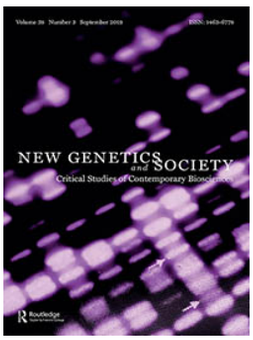

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Police epistemic culture and boundary work with judicial authorities and forensic scientists: the case of transnational DNA data exchange in the EU

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The exchange of forensic DNA data is seen as an increasingly important tool in criminal investigations into organised crime, control strategies and counter-terrorism measures. On the basis of a set of interviews with police professionals involved in the transnational exchange of DNA data between EU countries, this paper examines how forensic DNA evidence is given meaning within the various different ways of constructing a police epistemic culture, it is, a set of shared values concerning valid knowledge and practices normatively considered adequate and legitimate. The police epistemic culture is fuelled by multiple dynamics of boundary work, revealing how police professionals involved in international cooperation (i) define their specific core activities and competencies; (ii) construct particular understandings of valid knowledge and how it should be produced; (iii) enact the police epistemic culture in contrast to the epistemic cultures of the judicial authorities and forensic scientists.

Keywords: Forensic DNA evidence; international police cooperation; epistemic culture; boundary work

Introduction

The trend towards the "scientification" of police work, with scientific knowledge and methods increasingly incorporated into the routines of policing, is a phenomenon that has received widespread academic attention (Cole and Lynch 2006; Ericson and Shearing 1986; Innes, Fielding, and Cope 2004). One relevant aspect of this trend is the expansion of forensic DNA profiling and DNA databasing procedures within the work of police forces in a growing number of countries (Hindmarsh and Prainsack 2010; Williams and Johnson 2008). More recently, the transnational exchange of DNA data has been heralded as an increasingly important feature of efforts to enlarge the "scientification" of police work. In particular, to create new forms of police cooperation across international borders,

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particularly to support criminal investigations of organised crime, control strategies and counter-terrorism measures (McCartney, Wilson, and Williams 2011; McCartney 2017; Prainsack and Toom 2010, 2013; Santos and Machado 2017; Wilson 2016).

This paper examines how forensic DNA data is given meaning in the context of police work and how it is related to the various ways of constructing a police epistemic culture, i.e. a set of shared values concerning valid knowledge and practices normatively considered adequate and legitimate (Knorr-Cetina 1999; Kruse 2016). On the basis of a set of interviews with police professionals engaged in transnational operations involving reciprocal automated searching, comparison, and exchange of DNA data between EU countries within the so-called Prüm system[1], this paper aims to address the following research questions: Which meanings do the police involved in international cooperation ascribe to the role of forensic DNA data in transnational criminal investigations? How are these views embedded within a particular police epistemic culture, and how do they relate to certain boundaries established in relation to other professionals involved in transnational cooperation? How are these views implicated in, and how do they reflect, socio-political attitudes to crime and policing?

Scholarly interest in forensic DNA evidence and its role in the criminal justice system tends to critically focus on its presumed reliability and unrivalled capacity to identify crime suspects (Heinemann, Lemke, and Prainsack 2012; Lynch *et al*. 2008; Williams and Johnson 2008). As Michael Lynch argues, DNA evidence is treated "as both the source and object of an extraordinary, and even absolute, degree of certainty in criminal law" (Lynch 2013, 60). Claims for the operational utility and scientific standing of forensic DNA profiling have often been made in the context of new concepts and methods designed to improve the quality and effectiveness of police criminal investigation practices (Williams and Johnson 2008). Therefore, forensic DNA evidence is often viewed as capable of enhancing the "scientification" of police work. In particular, by attributing to police practices some degree of "objectivity" associated with the scientific authority of DNA technologies (Cole and Lynch 2006; Costa 2017; Santos 2014).

The anthropologist Corinna Kruse (2016) explains that in the criminal justice system there are various "epistemic cultures", defined as forms of knowing mobilised to interpret findings and make them meaningful (Knorr-Cetina 1999). Such epistemic cultures are associated with specific professional perspectives, practices and expertise, from the crime scene to the laboratory and to the court (Cole 2013; Lynch 2013). In other words, different professionals in the criminal justice system have different understandings, which are not codified in textbooks but do inform expert practice, with regard to what valid knowledge is and how it should be produced (Lynch *et al*. 2008; Santos 2014; Williams and Johnson 2008). Corinna Kruse illustrates this differentness in the various epistemic cultures in the criminal justice system, which impacts on how forensic DNA evidence is given meaning, in the following terms:

> To a crime scene technician, forensic evidence is something that can be produced by traces (…) from a crime scene. To a police investigator, forensic evidence is something that may be able to help him or her to assess a person's narrative. To a forensic scientist, forensic evidence is a trace that is to be analysed and evaluated (…) To a prosecutor, forensic evidence is something that will help him or her to convince the court of a defendant's culpability. And to a judge, forensic evidence is something reliable, an anchoring point in their assessment of a case (Kruse 2016, 155–56).

Such different ways of looking at, assessing and making sense of DNA data shed light on the diverging epistemic cultures involved in the production of forensic DNA evidence. This variability can make the circulation of DNA data a challenging task since each profession aims to define and protect their specific core activities and competencies, authority and expertise (Kruse 2016, 110). It therefore reflects what Thomas Gieryn would call "boundary work", a concept which he defines as "[scientists'] attribution of selected characteristics to the institution of science for purposes of constructing a social boundary that distinguishes some intellectual activities as 'non-science'" (Gieryn 1983, 782). By analogy, the concept of boundary work applied to police professionals working in the Prüm system allows understanding how they construct boundaries in relation to other professionals in order to demarcate their specific area of expertise.

In the case of Prüm, the nature of the boundaries of knowledge flow and data circulation between different jurisdictions might be more complex than indicated by previous studies (Machado and Granja 2018; M'charek, Hagendijk, and de Vries 2013; Prainsack and Toom 2010, 2013). The concept of boundary work is therefore deployed throughout the article to shed light on how professionals involved in international police cooperation create, advocate and reinforce certain distinctions in relation to other professionals involved in transnational cooperation, such as the judicial authorities and forensic scientists. The various forms of boundary work that are mobilised highlight how they attempt to assert their expertise, monopolise professional authority, and protect the autonomy and distinctiveness of the police epistemic culture.

Epistemic cultures in the Prüm system

The informal exchange of DNA data is not new and has often taken place on an *ad hoc* basis (Hufnagel and McCartney 2015; McCartney 2014; McCartney, Wilson, and Williams 2011; Williams and Johnson 2008). However, reciprocal automated searching and the comparison and exchange of DNA data between EU countries has been mandatory throughout the European Union since August 2008, following the implementation of the so-called Prüm system (Council of the European Union 2008a, 2008b).

The latest report on the progress of the implementation of Prüm, dating from November 2018, indicates that there are 24 EU Member States operational (Council of the European Union 2018a).[2] With regard to the exchange of DNA

data, the Prüm system functions as follows: when a search is made in a national database for a DNA profile retrieved from a crime scene and no match is found, the Council Decision permits the DNA profile reference to be transmitted and searched in other Member State national databases. A notification is then sent to the original Member State informing it of a hit (a matching profile) or no hit.[3] *If a hit is identified, further requests for information are processed through the existing police and/or judicial channels.*

The Prüm regime brings together a wide range of different professionals and a shifting set of relationships with data, technological infrastructures, operational procedures, and criminal justice systems that support the circulation of information (M'charek, Hagendijk, and de Vries 2013). Hence, the Prüm system involves the interaction of various epistemic cultures and professional practices, entailing both cooperation and coordination, in addition to enacting the differences and divisions between the different social actors in the criminal justice system (Machado and Granja 2018).

The political scientists Barbara Prainsack and Victor Toom have reflected on how the Prüm regime produces a specific kind of "forensic culture" that is made up of a set of relations of power supporting and supported by several types of knowledge (Prainsack and Toom 2013, 73). According to the authors, this set of relations based on epistemic authority and knowledge comprises "various elements – material and immaterial, formal and informal, intended and unintended – as *a priori* equally important factors in the production of hegemonic values and practices (understood as normative points of reference for 'how to do things right')" (Prainsack and Toom 2013, 73).

Since forensic DNA analysis in laboratories is mainly automated, it is seen by many stakeholders as "more scientific" than other forensic technologies (Prainsack and Toom 2010), thus reproducing the reputation of DNA technologies as a "truth machine" (Lynch *et al*. 2008). Prainsack and Toom also noted that the increasing importance given to DNA evidence in transnational cooperation within the EU Prüm system has led to shifts in epistemic authority within the criminal justice system. In the authors' view, one of the implications of the Prüm system is the movement of the centres of epistemic authority away from criminal investigators to forensic scientists:

> [The] current status [of forensic DNA technologies] as a gold standard in criminal investigation locates the production of crucial evidence for truth-finding in the laboratory of the forensic scientist. Thus, it is no longer the criminal investigator who is seen as the bearer of the decisive expertise for solving a crime, but the forensic scientist (Prainsack and Toom 2010, 1125).

The EU regulations for the Prüm system stipulate that for the purposes of supplying data, each Member State must designate a National Contact Point (NCP) whose powers are governed by the applicable national law (Council of the European Union 2008a). Different countries have attributed custody of the national DNA

databases to different entities, ranging from judicial authorities to police forces.[4] As a result, the roles and responsibilities of Prüm NCPs may vary among countries, according to different organisational structures and national legislation. The NCPs in charge of complying with the technical standards for the exchange of DNA data information among Member States on a match/no-match basis are officially called Step 1 NCPs. Typically, these NCPs are forensic experts working in forensic genetics laboratories. The NCPs in charge of the requests for additional information through mutual assistance procedures are called Step 2 NCPs and are usually professionals with experience of police and judicial cooperation in transnational criminal investigations, which represent the focus of this paper.

We would argue that professionals working as Prüm NCPs for Step 2 constitute what Didier Bigo calls "professionals of the management of unease" (Bigo 2006, 6). In other words, they are professionals whose field of action crosses the line between internal and external borders and whose work is embedded in a "new generative space of struggles between security professionals that produces common interests, an identical program of truth and new forms of knowledge" (Bigo 2006, 14–15). Although such professionals do not share the same logic of experience or practice and their work does not converge in a single function (Bigo 2006, 7), they may form alliances that overstep national boundaries to reinforce the credibility of their assertions within a context in which they find themselves competing for the monopoly on legitimate knowledge (Bigo 2006, 8). In this sense, despite their internal diversity – which is as much professional as geographical (Bigo 2006, 15) – these professionals have expectations of creating a "consensual" epistemic community among EU police forces:

> Their ambition is to assemble cells of openly available information, social-scientific data, and the techniques of police intelligence operations. This dream of a common and consensual epistemic community haunts the imagination of these professionals who conduct societal transformations at a distance – a geographical and temporal distance piloted by the logic of anticipation (Bigo 2008, 101).

This paper aims to contribute to the on-going debate about the epistemic culture and boundary work deployed by the presence of DNA data in the criminal justice system (Cole 2013; Kruse 2016; Lynch 2013) and in the Prüm system in particular (Machado and Granja 2018; Prainsack and Toom 2010). The innovation of our work derives from the focus on the perspectives of police professionals involved in transnational cooperation. Within the scope of this article our aim is twofold: first, to understand how the meanings the police professionals give to forensic DNA evidence within their process of knowledge construction (e.g. using intelligence to develop a criminal investigation) are embedded within a particular epistemic culture. Our study shows how, within a context of scientification of police work, the construction of a police epistemic culture is anchored in the perceived shared values of reciprocity and trust (Hufnagel and McCartney 2017). Those values come with the prerogative of intelligence or, in other words, "a

mode of information (…) that has been interpreted and analysed in order to inform future actions of social control against an identified target" (Innes, Fielding, and Cope 2004, 42).

Secondly, we analyse how the police epistemic culture is linked to the multiple ways of building up boundary work (Kruse 2016) between the professionals involved in international police cooperation and other professionals working in the Prüm system, namely the judicial authorities and forensic scientists. We thereby explore how police professionals construct (and in consequence, understand) the knowledge they receive in different ways. Our data shows that, on the one hand, the judicial authorities are seen as a professional group that works mainly through formal procedures on a national or local level and lacks the experience of the tradition of international cooperation. On the other hand, forensic scientists are viewed by the police professionals as a group that attributes excessive significance to the production of DNA hits and laboratory work.

Research method

For the purposes of this paper we analyse interviews conducted with professionals involved in international police cooperation who have acted as Prüm National Contact Points or were directly involved in the process of joining the Prüm system. The data on which the analysis is based includes 19 semi-structured interviews conducted with a total of 22 professionals in charge of international police cooperation, including law enforcement and intelligence officials. The interviews were held in 19 different EU countries. The participants were recruited by email, letter and telephone.

Prior to the interviews, all the participants signed a written informed consent form and agreed to be audio-recorded. The interviews took place at the participants' workplaces or a location of their choice. All the interviews were digitally recorded and transcribed *verbatim*.

Quotes pertaining to the participants' conception of the capacity and potential value of DNA data in transnational criminal investigations and their views on how transnational DNA data exchanges affect their work were coded and subjected to multiple readings to develop an in-depth understanding of the meanings expressed by the professionals operating the Prüm system. These quotes were systematically compared, contrasted, synthesised and coded by theme and thematic category following the principles of grounded theory (Charmaz 2006) and interpreted using a qualitative content analysis approach (Mayring 2004). In order to protect the identity of the participants, a letter and number were attributed to each interview.

The police epistemic culture

Since Schengen concerns about cross-border crime and fears of the transnational movements of people have been increasing. As a response, several initiatives

were introduced in the EU to support police cooperation. The transnational exchange of DNA data within the Prüm system is implicated in this prevailing broader ideology which defends increasing security and is coupled with the perceived strategic need to foster closer transnational cooperation to combat cross-border crime and terrorism (Bigo 2008; Hufnagel and McCartney 2015, 2017; Johnson and Williams 2007; McCartney 2014, 2017; McCartney, Wilson, and Williams 2011; Wilson 2016).

For the international police professionals who participated in this study, the exchange of DNA data and the use of intelligence across jurisdictions is considered an extraordinary opportunity to intensify transnational cooperation among EU Member States in order to ensure "security". The following excerpt clearly reveals the participants' views on what they consider to be a unique way of operating and cooperating with their international police partners. The *modus operandi* is built on long-standing practices for joint investigations, information-sharing mechanisms and the exchange of data, together with a high degree of informality and very few legal constraints (Hufnagel and McCartney 2017; Perras 2017; Sulca 2017):

> *We are all partners, so no limits for exchanging, except the legal ones. (...) We all have the same view* [*on*] *how we can exchange information (...)* [*on how to*] *disclose information, of course, and how together we can all disrupt the* [*criminal*] *networks. That's the point: we are looking at it the same way.* H02

Within this tradition of police cooperation across the EU, the Prüm system emerges as an additional tool which, by enhancing "scientification" of police work on the basis of automatisation, may be able to streamline communications between international partners. The Prüm system is therefore perceived by the interviewees as simultaneously anchored in the old ways of operating and knowing, and the new ways of producing intelligence based on the transnational exchange of data. As the following excerpt indicates, the Prüm system is seen as offering new possibilities for collaboration networks between international case officers:

> *When you do an investigation with the international case officers, you can put a puzzle* [*together*]*. You could not do that before (...). Prüm gives us the abilities to do this.* U01

The prevailing notion among our interviewees is that Prüm both derives from and reinforces the traditional collaboration between police forces in the different EU Member States. Narratives outlining a set of shared values between police professionals ("we are all looking at it the same way", H02, or "we don't have borders to crime fighting", I02) therefore provide the basis for reproducing expectations of creating an epistemic community among EU police forces based on delocalised police work that proactively gathers intelligence (Bigo 2006). In addition, the way in which police professionals communicate their shared values is also illustrative of the distinction that these participants make between their own

modes of knowing and acting – the police epistemic culture – and the knowledge and actions of other professionals involved in the Prüm system. In the following sections of this paper, we will focus on the various forms of boundary work developed by police professionals involved in international cooperation with regard to the epistemic cultures of the judicial authorities and forensic scientists.

Boundary work with judicial authorities

From the perspective of the participants in this study, the specific mode used by the police when working and cooperating with their international counterparts is clearly different from the practices of the judicial authorities. While police cooperation is seen as having a tradition of cooperation, regardless of territorial borders, this is not the case with the judiciary (Bigo 2006, 18). As the following quote demonstrates, according to the professionals of police forces interviewed for our study one core element of the distinction between the epistemic culture of the police and that of the judicial authorities lies in what is perceived as a lack of any historical tradition of international collaboration on the part of judicial entities during the criminal investigation phase:

> *When there is a police authority there is no problem* [*in providing information useful for criminal investigations*]. *The police or Ministries of the Interior usually* [*don't create problems*] *(...) because they have always worked in investigation and they have very good communications, they have secure linked channels. Interpol channels*[5]*, Europol channels*[6]*, where they can transmit information securely and very fast and also get the answer quite fast. But when there is a justice authority* [*involved*] *they have no such network (...) Historically, not all justice authorities have the idea that they also should, or have to, cooperate with police authorities in the investigation stage. M01*

The general feeling expressed by the participants is that while the police forces tend to follow the principle of reciprocity advocated for international cooperation, the judicial authorities tend to raise obstacles to this process of exchanging information.[7] Although the boundaries between "police" and "judicial" cooperation are not clear and may vary between countries (Spapens 2017, 151), the participants in this study highlighted that in their opinion there are in practice considerable differences between the ways in which the police and judicial entities collaborate. According to the participants, while the police aim to expand access to all the information needed to carry out criminal investigations regardless of national borders, the judicial authorities' methods are time-consuming, operate on a local level and are based on restricted forms of exchanging or using data. According to the interviewees, the potential of the Prüm system is therefore not being fully realised, due to the practices of the judicial authorities:

> *The major advantage of Prüm* [*in Step 1*] *is to make* [*possible*] *the cross-matching without any judicial request being sent (...) It's a pity* [*that some countries*] *which have been at the heart of the* [*Prüm*] *system from the beginning are obliged to go*

> *through the judicial network. Because the exchange is really slow, and most of the time incomplete, compared with what we can do in the police.* H02

It is therefore clear how boundary work between the police and judicial authorities reflects different ways of examining, assessing and making sense of DNA data. According to the participant, while systems based on police institutions tend to facilitate rapid information gathering to assess the usefulness of DNA in a given case, the judicial authorities tend not to respect the principle of reciprocity advocated by police professionals by preventing the exchange of information on the basis of bureaucratic requests.

In addition to the perceived failures in the practices of judicial authorities to meet expectations regarding reciprocity, the participants' narratives also emphasise the importance of trust among international counterparts. The creation and maintenance of trust, which Carole McCartney describes as "a critical factor in international policing cooperation" (McCartney 2017), lies at the heart of decisions on whether to share information or not. Elements such as interactions and informal exchanges of information with counterparts already known from previous investigations or meetings (McCartney 2017) are crucial to building up trust. In addition, factors such as a preference for using direct contact are valued because, according to the participants, direct interaction among police professionals enhances predictability and speeds up the process (Perras 2017). As clearly described by one of the interviewees, the trust built up from personal contacts significantly affects the exchange of data, both in terms of the type of information allowed to be circulated, as well as the speed of the process:

> *A lot also depends, I think, on personal contacts. Like everywhere. If you have close personal contacts with* [*specific*] *countries (...) it automatically leads to a good understanding and exchange (...) Also from the DAPIX meetings.*[8] *(...) it is good to have other contact partners, because you can easily ring them up and ask for something.* O02

In short, the process of boundary work with the judicial authorities carried out by the group of interviewees with police backgrounds is mostly based on constructing distinctions between different ways of working and producing valid knowledge. As previously mentioned, the police professionals are seen as having a tradition of cooperation on an international level, anchored in the principle of reciprocity and based on informal and interpersonal interactions. In contrast, the judicial authorities are seen by professionals involved in police cooperation as a professional group which operates mainly through formal and bureaucratic networks at a national or local level. According to the participants in this study, one of the reasons for the lack of trust between the police and judicial authorities is the excessive bureaucracy that leads to several barriers in the exchange of information and therefore creates obstacles to harnessing the full potential of exchanging DNA data:

> *You will be tired. You will be tired and then you say: "OK, it is enough". We read a lot of* [*rogatory*[9]] *letters and* [*we will*] *say: "Please, please, it is only of interest to*

> *criminals if we cannot cooperate (...) OK, but if you are not willing* [*to send the information needed*] *we will also stop cooperating and we will not provide* [*more information*] *because (...) we also have national legislation".* M01

Within these hybrid arenas of practice that combine to form the different epistemic cultures of the police and judicial authorities, the participants in this study consider that these two professional groups have differing views on the principles of exchange. The clash between different working methods of police professionals and judicial authorities – quick versus time-consuming; direct contact versus bureaucratic procedures; pre-existing traditions of cooperation versus no experience in cooperation – are seen as creating obstacles to the full realisation of the potential for scientification of police work. Police professionals define the distinctive nature of their work as based on reciprocity and trust – principles that enable information to be exchanged speedily after a DNA hit in order to produce intelligence that aims to capture the flows of moving people. Since judicial professionals are perceived as having little experience of transnational cooperation and tend not to respond to the need for the quick exchange of additional data to supplement forensic DNA data, they are described by police professionals as agents who hinder the Prüm system of transnational DNA data exchange. In sum, the context of the Prüm system is understood as potentially being a fertile context for the development of scientification of police work, but the full realisation of this objective is viewed as being curtailed by other professional groups, such as judicial authorities, that are far from adopting the working methods that the incorporation of DNA technologies in the support of criminal investigation requires.

Boundary work with forensic scientists

Studies have drawn attention to the fact that one central enabling factor of the Prüm system has been the intensive efforts of forensic scientists to standardise forensic DNA profiling technologies across national borders through the creation of institutions such as the European DNA Profiling Group (EDNAP) and the European Network of Forensic Sciences Institutes (ENFSI)[10] (Johnson and Williams 2007; McCartney 2014, 2017; McCartney, Wilson, and Williams 2011; Prainsack and Toom 2010, 2013). As explained earlier in this paper, according to Prainsack and Toom, the Prüm system has shifted the centres of epistemic authority away from criminal investigators to the work conducted in forensic laboratories (Prainsack and Toom 2010, 1124–26). This shift, which is connected to the automated transnational exchange of DNA data in the Prüm system, has been described as based on two main aspects: (i) the perpetuation of the image of DNA as a "truth machine" (Lynch *et al*. 2008); (ii) changes in the logic of criminal investigation that are increasingly gravitating towards the "scientification" of police work, namely through the use of DNA technologies (Cole and Lynch 2006; Ericson and Shearing 1986; Innes, Fielding, and Cope 2004).

The participants in this study offer a highly critical perspective on the idea of DNA as a "truth machine", based on what they consider to be an "excessive" focus on the "DNA hits" generated by the Prüm system. As stated by the following participant a DNA hit is not, according to this view, the most important element of a criminal investigation within the Prüm system:

> *If I am the director of a lab I say: "OK, highest quality, and I could never make an error, because when I have a hit it is 100% correct". But sorry, for this kind of solution I could just as well have a trained monkey in the laboratory.* M01

Forensic DNA data is seen by the participants in this study as one piece of information that might, or might not, become significant in a given criminal case. As the following excerpt illustrates, rather than prioritising the DNA information in itself, the professionals involved in international police cooperation consider its situated meanings according to the specificities of particular criminal cases:

> *DNA could be major evidence in one case and only the confirmation of the presence of some suspect in* [*a different case*]*, and nothing more. It really depends. You don't have to take DNA as the major piece of* [*evidence*]*. (...) it has to be analysed within all the elements you have in the case.* H02

Professionals involved in international police cooperation, therefore, emphasise the work that must be done in order to assess whether a DNA hit is meaningful in a certain criminal case. In other words, it is the core activities and competencies – specific to the police epistemic culture – that are able to turn DNA data into DNA evidence. As the following quote shows, the interviewees are particularly clear in defining the work that must be done between obtaining a DNA hit on the basis of the Prüm exchange system and producing a conviction on the basis of that hit:

> *If we are talking about DNA exchange (...) Prüm helps to identify the person responsible for the crime. (...) Prüm would not help you to convict the person. (...) It is effective in identifying the suspect. (...) To bring a person to trial it takes more than* [*DNA data*] *... you still have to prove that his DNA did not appear in that place* [*crime scene*]*, let us say, by accident. It is still a lot of work to prove that this person is responsible for this crime.* F02

Attributing meaning to the hits occurring within Prüm is related to a specific form of boundary work between the professionals involved in international police cooperation and the forensic scientists: the ability to generate intelligence is described as a specific competency of police professionals. Police professionals construct a clear form of boundary work between the activities of forensic scientists in the laboratory – analysing DNA data and producing a hit – and their own work, which relates to forms of constructing intelligence on the basis of the said hit. Information exchanged under the Prüm system is thus viewed by the participants in this study as "raw data". This data must be analysed and interpreted together with information from a wide range of sources, using a particular set of police skills and knowledge, in order to be considered intelligence that can (in)form actions

concerning how, when, why and against whom they take action (Innes, Fielding, and Cope 2004, 42). As highlighted by the following quotes, for police professionals the Prüm hit represents the start of the process. In order to turn it into meaningful and useful information (i.e. intelligence), the police must collect and make sense of the information that contextualises that hit that might or not be actually valuable in policing practices[11]:

> *Prüm is a small piece (...). We have to build so much more. That is how I see my role. Not just negotiating that little piece, I have to make sure that it fully. So, the Prüm is not: "We got a hit, that is good". The hit is just the beginning, the hit must lead to a result (...) we must go all the way and hopefully we will put one person in prison.* U01
>
> *We are not relying on the Prüm hit as the evidence. The Prüm hit is the intelligence to justify a particular course of action.* D04

DNA data is therefore mainly of strategic value to professionals involved in international police cooperation. The DNA hits generated within the Prüm system are viewed by these professionals as having a useful potential for identifying and pursuing links between a certain offence and a potential suspect. In addition, police professionals are extremely interested in detecting links between crimes, since this information might eventually lead to map networks of itinerant delinquency operating on a transnational level (Wilson 2016). DNA hits within Prüm are therefore seen as a type of information that might enable intelligence to be constructed for law enforcement agencies (Innes, Fielding, and Cope 2004) on when, where and how crimes are being committed across borders, without necessarily requiring detection of the actual offenders in each instance (Sulca 2017):

> *I think the value of DNA databases in helping us understand offending and who's offending in more types of crime is very powerful. If we do that across international boundaries it could provide a useful [tool].* D01
>
> *Nowadays all of these criminal activities have no borders. (...) So, DNA could help at least to locate the person or to see if the person committed the same crime in different countries in Europe.* E02

An additional form of boundary work between forensic scientists and police professionals concerns the different understandings of which DNA hits should be taken into consideration when deciding whether to pursue a criminal investigation. The automated comparison of DNA profiles within the Prüm system has increased the possibility of false positives and false negatives (matches that are invalid), given the high volume of profiles that are available for comparison.[12]

The forensic scientists acting as Prüm National Contact Points for Step 1 see the occurrence of a large number of false positives in transnational DNA data exchanges as ethically problematic due to the lack of procedures establishing criteria for both reaching agreements and resolving disputes about what constitutes a reliable match. Such professionals thus claim that more technical laboratory work has to be done to ensure that a DNA hit is reliable (Machado and Granja

2018). However, the police participants in this study have a different perspective: the validity of a DNA hit must be assessed through the work of the police and not on the basis of laboratory re-analysis. The background *rationale* for this preference is obtaining the maximum information possible from the Prüm system, even if, after doing the follow-up work from the DNA hits, it might not lead to a viable line of investigation. The participants argue that for a DNA hit to assume the status of forensic evidence, it must make sense in the process of intelligence analysis (Innes, Fielding, and Cope 2004). This assessment can only be made if the DNA hit is evaluated together with other types of information held by the police. As one of the interviewees explains:

> *Our police officers say: "We would like to get more hits and have the chance to throw it away, not to look at or follow it, instead of just getting one hit and missing all the other ones". So, this is the philosophy of our police. They do not want to miss hits which might be positive hits in the end. So, they also accept false positive hits. It is a sort of philosophy of getting hits - you would like to have a little bit more work but not miss an opportunity.* O01

What the interviewee calls the "philosophy of getting hits" therefore implies allocating the decision concerning what might constitute valid, legitimate, and useful knowledge to police work rather than the work of the forensic scientists in the laboratories. It also implies a crime control strategy which might constitute a form of boundary work that actively reacts to the alleged shifting of power away from criminal investigators to forensic scientists, which was brought in by the Prüm system (Prainsack and Toom 2010). In arguing that the police should be in charge of assessing which hits should be followed up, the interviewees are giving meaning to the complexity and ambiguous nature of forms of scientification of police work. The negotiation of boundary work between police forces and forensic scientists occurs by simultaneously monopolising their professional authority to gather intelligence and also protecting the autonomy and distinctiveness of the police epistemic culture.

Conclusion

On the basis of a set of interviews with police professionals involved in transnational operations associated with reciprocal automated searching and the comparison and exchange of DNA data between EU countries, this paper has explored the meanings attributed to DNA data and analysed how this relates to the various ways of constructing a police epistemic culture. The results of this study might contribute to understanding how trends towards "scientification of police work", in which police uses of science and technology are expected to have a recursive effect, might be particularly complex and ambiguous (Johnson, Williams, and Martin 2003; Williams and Johnson 2008).

The narratives of our interviewees emphasise how the construction of a police epistemic culture is implicated in, and reflects, socio-political attitudes towards

transnational policing that are anchored in the perceived common values of reciprocity and trust (Hufnagel and McCartney 2017) which come with the prerogative of gathering intelligence to fight cross-border crime. By "looking in the same way", the interviewees explain how they aim to jointly map and eventually dismantle networks of criminal groups who are operating on a transnational level. In this context, the DNA hits generated within the Prüm system are viewed by police professionals as having a useful potential for intelligence-led police work in terms of opening up new possibilities for criminal investigation by mapping networks of itinerant transnational delinquency.

The forms of constructing a particular police epistemic culture are also related to the multiple dynamics of the boundary work enacted by professionals involved in international police cooperation that create, advocate and reinforce certain distinctions in relation to other professionals also involved in transnational cooperation, such as the judicial authorities and forensic scientists. On the one hand, the judicial authorities are seen as a professional group that works mainly through formal procedures on a national or local level and lacks the experience of the tradition of international cooperation. This implies that when police professionals need to access information quickly to validate the importance of DNA data, the bureaucratic and time-consuming procedures of the judicial authorities tend to hinder the assessment. The clash between these different working methods – quick *versus* time-consuming; direct contact *versus* bureaucratic procedures; pre-existing traditions of cooperation *versus* no experience in cooperation – therefore undermines the principle of reciprocity and trust that police professionals claim is needed within transnational cooperation and prevents the construction of relationships based on trust with their judicial counterparts.

On the other hand, police professionals enact boundary work in relation to forensic scientists by outlining how the value of a DNA hit does not reside in the hit by itself but on the police work which can turn DNA data into DNA evidence. That is, in the core activities conducted by police professionals of assembling intelligence in ways that interpret and analyse data in order to make the findings meaningful within a particular epistemic culture. In addition, participants also engage with an additional form of boundary work when, while addressing the topic of false positives within Prüm, they attempt to allocate the decision concerning what might constitute valid and useful data to police work rather than the work of the forensic scientists in the laboratories.

In constructing these forms of boundary work with the judicial authorities and forensic scientists, the professionals involved in international police cooperation assert their expertise as the ability to produce intelligence (Innes, Fielding, and Cope 2004), attempt to monopolise their professional authority regarding the selection of cases to follow up, and protect the distinctiveness of the police epistemic culture by emphasising how it is based on shared principles of reciprocity and trust.

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Notes

1. The Prüm Decisions (Council of the European Union 2008a, 2008b) made it mandatory for all EU Member States not only to exchange DNA profiles but also fingerprints and motor vehicle information. In this article, our focus is restricted to the exchange of DNA profiles.
2. Greece, Ireland, Italy and the United Kingdom are not operational in the Prüm system (Council of the European Union 2018a). The UK was part of Prüm when the Decision to start it was taken in 2008 then withdrew in December 2014. Presently the UK is seeking to rejoin the Prüm system (Council of the European Union 2017, 2018b). According to Toom (2018), it is expected that each Prüm Member State will have implemented the Prüm Decision by Spring 2019.
3. A "match" or a "hit" are both terms used to describe a correspondence between DNA profiles discovered in a database search at a given moment in time (ENFSI 2016).
4. In the great majority of countries involved in the Prüm system, the Ministry of the Interior (or Ministry of Internal Affairs or Ministry of Home Affairs) – a government ministry typically responsible for policing, emergency management, national security and immigration matters – has custody of the National Criminal DNA Database. In the following EU Member States the Ministry of Justice has custody of the National DNA Database: Belgium, Netherlands, Portugal and Sweden. The Ministry of Justice typically has specific duties associated with organising the justice system, overseeing public prosecutors and maintaining the legal system and public order.
5. Interpol was created in 1923, as the first international security cooperation body. The UN recognises Interpol as an intergovernmental body, but it still is not a "formal" police cooperation initiative: it is not binding and its members are not States, but police forces. Interpol maintains an automated DNA database, established in 2002, called DNA Gateway, which contains DNA profiles submitted by member countries (Hufnagel and McCartney 2015; Johnson and Williams 2007; McCartney 2017).
6. The European Union Agency for Law Enforcement Cooperation, better known as Europol, is the most prominent EU-level mechanism for promoting cross-border law enforcement cooperation. It is an EU law enforcement agency, formed in 1998 to handle criminal intelligence between the competent authorities of EU Member States. The Agency has no

executive powers and its officials are not entitled to arrest suspects or act without prior approval from the competent authorities in the Member States.

7. Such scenario thus further exacerbate the complexity and potential problems of step 2 that have been well documented in previous studies about the Prüm system, namely: enormous disparities in national legislation and data protection; diverse regimes of responsibility and database custody; lack of transparency, accountability and trust; and lack of ethical oversight of the transnational flow of law enforcement information (Hufnagel and McCartney 2015; McCartney 2010, 2014; McCartney, Wilson, and Williams 2011; Prainsack and Toom 2010, 2013).
8. DAPIX is the name of the "Working Party on Data Protection and Information Exchange". This body is authorised to oversee and support tasks and procedures related to the implementation of legislation and policies on information exchange and the protection of personal data in the context of the Prüm Decisions (Council of the European Union 2008a, 2008b) and the so-called "Swedish Initiative" (Council of the European Union 2006). The Swedish Initiative provides a common legal framework for the exchange of existing information and criminal intelligence between EU Member State law enforcement authorities. Adopted in 2006, this instrument sets out the rules for cross-border exchanges of criminal information and intelligence. It regulates the conditions for exchanging information and intelligence among EU Member States, including time limits and admissible justifications for refusing to share data. It also tries to ensure that procedures for cross-border data exchanges are not stricter than those applying to exchanges at the national level.
9. Rogatory letters are a formal request from a court to a foreign court for some type of judicial assistance. The most common requests sought by rogatory letters are service of process and the taking of evidence.
10. EDNAP was established in 1988 by scientists from European countries with the original purpose of harmonising DNA technologies for criminal investigations so that DNA results could be exchanged across borders in Europe. Another important institution for the design and implementation of standards is the ENFSI, founded in 1995, for the purpose of improving the quality of forensic science delivery in Europe, as well as enhancing the mutual exchange of information in the field of forensic science.
11. Previous studies about the Prüm system pointed out the lack of information regarding the number of Prüm hits that have actually led to conviction and /or imprisonment (Santos and Machado 2017; Taverne and Broeders 2017). The only known study, focused on the Dutch DNA database custodian in the year 2010, shows that of a total of 2,020 matches found in Step 1, solely 37 (a total of 1.8%) lead to matches being deployed in a prosecution (Taverne and Broeders 2015).
12. As defined by Council Decision (2008b), a full match implies that all the allele values of the compared loci are the same in the requested and requesting DNA profiles. Near matches are accepted in Prüm when the value of only one of all the compared alleles is different (one mismatch). However, Kees van der Beek showed that near matches consisting of six loci plus a mismatch are almost certainly false positives – i.e., a declared match that is invalid – or false negative – a match not found due to a mistake in a DNA profile. Therefore, the Netherlands does not provide demographic data for near matches without the guarantee of confirmatory testing (Van der Beek 2011). Nevertheless, it remains unclear how other countries proceed with near matches (McCartney 2014).

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