Oñati Socio-Legal Series (ISSN: 2079-5971)
Oñati International Institute for the Sociology of Law
Antigua Universidad s/n - Apdo. 28
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Policing the poor through space: The fil rouge from criminal cartography to geospatial predictive policing

OÑATI SOCIO-LEGAL SERIES VOLUME 12, ISSUE 6 (2022), 1733–1758: LEGAL CULTURE AND EMPIRICAL RESEARCH
DOI LINK: HTTPS://DOI.ORG/10.35295/OSLS.IISL/0000-0000-0000-1360
RECEIVED 28 APRIL 2022, ACCEPTED 10 OCTOBER 2022, VERSION OF RECORD PUBLISHED 1 DECEMBER 2022

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Abstract

Recent years have witnessed an explosion of interest in predictive policing, with a clear opposition emerging between supporters and critics of its implementation. While critical accounts conventionally centre on opacities and operational asymmetries of the algorithmic construct (biased training, feedback loop, etc.), I argue that a different critique is first needed. Focussing on place-based techniques, I maintain that contemporary predictive mapping basically perpetuates the political and epistemic dictates which have historically framed the conceptualisation of crime in relation to space. Through a review of sources spanning from the Cartographic School to current predictive policing literature, I identify two main conceptual axes which operationalise this heritage: first, an explanatory framework of crime that has never detached from the socio-economic deficit archetype; and secondly, an ontologisation of crime alternative to biologicist positivism, nonetheless integral to the etiologic paradigm. Therefore, without first disputing these ideological bottlenecks, no initiative towards a transparent use of predictive policing is plausible, neither does a sharp distinction between place-based and person-based predictions seem tenable.

Key words

Predictive policing; crime mapping; predictive mapping; social control; critical criminology

I am grateful to Hanna Malik, Samuli Hurri and Nea Lepinkäinen for their comments on early versions of the paper, as well as to the anonymous reviewers for their helpful engagement. Thanks to David Whyte for his tip on titling.

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Resumen

En los últimos años se ha asistido a una explosión de interés por la vigilancia policial predictiva y al surgimiento de una clara oposición entre partidarios y detractores de su implementación. Mientras que los relatos críticos se centran convencionalmente en opacidades y asimetrías operacionales del constructo algorítmico (entrenamiento sesgado, bucle de retroalimentación, etc.), lo que aquí se plantea es la necesidad preliminar de otro tipo de crítica. Con el foco puesto en las técnicas de predicción geoespacial, se sostiene que los métodos de mapeo predictivo tienden a perpetuar los dictados políticos y epistemológicos que históricamente han enmarcado la conceptualización del delito en su relación con el espacio. Mediante una revisión de fuentes que abarcan desde la Escuela Cartográfica a la literatura contemporánea sobre vigilancia predictiva, se detectan dos grandes ejes conceptuales que operativizan dicho legado: primero, un marco explicativo del delito que nunca supo emanciparse del arquetipo del déficit socioeconómico, y segundo, una ontologización del delito alternativa a la del positivismo biologicista pero aun así parte integral del paradigma etiológico. Así pues, sin antes cuestionar dichas constricciones ideológicas, ninguna iniciativa encaminada a un uso transparente de la policía predictiva es plausible, ni una distinción real entre mapeo predictivo y predicción individualizada parece defendible.

Palabras clave

Vigilancia predictiva; cartografía del delito; mapeo predictivo; control social; criminología critica

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1. Introduction

Heralded by *Time Magazine* as one of the 50 best inventions of 2011, predictive policing refers, in a first approximation, to the use of algorithmic predictions to forecast future targets for police intervention (Perry *et al*. 2013, Uchida 2014). The algorithmic outsourcing represents a key difference with other manually replicable predictions – including statistically based machine scoring – that, as Ferguson (2017a) observed, have always been a part of policing. It must also be noted that the risk-assessment may refer to two distinct objects, corresponding to different algorithmic outputs: places where crimes are likely to occur (place-based systems) or individuals likely to be future perpetrators (person-based systems).

The difference from previous predictive techniques may explain why the literature praising the implementation of predictive policing usually emphasises the technical dimension as a self-sufficient argument, pushing the idea that "the presence of high technology speaks for itself" (Lyon 2007, p. 147). In doing so, the scope of the argument is artificially narrowed to an assessment of the technical efficiency imposed, on a pre-given reality, by the advent of the data revolution and advanced technologies (Beck and McCue 2009, Bachner 2013, Uchida 2014).

On the opposite side, most criticisms perform an essential task in raising awareness of the risks of biases, opacities, self-fulfilling prophecies, and other operational asymmetries derived from the surreptitious naturalisation of skewed policing practices (Robinson and Koepke 2016, Couchman 2019, O'Donnell 2019). Nonetheless, in a specular way, they also tend to stick to a technical – though critical – horizon, as their critique is mostly shaped as a reactive questioning of predictive accuracy and reliability. In doing so, they leave unexplored political and epistemic continuities that, as I try to demonstrate below, do not materialise out of nowhere.

Hence, while acknowledging the crucial role played by augmented computing power and the huge availability of data as technical preconditions for the algorithmic turn in policing (Babuta and Oswald 2021), I also agree with Amoore and Raley (2017) that the application of algorithmic technologies to the domain of security is not in itself an epistemological break with past modalities. Thus, starting from how the nexus between crime and space has been historically constructed, this study aims at preceding technical considerations about the quality of the operational steps or the conditions for their impartiality. Instead, it attempts to go deeper by recovering Kindynis' (2014) call for criminologists to interrogate the epistemological basis and hidden political functions of crime mapping.

In the field of person-based prediction, those works engaged in critical reconstructions of the actuarial, and incapacitative paradigms (Feeley and Simon 1992, Harcourt 2007) provide aid for a retrospective of this nature (though without always assuming algorithmic techniques as a vantage point, nor limiting the analysis to policing).[1] Milder criticisms, by contrast, are traditionally levelled at place-based predictions, mostly

[1] In Harcourt's *Against Prediction* (2007), the actuarial trends in policing only refer to specific forms of profiling unrelated to algorithmic methods. Within algorithmic techniques, in the sense of a clear distinction between policing and sentencing, see Završnik (2021), and the recent resolution of the European Parliament (2021) on the Vitanov Report.

endorsing the assumption that mapping is congenitally less worrying than personal targeting for its unrelatedness to legalistic definitions of profiling[2] (Lynskey 2019).

The gap that I intend to tackle is then two-tier. On the one hand, it concerns a generalised lack of exploration into the rationalities steering predictive policing practices, prior to subsequent algorithmic translations, which may amplify, but by no means generate, power imbalances. On the other, this shortage is particularly evident for the place-based approach to crime prediction, mostly regarded as a less alarming alternative to person-based profiling. The two dimensions are inextricably intermingled, as only an enquiry into the historical significance of crime predictability in connection to space may unsettle the premise of its less problematic nature.

Following an already familiar path (Weisburd and McEwen 1997, Kindynis 2014, Hunt 2019), I take the Cartographic School, the Chicago Ecological School, and an array of Situational theories as the three defining moments in the history of spatial analysis of crime. Moving within this three-step storyline, the centre of my reflection is not a thorough and detailed theoretical account of these criminological schools, but the search for common threads in how the notion of crime was constructed, naturalised, and revised through the lens of spatial analysis.

With this in mind, I pose a twofold research question: *What are the epistemic continuities (and disruptions) as regards the conceptualisation of crime in relation to space replicated into geo-spatial predictive policing; and how can the relation between place-based and person-based predictions be redefined on that basis?*

To answer the research question, I integrate the baseline of critical criminology, primarily understood as a sociology of penal control which unravels the processes of criminalisation (Pavarini 1983, Baratta 1986), with cues from critical cartography (Harley 1988, 1989) and Neocleous' (2000, 2021) critical theory of police power. The latter allows us to situate the appearance of crime mapping within a broader context of criminal policy, integral to which was the role of police power in the creation of a market economy predicated on the generalised commodification of labour. Critical cartography, instead, relocates predictive mapping within the broader questioning of the epistemic foundations of map neutrality. As Lacoste (1973, p. 1) recalls, a map is "an abstraction from concrete reality" and a "way of representing space which facilitates its domination and control" within a particular epistemological experience. Assembling all the elements, I interpret crime mapping as a cartographic practice arising in a specific time-space context, within the epistemic boundaries visualised by demographic variables that are allegedly explanatory of crime but, at the same time, never descriptive of the mapmakers.

The crime-space relational understanding is explored through a literature review which surveys sources from the Cartographic school, the School of Human Ecology, the Situational paradigm, and current predictive policing literature. The article first provides a historical excursus to place the early cartographic practices within their social and political context, with a special focus on France and England, where crime mapping first appeared. The following three sections scrutinise, in the terms clarified, the three

[2] Nevertheless, recent experimental studies suggest that a greater trust in officers' decision-making compared to the algorithmic ones is especially visible in place-based decisions (Hobson *et al.* 2021).

criminological schools marking the history of the spatial analysis of crime. Next, I focus on the contingencies surrounding the lexical coinage of "predictive policing" to set out the symbiosis with the situational rationale. I then retrace, in the discussion, the key points of my retrospection and suggest a redefinition of the relationship between place-based and person-based predictions. I lastly present my conclusions and envisage possible avenues for future research.

2. Social transformations and new penal strategies at the turn of the 19th-century.

At the dawn of the 19th century, the great concentration of capital and the demographic flows towards the largest European urban areas were marking the final transition from the Old Regime to a new social order inspired by free market principles and a generalised commodification of labour. Ruthless new forms of structural marginalisation began to emerge with direct reverberations on the conceptualisation of crime and the police function (Campesi 2016). An unprecedented synergy between criminal policies and the securing of new economic relations led to an increasing sophistication in the criminal protection of property and the systematic suppression of all forms of livelihood jeopardising the wage-labour discipline as the only acceptable subsistence modality (Neocleous 2000, 2021). The punitive surge found expression in a variety of intellectual and normative manifestations not limited to the institutional corpus of penal regulations. Begging, vagrancy, prostitution, and the old customary rights offering alternatives to a wage as the only source of livelihood for workers[3] underwent a widespread wave of criminalisation. Forced Labour in workhouses for vagrants and beggars - legally established in the synergy of poor laws, vagrancy acts and the reform of the police model – was institutionalised across almost all European countries throughout the 19th century. Such was the case, with slight variations, in England, Prussia, Belgium and Switzerland (Gillin 1929); France (Pinon 2001); Finland (Markkola 2007); Norway, Sweden and Denmark (Ulvund 2012); and Spain (Santolaria Sierra 1999). Holland was the first European country to establish in 1818 labour colonies for vagrants and indigents (Bosma 2013), while in Bavaria, on New Year's Day 1790, Count Rumford summoned the recently reformed army with orders to arrest all vagrants and assign them to different workstations according to their skills, age, and sex (Grell and Cunningham 2017).

In France, where the first crime mapping took form, the old system of the General Hospitals inherited from the Old Regime had gradually lost any semblance of charity relief and was replaced by blatantly corrective institutions such as the *dépôts de mendicité* (Pinon 2001). Since 1724, a general register of mendicants, aimed at preventing criminal reoffending through individualised monitoring, had accompanied the infrastructural network of the *dépôts* (Campesi 2016, p. 136). This denoted not only the strengthened correlation of "crime – subsistence – poverty", but also a tendency to translate this presumptive theorem into an early individual targeting. The Administrative Reform of the Police model, implemented in the Act of 14th of December 1789, summarises the conceptual asset behind the new criminal policy. In Article 50 of the Decree, police powers are divided into three areas: property, tranquillity of public venues, and health.

[3] In this sense see Marx (1842/2010).

Besides confirming the primacy of property protection – paramount in the foundation of criminal cartography – such partition corroborates the shift in the notion of security and the connection between police functions and the surveillance of environmental conditions ensuring a reliable course for economic and commercial activity. Briefly, there was a solid link under construction between the environment and security, whereby securitising the environment and securitising poverty were ever converging.

Similar institutional transformations – articulated in the Vagrancy Act (1824), the New Poor Law (1834) and the reform of the police system by the County and Borough Police Act (1856) – framed the origins of crime mapping in England. The old system of poor relief, bequeathed from the 17th century, was gradually converted into a mechanism of less eligibility between workhouse treatment and wage labour conditions, with a view to thwart the "destruction of society" (Bentham 1796/2001, p. 39). The rich literary output of the time, called to provide the new legislation with a theoretical footing, is dominated by the semantic and moral distinction between poverty and indigence, a yardstick for separating the respectable poor from the criminal class. According to Bentham's utilitarianism, poverty was not negatively connoted – at least in the abstract – for it represented an essential and beneficial precondition for the imposition of wage discipline and the very existence of wealth. Indigence, in contrast, corresponded to the pernicious state of those who, although considered able-bodied, did not sell their labour for a wage. However, beyond definitional distinctions, poverty and indigence were regarded as two neighbouring segments at a continuous risk of moral contagion, which enticed intellectuals and social reformers to develop models of epidemic containment.

The dichotomy soon transcended the boundaries of political literature and became the cornerstone of the reforms promoted by Edwin Chadwick, designer of the New Poor Law in 1834, and Patrick Colquhoun, creator of the Thames River Police in 1798, whereby crime was institutionalised as the survival strategy of the culpable indigents and the corollary of their economic inactivity. Concurrently, the kernel of policing was rearranged around a two-fold directive, which combined the conservative management of the labouring poor,[4] and the suppression of indigence, synonymous with criminality and a hindrance to a free labour market (Chadwick 1836).

3. The birth of crime mapping: the Cartographic School

Although in chronological terms Finland became the first European country to publish criminal court statistics (1754), the conceptualisation of spatial distribution of crime as a subject of social cartography arose in France, where the release of the *Compte Général de l'Administration de la justice criminelle* in 1827 (Ministère de la Justice) laid the groundwork for such a novel rationalisation (Melossi 2002). The *Compte* consisted of a collection of tables reporting the annual number of prosecuted crimes against persons and property, with additional information about the age, sex, occupation, and educational status of the accused.[5]

This organic source of information on criminal incidents allowed Balbi and Guerry, in 1829, to develop three choropleth maps on which, for the first time (Friendly 2007, p.

[4] In Colquhoun's words: "to prop up poverty" (1806, p. 8).

[5] The *Compte* nomenclature is not interchangeable with modern classifications of criminal offences: "Crimes against persons", for example, includes political crimes, rebellion, begging, bigamy, and abortion.

372), crime rates were projected and crosschecked with the average education levels and other demographic data retrieved from France's latest census.[6] The authors' conclusion was a direct connection between poverty and criminal behaviour in both categories of crime. While for the crimes against persons the higher rates in the poorest and rural areas made this syllogism immediate, the explanation about property offences, heavily concentrated in the wealthiest northern regions, consisted in greater opportunities for perpetrators, thus anticipating one of the founding motifs of situational prevention.

Therefore, since its origins, crime mapping evolved within pre-arranged epistemic and political boundaries whereby crime was nothing more than an alternative livelihood strategy to the legal ones. As a further consequence, the knowledge on crime distribution should start from poverty and education levels.

A few years later, in the *Research on Propensity for Crime at Different Ages*, Quetelet (1831/1984) undertook his own study of the *Compte*. His primary concern was the search for the regularities and laws governing the social world, which resulted in an unshakable faith in statistical calculations and the preventive ascription of any methodological failure to the insufficiency of empirical data (Beirne 1987, p. 1151).[7] Quetelet confirmed Guerry's conclusions about the non-accidental spatial distribution of crime and its geographical clustering in accordance with certain social variables, although offering slightly different explanations. As for property offences, he placed particular emphasis on the ranges of local relative inequality instead of poverty viewed in isolation. Violent offences, on the contrary, had their origin in the struggle between the dictates of reason and the impulses of strength and passion (Quetelet 1831/1984, p. 56). On these grounds, prominent weight was given to age, sex, moral instruction, and minor features connected to physical strength and shamelessness.

Quetelet (1835, p. 108) is also the author of the assertion that "society prepares crime, and the guilty are only the instruments by which it is executed", which is why he is sometimes described as a progressive scholar who places criminal responsibility on the shoulders of the societal structure. However, when crossing this statement with his aforesaid aetiology of crime, we can clearly note how his concept of society consists in a pure aggregate of individuals, which precludes any synthesis between individual characterisations and meta-individual dynamics. Moreover, his notion of "individual" mingles with that of "average man", a concept coined by the same Quetelet to designate the embodiment of a set of rational virtues – among which was the natural propensity not to commit crime – opposed to the vices of deviants. As a result, Quetelet's main legacy is a substantial validation of the socio-economic aetiology of crime, complemented by a binary opposition between normality and deviation (Beirne 1987): this marks an important step towards the ontologisation of crime as a human attribute mechanically emerging from a set of deviant characteristics – including biological variables (sex, age, rage) – which prevent the ordinary control of personal habits.

[6] The choropleth map was also a French invention dating back to 1826, when Pierre Charles Dupin displayed the levels of illiteracy throughout the country.

[7] This resonates with the "deficiency argument" (Završnik 2017, p. 11) embraced by contemporary advocates of predictive policing to explain the lack of tangible benefits in its use with the insufficiency of its development and diffusion. Being apparently only a methodological argument, it actually prevents substantive questionings, as any failure of the method at issue has tautologically to do with its under-use.

After its first appearance in France, the cartographic method crossed the Channel and rapidly spread to English-speaking countries through the translation of Guerry's work (Vaughan 2018). Joseph Fletcher, in *Moral and Educational Statistics of England and Wales* (1849), reproduced a well-established scheme by retrieving information from the judicial records and projecting it onto two separate maps which depicted property crimes and personal offences. In ideological continuity with the French school, Fletcher cross-referenced criminal data with a cartography of demographic variables such as improvident marriages, bastardy, pauperism, and levels of deposits in saving banks (pl. IX–XII, after p. 242), thus positing a peculiar blend of moralist and economic markers.

A few years later, in *London Labour and the London Poor, Those that will not work* (1862), Henry Mayhew offered an accurate map of the criminal intensity of each county of England and Wales. The intersection of crime data and demographic variables led to a set of thematic maps either revealing socio-economic assumptions, such as a map indicating ignorance and its relative degrees among criminals (1862, pp. 459–464), or moralistic categories like illegitimate children, early marriages, concealment of births, and bigamy (p. 467 ff.).

The inextricable permeation between early crime mapping and poverty mapping is indirectly confirmed by Charles Booth's London poverty maps annexed to *Life and Labour of the People of London*, a survey-based inquiry published in four editions between 1889 and 1903. Although crime was not Booth's primary theme, his social charting offers a cartographic ranking of wealth levels according to seven colours projected street by street onto a map of London. In the colour-grade classification, the lowest class, labelled class A, "consists of some occasional labourers, street-sellers, loafers, criminals and semi-criminals" (Booth 1904, p. 37). In line with the poverty-indigence thematisation traced by Bentham, Colquhoun, and Chadwick, the so-defined poor do not encompass the totality of the non-wealthy sectors, but only those "whose means are barely sufficient for decent independent life" and are divided into classes C and D according to the intermittency or regularity of their earnings. They are nonetheless integrated in the free-market dynamics, unlike the "very poor" (class B), who only rely on casual earnings and represent an unsafe borderland with the "criminals" from group A. In conclusion, by positing this binary correspondence between poverty and criminality under the common denominator of sustenance means, poverty mapping actively bolsters a notion of crime as being an exclusive prerogative of the poorest layers of society.

4. The European *impasse* and the Chicago Ecological School

Redefined as a macro-social issue threatening the preconditions of the new social order, crime was no longer explainable through the traditional constructs of liberal legal thought. With the focus shifting towards moral statistics (Guerry 1833) and the search for general patterns in crime predictability, the Cartographic School marked the end of the liberal conception of crime as an imponderable misuse of free will and gave way to the irruption of the etiologic paradigm.

The rhetoric of the "free legal subject" (Beirne 1987, p. 1144) was overthrown by a new understanding summarised by Quetelet's claim to be able to enumerate in advance "how many individuals will stain their hands with the blood of their fellow creatures, how many will be forgers, how many poisoners, pretty nearly as one can enumerate in

advance the births and deaths which must take place" (1831/1984, p. 69). Assertions of this kind may explain the frequent placement of the Cartographic school among the crucial contributions to positivist criminology, with some authors clearly referring to cartographic scholars as early positivists (Beirne 1987, Courtright and Mutchnick 2002), while others underlined the historiographical fallacy of the "Lombrosian myth" (Lindesmith and Levin 1937) or still defined Quetelet and Guerry as the first sociological positivists in criminal studies (Melossi 2002).

Nominalist disquisitions aside, it is a fact that the Cartographic school was opposed and eventually defeated by what became known as criminological Positivism in the strict sense: an approach following Lombroso's criminal anthropology and grounded on biological determinism. Nevertheless, the historical prevalence of Lombrosian anthropology over the socio-economic framework of the Cartographic School was not the result of an irreconcilable theoretical clash. Arguably, the reasons lay in the practical need for "a convenient rationalization (…) and an escape from the implications of the dangerous doctrine that crime is an essential product of our social organization" (Vold 1979, p. 40). In fact, even without being inspired by any progressive impetus, the cartographic analysis made the link with demographic factors more visible, while an anthropological categorisation of the criminal ensured a safer distance from any reference to social dynamics.

However, while the clinical paradigm was affirming its dominance in Europe, the repetition on a larger and qualitatively new scale of the same factors triggering the Cartographic school in France pushed American criminology towards a strong sociological turn. Starting from the end of the 19th century, widespread processes of urban growth set in motion new initiatives of social hygiene (Stead 1894) and social mapping under the impulse of the temperance movements, while a new phase of primitive accumulation was unleashed by the late abolition of slavery and the significant revival of the old vagrancy regulations against the newly released (Neocleous 2020, 2021). Briefly, unprecedented economic and demographic transformations highlighted the need for a political handling of spatial disorder and other risks connected to such a conflictual and heterogeneous social fabric, forcing criminology to resort to sociology – rather than legal definitions or the tools of the clinical model – to exorcise criminality as a natural expression of profound demographic transformations (Pavarini 1983, p. 62). This rationalisation, far from being a legitimation of the underlying conflicts, represented a first attempt to categorise social tensions in relation to physiological thresholds and thus set their acceptable levels, consistently with the narrative of the consensual model of society. This also presupposed a "natural" allocation of roles within the urban structure – essential to optimising market deployment – and the subsequent labelling of any possible dysfunction as a social pathology.

On these premises, though not specifically addressing the cartographic study of crime, Robert Park established in 1915 two pillars for the future output of the Chicago School of Human Ecology: an organicist vision of the urban fabric and the heuristic primacy, in the study of urban expansion, of the category of "mobility". According to Park, the modern city is the natural environment of the "freeman" (1915, p. 584) and the meeting point of commercial activities flourishing around the marketplace, unlike the ancient town, mostly conceived as a defensive fortress. Studying the urban space is therefore the

same as studying the economic transformations accompanying the processes of city growth. Among the effects of the massive flows towards the largest American cities, particular attention is paid to the manifestations of social disorganisation resulting from the weakening of the traditional ties binding the rural communities and the communities of origin of foreign immigrants. The collapse of the social control and moral order ensured by these networks is considered the source of a cluster of social pathologies, all subsumed by a genus-species relationship under the "moral region" of deviance (Park 1915, p. 612). Crime, immorality, poverty, anomaly in social habits, truancy or divorce all culminate in being unified in the same dysfunctional mechanism, with no methodological diversification needed when addressing crime or other phenomena.

It should be noted that the assertion of such an ontological commonality blurs the normative nature of crime far beyond the point of the Cartographic school, whose persistent references to property or personal safety still enabled glimpses of legal categories. As a further consequence, the elision of the normative nature of crime resulted in the exposure of two conflicting impulses: on the one hand, a selective notion of criminal behaviour, basically tailored to the experience of the lower classes; on the other, the quest for universal conclusions predicated on the scientific objectivity of categories of analysis detached – and apparently independent – from legal definitions.

A decade after his seminal work, and in co-authorship with Burgess, Park transposed environmental sociology into the study of crime, setting out the theory of urban concentric zones. This model primarily associates crime rates with the physical deterioration of the urban areas and the permanent outward flows of working-class communities according to the improvement in their economic conditions from residences in the central slums, mostly industrial, to the outlying residential districts (Park and Burgess 1925). Although the equation of the deficit paradigm appears mediated by environmental factors, by linking delinquency to the physical degradation of the central industrial neighbourhoods, a clear correspondence is established between crime and the areas populated by the poorest strata of the working class and the most recent immigrants unable to afford higher rents and not aligned with the urban settings after losing their primary ties.

In 1942, Shaw and McKay tested the concentric zone model on juvenile gangs in Chicago. After crosschecking the crime levels with the economic status of each area – expressed by the number of families on relief, median rental, home-ownership rates, and occupation (industrial vs professional and clerical workers) – they also confirmed the non-random distribution of delinquency and its grafting in the physical configuration of the urban space, as cases were highly concentrated in the central business and industrial districts, whereas progressively decreased towards the outlying residential communities (Shaw and McKay 1942/1969, p. 52).

In assessing the legacy of the Chicago School for the purposes of this paper, any consideration cannot be detached from an institutional apparatus whose first concern was to depict the lack of structural conflicts in society. Correspondingly, the criminal system was still conceived as eminently rehabilitative: firstly, because its alleged raison d'être was to remedy only contingent and temporary failures within the natural and self-balancing deployment of the economic system; secondly, because the early 20th-century debate on the foundation of punishment had led to an unresolved conflict in the US

between retribution theorists, ideologically linked to the free-will perspective, and investigators of crime patterns, who radically rejected retribution as a valid punishment rationale (Alschuler 2003).

The ideological rebuttal of structural conflicts is also a corollary of the organicist conception of society, exemplified by frequent parallelisms with natural and biological processes which sharpen the ontologisation of crime according to a new aetiology. This was distant from Lombrosian biologicism, but neither did it fully coincide with the overt and unmediated socioeconomic determinism of the Cartographic school. The result is a particular framing which marks the appearance of environmental descriptors in the spatial study of crime. Nonetheless, they only provide a mediated rendition of the socioeconomic deficit paradigm, as ties with patterns in migration flows and market externalities are never cut. Furthermore, the idea of crime as an unaccomplished adaptation to a new and naturally self-balancing social organism paves the way for the characterisation of crime as a disruption brought in from the outside by immigrant communities.

5. The situational turn

In the second half of the twentieth century a "second wave of ecological studies" (Hayward 2004, p. 99), enlivened by the prioritisation of budgetary reasons in public security and new computational affordances, rippled through Europe and the US.

Placing particular emphasis on the physical settings of the crime scene, the situational doctrines, more than theoretical models, provide deployment strategies that gradually replace the study of the causes of crime with the dissection of its practical execution and the assessment of the suitability of targets. In fact, while the two previous generations of spatial analysis had tried to formulate a wider conception of man and society before any aetiological speculation on crime, the situational studies deliberately dispose of wide-ranging enquiries and narrow the focus onto the logistical tampering of specific conducts, regarding which space becomes not only the context of reference, but also the main causal mechanism.

Since his foundational work on Situational Crime Prevention, Clarke (1980, p. 136) unambiguously denounces the potential infinite regression of the "social measures" intended to address the root motivational causes of offending, as well as the naturalisation of dispositional biases within them. Clarke sustains, instead, an exclusive focus on the "measurable aspects of the situation" (p. 139), identified in the environmental settings which shape the risk-reward evaluation underlying criminal decision-making. In doing so, he clearly anticipates the atheoretical study of crime claimed by predictive policing theorists and, not surprisingly, his analysis centres on residential burglaries, shoplifting and vandalism.

Similarly, Cohen and Felson's Routine Activity scheme restricts the analysis to the "direct-contact predatory violations" (1979, p. 589) and identifies crime patterns in the convergence, in time and space, of three cornerstones for the following situational literature: suitable targets, motivated offender and absence of guardians. Consistently with the waiver of explicit socio-etiological reconstructions in favour of the physical settings, well-being indicators are dismissed as insufficient and carriers of dispositional flaws. Nevertheless, this alleged relinquishment is soon contradicted by Cohen and

Felson's definition of crime as either a routine activity reflecting the interdependence between the "structure of illegal activities and the organisation of everyday sustenance activities" (*ibidem*) or a "by-product of freedom and prosperity" (Cohen and Felson 1979, p. 605). In the same vein, Clarke (1980, p. 141) carves his notion of crime as an alternative to legitimate employment, straying not too far from the spirit of 19th-century political literature.

With the theory of Repeat Victimization (Farrell *et al*. 1995, Farrell and Sousa 2001), the topics of Situational Crime Prevention and Routine Activity achieve a deeper conflation.

The crime scene becomes the basic unit of analysis and, even more than in Routine Activity, the target selection has absolute heuristic primacy, as the physical settings define which targets are inherently exposed to repeated victimization due to their enduring characteristics.

The motifs of future predictive policing start here to emerge in plain terms: geomapping software and the use of business intelligence[8] are overtly claimed as budgetary countermeasures, while the ranking of crime targets according to their enduring features is admittedly designed to pre-emptively optimise the allocation of dwindling crime prevention resources (Farrell *et al*. 1995, Farrell and Sousa 2001, Townsley *et al*. 2003). A specific application of repeat victimisation to domestic burglaries, operationalised into predictive policing systems (Benbouzid 2015), is the theory of Infectious Burglaries, which employs a contagion model of infectious diseases to explain the propagation of offences among targets (Townsley *et al*. 2003). Nevertheless, despite the insistence on exclusively environmental variables, the assessment of target vulnerability for each suburb is nothing but an estimate of the resident offender population, based on unemployment, public housing, and low-income household rates (*ibidem*, p. 621). With a closer look, the focus on alleged clusters in need of permanent attention for their enduring characteristics also provides a prearranged counterargument to possible complaints of over-policing, much like Selective Incapacitation in individual targeting. This convergence between situational and incapacitative rationale is indeed confirmed by the claim that "if repeat victimization predicts more frequent and serious offenders on average, then a hot spot with intense repeat victimization may predict where to locate the super-predators" (Farrell and Sousa 2001, p. 234). In summary, a narrowed monitoring on small and preselected sectors of society, allegedly accounting for a large proportion of crime, represents the ultimate justification of both: "hottest places" in one case, "hottest people" in the other.[9]

Concluding this brief overview, the Broken Windows theory (Wilson and Kelling 1982) reiterates the situational assumption that analysis of the physical fixtures is the only unbiased alternative to socio-dispositional interpretations. Expanding the Chicago School's lesson on urban deterioration, the theory also assumes a "development sequence" whereby petty crimes, disorderliness and urban carelessness in general are the prelude to serious offences. The importance of the crackdown on petty crimes – and the future predictive systems focused on them – are thus given new theoretical backing.

[8] The reference is to the possible repercussions on health insurance practices in a context of repeated victimization (Farrel and Sousa 2001, 225).

[9] The same operational parallelism can be found in Mastrobuoni (2020, pp. 8, 38) in his validation study of the Italian place-based predictive system *KeyCrime*.

At the same time, police intervention is redirected towards the search for "disorderly people" (Wilson and Kelling 1982, p. 29) and the subsequent subdivision, centred on the evidence of means of support, into regulars and strangers. In this respect, the authors provide an exemplifying list of dangerous, unpredictable people and express their dissatisfaction with the legal constraints hampering energetic interventions on phenomena like vagrancy or loitering. Remarkably, the call for a clear separation between law abiders and the disorderly results in the substantial restoration of an individual-based dispositional element, which also leads to an ambivalent use of the concept of irregularity (Harcourt, 2001). This is, on the one hand, negatively connoted to depict the regulars-lawbreakers dichotomy, while on the other it is invoked in the name of flexibility, as regards claiming broader scopes of police intervention for "fostering health rather than simply treating illness" (Wilson and Kelling 1982, p. 38).

In conclusion, the ideological operation behind the situational theories is much more complex than it might seem at first glance. Compared to the Chicago School, the weight of environmental factors is exacerbated to the point at which they are presented as the only elements of an unbiased crime aetiology detached from socio-theoretical biases. Nonetheless, the distancing from socioeconomic descriptors is intended only to legitimise, on a political level, a new course in criminal justice administration characterised by the waiver of any intervention on the structural determinants of the criminalised behaviours.

By no means does this constitute a removal of the syllogism linking crime and subsistence strategies in the schemes of crime predictability. Indeed, this is regularly recovered by the situational authors when called to specify how the preventive vulnerability assessment of the targets is built. More than rejected in substance, the deficit paradigm is so interiorised and uninterrogated that further thematisations or references to well-being indicators are no longer needed.

6. Predictive policing and situational theories

Routine Activity, Repeat Victimization and further situational inflections provide, in chronological and theoretical terms, the junction between the spatial conceptualisation of crime and contemporary predictive mapping technologies. Even in operational terms, place-based predictive systems are usually nothing but algorithmic translations of situational schemes.[10] This symbiosis is further corroborated by the circumstances surrounding the coinage and subsequent consolidation of the expression "predictive policing", whose first appearance in literature harks back to a paper about police performance management published by Bratton and Malinowski in 2008, the year of the great financial crisis. Consistently with the climate of austerity informing its first thematisations, predictive policing is presented by the authors as a winning combination of computer-assisted metrics ensuring, among other benefits, a timely and cost-effective intervention that perfectly meets the tough demands of economic recession. In advocating for a policing structure inspired by Broken Windows quality-of-life initiatives, Bratton and Malinowski also introduce overt analogies with commercial

[10] See, among others, Benbouzid (2015) and Ferguson (2017b, p. 66).

practices, whereby the reduction in crime figures for police agencies corresponds to the production of profit for businesses (2008, p. 263).

In *Predictive Policing: What Can We Learn from Wal-Mart and Amazon about Fighting Crime in a Recession?*, Beck and McCue (2009) take a further step towards the marketing rationale. Crime management, they affirm, hinges on breaking the rational cycle behind criminal decision-making, much like how targeted coupons or loyalty programs orient customer decision-making. The nub of law-enforcement is then reduced to redefining in time the spectrum of risks and rewards for the offender. This should be done – their argument goes – with the aid of algorithmic models of customer preferences similar to those used to foresee the increase in food demand prior to an approaching storm (Beck and McCue 2009, p. 21).

In the *Encyclopedia of criminology and criminal justice*, Uchida (2014) includes business intelligence among the pillars of predictive policing and extends the analogy to Netflix and insurance companies, thus confirming, even etymologically (Rivera Beiras 2015), the inner actuarial rationale; at the same time, environmental criminology – in particular Repeat victimization, Rational action Theory and Situational crime prevention – is recognised as the broad general approach most germane to predictive policing. Analogously, the *Predpol Training Guide* (Predpol Inc. 2014) endorses the theoretical basis of Broken Windows, while, more recently, Ferguson (2017a, 2017b) identified, in *Near repeat and Routine activity*, the key theories of predictive mapping. Likewise, Lombardo (2019), in his account of the gestation of the Italian algorithm XLaw, underlines the centrality of Routine activity scheme, Clarke's theory, and the idea of disorder contagion purveyed by Broken Windows.

The list of cross-references could be extended further. However, the aim is to show how, through a commonality of purposes and intervention schemes, the situational studies provide the perfect theoretical toolkit for the operating modes of predictive policing, developed around four clearly identifiable linchpins. *First*, the positing of a rigid dichotomy between the dispositional bias of all previous theories, inspired by unrealistic ambitions to intervene on the social tissue, and the aseptic observation of the physical features of reality. *Secondly*, the adoption, as an explanatory pattern, of an extremely typified rational choice scheme which enables marketing rationale in two ways: by establishing an analogy with the prediction of customer behaviours, and by reorienting police intervention towards resource minimisation. *Thirdly*, the archetypal codification of crime determinants into target, offender, and level of guardianship, which prearranges an effortless and automated replication. *Fourthly and finally*, the resignification, in terms of resource efficiency, of a selective focus on limited classes of targets on which crime prevention should concentrate.

7. Discussion

In the previous pages, I pointed out how crime mapping, since its inception, has constituted an essential (cartographical) component of the criminal policies actively supporting the implementation of a market economy in Western Europe by selectively criminalising subsistence modalities incompatible with labour commodification. This is especially evident in the classes of crimes and the demographic variables employed by the French Cartographic School, a harbinger of an etiologic model of crime prediction

which rested on a socio-economic determinism. Despite the disavowal of the free-will perspective typical of liberal legal thinking, legal categories remain integral to the cartographic method and the socio-economic markers, although predominant, still move in a not absolutely one-dimensional terrain, where biological categories also make fleeting appearances.

This caused the biological theories of the Positivist school to gradually gain traction and defeat the Cartographic school on a political ground for better serving the interests of those who looked upon the lower classes "as a category detached from the prevailing social conditions and portrayed as a race apart" (Radzinowicz 1966, p. 39).

Nevertheless, a colossal-scale repetition within the American society of phenomena, akin to those affecting Europe in the 19th century, prompted American criminology to largely tap into sociological methods and put them at the ideological service of the consensual model of society. Starting from an organicist vision of the city, the main concern of the Chicago school was to rationalise social tensions as dysfunctional contingencies in the natural allocation of resources within urban growth, thus dismissing the hypothesis of structural conflicts in society. As a result, the normative specificity of criminal behaviour vanishes into a grey area where crime, poor integration, and forms of alleged deviance are all ontologically assimilated under the banner of "social pathologies". As regards the conceptualisation of crime, the main novelty contributed by the Chicago school is the conversion of ecological factors into very actants at play. However, this is not sufficient to undercut the socio-economic theorem: urban deterioration and other physical elements are still the flipside of market externalities and congestions in migration flows that, according to the Concentric zone theory, follow the economic upgrade of working communities within the urban space.

The second half of the 20th century witnesses the generalised curtailment of the welfare state and the resignification of the rehabilitative function of criminal policies as an unsustainable cost. Just as selective incapacitation thrives in the actuarial debate, situational theories channel the spatial analysis of crime from wide-ranging social reflections – criticised for their inherent dispositional bias – towards the dissection of the physical settings, touted as the main causal drivers of crime. The predictive potential relies mainly on simplified patterns, sensitive to budgetary demands, and easily replicable by computational technologies. Nevertheless, as seen above, the apparent distancing from well-being indicators conceals the continuity of the socio-economic paradigm in the modulation of the risk-assessment underlying the predictive template.

Bringing the subject to the present day, it should be clear now that the selective focus on crimes defined by a larger availability of data or precise time-space coordinates are not neutral operating preconditions of predictive technologies. Far from being only technical requirements, the amount of available data is not a natural fact, but the mirror of criminal policy guidelines; likewise, the space-time surroundings securing the conditions of crime traceability depend on the notion of crime (and space) that we select. Even limiting the scope of the discussion to property crimes, it is at least paradoxical that the same technologies which enable, in contemporary capitalism, an extraordinary widening of

the opportunities of value extraction – some of which clearly unlawful[11] – are placed, de facto, at the service of a 19th century concept of crime and the corresponding presumptive elements. We may also reflect on whether a ratchet effect,[12] analogous to that denounced by Harcourt (2007) vis-à-vis individual predictions, would alarmingly come into play between different classes of offences put under differential monitoring, albeit of a geo-spatial type.

This suggests the need for a reconsideration of how person-based and place-based predictions are conventionally differentiated, with the latter often regarded as a less worrying place-profiling. Such a picture appears, beyond the descriptive value, conceptually misleading.

As first proof of this, both families of devices, independently of the type of output delivered, usually employ interchangeable input data. In the person-based predictive systems, for example, the individual-based nature of the output does not exclude the inputting of geo-spatial information if assumed indicative of criminal propensity: the person-based HART model, for instance, uses postcodes as markers for individuals (Couchman 2019). Quite symmetrically, place-based predictive systems like XLaw in Italy or CAS in the Netherlands input criminal records and other personal information of individuals related to the hot areas. Moreover, in the Dutch system, five out of the nineteen markers have an exclusively economic nature and for each zip code area they factor into the housing stock, the average property value, the number of income recipients, the number of social benefits and the fiscal monthly income (Oosterloo and van Schie 2018).

Digging deeper, this space-individual permeability may be seen as the culmination of a long-lasting theoretical osmosis already traceable to authors such as Quetelet, initiator of the statistical method and cartographist; Bentham, whose utilitarianism is the backbone of the actuarial paradigm and a decisive inspiration for the English cartographic school; or Burgess, a prominent environmentalist and actuarialist at once. Though conscious of the limitations of any schematic explanation, I consider it helpful, for a better insight into the interplay between person-based and place-based approaches to crime prediction, to graph two parallel storylines of three topical moments each (see Table 1).

[11] The European Parliament (2021, p. 17) in its resolution on the Vitanov report on artificial intelligence in criminal law recognises that the greatest opportunities offered by AI in the law enforcement area and criminal justice are actually in the field of financial crime, money laundering, terrorism financing and certain types of cybercrime.

[12] "The ratchet effect" is a specific feedback loop acknowledged by Harcourt (2007). His basic idea is that, even when the starting assumption about differential offending rates among different ethnic groups is empirically true and verified, any form of profiling inevitably leads to an exponentially increasing disproportion at the expenses of the monitored group. Moreover, different elasticities to policing may also result in an overall increase in crime levels in society, for the increase in crime rates among the non-monitored groups may outweigh the reduction among the monitored ones if socially and culturally less responsive to policing.

TABLE 1

	Place-based approach	Person-based approach
19th century	1) Cartographic School	
End of 19th / Turn of 20th century	*Cartographic School is wiped out by biological determinism*	1) Clinical Paradigm*
1920s	2) Chicago School	2) Actuarial Paradigm (Burgess method)
Last quarter 20th century	3) Situational Theories	3) Incapacitative Paradigm

Table 1. Comparative Retrospection on the approaches to crime prediction (place-based and person-based).
***Bio-anthropological determinism.**

The left column shows the "place-based approach" storyline, which schematises the previous sections of the article. The right column, instead, reproduces Harcourt's (2007) periodisation of the history of individualised prediction, organised into three key steps: the (pre-actuarial) clinical model, the actuarial paradigm and the incapacitative paradigm.

Cross referencing the considerations made above with the synoptical retrospection in the table, the situational theories and the paradigm of selective incapacitation are characterised by a chronological simultaneity and display clear analogies in the budgetary and non-rehabilitative rationale, as well as in the exacerbated narrowing on pre-selected categories of targets. Proof of this are the individualised markers underpinning all situational inflections, in particular the Broken Windows theory, which first enacts an individual-based dichotomy and, when setting the goal of the penal system, overtly embraces selective incapacitation. Besides, situational theories and selective incapacitation represent, each one in their field, the final step of the series, as well as the training framework of reference for current predictive policing systems.

A similar symmetry also pairs the second step of the two storylines: in fact, the statistical actuarialism and the Chicago Ecological School represent two facets of the same statistical reaction to the clinical method and share a rehabilitative tension fully consistent with the ideal of the integrated society in which they unfold. Not surprisingly, some of the leading figures of one school – not least Burgess – are also prominent personalities within the other and vice versa. In this vein, whilst in the individualised

predictions of Hakeem's actuarial method (1948, p. 378) the neighbourhood is a central factor, Shaw and McKay (1942/1969), in turn, build their criminal mapping not on the incidence location but on the offenders' addresses. Analogously, the environmental idea of crime as a social pathology "brought in from outside" for its origin in a maladaptation to a new environment after the loss of former ties is also the conceptual ground of the first actuarial grids of predictive markers, heavily traversed by racial predictors (Warner 1923, Burgess 1928).

The main friction between the two storylines, interestingly, lies instead in their first stage, which for the individualised prediction is already an articulation of clinical positivism. On the contrary, the first spatial analysis of crime pre-exists the clinical method and is rather abruptly ended by the emergence of the latter. In sum, while in the spatial analysis that extraneousness to the clinical approach is congenital (and only transiently softened in Quetelet), in the individual prediction, rooted more in sentencing than in policing, it comes only as a later result of its internal development.

With this retrospective digression, what I want to highlight is that place-based and person-based predictive policing do not spring from mutually exclusive strategies. Both converge towards a shared horizon, whereby an archetypal spatial configuration, in which only certain crimes occur, is the natural setting of a prototypical offender. Although the polarity of the argument may be inverted according to the main term of reference (offender in person-based predictions, or hotspots in place-based calculations), identical outcomes are ensured under the same notion of crime and the same risk-management strategy in response to it.

8. Conclusion

The purpose of this study was to highlight the main breaks and stabilities in the conceptualisation of crime in its relational understanding with space and to develop, on that ground, a pre-technical and non-legalistic questioning of geo-spatial predictive policing. At the same time, this should be also a springboard for a redefinition of the relation between person-based and place-based approaches to crime prediction.

Given the above, the most visible discontinuities in the trajectory from the Cartographic school to the situational theories consist in the progressive dilution of the normative specificity of crime, the gradual abandonment of wide socio-theoretic enquiries, and the growing importance attached to environmental factors.

Nevertheless, two major points ensure a fundamental epistemic continuity in the lineage. *First*, from beginning to end, the basic explanatory pattern is a rational action model uninterruptedly secured to the socio-economic deficit paradigm and only mediated, depending on the historical phase, by environmental factors. Thus, to the extent that crime mapping has historically acted as a concealed governance of poverty where space is mostly a surrogate for property, the symbiosis between the market logic and the political agenda of predictive policing is neither an unfortunate coincidence nor a peculiarity of present times.

Secondly, the aetiology of crime endorsed by the different generations of spatial analysis, though traditionally alien to the biological explanation of criminality, is supported by a persisting ontologisation of crime which resorts to naturalistic metaphors and evocative

pictures recalled to the present day in predictive policing literature: hunting grounds (Lombardo 2019), earthquake aftershocks (Bennet and Chan 2018, Zach 2018); infection propagation (Karppi 2018) or "laser surgery (…) to remove tumors or improve eyesight" (Uchida and Swatt 2013, p. 290). This also proves, contrary to widespread belief about the centrality of anthropological characterisations of the criminal, that the place-based conceptualisation of crime has been a crucial hotbed of the dominant notion of crime.

As regards the significance of the distinction between place-based and person-based approaches to crime prediction, the study also demonstrates how misleading and devoid of explanatory potential a search for differential degrees of invasiveness may be. Such a legalistic attitude is indeed belied by the complementarity and the perfect synchronisation that, from the reaction to the clinical paradigm onwards (the second step in each storyline), both traditions of thinking display.

It is worth clarifying that, in highlighting these continuities, I do not intend to downplay the qualitative leap accomplished by the transfer of pre-existing rationalities to new technologies, nor are these merely re-enacted in an alternate form. Quite the opposite, they should be re-interpreted in the wider context of the neoliberal shift towards the quantification of political issues in public management and the data-based creation of meaning (Kalpokas 2019).

Similar to disciplining the dangerous classes when "crime statistics carried the promise of attaching reason to modern criminal justice system" (Završnik 2017, p. 133), the algorithmic outsourcing reinforces the decision indisputability. Concurrently, unprecedented accountability gaps are granted to the human decision-makers, artificially relegated to conveyors of truths presented as ontologically exogenous to the predictive procedure.

Any possible debate, anaesthetised by the rhetoric of the "atheoretical knowledge" (Kitchin 2014), is thus channelled into a dispute on the best technical solution, which prevents the questionability of the solution as such. By acknowledging the need for further research going beyond the ground covered here, this article ultimately urges all actors engaged in policing and surveillance studies to centre the critique of predictive technologies on the concept of crime naturalised within them and the deep political meaning of that predictability, rather than pandering to denunciations of biases and technical limitations which are politically less compromising. This may not only enable an emphasis on alarming common threads which pass through technological advances undisturbed and make corrective proposals of a technical kind totally inadequate, but also lay the groundwork for a deeper interpretative linkage between surveillance techniques and mechanisms of accumulation in the age of financial capitalism.

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