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# Predictive policing and negotiations of (in)formality: Exploring the Swiss case

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## ABSTRACT

Predictive policing, that is, the data-driven deployment of police operations on the ground, has become increasingly important in recent years. While predictive policing instruments serve to formalise the ways in which police think and operate, the human agent remains central to their exploitation and translation into strategic, operational, and tactical decision-making. The introduction of predictive policing instruments and methods therefore represents a particularly insightful terrain on which to analyse negotiations of formality and informality. How this plays out in the Swiss context will be addressed in this paper. Based on a review of documents and policies on predictive policing developments and exploratory interviews conducted with police officers and developers, we discuss how institutions and actors engage with predictive policing and what this tells us about the formalisation, respectively informalisation of police work. Our findings point to the challenges related to the federalist organisation of police in Switzerland and the growing importance of cantonal threat management (Bedrohungsmanagement) platforms. We also note a general lack of awareness regarding the potentially harmful outcomes of predictive policing instruments, which may be related to a specifically Helvetic narrative that downplays the impact these instruments have on decision-making.

## 1. Introduction

Despite the highly regulated environment in which criminal justice actors operate, tensions between formality and informality are commonplace. The domain of policing arguably illustrates this tension particularly well: the concurrent expectation of crime prevention (which demands high reactivity and human intuition) and protection of civil liberties (which demands utmost respect of the legal boundaries of state intervention) puts police in a position where formality and informality must be repeatedly negotiated. As some argue, the handling of discretionary powers in the policing of the *polity* may be both the core challenge and core competency of police work (Brodeur, 2001).

In modern industrialised societies, the demand for security and risk minimisation has continued to grow despite a fall in the frequency of property offences and homicides (Aebi and Linde, 2010). For decades, with a tangible boost after 9/11, we are witnessing the rise of preventionism and the “Preventive State” (Zedner and Ashworth, 2019). This has been put in relation to a perceptible pre-crime shift in the logics and public demands directed at police work (Zedner, 2007). Although, traditionally, policing includes both a repressive and a preventive function, the latter has therefore received growing attention. In the eye of the public, it is no longer

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considered sufficient for police to *react* to crime: policing must aspire to *prevent* criminal offences as soon as possible. This shift is accompanied by a proliferation of technological innovations in the criminal justice system at large, and the introduction of managerial logics which emphasise solutions that promise increased effectiveness and efficiency (Kaufmann et al., 2019; O'Malley, 2008; O'Neill and Loftus, 2013; Wacquant, 2009). It is in this social and political context that predictive policing techniques, tools, instruments and methods in Europe and North America have emerged.

Predictive policing adds a component of formality to policing – especially proactive forms of policing – through the objective of reducing the importance of the human agent and emphasising data and quantitative risk scores. At the same time, proactive policing is also a domain characterised by informal decision-making based on experience and intuition of the police officer. While there is a solid body of literature on the tensions between formality and informality in policing (e.g., Chiu, 2013; Davis, 2017; Hartmann, 2017; Polese et al., 2016; Waseem, 2021), there is much to be developed both empirically and conceptually regarding these tensions in the context of the introduction of data-based policing instruments. This paper examines this aspect in the Swiss case, where the federalist organisation presents specific challenges for the introduction of predictive policing instruments, such as the difficulty of cross-cantonal cooperation and data sharing which hampers the usefulness of predictive policing instruments.

After a brief review of the literature on predictive policing including its promises and problems, we present the data on which our reflections in this paper are based. The findings are then discussed, starting with the overview of the most important predictive policing instruments currently used in the Swiss context, continuing with the challenge of federalism and the importance of the cantonal threat management platforms, before concluding with the dominant narratives on the introduction and use of predictive policing instruments.

## 2. Predictive policing: the potential harms of predicting harms

### 2.1. Predictive policing in the light of digital transformations

Along with the digitalisation in a variety of fields within society, police work also continuously transforms and inherits digitalisation and technologization. New forms of surveillance and a growth of big data lead to datafication as the combination of massive amounts of digital data with increased possibilities for algorithmic sorting (Brayne, 2017; Flyverborn and Hansen, 2019).

Predictive policing methods are usually associated with Problem-oriented policing, Intelligence-led policing, and Hot-Spot Policing. The shift from reactive to proactive policing has been suggested as resting on Ratcliffe's (2009) *4P Model*: Patterns, Prediction, Proactivity, Prevention. This model can be seen as the basis of predictive policing methods and instruments. In fact, some authors argue that "patterns" are the epistemic core of predictive policing (Kaufmann et al., 2019). Hence, predictive policing denotes a form of proactive police work that is oriented towards anticipating and preventing crime, corresponding to the so-called pre-crime shift (Arrigo and Sellers, 2021; Strikwerda, 2021; Zedner, 2007). It is important to note that the aim is not necessarily to precisely predict the occurrence of a specific event, but rather to estimate the probability or risk of an event occurring or not (Gerth, 2015). This is a subtle yet important difference that needs to be acknowledged for an informed discussion of predictive policing, for the term "predictive" itself tends to be misleading.

The many instruments that fall into the category of predictive policing tend to come in two types, namely *location-based* predictive policing and *person-based* predictive policing. The former seeks to forecast in which regions or neighbourhoods certain forms of criminality may occur with a greater probability. Location-based policing functions according to mainly three analytical-technical approaches: hot-spot-methods, near-repeat-approaches (ex. PRECOBS, see below), and risk terrain analyses (with a more extensive theory and database behind, not only including police data, but also further socio-demographic characteristics of neighbourhoods) (Egbert and Krasmann, 2019). The latter, i.e., person-based predictive policing, seeks to estimate the risk of an individual committing a particular criminal offence (Egbert and Leese, 2021), or of an individual falling victim to a particular crime (Perry et al., 2013, p. 8; Pullen and Schefer, 2021, pp. 121 ff.) [Footnote 2]. As Kaufmann et al. (2019) cogently argue, no single theory forms the basis of predictive policing instruments. It is always through a complex process of negotiating normativities that the data is made sense of and variables are attributed. Hence, although patterns are the basis of predictive policing, "the pattern itself conceals the assumptions and the decisions that inform its identification." (p. 689).

It is important to distinguish between the appraisal of a risk that an offence will be committed and the appraisal of the risk of recidivism. The former is what predictive policing is primarily concerned with and the applied instruments tend to come in the form of screening instruments. The latter falls usually within the domain of criminal justice, prison and probation, where actuarial tools are used (usually with a form of *Structured Professional Judgment SPJ*) by forensic psychiatrists and clinical criminologists and where the quality standards are usually much higher (see Rohner and Ajil, 2021; Simmler et al., 2020, pp. 5–6). Since the focus of the present study is on tools and methods used by police bodies, we will not further elaborate on actuarial tools used in the realm of prison and probation. However, it is important to recall that several tools are used across different contexts (both criminal and non-criminal), which are regulated by different legal standards and are likely to differ from the original context their use was intended for. It is therefore not always easy nor appropriate to include or exclude certain tools based on their intended domain of application. By way of example, the Violent Extremism Risk Assessment (VERA) instrument was conceived for use in prison and probation contexts but is also being used in the realm of policing and screening operations. There are also actuarial instruments oriented towards estimating the risk of recidivism that are operating within the police, mainly in the field of domestic violence. ODARA, as another example, is also used within social services such as victim counselling centres.

Finally, predictive policing is not only about the application of tools with the aim of calculating crime occurrence probabilities. Rather, it is a process of iterative knowledge production that begins with the collection of data. The collected data is analysed and

based on this analysis, certain options for action are envisaged. This can lead to the production of asymmetries, due to police officers' impact on decision making; in the case of new technologies such as predictive policing, they mediate and shape its application (Flyverborn and Hansen, 2019; Fussey and Sandhu, 2022). The way these options are negotiated has an impact on actual police operations on the ground. As a consequence, the manifestations of crime – both the actual occurrence of criminal offences and the ones brought to the surface through police action – will change as well. This altered environment will be fed back as data into the analytical process, thereby closing the loop (Perry et al., 2013).

## 2.2. Risks and potential harms

It is this aspect, namely the fact that the nature of predictive policing directly contributes to shaping the reality of “crime”, which makes this endeavour such a tricky and potentially harmful one. Thereby, the prevention of crime may risk becoming a “self-fulfilling prophecy” (Lindenmuth, 2019, p. 22) where resources are allocated to areas and communities which are labelled as risky, thereby creating new opportunities for problematic encounters with law enforcement agencies which in turn will feed into the data that serves as a basis for future police action. Although many disregard location-based prediction tools when scrutinising predictive policing (e.g., Equey et al., 2020 in the Swiss context), this risk of creating “runaway feedback loops” (Ensign et al., 2018) deserves scholarly attention. As Legnaro (2018, p. 124) suggests, the indication that a certain area or neighbourhood is a “hot spot” or “high risk” location (which often correlates with “high-density”: the more people there are, the more crimes occur (Kaufmann et al., 2019)), will promote what he calls “projective policing” (p. 124): The attention of police officers will be directed to a specific group of individuals (those being in the “high-risk” area) and will discriminate more actively between potential suspects and non-suspects, according to stereotypical associations between certain characteristics (social behaviour, clothing, hair style, consumption, ethnicity, etc.) and particular forms of criminality or anti-social behaviour (Egbert and Leese, 2021; Ferguson, 2017). Thereby, the boundaries between location-based and person-based instruments become blurred.

That being said, person-based screening or risk appraisal instruments tend to be of more immediate concern because they produce risk appraisals about a specific individual which may be followed by restrictions of their rights and freedoms in case the calculated risk crosses a certain threshold. Individuals of concern are usually subjected to a screening or risk appraisal procedure without their knowing and may face legal consequences as a result of it. Given that, in this paper, we are focusing on policing and screening tools outside the context of prison and probation, we are, in principle, talking about individuals who are considered as “potential offenders”, even though convicted individuals or at least those having committed acts of violence recently, for example in the domain of domestic violence, are affected by screening tools applied within the police as well. It may therefore not surprise that critical academic discourse, as suggested by Egbert and Leese (2021), has focused on person-based risk profiling approaches: “The dangers of risk profiling, even when carefully curated and cautiously implemented, are numerous and range from discrimination (the creation of profiles based on variables such as sex, age, nationality, and religion) and collective liabilities (the creation of risk by association) to the production of false positives (the danger that innocent people will be marked as suspicious)” (pp. 28 ff).

Hence, predictive policing raises a large array of ethical concerns, including among other things, poor-quality – i.e. irrelevant, outdated or inaccurate – data (also called “dirty data” (Richardson et al., 2019)), which will impact the predictive performance; visualisation of data that might convey a certain impression of a risky area or person and thereby confuse police agents or push them towards excessive police action (Kaufmann et al., 2019); lack of transparency regarding the functioning of prediction instruments and lack of accountability on the side of police agents (see also Bennett Moses and Chan, 2018); lack of evidence regarding the effectiveness of employed tools and methods (see also Meijer and Wessels, 2019); and the stigmatisation of individuals, environments and community areas (Gstrein et al., 2019). There is also a risk of displacing police discretion to automated agents and thereby obscuring accountability (Brayne and Christin, 2021). The creeping in of private actors who provide technological innovations poses similar problems regarding accountability, privacy and ultimately state actors' responsibility (Hardyns and Rummens, 2018).

Hence, the increasing formalisation of police work through the introduction of predictive policing instruments and data-based policing approaches is linked to public demands directed at the police to proactively engage with crime instead of reacting to it. It is also linked to a desire to make police work more efficient and reduce biases inherent to the role of the human agent. The promise of increased formality is presented as a way to counteract the supposed drawbacks of informality. At the same time, the introduction of predictive policing instruments carries the risk of creating negative feedback loops based on poor data, which lead to problematic policing practices. The promise of formality and objectivity then fails to present a viable alternative to the informality inherent to the informed experience and intuition of the human agent. The handling of formality and informality is therefore a complex endeavour that must be studied according to the specificities of each context. In our case, this context is the Swiss one.

## 2.3. Predictive policing in the light of processes of (in)formality

Informality has been broadly discussed in the literature on informal state practice (Benit-Gbaffou, 2018) and informal governance (Polese et al., 2016; Baez-Camargo and Ledeneva, 2017). This literature moves beyond economic interpretations of informality that see it as a process outside the ambit of the state, that occurs due to state ineffectiveness. Instead, this literature qualitatively suggests that informality can actually be central to the effectiveness of state and state institutions. Research on governance and public administration shows that state and state officials (including police officers and bureaucrats) intentionally utilise informality (Polese et al., 2016) and accommodate it (Chiu, 2013). Writing on development and urban governance, for example, Davis (2017) explains how governance in certain urban spaces requires informality, as informalisation can aid in the delivery of public services. This is echoed by other urbanists who show how informal practices can help state actors deliver, improve the outcomes of certain policies, and

strengthen organisational legitimacy (Polese et al., 2016; Pernegger, 2020). Other works on urban development and governance have similarly explored links between informality and urbanisation, showing how informal practices on the part of state officials fall within a ‘grey area’, a tension between formal rules and norms, between what is expected and what can be delivered (Benit-Gbaffou, 2018).

#### 2.4. Narratives

Narrative criminological analysis per se has barely been applied to predictive policing discourses. Kaufmann et al. (2019) found that narratives of police officers and software developers regarding the patterns and hypotheses that should guide crime analysis influence the way data is visualised and eventually put into action. Egbert (2018) observed that German politicians frame predictive policing tools as appropriate “techno-fixes” for a growing problem (rising burglary cases) attributed to a specific group of offenders (“East European groups”). Vepřek et al. (2020) found that German police directors argue in favour of predictive policing instruments by referring to increased autonomy, transparency and emphasising the persistently central role of the human decision-maker. A dominant narrative associated with predictive policing is one that emphasises the potential of “Big Data” analytics for predictions of human behaviour (Babuta, 2017).

### 3. Collected data and methods used

This paper is based on an exploratory study that critically investigated the use and application of predictive policing instruments in Switzerland. It built on previous research on the topic (e.g. Simmler et al., 2020) but went beyond with the aim to shed light on existing narratives on the tools. Multiple forms of data were collected and analysed in autumn 2021. On the one hand, we collected relevant policy papers, directives, legal documents, and political debate records surrounding the introduction and use of predictive policing and crime analysis tools, the sharing of databases, and the prospects of inter-cantonal collaboration (Table 1). We also obtained diploma theses of police officers that deal with the implementation of predictive policing, obtained through the Swiss police institute (SPI). These documents are crucial to understand the political and legal context in which the development and implementation of these tools occurs, and which is, conversely, influenced by them and the purported need to promote their use.

On the other hand, first-hand data was collected in writing and orally through contacts with professionals and researchers with subject matter expertise. We spoke with practitioners (police officers) and experts (threat management focal points) in the cantons of Zurich, Solothurn, Basel-Stadt, Neuchâtel, Vaud, Aargau, and Lucerne. The aim of these short interviews was to understand which tools are operational (or whose implementation is planned) in the different cantons, whether there is relevant documentation allowing to get a better grasp of the indicators and functioning of these tools, and to what extent these tools influence decision-making.<sup>1</sup>

Given the federalist organisation, it is quite challenging to cover the entirety of the cantons and get a comprehensive grasp of the variety of tools that are being used, which is why information regarding the tools that are in use is not representative of the entirety of the Swiss landscape. These challenges are part of the reason why the study remains exploratory. Nevertheless, we believe that we were able to cover the most important developments in this area.

For the analysis of the data, the interview notes and the collected documents were stored in a common folder between the two researchers. In a first step, each piece of data was analysed vertically, that is in separation, by one of us in order to a) understand, descriptively, which instruments were introduced (or withdrawn), why and how, b) to identify themes and narratives relevant to the introduction, justification and implementation of predictive policing instruments, and c) to explore whether there were reflections on the potential repercussions of the instruments at hand. In a second step, we shared our respective insights and proceeded to a transversal analysis, seeking to find transversal themes and narratives that could further our understanding of the way predictive policing instruments are engaged with in the Swiss context.

For the present study, we focus in part on narratives, for which we build on a growing body of literature known as narrative criminology (Presser, 2016; Verde, 2017). The analytical strategy described above therefore drew on thematic narrative analysis (Sandberg, 2022). While most of narrative criminology has focused on the narratives of those identified as criminal offenders, scholarship is also turning attention to those employed in the criminal justice system (Kurtz and Colburn, 2019). It has been shown that police narratives contribute to shaping police culture and thereby police operations (Kurtz and Colburn, 2019; Kurtz and Upton, 2018; Turner and Rowe, 2017). As Egbert (2018) argues, the spread of predictive policing must be understood as a phenomenon “fundamentally embedded in societal discourses [...] meaning that the political attribution of predictive policing technologies follows certain discursive rules and is based on pre-existing and discursively structured bodies of knowledge” (p. 101). While it is beyond the scope of this paper to comprehensively map these discursive structures, we will provide an exploratory observation regarding specifically “Helvetic” predictive policing narratives and their relation to the production of formality and informality.

The findings will be organised as follows: First, the specific challenge of developing predictive policing in a federalist context will be addressed. Then, we will present the main instruments used in the Swiss context. We will go on to discuss developments related to cantonal threat management, before engaging with the dominant narratives on predictive policing.

<sup>1</sup> Interviews were not recorded; since total accuracy can therefore not be guaranteed, no quotes will be presented in this paper.

**Table 1**  
Collected data.

Written Documents	Content
Websites Cantonal Threat Management (CTM)	CTM Management
Meeting presentations predictive policing instruments	ODARA, Precobs, Octagon, CTM, Ra-Prof
Reports: Media, Human rights organisations, Political reports/ inquiries, Police organisations	Predictive Policing Tools, Domestic Violence, CTM, Terrorism, Inter-cantonal cooperation
Leaflets & questionnaires	CTM, Octagon
Theses: Diploma, Master, PhD	Precobs, DyRiAS, FRAD, Predictive policing in Switzerland in general
<b>Exploratory Interviews</b>	
Staubli (4)	CTM, Predictive Policing Tools (ODARA, Octagon)
1 Researcher	
1 Police officer (& CTM respondent)	
2 CTM respondent	
Ajil (5)	CTM, Predictive Policing Tools (Octagon, Risk pyramid, Ra-Prof)
2 Researchers	
2 Police officers (& CTM respondents)	
1 Tool developer	

## 4. Findings

### 4.1. Formalisation from ODARA to OCTAGON: predictive policing tools in the Swiss context

As mentioned, we argue that the introduction of predictive policing instruments represents a move towards a formalisation of police work. In a first step, we will therefore briefly outline the most important instruments currently used in the Swiss context.

According to some reports and experts, Switzerland is a pioneer when it comes to predictive policing (e.g., [Egbert and Leese, 2021](#)). The existing state of knowledge indicates that every canton has so far experimented with predictive policing tools and methods, while some have done so in a more sophisticated and systematic manner. According to some accounts ([Fichter and Wüstholtz, 2020](#); [Grosenbacher, 2018](#)), predictive policing tools really started to emerge after the murder of a woman and a social service assistant in a village near Zurich in 2011 (also referred to as the “Pfäffikon Doppelmord”). Since the perpetrator was known to the police and considered a potential threat, growing demands ensued that called for a more systematic treatment of potential offenders. When it comes to prison and probation, an event that occurred in 1993 (also referred to as the “Zollikerberg murder”), is sometimes said to have had a similar impact. After being convicted for several instances of rape and two murders, a man killed a 20-year-old woman during one of his temporary leaves from prison. Similar events happened later in French-speaking Switzerland (murders of *Adeline* and *Marie*). The general impact of such events is that they lead to a multiplication of demands for zero-risk-oriented policies, more repressive and restrictive measures, and for more effective prevention. It is against the backdrop of this socio-political context that the rise of tools of predictive and pre-crime policing in the Swiss context needs to be understood.

According to the available academic and grey literature, and based on our own research, we have found several tools, instruments, and methods to be currently used or available for use in the Swiss context of policing and threat management ([Table 2](#)). We found ODARA, DyRiAS-Intimpartner, OCTAGON, and PRECOBS the tools to be used most frequently and/or whose use has increased in recent years. These tools rely either on algorithmic calculations of actuarial risks, or on checklists and indicators to give an estimation whether a risk or danger may emanate from a person. They include both location-based and person-based tools. For another research project, we conducted an in-depth analysis of their development, content, use, and validity for the most frequently used tools and formulated an appraisal regarding the advantages and drawbacks of each instrument and their potentially harmful outcomes for groups and individuals. For the purpose of this paper, we will limit ourselves to a brief presentation of each tool, as follows:

Person-based:

- ODARA is an actuarial tool [Footnote 3] developed in Canada, with the aim of detecting males being at risk of committing a violent offence against an intimate partner. The tool will only be applied in cases where the male perpetrator has already committed at least one violent assault against the current or former intimate partner.

**Table 2**  
Predictive policing instruments in Switzerland.

Most important instruments	Further instruments
Person based:	- DyRiAS-Islamismusscreener
- ODARA	- TRAP-18
- DyRiAS-Intimpartner	- PICAR
- Octagon	- PICSEL
- Ra-Prof	- Risk pyramid (by R. Jaccard, Neuchâtel)
Location based:	- Schutzfaktorenmodell (by J. Sachs)
- PRECOBS	- JACA-Method (by G. Becker)
	- FRAD-Method (by H. Haas)
	- FaceNet
	- MorphoFace [Footnote 4]

- DyRiAS is based on the theory that violence must be seen as an interplay between perpetrator, victim and situational influences, and that risk assessment is a dynamic process. In contrast to ODARA, DyRiAS originates from Germany. DyRiAS-Intimpartner is an algorithm-based risk analysis tool that aims to prevent a serious violent offence against an intimate partner.
- OCTAGON was developed in Switzerland in 2017 and has been conceived for various types of violent offences. It distinguishes itself from other risk assessment tools through the absence of risk indicators. Rather, the tool guides the users towards a series of options for intervention. It does not rely on algorithmic calculations.
- Ra-Prof was developed in Switzerland. The tool dedicated to jihadist radicalisation is based on scientific evidence on the one hand, and on existing checklists, on the other. It was included here because it has been found to be used by police agencies and follows similar logics of prevention.

Location-based:

- PRECOBS is used to predict residential burglaries. The goal is to analyse areas where series of burglaries have occurred in the past in order to identify at-risk areas on which police operations should concentrate in the near future. The software was originally developed in Germany.

The following table [Table 2] summarises the instruments identified as currently operational in the Swiss context.

#### 4.2. The federalist challenge: when formality slows down formalisation

A specificity of the police landscape in Switzerland is its organisation according to the federalist tradition of the country. The confederation and the 26 cantons [Footnote 8] divide security-related tasks among them. While the confederation is responsible for the military, border security and the federal police office (*fedpol*), police entities are generally operating under the authority of the cantons (*Kantonspolizei*, *police cantonale*) or the municipalities (*Stadtpolizei*, *Regionalpolizei*, *police municipale* or *police régionale*). The various police bodies are organised in four concordates which fulfil tasks related to strategic coordination and harmonisation. The Conference of Cantonal Police Commanders (KKPKS/CCPCS) is responsible for the harmonisation across cantonal borders, in terms of strategies, exchange of expertise, and training. It is the operational branch (oversight of policing tasks) of the Conference of Cantonal Police and Justice Directors (KKJPD/CCDJP). The CCDJP operates at a political level and unites the highest cantonal echelons in the realm of security and justice, prison and probation, and migration. The Swiss Police Institute (SPI) develops training material and courses for all police officers throughout Switzerland.

It is common knowledge that the federalist organisation is a two-sided sword (Aeppli 2008; Leese, 2018). On the one hand, benefits of this structure are an improved ability to take local specificities into account, tighter control and transparency, and perhaps positive competition allowing for boosting processes of innovation. On the other hand, weaknesses of the system include the growing operative and practical gap between localised policing and transcantonal/-national criminality, the difficulty of finding common ground in terms of objectives and strategies, lacking resources, and overlapping competencies that can result in redundancies. For aspects related to predictive policing, this means that initiatives are often developed at the cantonal level, especially when it comes to their operational implementation. This is also linked to the fact that data protection regulations make it difficult to share databases across cantonal borders. Some tools focus on cross-cantonal crime analysis, and their implementation was accompanied by a considerable connection of databases that were hitherto limited to the cantonal jurisdiction. One such tool is, for instance, PICAR, which was introduced by the Latin police concordat in order to allow for a cross-cantonal crime analysis. Leese (2018) argues that the federalist tradition constitutes a major obstacle to the growth of predictive policing.

Hence, the legal framework which draws boundaries between cantonal jurisdictions makes it difficult to share information and data between cantons, something that is essential for the implementation of predictive policing. And when limited to one canton, police corps can rarely draw on sufficient data to effectively implement data-based predictive policing. In this context, at the macro level, the formality of the legal framework becomes an obstacle to the introduction of formality into police work via predictive policing instruments. It is therefore hardly surprising that promoters of predictive policing are starting to challenge the federalist structure and pushing for inter-cantonal cooperation. In this process, the sharing of data and shared access to databases is often a central preoccupation. Police corps tend to be in favour of sharing data because this could enhance their ability to identify crime patterns and police proactively. For example, a data sharing agreement between two cantons is promoted on grounds that it is important to “recognise patterns proactively and act preventively, even if the offender is not known (yet). The space in which offenders operate extends far beyond cantonal borders [...] Although analysis tools are available, their full potential will only be reached if databases are unified and operated across cantons.” (Baselland, 2020). Currently, the legal and political hurdles continue to hamper such initiatives. However, the Federal Council’s favourable view on increased cooperation between cantons and the general tendency towards data sharing may change this in the near future.

#### 4.3. The re-shaping of informality and formality through cantonal threat management

Another important aspect that encapsulates the challenges that the negotiations of formality and informality carry with them in the context of predictive policing is the emergence of the Cantonal Threat Management CTM (Kantonales Bedrohungsmanagement/ Gestion cantonale des menaces). The CTM (KBM/GCM) is a cross-agency platform that aims to ensure a continuous and interdisciplinary case management of high-risk potential offenders. The first cantons to introduce CTM were Solothurn and Zurich in 2014

[Footnote 5]. Meanwhile, most cantons are setting up CTM structures, partly in response to recommendations by the Federal Council (Bundesrat, 2017) and by the National Action Plan to tackle Radicalisation and Violent Extremism, to develop such forms of cooperation and strengthen them where they are already in place (Swiss Security Network, 2017 p. 17). The Federal Council explicitly encourages inter-cantonal cooperation in this field to overcome the issues related to the federalist organisation of police mentioned above (Bundesrat, 2017, p. 33). CTM has been conceptualised in the context of domestic violence, but has been extended to other phenomena, such as violent extremism. Different actors who are part of CTM use screening and risk assessment tools to evaluate the potential risk of violent action emanating from a reported individual, called *Gefährder* (cf. Simmler and Brunner, 2021). Individuals are reported via the agencies themselves (e.g., child protection agencies, social services, police, etc.) or via individuals through an online form or via telephone. Within the CTM, predictive policing or rather the risk assessment tools are applied to prevent (further) violence by potential offenders, which confirms that predictive policing should be understood as a multidimensional socio-technical practice.

With respect to the formality-informality continuum, the CTM introduces contradictory tendencies. On the one hand, it serves to formalise the collaboration between different agencies by setting up an institutional framework that allows for cross-agency data sharing. Predictive policing instruments are integrated in these formalised structures and serve the purpose of providing a common method to appraise potential risks. The Cantonal Threat Management further produces formalisation in the sense that the responsibility for the tools is distributed across several actors beyond police officers, which prevents a single-sided distribution of decision-making power.

On the other hand, it introduces an informalisation of police work by extending the competency to predict violence and crime to actors outside the criminal justice system who do not work according to the same prerogatives. Social services, adult and child protection agencies and migration services become integrated in a structure that pursues objectives traditionally incumbent upon police. This leads to a securitisation of traditionally not security-related aspects of social life by attributing predictive policing competencies and responsibilities to informal actors.

#### 4.4. Resisting formalisation: dominant narratives in the Swiss context

There seems to be a cultural difference between French-speaking Switzerland and the rest of Switzerland, something Simmler et al. (2020) and Equey et al. (2020) have observed before. Our interviews with French-speaking experts confirm the findings of Equey et al. (2020), namely that police agents in French-speaking Switzerland are highly critical of predictive policing instruments and emphasise the importance of crime analysis by human agents. It is therefore not surprising to find that French-speaking cantons and police agencies have barely introduced or acquired licenses for predictive policing instruments like PRECOBS or DyRiAS. This may have to do with the fact that many crime analysts were trained at the Lausanne School of Criminal Justice and therefore according to a similar doctrine that tends to be sceptical of predictive policing initiatives (see Equey et al., 2020). Moreover, the emergence of CICOP, i.e., the inter-cantonal concept of operational and preventive cooperation (*Concept intercantonal de coopération opérationnelle et préventive*), has enabled a cross-cantonal monitoring of crime patterns thanks to the information platform PICAR, mentioned earlier, which allows for the smooth and rapid sharing of information and collaboration between crime analysts in different cantons. CICOP and PICAR have proven effective and seem to have made the acquisition of predictive policing tools redundant – at least for the time being.

This francophone aversion conveniently feeds the perception of a general cultural schism between the Latin and the German-speaking cantons (which can also be felt in the realm of prison and probation). Nevertheless, the reception of predictive policing in the cantons where predictive policing instruments are available or employed is less exuberant than one might expect. In fact, our interlocutors indicate that although they possess licences for tools like OCTAGON, DyRiAS or Ra-Prof, they barely use them because they are apparently too time-consuming. Also, except for Zurich, most cantons have very few staff for person-based threat management (often one single police officer, which makes time a precious resource). The instruments are perceived as decreasing instead of increasing efficiency. Also, because they usually demand a high amount of information about the person of concern, which is usually not available, especially where persons of concern have not been previously known to the police or other services, they are often considered as useless. Methods like JACA [Footnote 6] or FRAD [Footnote 7] or locally developed checklists are preferred instead.

Also, interviewees tend to argue that the instruments have a minor impact on decision-making processes, and that they would arrive at the same result without the instrument. The instruments are said to mainly help ask the right questions, structure the thought process, and distinguish relevant from irrelevant information. This result reflects the findings of Simmler et al. (2022). While the importance of these instruments should indeed not be overstated – partly also due to their design which does not produce anything like a specific risk score – the widespread belief that they are harmless and do not impact the decision-making process more than any other instrument nevertheless warrants further examination.

Finally, a recurring point of concern, raised also by critics (among experts and practitioners) of certain instruments relates to the fact that instruments and their indicators were developed outside of the Swiss context. This is the case for ODARA, DyRiAS, or PRECOBS among the five instruments presented. Similarly, the indicators in OCTAGON and RA-Prof draw on instruments and literature that use or propose indicators whose relevance for the Swiss context cannot be taken for granted. Besides implying an ostensive expectation of scientific validity, these arguments may also be put in relation with a general cultural narrative (also strongly present in prison and probation) of Swiss exceptionalism that translates as a scepticism to concepts, models and programmes developed outside of Switzerland.

Therefore, the general narrative that seems to dominate the Swiss context is one that downplays the importance of predictive policing tools. It emphasises the importance of the police agent's experience and intuition and relegates instruments to the level of an accessory. The promises of "Big Data" or of increased autonomy, transparency or effectiveness do not seem to be of particular relevance for the Swiss context. Regarding the formality-informality continuum, this translates, in our reading, as a resistance to formality as it

manifests itself through predictive policing instruments. The dominant narrative emphasises the importance of experience and intuition that the human police agent has acquired over years of practice in this domain.

## 5. Discussion

As far as the distribution of the tools, our analyses revealed that more person-based tools have been implemented while the location-based tool PRECOBS is only used by two cantonal police corps. The tools are actively used in different contexts, of which some extend beyond the traditional remit of police activity into areas such as social services and schools. While some information is available on the items used for risk assessments, the lack of transparency that has been identified elsewhere (Bennett Moses and Chan, 2018; Ensign et al., 2018) applies to the Swiss context as well. This hampers closer investigation of the potentially problematic theories and assumptions underlying the risk scores produced by the instruments, like some items identified in OCTAGON. Another issue is that some quite challenging tools can be used without specific forensic training, or that the reports and outcomes are shared with non-trained actors.

While there is a critical observation within research on “statactivism” (Didier, 2018) and ICT at the police, regarding the tools under scrutiny, we found that academic literature has dealt with the potential social harms of predictive policing only in its margins. At least in part, this has to do with the fact that this is a fast developing and highly volatile field where research is inevitably lagging. Another issue may be that a significant portion of the research on predictive policing instruments in the Swiss context tends to focus on technical aspects of scientific validity. While some of the criteria associated with scientific validity give us an indication of potential harmful consequences (e.g., negative predictive value, i.e., the false positive rate), evaluations of the validity and quality of risk assessment and screening instruments tend to take refuge in a scientific jargon and focus on technical measures, while paying little attention to the concrete ways in which the individuals subjected to these instruments are impacted by their outputs.

The instruments under study are likely to lead to more or less severe restrictions of fundamental rights and liberties, in the context of preventive policing and threat management. Based on the interviews and available data, we would argue that there is still a lack of awareness of the potentially harmful consequences of these instruments and a worrisome absence of institutional and legal safeguards to mitigate them. It is also interesting to note that several instruments and methods draw on existing ones without necessarily verifying the scientific validity or potential human rights issues that may already be inherent to those, or whether the items included in them are relevant for the Swiss context. This is the case for OCTAGON and DyRiAS, and local tools such as the Neuchatel Risk Pyramid. While it is important to draw on existing knowledge, there is a risk of multiplying and perpetuating biases and dysfunctionalities inherent to existing methods and instruments.

Information that we collected further indicates that individuals can remain in databases for up to ten years (e.g., in Solothurn or Zurich) without engaging in behaviour that would give rise to concern. The differences between cantons and police corps are likely to be quite significant but further investigation into the duration of “potential offenders” registration in police databases and the repercussions this may have for their lives seems warranted.

The field of predictive policing is evolving by the day. There are continuous institutional, legal, political, cultural, and practical adaptations that have yet to come to fruition for us to be truly able to grasp the actual nature and dimensions of predictive policing in the Swiss context. Closely monitoring the way these four person-based instruments are implemented and applied will be vital to keep track of this evolution. Moreover, as mentioned, most appraisals of the technical or scientific validity of instruments fall short of a comprehensive analysis of their impacts. An in-depth study will have to move beyond existing technical evaluations and find a metric to appreciate the impacts in a more holistic manner.

Finally, in order to understand the true ultimate impact of these instruments on decision-making processes and perhaps a shifting of accountability and discretion powers from humans to machines, an ethnographic investigation such as the one adopted by Egbert and Leese (2021) may represent the most fruitful approach. It is virtually impossible to study this aspect solely through interviews with practitioners. Moreover, it will be crucial to look closely at cantonal threat management platforms as they use all the above-mentioned instruments. They are connected to social services, child protection agencies, migration offices, etc. – i.e., not police agencies. These platforms are also still being developed and implemented, yet often without the necessary external scrutiny. Apart from CTM, the use of the same instruments by prosecutors (cantonal or federal level) will also need to be considered, because the use they make of these instruments can have more incisive consequences in terms of restrictions of rights and liberties (for example, when it comes to the decision to order pre-trial detention).

Most of the interlocutors that we identified in the context of this study are practitioners or experts who either work closely with these tools or were/are involved in their development and distribution. This is of course a necessary first step to get an important piece of the puzzle that predictive policing in the Swiss context represents. Such interviews provide crucial insights into perceptions of these instruments, their use and potential problematic aspects from the point of view of institutional actors. However, we found this perspective often to be shaped by a dominant ideology which posits these instruments as relatively harmless and of little importance to police work. It is also likely to be biased by effects of social desirability and a heightened sensitivity to questions that may put one’s institution in an unfavourable light. Further research may therefore benefit from taking such aspects into account and emphasising data triangulation.

## 6. Conclusion: holding on to the promise of informality

In this paper, we set out to explore (in)formalisation processes around predictive policing in the Swiss context, based on exploratory interviews with practitioners and experts, as well as a review of policy papers, handbooks, and the grey literature.

The introduction of predictive policing instruments in the Swiss context has prompted a series of developments that illustrate tensions between formality and informality in the criminal justice system. We have argued that predictive policing instruments mainly pursue the aim of formalising preventive police work through the introduction of data-based operation planning and score-based decisions on intervention. The instruments are introduced with the objective of reducing the leeway of the human agent and purportedly increasing objectivity based on quantitative risk scores.

We have found that the instruments that are mainly used in the Swiss context are not very sophisticated in terms of their recourse to algorithmic calculations. They are mostly person-based tools that are meant to support decision-making. While Ra-Prof, Dyrias and ODARA independently calculate risk scores or colours, the final score in OCTAGON is calculated by the users themselves. Nevertheless, their expanding use and the lack of transparency as well as the little attention paid to potentially problematic outcomes warrant close scrutiny of their application in the years to come.

On a more general level, we found that the introduction of predictive policing instruments starts to challenge the federalist organisation of security and criminal justice in Switzerland. Since the cantonal boundaries and strict data protection regulations hamper the proper application of predictive policing instruments, there are efforts to loosen these restrictions and facilitate data sharing. The formality of the federalist system hereby presents an obstacle to the introduction of formality in the domain of police. Another important development is the growing presence of cantonal threat management platforms, which serve to both formalise the use of predictive policing instruments across different agencies and informalise police work by extending the competency to use predictive policing tools to actors who do not traditionally operate in security-related domains.

Finally, we found that the dominant narrative in the Swiss context is one that downplays the potential of these instruments and the formality that comes with it and instead emphasises the role of the human agent and therefore the role of informality.

The results presented in this paper are based on an explorative study and are not meant to be generalised. The reflections presented here, based on documentary analysis and interviews with researchers and practitioners, can be seen as a further and important step towards a critical analysis of the use of algorithms within police work and its repercussions in terms of formalisation and informalisation, respectively, in Switzerland. Based on this exploratory work, we recommend a more comprehensive research project into predictive policing in the Swiss context, which will contribute to shedding light on the negotiations of formality and informality in the criminal justice system.

## Footnotes

1 For a list of the Swiss cantons: <https://www.bfs.admin.ch/bfs/de/home/statistiken/kataloge-datenbanken/karten.assetdetail.453856.html>.

2 Person-based predictive policing is sometimes also referred to as “predictive profiling”, “person-based predictive targeting”, or “individual-based predictive policing” (see [Egbert and Krasmann, 2019](#), p. 20).

3 The selection of predictor items is based on their measured association with outcomes in representative samples ([Hilton et al., 2004](#)).

4 There seem to be initiatives to develop and implement face recognition tools in different police corps like St. Gallen (e.g., [Grob, 2021](#)), Vaud or Neuchâtel, but little information is available regarding their functioning, characteristics, and domains of application. Our research indicates that some licenses have already been acquired. Depending on the datasets that are used for automated facial recognition (which seem to go far beyond databases of convicted individuals), the use of such instruments poses a number of challenges and warrants closer scrutiny.

5 On the organisation of threat management and risk assessment in Zurich, see [Guldemann et al. \(2021\)](#).

6 Referring to Justification, Alternatives, Consequences, Ability (developed by Gary Becker).

7 Referring to First Responder’s Assessment of Dangerousness (developed by Henriette Haas).

## References

- Aebi, M.F., Linde, A., 2010. Is there a crime drop in Western Europe? *Eur J Crim Policy Res*, 16, pp. 251–277. <https://doi.org/10.1007/s10610-010-9130-y>, 4.
- Aeppli, P., 2008. Les réformes de la police en Suisse. *Rev. Int. Criminol. Police Tech. Sci.* 61 (4), 463–480.
- Arrigo, B., Sellers, B. (Eds.), 2021. *The Pre-crime Society: Crime, Culture and Control in the Ultramodern Age*. Policy Press.
- Babuta, A., 2017. Big Data and Policing. An Assessment of Law Enforcement Requirements, Expectations and Priorities. [https://rusi.org/sites/default/files/201709\\_rusi\\_big\\_data\\_and\\_policing\\_babuta\\_web.pdf](https://rusi.org/sites/default/files/201709_rusi_big_data_and_policing_babuta_web.pdf). (Accessed 11 July 2018). accessed.
- Baez-Camargo, C., Ledeneva, A., 2017. Where does informality stop and corruption begin? *Informal governance and the public/private crossover in Mexico, Russia and Tanzania*. *Slavonic East Eur. Rev.* 95 (1), 49–75.
- Baselland, Regierungsrat, 2020. Vorlage an den Landrat. Betreffend Genehmigung der Interkantonalen bzw. interbehördlichen Vereinbarung über den Datenaustausch zum Betrieb von Lage- und Analyse-Systemen im Bereich der seriellen Kriminalität.
- Benit-Gbaffou, C., 2018. Unpacking state practices in city-making, in conversations with Ananya Roy. *J. Dev. Stud.* 54 (12), 2139–2148.
- Bennett Moses, L., Chan, J., 2018. Algorithmic prediction in policing: assumptions, evaluation, and accountability. *Polic. Soc.* 28 (7), 806–822. <https://doi.org/10.1080/10439463.2016.1253695>.
- Brayne, S., 2017. Big data surveillance: the case of policing. *Am. Socio. Rev.* 82 (5), 977–1008.
- Brayne, S., Christin, A., 2021. Technologies of crime prediction: the reception of algorithms in policing and criminal courts. *Soc. Probl.* 68 (3), 608–624. <https://doi.org/10.1093/socpro/spaa004>.
- Brodeur, J., 2001. Le travail d’Egon Bittner : une introduction à la sociologie de la force institutionnalisée. *Déviance Soc.* 25, 307–323. <https://doi.org/10.3917/ds.253.0307>.
- Bundesrat, 2017. Bedrohungsmanagement, insbesondere bei häuslicher Gewalt. Bericht des Bundesrates in Erfüllung des Postulates Feri 13.3441 vom 13.
- Chiu, C., 2013. Informal management, interactive performance: street vendors and police in a Taipei night market. *Int. Dev. Plann. Rev.* 35 (4), 335–352.
- Davis, D.E., 2017. Informality and state theory: some concluding remarks. *Current sociology monograph* 65 (2), 315–324.
- Didier, E., 2018. Globalization of quantitative policing: between management and stactivism. *Annu. Rev. Sociol.* 44, 515–534.

- Egbert, S., 2018. About discursive storylines and techno-fixes: the political framing of the implementation of predictive policing in Germany. *Eur. J. Sci. Res.* 3, 95–114. <https://doi.org/10.1007/s41125-017-0027-3>.
- Egbert, S., Krasmann, D., 2019. Eine ethnographische Studie neuer Technologien zur Vorhersage von Straftaten und ihre Folgen für die polizeiliche Praxis. In: Abschlussbericht - Predictive Policing. Fakultät für Wirtschafts- und Sozialwissenschaften, Hamburg.
- Egbert, S., Leese, M., 2021. *Criminal Futures. Predictive Policing and Everyday Police Work*. Routledge, New York.
- Ensign, D., Friedler, S.A., Neville, S., Scheidegger, C., Venkatasubramanian, S., 2018. Runaway feedback loops in predictive policing. In: Proceedings of the 1st Conference on Fairness, Accountability and Transparency, PMLR, 81, pp. 160–171.
- Equey, S., Borisova, B., Caneppele, S., Chopin, J., 2020. Perceptions et attitudes des analystes envers les logiciels de prédiction de la criminalité: le cas des polices cantonales romandes. *Rev. Int. Criminol. Police Tech. Sci.* 1, 110–126.
- Ferguson, A.G., 2017. *The Rise of Big Data Policing: Surveillance, Race, and the Future of Law Enforcement*. NYU Press, New York.
- Fichter, A., Wüstholtz, F., 2020. Die Polizei Weiss, Was Sie Morgen Vielleicht Tun Werden. Republik. <https://www.republik.ch/2020/12/11/die-polizei-weiss-was-sie-morgen-vielleicht-tun-werden>. (Accessed 9 November 2021). accessed.
- Flyverbom, M., Hansen, H.K., 2019. Policing and anticipatory transparency: on digital transformations, proactive governance and logics of temporality. In: *Der Transparenz-Imperativ*. Springer, pp. 171–186.
- Fussey, P., Sandhu, A., 2022. Surveillance arbitration in the era of digital policing. *Theor. Criminol.* 26 (1), 3–22.
- Gerth, J., 2015. Dissertation zur Erlangung des akademischen Grades des Doktors der Naturwissenschaften. In: Risk-Assessment bei Gewalt- und Sexualdelinquenz – Standardisierte Risk-Assessment Instrumente auf dem Prüfstand. Dr. rer. nat., Universität Konstanz.
- Grob, F., 2021. Die Kantonspolizei St. Gallen setzt Gesichtserkennungssoftware ein – HSG-Juristin Monika Simmler: «Dies ist unrechtmässig». Tagblatt. <https://www.tagblatt.ch/ostschweiz/justiz-die-kantonspolizei-stgallen-setzt-gesichtserkennungssoftware-ein-hsg-juristin-monika-simmler-dies-ist-unrechtmassig-ld.2188021?reduced=true>. (Accessed 10 November 2021). accessed.
- Grossenbacher, T., 2018. Polizei-Software verdächtigt zwei von drei Personen falsch. SRF accessed 9 November 2021. <https://www.srf.ch/news/schweiz/predictive-policing-polizei-software-verdaechtigt-zwei-von-drei-personen-falsch>.
- Gstrein, O.J., Bunnik, A., Zwitter, A., 2019. Ethical, legal and social challenges of predictive policing. *Católica law review. Direito Penal* 3 (3), 77–98.
- Guldinann, A., Brunner, R., Habermeyer, E., 2021. Bedrohungsmanagement: deeskalieren, bevor etwas passiert. *Forensische Psychiatrie, Psychologie, Kriminologie* 1–10.
- Hardyns, W., Rummens, A., 2018. Predictive policing as a new tool for law enforcement? Recent developments and challenges. *Eur. J. Crim. Pol. Res.* 24 (3), 201–218. <https://doi.org/10.1007/s10610-017-9361-2>.
- Hartmann, M.R., 2017. Grey zone creativity: the case of proactive policing. In: Oppen Gundhus, H., Vrist Rønn, K., Fyfe, N. (Eds.), *Moral Issues in Intelligence-Led Policing*. Routledge, pp. 161–181.
- Hilton, N.Z., Harris, G.T., Rice Lines, K.J., M.E., Lang, C., Cormier, C.A., 2004. A brief actuarial assessment for the prediction of wife assault recidivism: the ontario domestic assault risk assessment. *Psychol. Assess.* 16 (3), 267–275. <https://doi.org/10.1037/1040-3590.16.3.267>.
- Kaufmann, M., Egbert, S., Leese, M., 2019. Predictive policing and the politics of patterns. *Br. J. Criminol.* 59 (3), 674–692. <https://doi.org/10.1093/bjc/azy060>.
- Kurtz, D., Colburn, A., 2019. Police narratives as allegories that shape police culture and behaviour. In: Fleetwod, J., Presser, L., Sandberg, S., Ugelvik, T. (Eds.), *The Emerald Handbook of Narrative Criminology*. Emerald Group Publishing, Bingley, pp. 321–341.
- Kurtz, D.L., Upton, L.L., 2018. The gender in stories: how war stories and police narratives shape masculine police culture. *Women Crim. Justice* 28 (4), 282–300. <https://doi.org/10.1080/08974454.2017.1294132>.
- Leese, M., 2018. Predictive policing in der Schweiz: chancen, herausforderungen, risiken. *Bulletin zur schweizerischen Sicherheitspolitik* 57–72.
- Legnaro, A., 2018. Kennzeichen des Gefährdendens. *Skizzen einer Ethnomethodologie des Sich-verdächtig-Machens*. *Kriminol. J.* 50 (2), 123–138.
- Lindenmuth, K., 2019. Predictive Policing's Erosion of the Presumption of Innocence. In: *Prevention or Self-Fulfilling Prophecy? Law School Student Scholarship*, p. 1018.
- Meijer, A., Wessels, M., 2019. Predictive policing: review of benefits and drawbacks. *Int. J. Publ. Adm.* 42 (12), 1031–1039. <https://doi.org/10.1080/01900692.2019.1575664>.
- O'Malley, P., 2008. Neo-liberalism and risk in criminology. *The critical criminology companion* 55–67.
- O'Neill, M., Loftus, B., 2013. Policing and the surveillance of the marginal: everyday contexts of social control. *Theor. Criminol.* 17 (4), 437–454. <https://doi.org/10.1177/1362480613495084>.
- Pernegger, L., 2020. Effects of the state's informal practices on organisational capability and social inclusion: three cases of city governance in Johannesburg. *Urban Stud.* 58 (6).
- Perry, W.L., McInnis, B., Price, C.C., Smith, S.C., Hollywood, J.C., 2013. Predictive Policing: the Role of Crime Forecasting in Law Enforcement Operations. RAND Corporation.
- Polese, A., Rekhviashvili, L., Morris, J., 2016. Informal governance in urban spaces: power, negotiation and resistance among Georgian street vendors. *Geogr. Res. Forum* 36, 15–32.
- Presser, L., 2016. Criminology and the narrative turn. *Crime Media Cult.* 12 (2), 137–151. <https://doi.org/10.1177/1741659015626203>.
- Pullen, J., Schefer, P., 2021. Predictive Policing – Grundlagen, Funktionsweise und Wirkung. In: Simmler, M. (Ed.), *Smart Criminal Justice. Der Einsatz von Algorithmen in der Polizeiarbeit und Strafrechtspflege*. Helbing Lichtenhahn Verlag, Basel, pp. 103–121.
- Ratcliffe, J. (Ed.), 2009. *Strategic Thinking in Criminal Intelligence*. Federation Press.
- Richardson, R., Schultz, J.M., Crawford, K., 2019. Dirty data, bad predictions: how civil rights violations impact police data, predictive policing systems, and justice. *NYUL Rev. Online* 94, 15.
- Rohner, B., Ajil, A., 2021. Die Risikobeurteilung zur Erkennung von Radikalisierung und gewalttätigem Extremismus im Justizvollzug. Schweizerisches Kompetenzzentrum für den Justizvollzug. [https://www.skjv.ch/sites/default/files/documents/SKJV\\_Risikobeurteilung\\_anhaenge\\_0.pdf](https://www.skjv.ch/sites/default/files/documents/SKJV_Risikobeurteilung_anhaenge_0.pdf). (Accessed 10 November 2021). accessed.
- Sandberg, S., 2022. Narrative analysis in criminology. *J. Crim. Justice Educ. JCJE* 1–18. <https://doi.org/10.1080/10511253.2022.2027479>.
- Simmler, M., Brunner, S., 2021. Das Kantonale Bedrohungsmanagement: rechtliche Grundlagen eines neuen Polizeiparadigmas. In: Simmler, M. (Ed.), *Smart Criminal Justice. Der Einsatz von Algorithmen in der Polizeiarbeit und Strafrechtspflege*. Helbing Lichtenhahn Verlag, Basel, pp. 165–188.
- Simmler, M., Brunner, S., Schedler, K., 2020. *Smart Criminal Justice – Eine empirische Studie zum Einsatz von Algorithmen in der Schweizer Polizeiarbeit und Strafrechtspflege*. Universität St. Gallen, Institut für Systemisches Management und Public Governance, Kompetenzzentrum für Strafrecht und Kriminologie.
- Simmler, M., Brunner, S., Canova, G., Schedler, K., 2022. Smart criminal justice: exploring the use of algorithms in the Swiss criminal justice system. In: *Artificial Intelligence and Law*. <https://doi.org/10.1007/s10506-022-09310-1> online first.
- Strikwerda, L., 2021. Predictive policing: the risks associated with risk assessment. *Police J.* 94 (3), 422–436.
- Swiss Security Network (SSN), 2017. National Action Plan to Prevent and Counter Radicalisation and Violent Extremism.
- Turner, E., Rowe, M., 2017. Police culture, talk and action: narratives in ethnographic data. *European journal of policing studies* 5, 52–68.
- Vepřek, L.H., Sibert, L., Sehn, L., Köpp, L., Friedrich, D., 2020. Beyond effectiveness: legitimising predictive policing in Germany. *KrimOJ* 2 (3), 425–443. <https://doi.org/10.18716/ojs/krimoj/2020.3.3>.
- Verde, A., 2017. Oxford Research Encyclopedia of Criminology and Criminal Justice. In: *Narrative Criminology: Crime as Produced by and Re-lived through Narratives*. <https://doi.org/10.1093/acrefore/9780190264079.013.156>.
- Wacquant, L., 2009. *The Neoliberal Government of Social Insecurity*. In: *Punishing the Poor*. Duke University Press, Durham.
- Waseem, Z., 2021. Policing COVID-19 through procedural informality in Pakistan. *Polic. Soc.* 31 (5), 583–600.
- Zedner, L., 2007. Pre-crime and post-criminology? *Theor. Criminol.* 11 (2), 261–281. <https://doi.org/10.1177/1362480607075851>.
- Zedner, L., Ashworth, A., 2019. The rise and restraint of the preventive state. *Annual Review of Criminology* 2, 429–450. <https://doi.org/10.1146/annurev-criminol-011518-024526>.