Comparative Criminology in the Time of Algorithmic Knowledge: The Challenges of Global Comparison

Abstract

The ways in which criminal justice agencies, on a global scale, collect and organize data related to the assessment of risk is rapidly transitioning to algorithm-based big-data analysis. This revolution in data collection and knowledge production generates a profound impact on a variety of areas. In this chapter, we focus on the challenges it poses to comparative criminology, particularly at a moment of time when a comparative perspective is crucial. As we illustrate, the transition from data defined by social science, theoretical categories, to a stream of independent variables under the algorithmic analysis, which cannot be described using traditional positivist knowledge, is at the core of this challenge. By comparing the goals of modern comparative criminology (characterized by the commensurating approach to comparison) with the epistemic change of criminal justice agencies, we argue that there are three main points of friction: commonalities are replaced with idiosyncrasies; the loss of generalizability and policy reform as possible goals; and omnivorous data that defies parsimonious comparative models. Hence, this transition from a foundation of positivist knowledge to a stream of information defined only in terms of prediction viability requires a recalibration of how we derive inferences from comparison.

Introduction

Risk assessment has been an integral part of crime control at least since the birth of modern criminology. The present-day notion of measuring risk first crossed the Atlantic from Europe to the US in the late 19th century, and in the second half of the 20th century the use of actuarial risk assessment took over the world. Over the long years, risk assessment has been used throughout the criminal justice system in multiple forms. It served as a helping tool to manage decisions concerning the processing, punishment, parole, and rehabilitation of offenders. Throughout different time periods the ways in which risk assessment has been performed developed and varied. Mostly, it transitioned from subjective expert evaluation to actuarial analysis, and finally to automated calculations of risk scores.

Since the mid-1980s, in what is known as risk factor prevention, risk assessment has become a dominant paradigm, first in developed Western nations, particularly in the USA, and then in

numerous countries around the world. Today risk factor prevention is a wholly global phenomenon, which by nature demands the attention of comparative criminal justice analysis. Whether it be through subjective assessment, actuarial analysis, or automation, the global dimension of assessing the risk of violence in criminal systems continued to rely on the episteme of positivist knowledge. In this context we define positivist knowledge broadly: it is the cumulative set of assumptions, findings and conclusions that are the product of studying crime as the outcome of delinquent behavior. Prioritizing causal analysis, positivist knowledge is also guided by a principle of "usefulness," (on criminology and usefulness see Sherman, 2005; Clear, 2010) seeking to bring about change of behavior, and in this regard, as we argue below, it is also reflexive. It is knowledge based on social theory which aims to study the criminal (rather than the crime) and meets possible policymakers demand for prediction.

As we enter the third decade of the 21st century, risk assessment is increasingly transitioning to algorithm-based big-data analysis (Hannah-Moffat, 2019; Kehl et al., 2016; Mehozay & Fisher, 2019). Algorithmic Risk Assessment (ARA), as its proponents argue, increases accuracy to the extent that it may even eliminate tendencies towards the bias that exist in current tools of risk assessment (Hannah-Moffat, 2019, p. 9). ARA is the most advanced form of risk assessment automation, and as such it is unsurprisingly following the path of actuarial risk assessment and becoming a widespread phenomenon. However, with the spread of ARA, the criminal justice system replaces old ideas about crime and criminality with new, epistemically different sources of knowledge. Until very recently, risk assessment tools kept a constant reliance on reflexive knowledge based in social theory as the foundation for the assessment process. In this context, regardless of any paradigmatic shifts, criminological research remained the categorical source of knowledge for risk assessment.

As we illustrate below, algorithmic risk knowledge breaks with the traditional episteme and relies on a-theoretical, predictive, and non-reflexive knowledge instead. It replaces the positivist-self with the algorithmic self (Mehozay & Fisher, 2019). Therefore, we argue that it no longer shares the same epistemic foundation with comparative criminology, which predominantly emphasises the use of positivist knowledge. Instead, it introduces a challenge for a comparative analysis in criminology, particularly to a commensurating approach (Espeland & Stevens, 2003; Merry, 2011; Nelken, 2015).

Using a historical lens, we begin by discussing the global nature of risk assessment practices, which dates back to late nineteenth century Europe. Then, we argue that the accelerated adoption of actuarial risk assessment tools beginning in the 1970s is now moving to its next step with the enhanced embrace of ARAs in the West. A critical review follows, about the ways in which ARA changes the foundational data structure of criminal justice – from positivist to non-essentialist, non-categorical data. In this chapter, we suggest that comparative criminology came to rely increasingly on theory-based and reflexive knowledge, which is evident in the commensurating approach to comparative work (Nelken, 2021). As such, comparative criminology must acknowledge the novel challenges of ARA, which we present and discuss. Currently, we do not evaluate this epistemological shift with respect to the knowledge-power nexus, a wholly important analysis which we leave open for future examination.

1. Risk Assessment – Past and Present

1.1. What is risk assessment?

Pre-algorithmic risk assessment can be defined as “the process of using risk factors to estimate the likelihood (i.e., probability) of an outcome occurring in a population.” (Kraemer et al., 1997, p. 340; Skeem & Monahan, 2011). A risk factor is "a variable that correlates positively with the

outcome of interest." (Scurich, 2016) In the context of violence, risk factors are variables that covary with acts of violent crime. Today, thanks to globalization and technological developments, we are witnessing an important shift in the way risk assessments are performed, as well as in the scale.

The use of risk assessment became a fundamental part of criminal justice systems around the world, and a yardstick according to which the legitimacy of criminal justice administration is assessed (Singh et al., 2014). Methodologically, we witness the increasing reliance on algorithm-based big data analysis (Hannah-Moffat, 2019; Kehl et al., 2016; Mehozay & Fisher, 2019). Proponents of algorithmic risk assessment argue that this method introduces a new level of accuracy, to the extent that it may even eliminate forms of bias inherent in previous – mostly non-structured – decision-making methods (Hannah-Moffat, 2019, p. 9).

1.2. Risk factors and prediction – an ongoing endeavour

A motivation to identify degrees of dangerousness in offenders was already present in the writings of the founding fathers of the positivist school of criminology, dating back to the 19th century. In Europe, during the 19th century, positivist criminology began its conceptual formation, occupied with the prescriptive goal of identifying risk factors, or, *dangerousness*, as they referred to it (see, Raffaele Garofalo, quoted in (Ferri, 1906, p. 6). In 1880, Cesare Lombroso published in Italy "The Criminal Man", in which autopsies were used to reveal risk factors in the form of "atavistic deviations." Although Lombroso's ideas were later contested by the French environmental school (Nye, 1976) and in England on the ground that these atavistic deviations are of degree, not kind (Goring, 1913), the practice of constructing positivist knowledge about risk factors took hold in Western criminology. Equally, crime prediction – and, therefore, the principles

underlying risk assessment – have been a feature of the U.S. criminal justice system since the early 1920s (Kehl et al., 2016, p. 3).

From the early 20th century, risk evaluations were conducted on a case-by-case basis and based on clinical judgment by professionals, mostly from the fields of psychiatry, psychology, and social work, along with correctional staff and clinical professionals (Ibid: 8; Simon, 2005, p. 398). The guiding thinking was that crime is an outcome of some deviant cause, either internal or external, and therefore criminal culpability can always be tempered by mitigating circumstances. It stems from the conception of the pathological self (Mehozay & Fisher, 2019, p. 526). Accordingly, human behavior is determined by internal and external forces, whether biological, physiological, psychological, or social. Under the premise of the pathological self, crime is understood to be an outcome of some deviant cause, either internal or external, and therefore criminal culpability can always be tempered by mitigating circumstances (Ibid). At the time, criminologists and sociologists in Chicago managed to shift the positivist focal point from biological and mental to the social (Melossi, 2008, p. 105; Young, 2011, p. 180). From the 1930s on, under the influence of the Chicago School, increasingly more weight was given to external social variables, to the point where positivist criminology was dominated by sociological approaches.

As crime rates rose at the end of the 1960s and the early 1970s, there was growing dissatisfaction with the mainstream positivist-etiological approach (for more about how the crime rate rise relates to a transition in the goals of criminal justice policy see Garland, 2001, CH. 6, 7). It was perceived as a purposeless fixation on attempting to explain crime, rather than manage it effectively. During this period, managing crime became almost synonymous with managing risk. Accordingly, traditional methods of conducting risk evaluations, based on professional clinical

judgment, came under scrutiny from leading academics, jurists, and social scientists for being too subjective and hence inaccurate and ineffective (Simon, 2005, p. 397). Once again, as it was articulated by the classical school in criminology, delinquency was seen as a product of free choice by individuals who are capable of logical decision making and who understand the consequences of their actions. New theories, which came to be known as neoclassical, embraced the core classical principles and returned to conceiving delinquency in terms of choice and moral responsibility (Garland, 2001, p. 127). Indeed, this sentiment led to reembracing the concept of the rational-self (Mehozay & Fisher, 2019, p. 529) as a competing perception of criminal behavior as pathology, or the "pathological self." Much more in line with the managerial goal was the perception of crime as a rational act, and therefore not a unique form of behavior. However, it is important to note that the managerial movement did not part ways with positivist notions, and even though it questioned the value of aetiological research, it never set aside the idea of an ontological closure of the observed system. The pathological-self continued to play an important part in criminological research under the managerial movement. It was the pathological-self that provided the foundation for identifying risk factors for delinquent behavior that could inform and shape policy (ibid, p. 531).

The managerial movement therefore continued to adhere to positivist knowledge with unescapable theoretical underpinnings. While under a theory of rational behavior positivist knowledge is used to learn about incentives, under a theory of pathologies the knowledge is used to explain behavioral abnormalities. In this regard, positivist knowledge is reflexive because of its devotion to causal analysis and, consequently, to influencing behavior – either through deterrence or some form of rehabilitation. As a discipline, criminology relays heavily on positivist knowledge, and comparative criminology is no different.

1.3. Actuarial risk assessment becomes a global phenomenon under the managerial movement.

Since the mid-1970s, the managerial movement in crime control has been a dominant force in criminology. It has given precedence to relevance and optimization of policy (Mehozay & Fisher, 2019, p. 524). Methodologically speaking, the managerial movement promoted evidence-based practices, which sought to incorporate quantitative scientific methods that could identify potential offenders and reduce recidivism by predicting future behavior (Kehl et al., 2016, pp. 7–8). From the perspective of "evidence-based" approaches, risk factor prevention is considered a major step "towards more efficient, unbiased, and empirically-based offender management" (Hannah-Moffat, 2016, p. 33; Kehl et al., 2016, pp. 7–8).

Arguably one of the most important developments in criminal justice procedures that came out of the managerial movement is the project of articulating factors for delinquent behavior which informs risk analysis tools. In evidence-based risk assessment, offenders are assigned a risk score (high, medium, or low) that is used – sometimes in comparison with previous assessments – to determine not only processing and sentencing but also treatment and intervention (Kehl et al., 2016). The score is computed based on risk factors which are variables that covary with available information about acts of violent crime. The opposite are protective factors, which are variables that negatively correlate with violent crime.

Risk factors are by definition categorized according to social science theory. As such, they are in close affinity to the concept of the pathological-self, and, at any rate, founded on positivist knowledge. More specifically, risk factors are based on two main categorization methods that stem from social research. The first method divides them according to their relation to the person being assessed (Monahan, 2006): what the person is (typical examples are age, gender, race); what the person has (e.g., major mental disorder, personality disorder, substance abuse disorder); what the

person has done (e.g., prior crimes, violence); and what has been done to the person (e.g., pathological family environment, victimization). The second method is a later development. In this case, statistical predictions are assigned weights to fixed or "static" predetermined individual risk factors such as a history of substance abuse and age during the first offense. Over time, actuarial risk tests based on static criteria were enhanced to include dynamic factors. Dynamic risk factors comprise any criteria that can change over time, such as age, employment status, and whether the person in question is in treatment for substance/alcohol abuse (Bonta & Andrews, 2016; Kehl et al., 2016, p. 9).

In the 1990s, new methods based on actuarial modeling were introduced, and since then, risk assessment has been a largely uncontested component of the criminal process (Simon, 2005). The actuarial phase in risk analysis represents a major evolution towards evidence-based practices and the development of sophisticated mathematical tools to measure risk (Kehl et al., 2016, p. 9). Indeed, one of the main outcomes of the managerial movement was that crime came to be viewed as a routine risk to be calculated, so it is no surprise that there is a booming industry of social science research constructing instruments: more than 150 actuarial risk assessment instruments exist, and more are being constructed by social scientists routinely (Fazel et al., 2012; Ramesh et al., 2018; Schwalbe, 2008; Viljoen et al., 2019).

Early and fast adoption by the American system led to a rapid spread of actuarial risk assessment around the world (Harris et al., 2015, Chapter 5). A survey from 2012 asked mental health professionals from 44 countries in six continents about their risk assessment practices and found that the growing reliance on structured actuarial risk assessment practices is not strictly an American phenomenon (Singh et al., 2016). More specifically, even though mental health professionals in the US reported the highest rate of use, actuarial instruments such as the Historical,

Clinical, Risk Management-20 (HCR-20), the Psychopathy Checklist-Revised (PCL-R), and Psychopathy Checklist—Screening Version (PCL:SV) were all used globally in similarly high rates (Ibid, 115-117). The survey also found that users of these instruments "rated these tools, on average, as being very useful." (Ibid, 119).

Globally, the use of highly automated actuarial tools is also growing, following the embrace of structured actuarial risk assessment. Automated tools represent the pinnacle of the risk assessment evolution. Automation is a matter of degree and varies from automation of the calculation to a complete autonomous evaluation process. A few country-specific examples include Australia in which "national and state-based agencies have begun to develop and implement computerized decision support systems (DSS) and risk assessment tools that draw on standardized data (within and/or across agencies) to help understand the risk of [domestic violence] recidivism for sub-groups within the population" (McNamara et al., 2018). Australian researchers are evaluating the potential of existing administrative data to predict domestic violence-related recidivism (Ringland, 4/2018) and the implementation of an ARA for policing purposes called the Suspect Targeting Management Plan (STMP) has begun (NSW Police Force, 2016). Canada which uses the Static-2002 to assess the risk of violent and sexual recidivism (Konikoff & Owusu-Bempah, n.d.; *Police in Canada Are Tracking People's "Negative" Behavior In a "Risk" Database*, n.d.; R. Karl Hanson & Canada, 2003; Treasury Board of Canada Secretariat, n.d.); and the Netherlands which uses the Quickscan to assess static and dynamic risks of recidivism (Tollenaar & van der Heijden, 2013).

The globalized character of actuarial and automatic risk assessment, and its ongoing continuous spread, has obvious implications on comparative methodology. Criminology, and comparative criminology, follows criminal justice administration practices, just as much as it seeks

to influence them. The managerial era, from a criminological research perspective, was also a time of a rise in comparative research based on generalizations and quantified knowledge. Hermann Mannheim's seminal *Comparative Criminology* ((Mannheim, 1965) is one of the early trailblazers of the reliance on positivist knowledge in the comparative criminology field. Mannheim's textbook was a pioneer in putting the emphasis on delimiting criminology as a quantitative science independent from sociology or criminal law, that aims at identifying generalizations based on social theory. Here, the emphasis is on "communalities, on those characteristics that criminal justice systems share. The assumption is that, at a certain level, we can find 'universals' in how justice is administered or how social control is given shape." (Pakes, 2019, p. 16). The spirit of Adolphe Quetelet's 'thermic law of delinquency' is present in Mannheim's work and the scholarship that succeeded it.

The field of comparative criminology that evolved from these seeds relies to a large extent on one main measurement strategy: actions. Actions, such as police reports, arrests, recidivism, or incarceration, are all imbued with aetiological meaning. As such, these actions are all related to the ways in which risk is measured under the actuarial method. The quantitative method is concerned with the countable aspects of reality - issues such as rates of imprisonment, murder rates, number of police stops, and statistics about the reporting of crime. The quantitative comparison, hence, requires the ability to compare apples to apples, which became increasingly easier during the second half of the 20th century, when actuarial data and quantitative parameters took centre stage in criminal justice administration, to a large extent through the embeddedness of actuarial risk assessment in decision-making.

1.4. ARA global tide of next-level automation – parting ways with positivist knowledge

The global motivation for more accuracy and bias-free analysis led to an entirely new generation of automated tools incorporating big data and machine learning algorithms (Harris et al., 2015, Chapters 5, 7, 9). As such, ARA may be the outcome of ongoing and concentrated pressure to improve efficiency in crime control. ARA represents a methodological and technical, as well as epistemological, break from the previous actuarial assessment.

Technically, ARA are the product of a rapid process of actuarial risk assessment development. This development can be described as beginning with binary item weightings and differential item weightings (e.g., the 0 to 2 scale), then progressing to approaches that use multiple and logistic regression and finally current instruments using machine learning methods and automated calculation (Wormith 2017).

From an epistemological standpoint, ARA represents a transition away from positivist knowledge, which for more than a century served as the pillar of criminological knowledge production. In this respect, the works of Adolphe Quetelet (1796—1874) and A. M. Guerry (1802—1866) played a key role in setting the conceptual foundation of the positivist school of criminology. At the time, positivist criminology was occupied with the descriptive goal of constructing generalizations about the nature of social hierarchy. Yet it was not long before positivist knowledge became the foundation for prescriptive endeavors. This type of knowledge assumes that similar to the study of irregularities in nature social science can study abnormal characteristics among people (Jenkins 1982, 347; Beirne 1993, 3). Positivist criminology seeks to produce knowledge about the offender. Toward this end, the positivist school promulgated "a system of *assessment, classification and differentiation*," to be carried out by "trained 'diagnostic' personnel" (Garland 1985, 126; italics in original). In that sense, it is aetiological. Thus, the transition represented by ARAs is an attempt to topple the "positivist pillar": to finalize the switch

from aiming to understand crime by asking "why," to managing crime based on prediction absent of theory.

Positivist knowledge is, accordingly, also reflexive to a degree. It becomes reflexive through its emphasis on causality. Modern criminology's preference towards causal explanations is also an emphasis on the goal of influencing action, it is a symbiotic relationship with criminal justice administration. Note, positivist criminology seeks not description alone but prescription of action—and not just action as such, but that which can shape or alter behaviour (via treatment or deterrence for example). For both the rational and the pathological theories of criminal behavior knowledge is also about understanding how to shape behaviour, for both there is the possibility of change and in that sense both are reflexive. As we argue below, algorithmic knowledge is not causal and does not seek to explain and influence action but to predict it, contrary to the reflexive nature of traditional epistemes.

In a departure from the previous actuarial risk assessments, algorithmic risk analyses are based on data collected from diverse sources, rather than specific data being gathered specifically to serve criminological research. As a result, unlike the case with previous risk analyses, the database of the ARA can be expanded indefinitely. And as such, the size of the population on which it is built can be infinitely greater than in the actuarial model. Furthermore, as the data is no longer grounded in social science disciplines, it is no longer based on the same epistemes as past positivist approaches to crime and criminality (namely, the pathological self, specifically on markers of some crime-prone traits that are based on positivist knowledge) (Hannah-Moffat, 2019, p. 6). Finally, unlike previous approaches to knowledge production, here the main driving force of data collection and analysis is prediction; such prediction no longer depends on theory and research design but becomes the be-all and end-all. While non algorithmic positivist knowledge in many

respects also aims at prediction, its calculation can be explained as it is based on theoretical conceptions and known empirical data. Moreover, ARA in this sense is the final stage of administrative criminology where prediction becomes the only objective; affecting behavioral change is abandoned. Thus, algorithmic risk analysis marks a new stage in the epistemology of the self in criminology, the algorithmic self (Mehozay & Fisher, 2019).

In short, whereas actuarial risk tests defined the factors to be analyzed based on aetiological research, algorithmic risk assessments break with this scientific foundation; here, the goal is simply prediction itself: to let the algorithm uncover patterns in the data (Mehozay & Fisher, 2019, p. 534). Moreover, the evaluations of algorithmic risk assessments are not obliged to be empirically defensible (Hannah-Moffat, 2019, p. 6). Indeed, the algorithms employed are often locked within a black box, meaning it is impossible to explain how a risk score was deduced. ARA is based on several key conceptions that can be distinguished from those that underlie actuarial risk assessment. ARA prioritizes prediction over theory which leads to the introduction of omnivorous data collection - the lack of interest in social theory allows any type of data to be collected (Striphas, 2015). Importantly, the massive amount of data processed and the complex nature of algorithms, including the fact that they can be programmed to learn and evolve, makes the process of algorithmic decision making opaque. The algorithmic process is therefore virtually black-boxed (Pasquale, 2015), impenetrable not only to a-priori controls but to a-posteriori reverse engineering as well.

ARA breaks apart from the construction of positivist knowledge in the criminal government field. ARA relies on mass data collection and storage, and on machine learning prediction technologies that are supposed to provide computational precision at the cost of interpretability (Lipton 2018; Gilpin et al. 2018). Underlying ARA is the assumption that by using

these technologies to amass and process large quantities of data representing diverse variables, we can predict human behaviour better than by collecting and processing data based on variables derived from theoretical models (Mayer-Schönberger & Cukier, 2013).

ARA are part of a global zeitgeist, described by some as an "algorithmic age" (Danaher et al., 2017, p. 1). Scholars have noted that "New hardware and new software promise to make 'quantified selves' of all of us, whether we like it or not. The resulting information— a vast amount of data that until recently went unrecorded— is fed into databases and assembled into profiles of unprecedented depth and specificity." (Pasquale, 2015, p. 4). In the sphere of criminal justice, in the wake of continued and concentrated pressure to improve accuracy and efficiency in risk prevention, risk analysis developers turned to the emerging new technique of algorithmic data analysis with the hope of entering into a new era of complete precision, devoid of any subjective bias. Toward this end, criminal justice researchers around the world are currently working with computer scientists and software engineers at universities and commercial companies to develop machine learning algorithms that can predict an individual's potential for offending based on vast quantities of data.

In line with other global trends in penal governance, such as predictive policing (*AI & Global Governance: Turning the Tide on Crime with Predictive Policing*, n.d.; Meijer & Wessels, 2019; Oswald et al., 2018), ARA is intrinsically a part of a global algorithmic phenomenon that crosses from the private sector to government authorities. Today the use of emerging ARA technologies is on the rise mainly in the American systems of criminal justice, however, there is a trend of embracing automated risk assessment globally as well. In the US alone, pre-trial ARAs are now actively being used, or adapted for use, in as many as half of the states (National Conference of State Legislatures, 2015, 2018). Moreover, as of 2019 "Risk assessment tools are

used at sentencing in 28 states; at least 7 additional states use risk assessment at sentencing in at least some counties." (Stevenson & Doleac, 2019). According to a 2019 survey, all US states, including DC and the federal government, use some form of ARA, for pre-trial, sentencing, prison management, or parole (Electronic Privacy Information Center, n.d.).

Two examples illustrate the difference in the degree of algorithmic development: COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) and MnSTARR (Minnesota Screening Tool Assessing Recidivism Risk). COMPAS is the most commercially successful application of machine learning in the market of ARAs. It employs a decision tree model and uses large amounts of data ("big data") for analysis. The result is a "black box" insofar as the exact calculation for arriving at the assessment outcome is unknown to the evaluator. The evaluator selects the items for analysis but is incapable of explaining how the outcome was determined. MnSTARR is a new development (from 2017) of an individual's automated scoring, as it uses electronically stored data in searchable databases. It requires no human involvement, as it is a fully-automated risk assessment tool, thus the developer boasts that before the automation the manual score took 35 minutes to produce, while the automation means that in seven seconds a score is produced.

Some states, such as Virginia, Pennsylvania, Ohio, Texas, and Kentucky have developed their own tools, but many utilize ARAs produced by companies, nonprofits, and other organizations (Electronic Privacy Information Center, n.d.). COMPAS is used in Florida, Michigan, Wisconsin, Wyoming, and New Mexico. The Public Safety Assessment (PSA) tool, which advocates transparency and is provided at no cost, is being used "statewide in Arizona, Kentucky, New Jersey, and Utah. It is used in a number of major cities and surrounding areas, including Allegheny County (Pittsburgh), PA; Cook County (Chicago), Il; Harris County

(Houston), TX; Mecklenburg County (Charlotte), NC; Milwaukee County, WI; and San Francisco County, CA." (*Advancing Pretrial Policy & Research - FAQ*, n.d.). LSI-R is another commonly used automated tool "used by more than 900 correctional agencies in practice" (Lowder et al., 2019).

It should be emphasized that algorithmic risk assessment is no longer an American phenomenon. In the U.K., Durham Constabulary has developed with Cambridge University the Harm Assessment Risk Tool (HART), a machine learning system that analyses 34 categories of data to predict the likelihood of reoffending. The tool is not used to determine bail or sentencing decisions yet, but only to inform the selection of candidates for a rehabilitation program (Oswald et al., 2018). In addition, the Offender Assessment System (OASys) is widely used with adult offenders across the prison and probation to better construct individualized sentence plans and risk management plans. At the end of December 2013, almost two-thirds of all offenders had a full OASys assessment, and by the end of March 2014, almost seven million prison and probation assessments for over one million offenders were completed. (Ministry of Justice Analytical Series, 2014; Moore, 2015). Finally, the U.K. uses the Offender Group Reconviction Scale to predict re-offending while on probation (Les Humphreys, 2009).

Recently, a new set of algorithmic tools, developed by the Forensic Psychiatry and Psychology group at the University of Oxford, became widely available: the OxRisk. The OxRisk includes "four freely available web-based risk calculators: OxRec – Risk of Recidivism Tool, also available in Swedish, Greek, French, Chinese, and Russian. OxMIV – Mental Illness and Violence Tool, also available in Greek, German, French, and Chinese. OxMIS – Mental Illness and Suicide Tool, also available in French. FoVOx – Forensic Psychiatry and Violence Tool, also available in German and Chinese (*OxRisk*, n.d.).

Although the implementation of ARA within criminal justice administration is still ongoing, these examples suggest that it is very reasonable to assume that it will follow the same path of its actuarial-tools origins.

2. Different Modes of Comparative Criminology

Comparative criminology is a dynamic field of research. With the invention of new penal technologies, the rising popularity of new methodologies in social science, and the speed at which data and ideas travel across the globe, the methods of comparison are ever-evolving, alongside the subjects of interest. Yet, with the epistemological transition in such a globally developing practice in the field of criminal justice the field of comparative criminology is at a critical crossroad. ARA, a part of the global algorithmic turn, represents the establishment of a new criminological episteme and signifies a new form of thinking about human beings and delinquency. The algorithmic turn, as embodied in the growing use of ARA within criminal justice administration, poses a substantive challenge specifically to a comparative approach which seeks to commensurate – to assume similar units of analysis with the goal of drafting better policy.

Comparative analysis, particularly commensuration, is rooted in positivist knowledge; it demands, so to speak, theoretically conceptualized and researched based factors (either inductively or deductively defined) that could be mutually evaluated. Yet this epistemological ground is lost with ARA. With ARA, knowledge based on theory and causal analysis clears the way to rationale-free data, meaning data used for prediction alone, not based on tested hypothesis or even theorized categories – what are the implications for comparative criminology?

Systems of social control, such as criminal justice authorities, assume some form of theory about human behaviour. The managerial era in criminal justice administration, for example,

assumes a combination of knowledge-based partly in the pathological self, and partly in the rational self episteme. Yet, this is not just a feature of social control systems, but of social study methods as well. Conducting comparative research, or thinking about criminology in comparative terms, commends a recognition of one's conception of the social construction of criminality itself. Comparative criminological research, as all social science, is embedded within socially constructed subjectivity, through which epistemological assumptions are made. Comparative criminology requires positivist knowledge - knowledge about criminality, criminological tendencies, criminal justice, and criminal law processes and "the actors involved in it and the society that forms the backdrop to these processes" (Pakes, 2019, p. 15).

In addition to the discussed competing epistemological conceptions of crime and punishment, comparative criminology presupposes different technical conceptions of what it means to compare (Nelken, 2019). Here, the issue revolves not around the subject of study (criminality) and the measurement of choice (quantifiable actions) but on the meta-question of the methodology – why comparison? At the outset, criminological research builds on multiple foundational frameworks of knowledge - rational choice theory, positivism, managerialism. Comparative thinking adds to those foundations multiple diverging ways of interpretation - on the spectrum of ethnocentrism and relativism (Nelken, 2009). While the former emphasizes an imagined universality for thinking about and understanding crime and justice, the latter calls for the opposite approach "that we will never really be able to grasp what others are doing and that we can have no basis for evaluating whether what they do is right" (Nelken, 2009, p. 292). The quantitative turn in Criminology, and subsequently in comparative criminology, emphasizes ethnocentrism, in line with the globalized nature of comparison and the use of global indicators. ARAs and the algorithmic tide challenge this long-standing model of comparison, as it replaces

generalizable social theories with "black box" data, meaning whatever set of quantified information chosen by an algorithm to optimize statistical inference. This challenge is most apparent in the commensurating approach to comparison.

David Nelken distinguishes comparison from *commensuration* - unlike "simple" comparison, commensuration requires (or perhaps assumes) a common measurable unit (Nelken, 2021). Commensuration is the act of demonstrating similarities despite other differences, with a goal (explicit or implicit) of bringing about change. Their comparative aim is practical, and less driven by curiosity - it is a move from comparing with the goal of gaining insight, towards comparing to promote a more effective process of reform in the world (Ibid). It is important to note that Nelken's distinction is not binary, instead, there is often an overlap between comparison and commensuration.

An abundance of positivist knowledge made the rise of a commensurating approach to comparative criminology possible. Late in the 20th century, both neoclassical theories, assuming a rational self, and theoretical developments assuming a pathological self, have been incorporated into the managerial movement in different capacities. Under the umbrella of growing reliance on positivist knowledge in comparative research, both conceptions came to share an epistemic backbone, according to which a person can be explained by reference to a theoretically informed abstract category. Accordingly, people can be classified into a simple matrix and a theory can be applied to explain the connection between the category with which one is associated and delinquent behavior. This procedure is central both to rational choice theory and to a study of pathologies in positivist criminology. And most importantly – crucial for performing commensuration.

The merger of what are essentially two positivist knowledge-generating epistemes is well demonstrated in the boom of actuarial risk assessment. Static risk assessment uses factors based on a causal understanding of criminality and correlations with recidivism. It abides by positivist methodology and theory, dominated primarily by psychology (Hannah-Moffat, 2019, p. 6). Actuarial risk factor analysis, then, was a direct product of the episteme of the pathological self. Yet the way it was used changed under the managerial movement. Actuarial analyses were now used as tools to manage crime rather than to discover the causes of crime – a direct effect of the rational self episteme. The dynamic model is also still informed by empirical research and theoretical frameworks and assumes the pathological self.

The way in which both epistemes are synthesized together is revealing. The capacity of actuarial risk assessment to rely on both is the outcome of their shared foundation – the ability to construct positivist knowledge about a person. While the pathological self constructs deviant behaviour as the result of categorical evaluation (social, economic, psychological, etc.), the rational self evaluates delinquency under a different positivist lens – actions. Both, in turn, demand positivist knowledge, and in that sense, command a positivist-self.

An assumption of positivist knowledge is precisely the trait that allowed comparative criminology to gain traction during the 20th century. However, as the use of ARA increasingly becomes a new norm, it brings with it a new episteme – the algorithmic self – and a profound challenge for future comparative criminology.

2.1. ARA moves away from the required data generating process for commensuration

While commensuration has taken much of the centre stage of comparative criminology, it faces a challenge – what happens if criminal justice knowledge itself changes? The nature of

quantified positivist knowledge, rooted in social science, allowed commensuration to flourish as an approachable method with easy to digest outputs that seem to fit nicely within policy discussions. Such projects as the European Sourcebook of Crime and Criminal Justice Statistics, the Council of Europe Annual Penal Statistics, the American Bureau of Justice Statistics, and the Cambridge Crime Harm Index represent the aspiration of policymakers to turn to comparative criminology for reports, indicators, and rankings. Their mission is to place a list of countries (usually, but not necessarily) on a single/multi-dimensional dimensional plane, chosen for its assumed commonality (for example, murder rate and size of the population; the number of police officers and reported crime rate).

What is the commensurating approach to criminal behavior? As we discussed, positivist knowledge usually assumes criminality which is associated with some categorical abnormality. Yet the commensurating approach is not very concerned with the individual as a subject of analysis. Instead, it is a "unit of analysis" approach – even if individuals are the unit of observations, the subject is usually an aggregated unit. As such, the commensurating approach constructs a "unit of analysis" pathology. When the subject shifts from the individual to some other unit, it requires different constructs that relate to different fundamental research questions. No longer is the researcher interested in the behaviour of individuals, but in differences between clusters such as age cohorts, zip codes, religious groups, or income percentiles. Accordingly, the researcher's theory concerns these units, not individuals. Most importantly, the required knowledge now relies more than ever on fixed categories of meaning – breaking apart from positivist criminological knowledge thus shakes the very grounds on which the commensuration approach stands.

The nature of ranking within the commensurating approach also requires a normative dimension, which is realized by identifying a unit of analysis that is incommensurate – an outlier. This normative aspect is what is at stake when the positivist knowledge foundation is removed. David Nelken argues that the backbone of commensuration, namely global social indicators, "begin their lives" as the product of a will to outline the contours of differences between units of interest, yet soon they transform to normative standards that yield a normalising force (Nelken, 2015). In David Nelken's words, it is the second and third "moments," when "legal actors or others make proposals or otherwise act on the basis of their perceptions (right or wrong)" and then "comparison forms part of efforts to impose general norms relevant to crime and criminal justice more widely and to bring practice elsewhere into line with such standards" (Nelken, 2015, p. 26). It is those second and third moments that are at stake when knowledge ceases to be aetiological and becomes a-theoretical and un-generalizable. If the second and third moments lose their hold, commensuration loses its relevance.

Under comparative commensuration, identifying a pathology becomes an outlier analysis. Hence the assumed offender is still a positivistic self, capable of being analyzed according to known categories and positivist data. Yet, our attention should be directed not only to the standardization power of comparative criminology but to the change in "what it means to compare." If traditionally it was fair to say that "most of the important points made by leading scholars of criminology are comparative in nature" because "[t]he contents of cultural meanings that are loaded into the subject of criminology are too variable for it to be otherwise" (Sheptycki & Wardak, 2005), currently comparison draws on a different source of legitimacy. No longer is the "dispossessed, marginal and the strange" (Burawoy et al., 2000, p. 12) the focus of interest, and nor are the "lives of actors entangled with criminal justice systems, allowing insight into the

social and cultural production of crime and harm in a way that recognizes the complexity of power, culture and agency" (Fraser, 2018, p. 180). Both have secondary places. The centre of the stage is dominated by quantitative efforts to construct and maintain aggregated universal categories of meaning. When those categories of meaning are replaced with meaningless streams of ungeneralizable data, our ability to commensurate is challenged.

Criminal justice agencies' adoption of algorithmic techniques (predictive policing as well) is part of a global shift towards conceptualizing behavior under new conditions. It is the replacement of traditional social categories with non-essentialist aggregated data. Importantly, these new conditions are not compatible with the theoretical assumptions of comparative commensuration. We argue that the theory which informs the algorithmic conception of the human, and therefore, of the offender is mostly based on three conditions: a non-essentialist conception of human beings, a lack of reference to a larger social phenomenon, and a dynamic flow of data.

Unlike the rational and pathological epistemes that were based on essentialist criteria, the algorithmic episteme imagines a self composed of data points that represent empirical phenomena. Hence, it apparently reflects a non-essentialist conception of human beings which is indifferent to social context and identity (gender, income, education, and skills, etc.) as well as to grand modern narratives (nationality, class, etc.). Moreover, rather than cataloging offenders according to social categories, the algorithmic self episteme requires that they will be catalogued according to patterns of data. As a corollary to this, because people from very different social categories can end up in the same rubric (for example, as being at the highest risk of recidivism), it becomes impossible to draw general social conclusions from ARA. Each case is unique and does not inherently reflect a larger social phenomenon.

The ramifications for a comparative approach that assumes social generalizations are clear. ARA is based on a constant and unstructured flow of data, processed by an algorithm that itself is constantly changing. As such, each risk assessment event may lead to a different outcome. Taking these points together, Mehozay and Fisher (2019) draw on a general algorithmic epistemology. According to the algorithmic episteme, to know people means to recognize their behavioural patterns, not to understand the causes of their behavior theoretically or empirically. This excludes any attempt at a sociological, psychological, or indeed any theoretical aetiology. It also stands in contrast with an attempt to draw general policy decisions based on global indicators. This epistemology signals a rejection of any essentialism in how we think about people as individuals and about human nature; if there is no "deep structure" but only surface behaviour it becomes impossible to speak of any individual as a case of a larger systemic whole, such as gender or class. The algorithmic episteme assumes no social ascription, identifying individuals as the sum of their actions.

This new episteme and the new conception of self have profound ramifications for the criminal justice system, and for penology in particular. The algorithmic episteme reduces selfhood to general quantifiable behavior, excluding components that have been central in criminological thinking in the past such as language and reflexivity. Knowledge about the self is no longer aggregated under categories that ascribe social meaning –the foundation of the commensurating approach. The implications of this are what we turn to next.

3. Challenges for Comparative Research

The algorithmic self, insofar as ARA becomes the "assessment of choice," puts a question mark on the dominant practice in current comparative criminology, namely commensuration. There is a surprising schism between the algorithmic self and the conception of criminality of the

commensurating approach. There are three main points of diversion, all of them relate to the loss of positivist knowledge:

1. Unit of analysis incompatibility: Commensuration requires locating, or assuming, commonalities as general standards for comparison between groups – this is no longer possible under the embrace of ARA. Assuming commonalities becomes obsolete; focusing on places or groups becomes irrelevant. As criminal justice systems around the world turn to ARA, they turn away from generalized decision-making and policy to embrace "micro penology" where the unit is no longer the individual but a certain set of data variables that correlate with "the individual". Decision-making techniques that spread after the 1970s regarding the allocation of bail, parole, or long sentences, were focused on essentialist social theories, either based on the pathological or the rational self, with a particular focus on the possibility of making generalizations. As such, they extrapolated from theory to policy. However, replacing those methods with ARA also means replacing generalizations as a framework for decision-making with a new framework - extreme individualization.

   For the comparative researcher, this would mean that an analysis of penal systems would no longer be intertwined with social context and group identity because individuals would be assessed under a non-essentialist conception of human beings. Comparatively, it would no longer be relevant to commensurate according to social groups, because it would not reflect the reality of penal systems' approach to decision making. Such commensuration will be incapable of uncovering any grand insights. Instead, in order to gain insights, the comparative researcher must shift from "big units of analysis" as the comparison subjects, to infinitesimally small units - a comparison between variance and covariance of data points and their micro effects on the assessment of risk (and as a result,

on the structure of the penal policy). Such comparative research cannot be defined as there is no commonality to build on, other than the commonality of the process.

2. The loss of generalizability: The commensurate approach advocates reform. Thus, it presupposes the possibility of arriving at essentialist conclusions. However, under the algorithmic epistemology, aiming to draw such conclusions becomes futile. As the sociological, cultural, national, and economic context are no longer meaningful for the purpose of penal decision making, it follows that any attempt to artificially reattach essential meaning and conceptions is in vain.

   Instead, the single case becomes unique, and any decision is idiosyncratic. The algorithmic self has no preconceptions of what it is to be human and puts forward a conception of the individual based on operative, a-theoretical, and predictive knowledge that bypasses will, consciousness, and social and cultural criteria. The algorithmic episteme fragments social categories to such an extent that social fields become composed almost entirely of single individuals, or of categories of individuals who merely share similar data patterns.

   The inability to deduce general insights is a direct outcome of the practical use of "black box" decision making. The turn to an unknown, non-essentialist, component of thought about criminality is thus an admission in quantitative failure – our variables were abandoned and replaced by incomprehensible machine-generated factors of analysis.

3. Omnivorously over parsimoniously: Quantitative comparative criminology is an exercise in parsimonious explanation. For example, Cavadino and Dignan published in 2005 an important book project that aims at explaining differences in rates of incarceration through differences in political economy regimes (2005). Although their empirical work traverses

history, economy, and politics, it is an effort to develop the most parsimonious explanation possible for the large-scale issue of differences in levels of punishment. However, the crux is that parsimony in this context speaks to the elegance of theory, not necessarily to the simplification level of the underlying explanatory mechanism.

The use of ARA demands a different kind of parsimony in explanation. Instead of theoretical parsimony, we are left with parsimonious multivariate regression models. However, the comparative researcher will also have difficulties if they seek to compare statistical models, as these models would no longer be manmade nor based on social theory. In its place, ARA promises improved models that break the limits of social theory and rely on omnivorous data and patterns that the algorithm discovers. As each individual decision will become increasingly informed by ARA, not only will each instance become distinguished from its adjacent cases, it will also hover above a bottomless pit of variables that resulted in the individual prediction. No longer would it be possible to describe a model of decision-making, because the "black-box" of unique variables is beyond our reach.

Our argument is hence that the embrace of ARA compels a change over the way we think comparatively. It is still an open question how comparative criminology will adapt to the new algorithmic self episteme underlying its research subjects. The algorithmic episteme puts us in a different numerical universe than that to which we are accustomed, with possibly hundreds of variables and values. To the extent that it is possible to render such data into natural language (a table, for example) it would contain thousands upon thousands of rubrics, making it impossible to process. But the difference is not merely quantitative. Such rubrics would represent not social categories, but patterns of data. In the absence of theory and assumptions regarding a deeper cause for human behavior, no a-priori variables can be selected for analysis. Moreover, algorithms face

no technical limits to the number of variables that can be processed; and as algorithmic knowledge is increasingly aided by machine learning, neural networks, and artificial intelligence, the need to control variables is reduced. Hence the algorithmic episteme takes an omnivorous approach: any variable can be added to the mix. The guiding measure for assessing risk thus becomes predictive, rather than explanatory.

There is, however, hope for the comparative criminologist. Deep immersive qualitative research, we must remember, is founded on *humility* in the face of society's endless complexities. Instead of a parsimonious description of reality, the ethnographer for example is developing thick descriptions - a deep understanding of people, situations, and interpretation of action in a social context. The source for this approach is a foundational recognition of the impossibility of reducing a social phenomenon to a finite set of observable variables, and a matching belief in the uniqueness of situations, which never fully represent a globally shared human experience. The criminologist of the algorithmic age must adapt to the changing epistemological nature of penology. Criminology, again, must become appreciative. In the face of non-essentialist, non-theoretical penology, a humanist approach to comparative research might be imperative.

Conclusion

When systems of criminal justice transform their foundational operationalization of criminality and the subsequent knowledge-generating process, then methods of criminal justice comparison are forced to come up with novel ways of reconceptualizing comparison itself. Sophisticated prediction will be used in criminal justice one way or another, as agencies turn to algorithms promising a world without human error (Tonry, 2019, p. 444). It is no secret that traditional ways of understanding criminality are unsatisfactory and failed to promote justice and dignity in criminal policy (to that extent, current ARAs are no different). We are in the process of

changing the lens through which we examine criminality. No longer will we rely on (presumably) humanly flawed social science theory to think about people in an essentialist form; our measurements will transform into non-essentialist, non-positivistic data. In other words, knowledge production, in this sense, is solely directed at prediction; it is not knowledge that is the product of research nor does it aim to be. Yet, it is knowledge that is credited as valid, and it is administrative knowledge in the sense that it informs public policy decision-making. This sea-change in epistemology and knowledge production affects the comparative methodology which relies on positivist knowledge to construct essentialist, commensurating comparisons. Although for the comparativist, the surface level data of interest may seem, at glance, the same (particularly because it continues to deal with public knowledge), it would be a mistake to ignore the new ways in which it was created – omnivorous, with different underlying units of analysis and a loss of generalizability assumptions. The future is here.

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