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ARTICLE

Opening Black Boxes is Not Enough – Data-based Surveillance in *Discipline and Punish* and Today

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ABSTRACT: *Discipline and Punish* analyzes the role of collecting, managing, and operationalizing data in disciplinary institutions. Foucault's discussion is compared to contemporary forms of surveillance and security practices using algorithmic data processing. The article highlights important similarities and differences regarding the way data processing plays a part in subjectivation. This is also compared to Deleuzian accounts and Foucault's later discussion in *Security, Territory, Population*. Using these results, the article argues that the prevailing focus on transparency and accountability in the discussion of algorithmic applications needs to be amended with a perspective on different forms of subjectivity and ensuing power relations.

Keywords: Discipline and Punish, Societies of Control, algorithmic surveillance, Big Data, norms, subjectivity

Algorithms have become a problem. Or, rather, "algorithm" has become one of two terms under which a particular set of problems concerning information technology has been summarized. The other term is "Big Data". Both refer to information technologies that seem to have become a little more intelligent, autonomous, or capable than the forms of automation we already know. Progresses in machine learning, pattern recognition, data mining, and similar fields of computer science made it possible to produce systems that work on more complex input than just database tables (images, natural language texts, movement patterns, market data etc.), and that somehow automatically and intelligently – or at least adaptively – react to that input. Such systems are meant to automatically place ads on websites, buy and sell stock, detect suspicious behavior in CCTV footage, identify potential terrorists at the border, decide who gets parole, design buildings, and soon drive our cars.

This plethora of actual or potential use cases of "algorithms" has led to repeated calls for oversight and for an ethics or governance of algorithms.[1] Very often, the opaque, hidden functionality of the algorithm is a central concern of these debates. For example, Frank Pasquale has eloquently criticized the "black box society" in which automatic judgments determine even important decisions in major companies or on Wall Street.[2] The algorithms that are used in these cases are not accessible, they are rather black-boxed. Pasquale shows that all kinds or egotistic or even illegal corporate interests can be hidden in algorithms. They can also have adverse effects that no one intended. The metaphor of opening black boxes, which Pasquale uses, is exemplary for a growing number of texts that center on the same issue: If the algorithms determine important things in our lives, then we should know how they function and what they really do. Access to their inner workings is considered the prime lever for an ethics or governance of algorithms.

This standpoint has been challenged from various perspectives. One strand of critique engages with the exclusionary focus on the algorithm that reduces the outcome of a complex sociotechnical system to just one element.[3] Elsewhere, I discuss the residues of humanist concepts of subjectivity that are projected on the algorithm in attempts to find a single, responsible instance for the results of information processing.[4] Another critical point is the question to which extent algorithms have the agency that – at least on a discursive level – is bestowed on them, and where this agency is located if not in the algorithm.[5]

This paper provides a further argument why the repeated demands for supervision of algorithms, for opening black boxes, fall short of their own aim: the role data play in the applications of pertinent algorithms and the ways data are implicated in ensuing processes of subjectivation and power relations. To that aim, several concepts in Foucault's *Discipline and Punish* concerning data are re-read concerning their application to current algorithmic systems. In *Discipline and Punish*, Foucault discusses the beginnings of data-based sciences and the subjectivating effects of data and "apparatus[es] of writing"[6]. Thus, if the central question of an ethics of algorithms is: "What do algorithms do to subjects?", with Foucault this question gets a new angle: "The algo-

[1] Malte Ziewitz, ed., Special Issue: Governing Algorithms, Science, Technology and Human Values, 41:1 (2016).

[2] Frank Pasquale, The Black Box Society (Cambridge: Harvard University Press, 2015).

[3] Tarleton Gillespie, "The Relevance of Algorithms", in Media Technologies, ed. Tarleton Gillespie, Pablo Boczkowski, and Kirsten Foot (Cambridge, MA: MIT Press, 2014) 167-194. https://doi.org/10.7551/mitpress/9780262525374.003.0009; Daniel Neyland, "Bearing Accountable Witness to the Ethical Algorithmic System Science", Technology & Human Values, 41:1 (2016), 50-76. https://doi.org/10.1177/0162243915598056.

[4] Tobias Matzner, "The Human is Dead – Long Live the Algorithm! Human-algorithmic ensembles and liberal subjectivity", Theory, Culture & Society (forthcoming).

[5] Lucas D. Introna, "Algorithms, Governance, and Governmentality: On Governing Academic Writing Science", Technology & Human Values, 41 no. 1 (2016): 17-49. https://doi.org/10.1177/0162243915587360.

[6] Michel Foucault, Discipline and Punish (New York: Vintage, 1995), 190. Henceforth cited as "DP".

rithm and the data it uses constitute these subjects in the first place." In this paper, I will trace such moments of subjectivation in contemporary uses of "smart", "intelligent," or "autonomous" algorithmic systems based on data. As mentioned in the beginning, there is a plethora of use cases that each come with their own ways of subjectivation. Hence, I will limit myself to examples from surveillance and security technologies. However, it is important to notice that they are complexly intertwined with automated analyses of data in other parts of our lives.[7]

I start by analyzing the interrelation of algorithms and data. I then shortly summarize existing critical accounts, in particular Deleuze's *Postscript on the Societies of Control* and several texts that are inspired or derived from this work. I show that these texts delineate important implications of current algorithmic systems, which, however, should be amended using Foucault's theory. I thus trace elements of his discussion of using data in *Discipline and Punish* and discuss their use for analyzing current applications of information technology. In conclusion I summarize the implications of this analysis for requirements of transparency and oversight.

Algorithms and data

Very generally speaking, an algorithm can be understood as a series of steps executed in order to perform a certain task. In terms of computer science, an algorithm often refers to a certain level of abstraction that summarizes in human terms the essential steps to perform a task, which are then broken down to machine-readable code via programming languages and compilers or interpreters.[8] On a related, but not quite the same level of abstraction, the concept "algorithm" has become a matter of concern in ethics of technology as well as in public debates. Here, "algorithm" refers to a particular subset of programs, namely those that react in an adaptive manner to rather complex input. For quite some time, the archetypical case of computing has been the handling of databases that access and manage entries using predefined fields (names, addresses etc.). Now, information technologies process much more complex and ambiguous data and their meaning is no longer predefined but emerges during queries. For example, targeted advertising collects heterogeneous data like the make of the computer that is used, the operating system, the sites visited online, the apps installed, the entries that have been liked or shared on social media, the location of the internet access, and more. Within these data, algorithms try to detect patterns or regularities that are meant to hint at products that the user would probably consider buying. IBM has suggested using one of its software products to assess the large number of refugees that have tried to enter Europe since 2011 after the crisis in the Middle East. They claim to use data from such different sources as lists of casualties in the war, assessments of illegal markets in the "deep

[7] Tobias Matzner, "Beyond Data as Representation: The Performativity of Big Data in Surveillance," Surveillance & Society 14 no. 2 (2016): 197–210.

[8] Donald E. Knuth, The Art of Computer Programming, Vol. 1. (Reading: Addison-Wesley, 1973), xiv–9.

web", openly accessible social media, phone calls, or parking tickets.[9] Thus, the "smart", "intelligent", or "autonomous" algorithms share the common property that an essential part of their efficacy is based on the data which is used. They are meant to "detect" patterns, rules, associations, or regularities in the data. From that point of view, the data carries much of the epistemic load. The label "Big Data" is often used to emphasize the variety of data such systems process, the huge amount (e.g. data from all users of sites like Facebook or Twitter) of data that is involved, and the fact that the systems use data that constantly changes or updates.[10]

The purported informative value of these data has been challenged on several levels. A number of important papers show the difficulties of defining an epistemology of such automatically processed data.[11] They argue that many of the approaches in data analytics cannot derive the knowledge from the data they purport to do – or at least do not necessarily produce these results. Applied to surveillance and security technologies, these critiques often amount to the claim that the persons under surveillance, or those that are examined at airports or borders, for example, are not correctly described by the data. Generally, this critique is based on questioning what data represent.

Such an assessment could be the result of oversight in the form of opening black boxes. It could scrutinize the way categories or patterns are formed and determine whether they produce the desired insights. Since the outcome is contingent on the input data, such scrutiny, however, is partly only possible in hindsight.[12] On a more fundamental level, such scrutiny accepts the implicit assumption that subjects can be sorted into categories which can be compared with their representation in data. The task of oversight would then be to ascertain whether the data analytics do justice to these subjects or not. Using Foucault's insights, we can see that this is too limited a perspective.

Foucault, Deleuze, and Data

When discussing surveillance using data, one of the prime resources in Surveillance Studies is Deleuze's *Postscript for the Societies of Control*.[13] Many of the differences and developments that

[9] Patrick Tucker, "Refugee or Terrorist? IBM Thinks Its Software Has the Answer", accessed August 10, 2016: http://www.defenseone.com/technology/2016/01/refugee-or-terrorist-ibm-thinks-its-software-has-answer/125484/

[10] The term Big Data is both a concept used in academic papers and in marketing and advertising. Thus, there is a variety of definitions; for an overview, see Rob Kitchin, "Big Data, new epistemologies and paradigm shifts", Big Data & Society, 1 no. 1 (2014): 1-12. https://doi.org/10.1177/2053951714528481.

[11] Kitchin, "Big Data, new epistemologies and paradigm shifts"; Louise Amoore, "Data Derivatives: On the Emergence of a Security Risk Calculus for Our Times", Theory, Culture & Society, 28 no. 6 (2011): 24-43. https://doi.org/10.1177/0263276411417430.

[12] For example, Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica, "Machine Bias", accessed August 10, 2016: https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing

[13] Gilles Deleuze, "Postscript for the Societies of Control", October 59, 3-7. Henceforth cited as "PS".

Deleuze singles out as characteristic for the shift from the disciplinary societies described in *Discipline and Punish* to societies of control are easily linked to computerized data processing. Thus, the spread of information technology is taken as one of the reasons why Foucauldian theory shows its historical situatedness and needs to be amended. Deleuze emphasizes three important aspects.

First, *Discipline and Punish* focuses on closed institutions (PS 3). In contrast, control is possible everywhere. What Deleuze cites as Guattari's imagination of constantly being tracked (PS 7) has long become reality. The "apparatuses of writing" follow us wherever we go – or rather we happily take them along.

Second, the normalizing or homogenizing character of the institutions vanishes. Both societies of control and disciplinary societies need data. But where the latter utilize the data to establish norms and "mold" (PS 3) individuals into a mass, the former need data to provide incentives, nudges, or stimuli for individuals in constant competition and perpetual training (PS 5).

Third, and partly as consequence of the second aspect, the homogenous individual loses importance. It breaks apart into a mass of data points and samples from various institutions or areas of life that can be moved and recombined without any claim for grasping the totality of a human life. Deleuze's neologism "dividual" has inspired several prominent concepts, from Haggarty and Ericsson's "data double"[14] to Louise Amoore's "data derivative"[15]. All these notions express that the individual is no longer important, whereas the many bits and pieces of data that are "extracted" are.[16] They can be rather freely used, compared, transferred, and processed, creating new distinctions, groups, values, and needs for action. Thus, they seem to inherit a certain suspicion against motives of subjectivation in Deleuzian theory. They are also certainly inspired by the ease of copying and moving data. Deleuze's example is financial products that are no longer related to gold or any other "real" objects, and the value of which is consequently purely virtual (PS 5).

In fact, this Deleuzian perspective has inspired important steps in the discussion of data-based surveillance. It moves the focus away from the effects of being watched towards what can be done with the results of being watched, in particular data. This runs counter to the discussions that have long been central to Surveillance Studies, and which foreground Foucault's idea of the panopticon, the internalization of the gaze etc. But as will be shown in the next sections, Foucault also has important things to say about the use of data that are still relevant today. In particular, *Discipline and Punish* provides a rewarding starting point for looking at the details of data processing practices, to which Deleuze alludes, and their effects on subjects. In fact, in many of the areas where data-based surveillance is used, subjectivizing moments happen. These no longer form an enclosing totality, but are rather heterogeneous, instantaneous, even surprising at times.

[14] Kevin D. Haggerty and Richard V. Ericson, "The surveillant assemblage", The British Journal of Sociology 51 (2000): 605-622. https://doi.org/10.1080/00071310020015280.

[15] Amoore, "Data Derivatives".

[16] Haggerty and Ericson, "The surveillant assemblage".

This might seem to be in contrast to the way discipline works in Foucault's text. But his discussion of data elaborates many details of practices that create and use data and their contributions to the subjectivizing effects he describes. Many of these details can be found in contemporary data-based surveillance. But not only the similarities of contemporary forms of data-based surveillance and those analyzed by Foucault are elucidating, so are the differences. In this sense, the discussion does not aim at a coherent analysis of the disciplinary character of data-based normalization. The individual cases are too diverse and complexly interrelated to do that. Instead I want to provide fruitful perspectives derived from *Discipline and Punish* which show that current uses of algorithms and data in surveillance are not only an issue of opaque algorithms or biased data, but entail new forms of subjectivation.

Data in *Discipline and Punish* and today

Repetition, Regularity, and Heterogeneous Moments of Subjectivation

In the chapter on "discipline", Foucault argues that at the end of the 17th century, "the threshold of description" began to decrease. Being looked at and chronicled was no longer a privilege. Description becomes "a means of control and a method of domination" and consequently, the documents produced are "no longer a monument for future memory, but a document for possible use" (DP 191). One particular example of such a "possible use" is the examination, as Foucault exemplifies regarding the shift from 17th to 18th century hospital regulations. They prescribe routinized, regular, daily examinations that even have to take place during holidays (DP 185-6). Similarly, the importance of regular examinations in schools was highlighted – up to a daily interval. Consequently, Foucault calls them a "sort of apparatus of uninterrupted examination" (DP 186). This has consequences for the data collected. They are not just produced and stored like chronicles and protocols, they are also updated on a daily basis. Furthermore, the examination is not just the production of data. The routinized daily practices immediately produce effects for those examined. "The examination did not simply mark the end of an apprenticeship; it was one of its permanent factors; it was woven into it through a constantly repeated ritual of power" (DP 186). The processes of education or training are geared towards the next examination. They are backed by another set of "innovations of disciplinary writing [that are] concerned [with] the correlation of these elements, the accumulation of documents, their seriation, the organization of comparative fields making it possible to classify, to form categories, to determine averages, to fix norms" (DP 190). Thus, beyond the direct involvement with the pupils, patients, or inmates, new routines of data processing are established. Their results are fed back into the daily practices of training and education, which in turn need to be examined. This shows that neither the data nor the judgments drawn from them (norms, categories etc.) are static. They need regular updates, curation, and processing.

Closed institutions formed the locus where such regular and routinized practices could emerge: the inmates, patients, pupils, soldiers where always at disposal. Yet the efficacy of such practices is not necessarily tied to closed institutions. Today, information technology allows data

to be stored and transported quickly. At the same time, sensors are becoming more widespread and mobile. Finally, many more aspects of our lives are managed through IT systems, which means that a lot of data is already available. Hence the production of data, their processing and analysis, as well as the actions taken based on data, can happen at different times and different places. Data thus have long become independent of the spatial configuration of closed institutions as well as the particular daily schedules they impose, but nevertheless the regularity and repetition of creating and analyzing data still remains important.

Foucault used the expression "apparatus for uninterrupted examination" for schools, where uninterrupted in fact meant daily. Current IT systems allow the intensification of sampling to intervals of several times a second. In fact, one of the defining characteristics of Big Data is velocity (the other two are volume and variety).[17] This does not only refer to the speed of data processing, but also to the immediacy with which data is available – up to the point where people speak of real-time data (e.g. location tracking via smartphones).[18] Of course, such promises and rhetoric have to be taken with care. But their existence shows that data-processing practices and the knowledge derived from them are still structured by repetition and regularity linked to a demand for ever more data that is always actualized – or even more so.

This structure is relevant to the subjectivizing effects of data and their use. In *Discipline and Punish*, examinations and apparatuses of writing are discussed in the section on the means of correct training. They enable a progress from military exercise that required the exact and homogenous reproduction of movement like marching patterns from all soldiers. The processes of writing make each individual "a case" (DP 191). This allows the individualized selection of lessons, assignment of classes, corrective punishment, and similar means. Thus, subjectivation is essentially achieved through repeated individualized moments of measurement, judgment, and corresponding training. For example, the assignment of classes at the École Militaire is described as "classificatory, penal distribution […] carried out at short intervals" (DP 181). The effects of these means can quickly be tested again, new measures taken, and so on. Every achievement is at the same time reason for further examinations and further training. Thus, subjectivation through training, or subjectivation through data is spread out in time over many moments of measurement, classification, and selection of appropriate treatment or training.

This parallelism of creating data – of practices of writing, management, and analysis – and their subjectivating effects through training and exercise is not that straightforward in current, digital uses of data. The accrual and analysis of data seems to have increased since data is so easily stored and transmitted, whereas the routinized exposure to being classified, ranked, even spatially redistributed based on data, which prevailed in enclosing institutions, is no longer given in many cases. The important lesson, however, is Foucault's insight that subjectivation is not a singular event; it is distributed among many moments of creating data and ensuing actions. Thus, it

[17] Kitchin, "Big Data, new epistemologies and paradigm shifts".
[18] Ibid.

is important to notice that these subjectivizing moments have not vanished – even if they are no longer concentrated in one place and no longer follow a predictable temporary pattern. For example, people are spatially distributed based on data at the airport – at least once the "checkpoint of the future" envisaged by the International Association of Airlines is in place. This is a system that collects and processes all kinds of data about passengers in order to provide a risk assessment even before they arrive at the airport. Based on that assessment, passengers will encounter different security measures, where the time-consuming and dissatisfying checkpoint we know today will only be one option for those with highest risk scores.[19] Increasingly, persons are stopped at borders and relegated to further scrutiny based on data that has been collected and analyzed beforehand.[20] Similar to the "checkpoint of the future," huge databases are meant to create a "a more person-centric approach that allows to distinguish between certain groups of travelers, and in particular allows certain groups to benefit from a more facilitated check at the borders when they come to Europe".[21] This will also include registered traveler programs with voluntary pre-checks.

Here we encounter quite a spectrum of subjectivizing effects. While some travelers will perform Deleuzian (self-)control in trying to become eligible for registered traveler programs, others will be confronted with disciplinary mechanisms of detention or refusal to enter the country. This shows that both perspectives need not be opposed, as they can complement each other. Much of the liberal (self-)control Deleuze analyzes happens in spaces whose fringes or borders have come to the attention of all kinds of surveillance and policing. Here, at the border, subjectivizing moments like the ones described above using Foucault's theory prevail.

A different form of subjectivizing moments based on data is brought about by the use of data-mining tools for police work. Software that is already in use in the US assesses the subjects of emergency calls prior to the arrival of the police. The officers can calculate a risk score of the persons they are about to encounter, using a software that scans "billions of data points, including arrest reports, property records, commercial databases, deep Web searches and the man's social-media postings."[22] Many of these data points do not at all relate to criminal activity. Yet the re-

[19] Andreas Baur-Ahrens, Marco Krüger, Regina Ammicht Quinn, Matthias Leese and Tobias Matzner: How Smart Is "Smart Security"? Exploring Data Subjectivity and Resistance. Final Report. Tübingen: IZEW 2015. Available at: http://hdl.handle.net/10900/66898. Doi:10.15496/publikation-8318.

[20] Adey, Peter: Borders, identification and surveillance. In Routledge Handbook of Surveillance Studies, ed. David Lyon, Kirstie Ball and Kevin D. Haggerty (London: Routledge, 2012), 193-201. https://doi.org/10.4324/9780203814949.ch3_1_a.

[21] Henrik Nielsen, Head of the unit for Border Management and Return Policy in the European Commission's Directorate-General for Migration and Home Affairs, quoted in Julien Jeandesboz, "Smartening border security in the European Union: An associational inquiry", Security Dialogue, 47 no. 4 (2016): 292-309, here 297. https://doi.org/10.1177/0967010616650226.

[22] Justin Jouvenal, "The New Way Police Are Surveilling You: Calculating Your Threat 'score,'" *Washington Post*, accessed October 27, 2016, https://www.washingtonpost.com/local/public-safety/the-new-way-police-are-surveilling-you-calculating-your-threat-score/2016/01/10/e42bccac-8e15-11e5-baf4-bdf37355da0c_story.html.

sults of that software determine the means the police will select to deal with persons that so far have been identified only by an emergency call. The data-based judgment can lead to decisions like gun use or calling negotiators, thus influencing the subjectivity of the respective persons in decisive ways. Again, this includes disciplinary mechanisms, but based on a norm that is based on data and much more flexibly determined than the predetermined norms that Foucault discusses. Thus, the subjectivating moments that Foucault describes – classification, distribution, examination etc. – are heterogeneous and distributed today. Often, the institutions involved are not even discernible for the emerging subject, but such subjectivating moments still happen. The way these data-based "judgments" come to pass is discussed in the next section.

The mass and the (in)dividual

Although the disciplinary subjectivation of the individual is central to *Discipline and Punish*, it never concerns the individual alone. It is always a matter of the relation of the individual and a "population" (DP 190) within which the individual is individualized. The closed institutions did not only provide the possibility to create new corpora of circumspect data about the individuals which inhabit them. They also allowed the organization of these individuals into a comparable whole. Such organization is initially based on a predefined requirement for everyone: to march in line, to work after the clock, to sit in hierarchized school benches and work through the respective lessons (DP 174-5). Observing the performance relative to these aims allows the judgement of the individual based on departing from the rule (DP 178). Yet with the progress of data-based training, the rules are no longer the fixed demand by some kind of external authority. Individual actions, Foucault writes, are refed to "a whole that is at once a field of comparison, a space of differentiation and the principle of a rule to be followed" (DP 182). The rule itself can "be made to function as a minimal threshold, as an average to be respected or as an optimum towards which one must move" (DP 182-3). These are criteria derived from observation of substantial groups of inmates, pupils, soldiers, or patients. Thus, as mentioned before, the apparatuses of disciplinary writing do not only concern the production of data about single individuals, but also create the possibility to store, create, and analyze these data to *establish* means, norms, and rules (DP 190). The examination as a combination of "observing hierarchy and normalizing judgment" (DP 184) enables two interrelated moments: "the constitution of the individual as a describable, analyzable object" and "the constitution of a comparative system that made possible the measurement of overall phenomena, the description of groups, the characterization of collective facts, the calculation of gaps between the individuals, their distribution in a given 'population'" (DP 190). The apparatus of writing constitutes both the homogeneity of the population and the ways in which individuality within that system is established. Therefore, as many individuals as possible need to be observed since the greater the number, the higher the quality of the knowledge produced and thus the more effective the entire institution.

Deleuze addresses this aspect of *Discipline* and *Punish* as well. "The disciplinary societies have two poles: the signature that designates the individual, and the number or administrative numeration that indicates his or her position within a mass" (PS 5). Thus, the disciplines consti-

tute "those over whom it exercises power into a body and molds the individuality of each member of that body" (PS 5). However, he argues, we no longer deal with the pair of mass and individual in societies of control. "Individuals have become 'dividuals,' and masses, samples, data, markets, or 'banks'" (PS 5). A new "dividualized" logic of personalized incentives, corrections, or adaptions emerges, rather than immersion or submission into a mass. Deleuze elucidates this new logic with regard to money, its loosely regulated flows that are only locally modulated, with short-term adjustments and aims rather than the long-term projects of disciplinary correction. Here, Deleuze certainly notices important differences concerning temporality. But the salience of locality and relationality that comes with the transition from individual/mass to dividual/samples too quickly dismisses the important issue of context for all kinds of data.

The organization of data no longer corresponds so obviously to the organization that produces it as it did in a closed institution, but that does not mean that the structure of a whole or a "population" that counts as reference is no longer necessary. In fact, creating such structures is one of the most elementary tasks of every "data science". While in so called "supervised" systems experts' knowledge is necessary to determine what has to be detected in the first place, "unsupervised" systems build their own categories based on data.[23] Rather than looking for something in the data, these systems are meant to tell us what to look for. They promise to find novel relations, associations, or rules to single out suspects. All these methods, as diverse as they may be in detail, need a measure of similarity to form the rules. They need to render data comparable and within these comparisons something has to stand out. Hence, data about "innocents" – "normal" data – is necessary too. Even experts who consciously select training data for supervised systems usually extend this with "negative examples", i.e. data that do not exhibit the wanted features, to increase the discriminatory performance of the system. This illustrates that even flexible norms based on samples and data presuppose the organization of a population or larger context.

Jürgen Link has described a similar flexibilization of norms. He distinguishes two forms of normalization: protonormalization, based on "the establishment of the borders of normality that are as fixed as possible for the longest possible span of time, and through zones of tolerance that are as restricted as possible"; and flexible normalism, where "the limits of normality are managed […] in the most flexible manner possible and are fixed for the shortest possible span of time. Zones of tolerance and transition are established to be as 'broad' as possible, so that short-term adjustments remain possible, despite the unforeseen dynamic of statistical values."[24]

Many of the data-based surveillance practices seem to conform to the model of flexible normalism: norms are fixed for a short term only and constantly updated. There are, however, differences. In particular, there are no zones of tolerance. In a sense, in the search for suspects, the attention has moved from the center of the bell curve to the fringes. Rather than aiming for the

[23] Theodoridis, Sergios & Koutrumbas, Konstantinos, Pattern Recognition (Burlington: Academic Press, 2008), 7.
[24] Jürgen Link, "From the 'Power of the Norm' to 'Flexible Normalism': Considerations after Foucault," *Cultural Critique* 57, no. 1 (2004): 14–32, here 28. https://doi.org/10.1353/cul.2004.0008.

normal, surveillance looks for the exceptional, the outlier, the high-risk individual, which has its contemporary archetype in the suspect of terrorism, who cannot be hedged by the liberal means of control exemplified as flexible normalism. In the latter case, a lot of deviance is tolerated because this inclusion in the mechanisms of normalism will eventually lead to adaptation to the norm. The high-risk individual, however, is separated, excluded, treated differently, which according to Link is the logic of protonormalization. This is tied to moments of threat, of imminent danger, as discussed below in section 4.3. However, it is also tied to disciplinary mechanisms that use a flexible norm. Link characterizes protonormalization as having an "other-direction", whereas flexible normalism has an "inner-direction": subjects "'normalize' themselves".[25] Yet while data-based practices have led to all kinds of self-relations which could be described that way, the same data is also used to create outer-directed moments, as my examples of airport security, borders, or police work illustrate – but still regarding flexible norms.

That ambivalence can be grasped using Foucault's own distinction of normation and normalization in his lectures at the Collège de France from 1977/1978. He contrasts the "disciplines" with the statistical normalization he identifies in the treatment of smallpox in the eighteenth century:

> In the disciplines one started from a norm, and it was in relation to the training carried out with reference to the norm that the normal could be distinguished from the abnormal. Here, instead, we have a plotting of the normal and the abnormal, of different curves of normality, and the operation of normalization consists in establishing an interplay between these different distributions of normality.[26]

In the case of disciplines, the norm is fixed and disciplinary mechanisms try to form subjects according to that norm. Because "disciplinary normalization goes from the norm to the final division between the normal and the abnormal," Foucault concludes that "what is involved in disciplinary techniques is a normation […] rather than normalization."[27] In the treatment of smallpox, detailed data allowed the tracing of several normalities for different parts of the population, e.g. based on age, milieu or profession.[28] These data thus inform the procedures taken in confronting the disease. Here, the "normal comes first and the norm is deduced from it."[29]

This is much closer to data-based surveillance where data are supposed to tell us what to look for. For Foucault, however, this development is intertwined with a shift from individual cases, which reign in the hospital as a disciplinary institution, towards the population. The new apparatus does not separate the sick from the healthy, but treats the population as a whole and

[25] Ibid., 29.
[26] Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977-78*, trans. Graham Burchell (Basingstoke; New York: Palgrave Macmillan, 2007), 63.
[27] Ibid., 57.
[28] Ibid., 60 et seq.
[29] Ibid., 63.

identifies distributions of the sickness among them. The focus again lies on normalities, on finding apt treatment for different social groups. In the case of suspicion based on data-based surveillance, the norm is mainly interesting because it is used again to separate the normal from abnormal cases.

Consequently, while the norm is derived from the data in the new form Foucault analyzes, it is used in disciplinary measures that erect "walls," which Link takes to be a particular trait of protonormalization.[30] New processes of data-analysis promise a "more individualized" approach to security, with a profile involving enough data to enable unique verdicts rather than generalizing judgments. Thus, the norms derived from the data are used to judge individual cases, which for Foucault is an element of the disciplines. In sum, while the norms are flexibly derived from data, the subjectivizing moments they enable still retain elements of disciplinary mechanisms. We thus deal with a hybrid form of normation and normalization.

Importantly, the use of data-based verdicts in these subjectivizing practices does not mean that the other, more flexible forms of normalism or the dividualized forms of control do not take place too. As argued above, security and (self-)control function quite differently within liberal Western societies (which are also Link's focus) and on their borders or in exclusionary zones within them. Today, the same data can be harnessed for either form. In part, the data we use in our daily flexible normalism in the West is parasitized for subjectivizing practices by security agencies and police forces.[31] In comparison to Foucault's description of apparatuses of writing in disciplinary institutions, not everybody whose data is gathered is equally also affected by the subjectivizing measures that are infused with the power based on these processes. In a closed institution, there is a certain parallelism: everyone is monitored and examined, everyone is trained and corrected. Today, the power to subjectivate based on data is still constituted by the collection and organization of data from everyone under observation. But the effects of this subjectivizing power are distributed quite unequally. Some of them focus on the borders and fringes of the societies of those who "have nothing to hide." Others implicate several forms of subjectivity at the same time. For example, the aforementioned study on the "checkpoint of the future" shows that the primary aim of airlines is to make security screenings more efficient and less annoying for valuable customers while maintaining the current level of protection, rather than increasing the level of security.[32] Thus, not only suspects, but also profitable customers are to be discerned in the data. There is an increasing group of people about whom data is gathered and analyzed, but the assessments made based on these data concern others. Thus by allowing to be monitored or even voluntarily providing data (e.g. in order to use "free" services online or to apply for registered traveler benefits), they contribute to the establishment of the subjectivizing force of that data, even if not to their own subjectivation.

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[30] Link "From the 'Power of the Norm' to 'Flexible Normalism'",28.

[31] Matzner, "Beyond Data as Representation".

[32] Baur-Ahrens et al., "How smart is smart security?"

When the norms derived from the data are used to focus on suspects, rare events, and outliers, this also entails a particular temporal relation of judgments based on data and certain deeds and events. Foucault analyzed this relation regarding his notion of delinquency.

Judging events and lives

Besides the chapter on the means of correct training, Foucault's discussion of delinquency is one of the most important sections in *Discipline and Punish* regarding the use of data. The figure of the delinquent stands at the center of the emerging "punitive system" and is distinguished from the convict. A convict is defined only by the committed criminal deed. For the delinquent, the conviction is merely the start of an intensive collection of information concerning the personal development and social circumstances of the criminal. This information is used to define the criminal, rather than just a criminal act:

> The legal punishment bears upon an act; the punitive technique on a life; it falls to this punitive technique, therefore, to reconstitute all the sordid detail of a life in the form of knowledge, to fill in the gaps of that knowledge and to act upon it by a practice of compulsion. It is a biographical knowledge and a technique for correcting individual lives. (DP 252)

This intensive collection of biographical data combined with psychological investigations became an important element of the punitive system. A new form of knowledge emerged that "establishes the 'criminal' as existing before the crime or even outside it" (DP 252). At first, this meant a change in the corrective processes: the life, i.e. biographical development, has to be addressed in making the delinquent a better person. The punitive system thus creates biographical knowledge of the past, or rather a biographical knowledge that establishes the past as that which defines the deed.

This way, the criminal act in itself loses its importance as the defining instant of criminality. Since this particular form of knowledge establishes the criminal as existing before the act, those features that start to be discernible in the individuals' biographies before the act gain importance and at a certain point overshadow the criminal act itself as the defining instance. Yet, this collection of knowledge is not limited to the interrelation of several elements of a single biography. The "triple point of view of psychology, social position and upbringing" (DP 252) detects all kinds of features in the new corpus of data that eventually turn the delinquent into a "quasi natural class" (DP 253). This new form of the criminal is to an important extent the product of the collection of data about many different individuals in a form that renders them comparable. Not only prisons but also courts are influenced by this new form of knowledge: "[…] it is this delinquency that must be known, assessed, measured, diagnosed, treated when sentences are passed." (DP 255). It also influences the writing of legal codes as "anomaly", "deviation", and "potential danger" (DP 255). Again, we notice the salience of data-based practices in measuring, in detecting anomalies and deviations.

This Foucauldian analysis shows that from the very beginning of the collection of knowledge about delinquents, it came with the potential of prediction. Since this knowledge establishes the criminal as existing before the act, it provides techniques for collecting the necessary biographical data – rather than data about a crime – and for classifying and sorting it. It also moved this logic from treating criminals after conviction towards the decision of the court itself, which no longer defines criminal acts but diagnoses delinquent lives. From that point on it is a rather small step to try to detect such delinquent individuals before they commit a crime – the essential idea of many data-based surveillance systems. Such a move is possible since the knowledge centered on delinquency produces the comparability of biographical features and ensuing classes, which needs the criminal act as a defining moment only temporarily in the creation of this knowledge. This Foucauldian reading of delinquency provides a differentiated view of the temporality of prediction.

The prevailing Deleuzian view on these matters in Surveillance Studies and Security Studies has been significantly affected by Brian Massumi's text on preemption.[33] Massumi differentiates prevention from preemption. Prevention, following his conception, is based on the identification of causes for a threat, and "[o]nce the causes are identified, appropriate curative methods are sought to avoid their realization"[34]. On the contrary, preemption aims at an "unknown unknown"[35]. It is based on a potential threat, but we do not know when, how, and through whom it will materialize. Thus, the only possible remedy, following the logic of preemption, is to act now, to take action before the threat materializes. By taking this action in the present, the preemptive logic produces its own cause. The actions taken to prevent the future have immediate, present effects. This entails that the future event, in the form that has been predicted, never happens, because the present action already changes its possibility. At the same time, however, it is reinstantiated: if it could have happened before we acted pre-emptively, it could happen again.

Massumi's analysis has explanatory power regarding military strategies, the recent preemptive wars, the "war on terror" etc. But the specific form of rendering the future actionable in the present that Massumi analyzes cannot explain all efforts of current attempts at detecting suspicious behavior based on data.[36] The growing surveillance apparatus since 9/11 attests to the fact that security agencies all over the world do not content themselves with dealing with "unknown unknowns" – the central role they play in the logic of preemption notwithstanding. In contrast, they aim to build a new corpus of data and knowledge aimed at predicting crimes. Or

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[33]Brian Massumi, "Potential politics and the primacy of preemption", Theory & Event, 10 no. 2 (2007), accessed August 10, 2016: https://muse.jhu.edu/article/218091. https://doi.org/10.1353/tae.2007.0066.

[34] Ibid.

[35] Ibid.

[36] For applications of Massumi's theory to data based prediction, see for example Louise Amoore, *The Politics of Possibility: Risk and Security beyond Probability* (Duke University Press, 2013) or Matthias Leese, "Seeing Futures' - Politics of Visuality and Affect," in *Algorithmic Life: Calculative Devices in the Age of Big Data*, ed. Louise Amoore and Volha Piotukh (Milton Park/New York: Routledge, 2016), 148–64.

rather, as we can now see using Foucault's concepts, this knowledge aims not so much at the prediction of criminal acts, but at the identification of particular lives.

Using elements from Foucault's reading of delinquency, we can see that this new form of knowledge is neither fully describable using the logic of prevention nor that of preemption. At first glance, a continuation of the logic of delinquency to assess lives in order to detect criminals before they act corresponds to what Massumi calls prevention. But Foucault shows that the establishment of the criminal as existing before the act is not just a matter of linking cause and effect. It is the result of a shift in the meaning of criminality and its defining aspect from a particular deed to specific forms of biographies and social circumstances. Those can be identified based on a corpus of data and a corresponding new form of knowledge that can assess and classify them.

There is a multifarious discourse that relates current forms of policing and the implied concept of criminality to an actuarial or managerial logic, which is again based on statistics, but without a focus on individual lives. Rather, it has been analyzed using Foucault's motives of governmentality and technologies of the self.[37] Also, the underlying statistical practices and actuarial knowledges have been described as a mechanism of governmentality.[38] However, this focus on Foucauldian concepts is not without its critics, who argue that a more detailed sociological grounding is necessary.[39] This would mean a further distance from the logic of delinquency. Consequently, there are contemporary analyses of algorithmic technologies and prediction that hold that subjectivation is not the central issue, but rather the management or policing of environments, contexts, spaces.[40] However, as the examples in section 4.1. show, with the advent of data analysis at scale, a focus on the individual case, on individualized approaches of policing, border controls, and security checks re-emerges – even tied to the hope that these checks on a supra-individual level will eventually become obsolete. Data-based processes deal increasingly with individual bodies and lives.[41]

In this regard, the structure identified in Foucault's analysis of delinquency retains importance because it allows to show that rather than attempting to find specific causes for a subject's criminal behavior, a new individualizing form of criminal subjectivity is created. Massumi

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[37] David Garland, "`Governmentality' and the Problem of Crime: Foucault, Criminology, Sociology," *Theoretical Criminology* 1, no. 2 (1997): 173–214. https://doi.org/10.1177/1362480697001002002.

[38] See for example François Ewald, *L'état providence* (Grasset, 1986), or Geoffrey Clark, *Betting on Lives: The Culture of Life Insurance in England, 1695-1775* (Manchester University Press, 1999).

[39] Garland, "`Governmentality' and the Problem of Crime".

[40] Antoinette Rouvroy, "The End (s) of Critique: Data-Behaviourism vs. Due-Process.," in *Privacy, Due Process and the Computational Turn – The Philosophy of Law Meets the Philosophy of Technology*, ed. Katja de Vries Mireille Hildebrandt (London: Routledge, 2013); Matthias Leese, "Exploring the Security/Facilitation Nexus: Foucault at the 'Smart' Border," *Global Society* 30, no. 3 (July 2, 2016): 412–29. https://doi.org/10.1080/13600826.2016.1173016; see also Bernard E. Harcourt, *Against Prediction: Profiling, Policing, and Punishing in an Actuarial Age* (Chicago: University of Chicago Press, 2007).

[41] Rita Raley, "Dataveillance and Counterveillance," in *Raw Data Is an Oxymoron*, ed. Lisa Gitelman (Cambridge, MA: MIT Press 2013), 121–46.

argues that preemption builds on the logic of uncertainty. We do not know what will happen and who will do it. Yet this is linked to the implied certainty that it can happen every time. Thus, the threat is already present. This is the justification of preemptive action, and the reason why preemption creates its own cause. To some extent, predictive data-based methods do that as well, yet not by preemptive action but by creating a corpus of knowledge about what is already present: individuals and their biographies. These methods create *suspects* as the particular, individualized, current form of a (future) threat. Data promises access to what is already present, i.e. the suspects rather than the future acts; maybe in the form of a pattern or relation we had not yet noticed.

The punitive system has allowed the creation of a corpus of knowledge that started from convicts and used the emergent human sciences to establish new means of classification, which would eventually be those that figured in courts and laws. Data-based prediction promises a similar set of knowledge that again analyzes lives, like in delinquency. Following this logic, the suspect, in particular, is not someone who will commit a crime, but someone whose life exhibits a certain pattern. This is, however, no continuous biographical writing nor circumspect psychological study. It is a sampling, a collection of all kinds of data points as has been shown above. Nevertheless, it is in the same regard a corpus of knowledge that establishes the presence of the criminal before the act.

Thus the uncertainty of the threat is not absolute. It is, after all, modelled after examples of terrorist attacks and similar events. It contains an uncertainty because something like this could happen everywhere and does not need overly suspicious acts of preparation, etc. But it is done, we learn, by specific people: youngsters playing videogames, social outcasts recruited on twitter, persons with particular travelling patterns, etc. This might also explain the prevailing preoccupation that every terrorist or violent act needs a "mastermind" – a person who incorporates these features, even if the concrete organizational structure of terrorist plots can be quite different.[42] At the very least there need to be connections to a suspicious, dark background. They cannot be the spontaneous acts of an otherwise normal person – which would be a real "unknown unknown".

Yet the uncertainty and potentiality of the threat, which Massumi highlights, remain important for this analysis because they legitimize the circumspect collection of data. The same corpus of knowledge that establishes suspects as identifiable patterns also shows that these patterns constantly change and need updates. The particular relations of different events, behaviors, and activities that make up a suspect are not known in advance, particularly *because* they do not stand in a causal relation.[43] Yet new technologies imply that they can be discerned by algorithms that detect regularities, rules, patterns, and correlations. However, since it is not known in advance which of those elements will prove to be significant, all pertinent data is necessary. And since the

[42] Jack Sheafer, "The myth of the terrorist mastermind", accessed August 10, 2016: http://www.politico.eu/article/the-myth-of-the-terrorist-mastermind/

[43] Amoore, "Data derivatives", 30.

focus of the analysis is not criminal acts but the particular lives of suspects, all data that concerns their lives is pertinent. This legitimizes the circumspect collection of data.

Similar to the discussion of the flexible and dynamic creation of norms in the last section, we are dealing with a heterogeneous, discontinuous version of what Foucault described. There are no more "natural classes" to be discerned, but particular subsets of lives and particularities of behavior that themselves have become dynamic and consequently have to be continuously traced. Furthermore, some of the measures taken as a consequence of data-based prediction deviate strongly from the program of correction that was the aim of the punitive system. In contrast, many of those who are identified as suspects today are persons that are kept outside of Europe and North America. They can be detained in illegal camps like Guantanamo. They can even be killed – as Michael Hayden, former director of the NSA and the CIA openly confirmed – based on (meta-)data.[44] Here the difference between Deleuze's society of control, in which lives in the coherent sense in which they figure in Foucault's discussion of delinquency are no longer important, and the lives on the fringes or outsets of these societies becomes salient again. The liberal subjects described by Deleuze are constantly adapting to "dividualized" measures and data points without aiming at biographical coherence. Yet the suspects that are established as threatening these societies must exhibit features that define their lives. This is not a definition in the full sense that a closed institution like the punitive system in the 18th century allowed – but in a circumspect enough way that this life can be classified as necessarily detained, extracted, or even eradicated.

Conclusion

In the light of the discussion of data-based surveillance in the last sections, requesting oversight in the form of opening black boxes, of gaining transparency and insight into surveilling technologies is a limited if not problematic approach.

Section 4.1 shows that the subjectivating effects of algorithmic systems cannot be reduced to what the algorithm does. Its outcome is based on many measurements (moments of writing or sampling data) and actions carried out based on the evaluations that these data enable. Those moments are temporarily and spatially distributed. Although this distribution is no longer linear and regular, these moments all potentially contribute to subjectivation. Even a single data-based judgment at a border, for example, can exert subjectivating power. Some are still repeatedly exposed to such moments, for example when every flight implies lengthy additional security checks that clearly separate those who need and those who need not submit to such procedures. Opening black boxes and transparency can deliver important information about how these judgments come to pass. But it cannot provide answers as to whether such subjectivating moments should be possible in the first place, or who, where, and when it should be allowed to carry out the respec-

[44] http://www.nybooks.com/daily/2014/05/10/we-kill-people-based-metadata/

tive actions, etc. In particular, some approaches to transparency, regarding questions of whether the subjects are judged correctly, disavow these subjectivating processes by implicitly presupposing a subject that could be represented in data.

This is complemented by section 4.2, which shows transparency and insight as too limited in a further respect: it often focuses on data collected about those who are eventually assessed using this data. To the contrary, everybody whose data is collected is implicated by the ensuing relations of power – first of all by enabling the new forms of subjectivity, here called suspects, by contributing data. Yet, this feeds back on the perception of normalcy. In consequence, what it means to be an orderly citizen is increasingly based on the same processes of knowledge creation as the moments of establishing suspects. Data can be used to quite different aims, ranging from flexible self-normalization and the policing of populations to the disciplinary separation of the normal from the abnormal based on individual cases. All these activities are based on the same submission to the circumspect collection of data – following the logic that all data is pertinent.

Section 4.3 continues this argument by showing that data-based surveillance technologies aiming at identifying potential future criminals constitute a particular form of subjectivity: the suspect. It is related to certain patterns in the lives of individuals and social circumstances that gain their meaning only by first grasping them in the form of data and second collecting and organizing that data in a particular fashion. Rather than asking whether such algorithms identify the right persons or correctly predict future deeds, the relevant question is whether we want such a new form of subjectivity as well as the ensuing power relations to emerge and to determine our lives. This becomes particularly problematic because many of the technologies discussed here are used to police the borders of societies of control where a perspective on individuals that are subjected concerning their entire lives still remains important – and not just the control of dividualized data points that determines life within societies of control. Here, a parallelism emerges when the societies of control produce all kinds of data on dividuals that can, however, be appropriated and harnessed towards subjectivizing – disciplinary – effects. This directly influences current procedures of oversight and transparency, which are very often limited to ascertaining that no rights of the citizens of the particular state are violated.

This does not mean that there is no sense in opening black boxes. For example, it has been uncovered that an algorithm used to judge recidivism among prison inmates had a quite different distribution of the risk factors it assigned to whites and people of color than the actual recidivism rates a few years later.[45] But it would be wrong to conclude that we only need better insights in the working of the algorithm in order to build a better – unbiased – one. Requests for transparency always imply that we have a measure to judge what we see once the insight is granted. However, there is no measure for data-based judgments of suspicion, because the very knowledge that allows such judgments emerges with the algorithms and data-collections that should be judged. Instead, the underlying effects on the meaning of recidivism, how the knowledge about this

[45] Angwin, Larson, Mattu and Kirchner, ProPublica, "Machine Bias".

comes to pass, how a new "kind" of subject – the numerically determinable suspect – emerges, should be at the center of inquiry. In particular, we need to ask who gains power over these subjects and how this is legitimized. Knowing how an algorithm works alone can never answer these questions, particularly since a lot of the power relations and their legitimization is derived from data. That does not just mean that the outcome of the algorithm depends on the data themselves. A lot of the legitimization of data-based surveillance stems from the claim to own particular kinds of data, to be able to organize and analyze them in a particular way (using automated algorithms) and to discern a particular new form of life: the suspect. Thus, opening black boxes is an important element for an ethics or governance of algorithms. However, it has to be embedded in a larger social, institutional, and technical picture that analyzes shifts in power and subjectivities rather than biases and correctness in data and algorithms.

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