data access create authority asym-metries where owners are given epistemic authority with limited ability for external audit
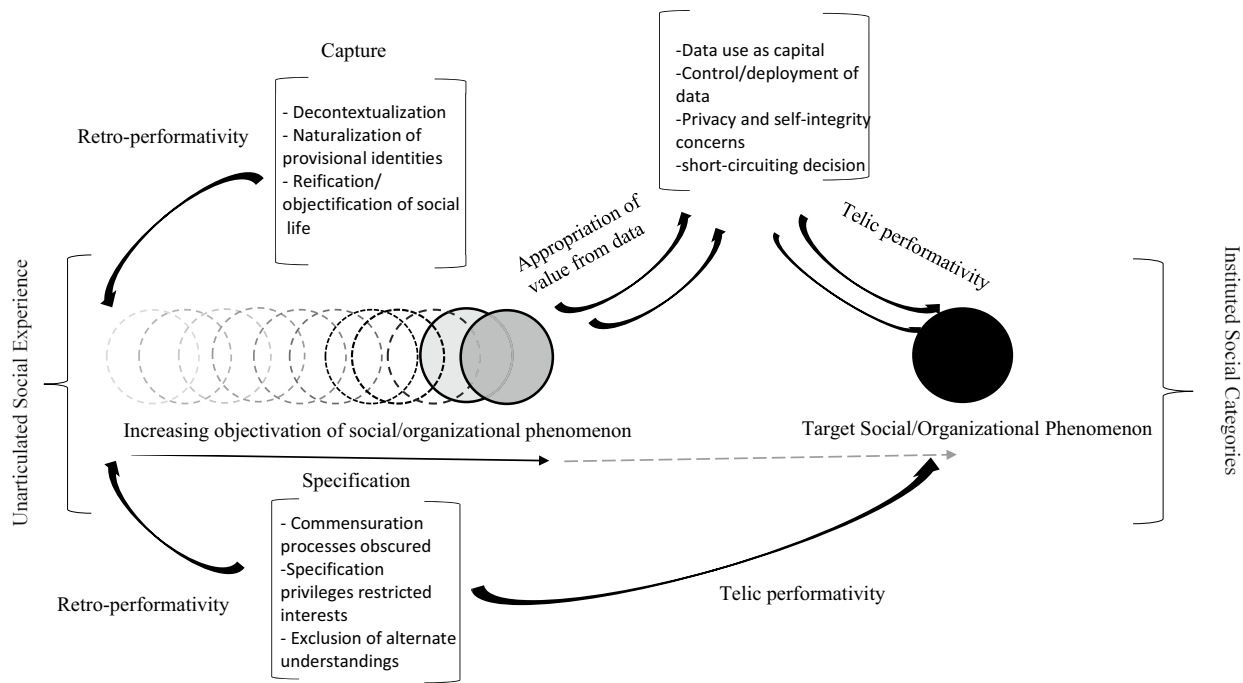
Fig. 1 Conceptual model of quantitative capture, specification, and appropriation

new social object. Capture and specification increasingly fix and define ongoing social experience to frame it in terms of "objects," definitions which act retroactively to modulate how actors understand their own experience, and thus frame that experience according to measurement categories.

Beyond the measurement-feedback process by which social reality is quantitatively objectified, the definitions used in specification also become projected into potential future values of the object, or "targets." It is at this point that, in Greenfield's (2017, p. 205) words, "a measure becomes a target." The process of turning a measurement dimension into a future target characterizes telic performativity. Telic performativity works, first, by reducing a measured phenomenon to a number, it confers a sense of objectivity and stability to the phenomenon. Second, the resulting data may be used as a source of value, supporting efforts for planning, control, creating incentives to maintain the objectified measure regardless of its relation to any social reality. In this way, even if the specification of a measure was discovered to be misguided or inaccurate, when enough political or economic stakes have been piled onto the target measure, and enough institution building has used it as an anchor point, its epistemic value may cease to be of interest to those who have built an edifice around a measure.

From this initial model, we can see several places in which ethics research around quantification could direct its questions. Notably, the effects of capture, specification, and appropriation have distinct but interrelated qualities that may raise different ethical concerns. Put broadly, one set of

concerns could be thought of as the "epistemic" concerns around how quantification shapes, enables, or forecloses on knowledge, as social reality is shaped and concretized in certain ways. These concerns center on the retro-performativity of knowledge tools on the realities they aim to know and are most visible in the processes of capture and specification. At the same time, the deployment and use of quantitative data have impacts on social reality as well, involving the telic aspect of performativity as actors lean on measures to achieve their goals.

To note, because social action shapes the ground of experience as such, the epistemic and practical aspects of quantification are deeply intertwined in any empirical situation (and thus retro- and telic performativity are also deeply linked in practice). However, as an analytic distinction, separating these elements helps ethics scholars separate out the different kinds of ethical issues that quantification raises. Data extraction, profiteering, and surveillance cause social ills that are distinct from those caused by misjudging reality by overly clinging onto a measurement scale. In fact, the two may contradict each other—for instance, surveillance may presume valid measurement, and imposing self-serving measures may reduce the economic and practical utility of the measures. Convincing people to adopt a measure for expedience reasons is different than arguing for the scientific validity of the measure. Yet, in practice, these different ethically relevant aspects of quantitative measurement are likely to co-exist in complex ways, requiring emerging ideas to theorize and study their interrelations.

The complex combination of processes described above may be illustrated by a case recently described by Aitken (2017). A recent attempt in New York City to expand ID cards to undocumented populations was rejected by financial institutions such as Bank of America, JP Morgan Chase and Citibank, who refused accept the new IDs to open new accounts, claiming that the initiative would increase the riskiness of client identification (cf., Corkery and Silver-Greenberg 2015).

This example could be read along different dimensions in the model in Fig. 1, with different ethical implications. At the level of capture, a public logic of capture as inclusion was contested by a private logic of exclusion of high-risk individuals, leading to contested "regimes of visibility" (Aitkin 2017, p. 275). As retro-performativity, the inclusion (or not) of these individuals would establish a social criteria for who "counts," retroactively recognizing or denying a person's status and raising deontological ethical issues about the duty of recognition of humans in society.

On the other hand, the extension of credit scores to high-risk groups as a basis for predatory lending would have allowed capture but configured specification so as to re-define "the unbanked" as "the high-risk" (Aitkin 2017). As telic performativity, "risk" would establish a set of behavioral targets (to raise credit scores) that subjects could leverage to "improve" their standing, constructing themselves into different future selves. In this situation, the ethics of inclusion could come into tension with the ethics of manipulation, a tension invoking both utilitarian (the consequences of credit access) versus deontological (the principle of autonomy) issues. Finally, inclusion via credit scores would initiate a process of data appropriation, where complex educational, consumer, and other data composing the credit score would be commoditized and used by financial institutions, raising the ethical question of who should profit from the data traces left behind by everyday life.

While cursory, this brief example illustrates how a single case can raise multiple issues related to capture, specification, and appropriation, invoking retro-performativity to define reality and telic performativity to shape reality. Each of these issues raises ethical consequences but also foundational principles, such as who has the right to name the world and its inhabitants, and on what basis.

Discussion: Toward a Research Agenda around the Ethics of Quantification

The current study has examined the phenomenon of quantification from an ethical lens, to unpack the different ethically relevant issues emerging along the process of quantification. Doing so required first decomposing quantification, a complex concept, into the specific components of capture, specification, and appropriation, and discussing the ethical implications of each of these. This involved stressing the active aspect of quantification as a force in the world, above and beyond its epistemic functions of representing, which was discussed in terms of performativity, understood in two distinct ways. From this conceptual layout, the final step was to reconnect these parts into an overall model of quantification from which an agenda of future research around the ethics of quantification can be constructed below.

Taken as a whole, this study contributes to understanding the ethical ramification of quantification that connect to recent organizational concerns. While the perspectives showcased here exist in current literature, they have been dispersed across fields and topics, making it difficult to think about the ethics of quantification in an integrated way. Organizational research has shown increasing interest in the social implications of numbers. These have ranged from concerns around "audit society" and the encroachment of metrics across organizational life (Mingers and Wilmott 2013; Powers 1997) to the datafication of everyday worklife in organizations (Stein et al. 2019; Mazmanian and Beckman 2018), to considerations of the social foundations of quantitative data and relation to power (e.g., Perides and Zyphur 2019; Gephart 2006). Despite their breadth, these perspectives have in common a recognition that numeric values are born out of social process and have social impact.

The current study begins from this broad literature, distilling out of the various aspects of quantification the specific ethical stakes of each. Beginning by arguing for the "social life of numbers," my goal was to position numbers as a form of social action closely linked to governance by state and market actors (cf. Bruno et al. 2016; Desrosières 1993) and thus to establish the need to examine numbers beyond the question of scientific representation. Then, I analyzed quantification not as a single process, but as three intertwined processes of capture, specification, and appropriation, linking these to the actions of reframing social categories (retro-performativity) and anchoring future actions through incentives and targets (telic performativity).

Laying out the aspects of quantification in this way clarifies its ethics because the stakes involved in each of these components is distinct. Questions of what should or not be counted (capture) are distinct from how they should be counted, or by whose criteria (specification). Further, the question of who owns, or uses, these numbers, and how they may be stored, sold, analyzed, or destroyed, raised separated ethical questions. My hope is that an ethics of quantification would draw upon the schematic framework to build an agenda around each of these sets of issues. Below, I give some initial ideas for starting such an agenda.

Future Research Directions

Regarding how quantification can be developed as a theme in business ethics, one can immediately noting the wide array of immediate research questions that appear from the above discussion. For example, the ethics of ownership and privacy of personal data, consent in collecting data, and permission for use are topics at the forefront of contemporary controversies (Sadowski 2019). Similarly, how organizations use—carefully or less so—psychometric scales, performance metrics, targets, and other numbers produce ethical questions both around the sometimes-questionable validity of such measures (Alexandrova and Haybron 2016) and around their possibly harmful social effects (Espeland and Sauder 2007). Moreover, issues around the critical sociology of numbers have recently entered organizational discussions around the ethics of quantitative methods, and how to understand quantitative methods as technologies of power and thus build reflexivity in management research (Zyphur and Perides 2017; Zyphur and Perides 2019). Such topics about the "effects" of numbers are important areas for future research. I would like to highlight three related issues, however, which dig deeper into the core conceptual themes, that is, what is the nature of numbers in their relation to social and organizational practices.

First, it is valuable to examine the complex relationships between beliefs in the objectivity of numbers and what critical scholars have referred to as the "objectivation" of power relations (cf., Mau 2019; Cussó 2016; Bourdieu 1985). According to Cussó (2016), objectification involves "hardening" social reality into taken-for-granted forms, which are then taken to be "objective." Bourdieu (1985) uses this notion to describe how powerful actors confer a sense of reality and legitimacy on their vested interests and thereby reinforce social power relations and obscure injustices to groups without such objectifying power. Ethical examinations of quantification should focus on the use of quantification as an objectification strategy to understand whose interests are upheld, and whose interests are obscured, behind a given number or metric.

Based on this idea, a second set of research questions involves the ethics of struggle around who measures or how a social phenomenon is measured. Already, an emerging literature on "statactivism" is beginning to take seriously the idea of counter-statistics or inclusion of less-represented groups in the quantification process (e.g., Didier 2018; Bruno et al. 2014a, b). Some work has begun to try to map out who are or are not represented by scale development (e.g., Ottaviani 2015) and how scales relate to domination (e.g., Wilson et al. 2020) as well as examining alternative quantifications of constructs such as well-being

(Bache 2019; Alexandrova and Haybron 2016). Yet, a vast array of quantification processes in organizations, as well as scales and constructs in the social scientific literature, remain off the radar of such critical work.

In this respect, ethical quantification should be reflexive about what aspects of social life are quantified, why, and by and for whom (Bruno et al. 2014a, b). Scale construction, for example, could draw more actively on the participation of those who are measured, not only as objects of study but as subject experts of their own qualities. Such reflexive quantification would also acknowledge the capitalization possibilities of numbers, ensuring fair distributional arrangements when data are monetized, but also asking difficult questions about the shifting lines between the epistemic and the economic use of numbers.

A third, somewhat more speculative, research question around quantification would ask whether all numerical representations have the effects of closing or occluding their sources, a theme which runs throughout the critical discussion above. Are the "injustices" done through capturing and framing reality through numbers inherent in quantification, or is it possible to represent social reality through numbers while maintaining the richness of social life? An early but promising concept to address such a question is Boltanski's (2016) concept of "reflexive numbers." With this concept, Boltanski describes the challenge of using statistics to describe social reality when the production of statistics is itself part of that social reality. To establish a critical statistics, he argues, one must be able to both use statistical operations to support social critique (e.g., by statistically revealing social inequality, gender discrimination, or other quantifiable justice-related themes), and at the same time, subject statistical techniques themselves to critique. Doing this involves genealogical examinations of statistics (cf., Zyphur and Perides 2019), but also sociological analyses of where and how statistics are made as a form of organization (cf., Mazmanian and Beckman 2018).

Each of the three above suggestions is deeply critical of quantification, but none dismisses it or longs nostalgically for a world that cannot be measured (cf., Mingers and Willmott 2013). Rather, treating quantification as a social technology, it would develop a line of ethical analysis that both acknowledged the power and potential of organizing by numbers, while remaining aware of the politics that arises from this power.

Applied Ethical Research on Quantification in Specific Domains

Beyond the above broad questions around quantification as such, it is useful to point out some specific empirical domains in which this research agenda could be applied, although these are inevitably limited by the scope of this article.

First, quantification is increasingly central in and may soon become transformative of workplace dynamics (Moore and Robinson 2015), with deep ethical implications. The use of metrics as control and subjectivity-shaping technologies in the workplace has been acknowledged (Wilson et al. 2020), but as these become linked to online platform, credit, and other data sources, the totalizing effects of such technologies may take on qualitatively different character. Such technologies of worker measurement carry ethical ramifications in terms of their consequences for worker economic and psychological well-being, and also in terms of their ramifications the human dignity of workers. Thus, it is urgent that ethics research devotes more attention to the ethical aspects of the forms and uses of workplace measurement.

Second, and relatedly, the ubiquity of online interaction and the emergence of algorithmic (and increasingly, AI) interaction (Beverungen et al. 2019) suggests that increasing swaths of human life will be mediated through datafying systems. The data thereby produced are a fundamental part of technology business models (Beverungen et al. 2015), and bode both new forms of extraction of personal information (Dean 2010) and the retroactive shaping of uses actions and ideas though algorithmic feedback (Mau 2019).s The dynamics of such data flows can shape political communities, influence democratic elections, and build or destroy reputations, as well as individual and group self-concepts. Both as a deontological issue of one's property over oneself and of the consequences of such developments, ethics research must begin to untie these complex webs of data politics in digital cultures.

Third, as recent public health and environmental crises have revealed, data play an important macro-level role in public management with deep ethical ramifications. In the context of the COVID-19 pandemic, contact-tracing technologies may pose a key public health response, while raising important concerns about surveillance and data privacy (Taylor 2020). Public management responses in similar macro-level phenomena, from global warming to the genetic modification of species populations, require complex data modeling outside of the hands of most citizens, raising questions of data control, institutional trust, and political accountability (Zuboff 2019). It may be that the ethical imperative of preserving democratic society will increasingly require struggles on the terrain of data management, and the earlier we can build applicable knowledge about the social life of data, the better.

Conclusion

In conclusion, the current paper has addressed the ethics of quantification as a social phenomenon, in which numbers both represent and shape social reality. They do so through capturing everyday life in easily manageable yet opaque units, which specify the flow of life into specified values. These operations confer commensurability onto the variety of social experience, making life manageable in ways that support the functioning of organizations, markets, and governments. Yet they also bring a host of worries, about the loss of experience, the exclusion of alternative views, and the exploitation of data by powerful actors. The metric society has been increasingly described in dystopian terms, yet the quantification processes making it possible are only recently beginning to come under sociological scrutiny. The current paper attempts to push such scrutiny further and to define it as an important field of ethics.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest.

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