



Bundeskriminalamt

Towards a better communication between theory and imperfect realities of professional practice

On barriers among stakeholders and possible ways out

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1. Preamble
2. Impact of Bayes in (Criminal) law
 - A few words about the situation in Germany
 - Impressions of the situation in England and Wales, Netherlands and Sweden
3. The stakeholders
4. Stakeholders' incentives
5. On barriers
6. Suggestions
7. Closing remark

⇒ using Bayes in law: situation in Germany

General

- see e. g. Bender/Nack/Treuer (2007)¹, Simmross (2014)², Schweizer (2015)³, Kotsoglou (2015)⁴

DNA evidence

- "A set of national recommendations is presented to support DNA-experts in terms of the evaluation process, the choice of the calculation approach and the verbal expression of statistical outcomes." (2016)⁵ According to the recommendation of the ENFSI-Guideline and the International Society for Forensic Genetics (ISFG) preferentially a LR should be calculated provided that reasonable and plain hypotheses could be determined.
- The above mentioned national recommendations were developed independently.
- It seems that the ENFSI-Guideline is of less importance for German DNA-experts, the activity-level calculations, in particular, find little enthusiasm.
- Seminar for judges & public prosecutors at the German Judicial Academy (once a year).

¹Tatsachenfeststellung vor Gericht, C.H. Beck, 173-174 ² On Winds of Change and Coexisting Formats, Law, Probability and Risk 13(2): 105-115

³ Beweiswürdigung und Beweismaß - Rationalität und Intuition. Siebeck ⁴ Forensische Erkenntnistheorie, PhD Thesis ⁵ Rechtsmedizin 26(4): 291-298

⇒ using Bayes in law: situation in Germany

Trace evidence

- **Paint and Glass:** LR-approach did not matter up to now
- Two domestic working groups have already addressed this subject for more than 15 years with little success. An LR-approach-related project group has been established in 2014. This year a seminar for interested German paint and glass experts was conducted with professional lecturers from Lausanne (focus on understanding and possible use of the ENFSI-Guideline for Evaluative Reporting in Forensic Science using specific examples). The project group is going to get an official status and has meanwhile increased in members, now chaired by a Bavarian colleague. BKA-paint and glass experts have utilized a derivative of the so-called Bommarito scale for some years (SWGMAT).
- **Fibres:** LR-approach did not matter up to now
- **Gunshot Residues (GSR):** LR-approach did not matter up to now
- Consider the differentiated conclusion of the final report of the ENFSI MP2010-M5-Project "Application of the Bayesian Approach in Gunshot Residue Investigation". (unsuitable for many cases) Consider the fact that the two presented GSR-case examples of the ENFSI-Guideline were not concerted with the ENFSI EWG Firearms/GSR.

England and Wales

- Safe to assume that in the UK there are the most Bayes-experienced forensic experts.
- "Although a number of published guidelines recommend the use of LRs extensively for forensic evidence presentation the use of such methods is actually likely to decrease following rulings such as R v T." (Fenton et al 2016)
- Certainly, as a result of time and cost-cutting pressures, "Streamlined Forensic Reporting" (SFR) has been established for some years in England and Wales "to get rid of unfair and avoidable delays" (Crown Prosecution Service, 2016).
- Recently SFRs have been challenged on the grounds of "lack of evaluative statements/role of experts", "compatibility with ENFSI guidelines" and "clarity" (Sallavaci, 2015)
- Bayesian methodology is not mentioned at all in a recent forensic science strategy paper (Home Office, 2016) that also refers to a relevant review of efficiency in criminal proceedings (Leveson, 2015) in England and Wales.

Netherlands

- Dutch prosecutors and judges have been trained by forensic experts (Berger and Meuwly, 2010)¹ since 2008.
- According to Henderson², a Dutch forensic consultant, “Reports from the Netherlands Forensic Institute where the LR scales are uniformly applied amongst the major forensic disciplines reach the courts. Many judges were trained to apply this way of evaluating the evidence and the trainings continue to be available for them. But as it is not an obligatory part of their education program in practice the understanding differs a lot between judges. It seems that trained Dutch judges can understand LR-based expert conclusions, however, applying these conclusions within the context of the whole criminal case is still a problem, i.e. Bayesian reasoning itself, as a way to evaluate a case, may have not yet found its way in the reasoning of individual judges.”

¹ Logically correct concluding and rational reasoning in evidence evaluation. *Science & Justice*, **50** (1), 33

² Personal Communication, 2016

Sweden

- Nordgaard et al. (2012)^{1,2} and Kruse (2013)³ report on an established LR-based conclusion scale at the former Swedish National Laboratory of Forensic Science (SKL) for all forensic fields except that of finger prints.
- Sweden seems to be further advanced in teaching, discussing and developing the use and understanding of probabilistic reasoning in the Swedish legal community.
- Unfortunately, evaluation reports are not available so far.

¹ Nordgaard / Ansell / Drotz / Jaeger (2012). Scale of conclusion for the value of evidence. *Law, Probability and Risk*, **11**, 1-24

² Nordgaard / Rasmusson (2012). The likelihood ratio as value of evidence - more than a question of numbers. *Law, Probability and Risk*, **11**(4), 303-315

³ Kruse (2013). The Bayesian approach to forensic evidence: evaluating, communicating, and distributing responsibility. *Social Studies of Science*, online version: <http://sss.sagepub.com/content/43/5/65>

stakeholders

⇒ the clients



- Police



- Prosecution

- Courts



- Lawyers

Conformist organizations¹

Characteristics

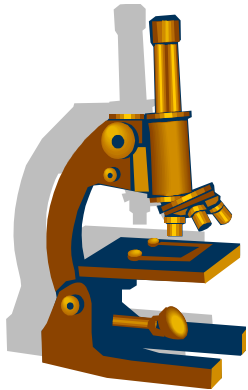
- Highly formal roles within a hierarchical pyramid
- Stability valued above all through rigorous processes
- Future is repetition of the past

¹ according to identified organizational types in F. Laloux, Reinventing Organisations, Nelson Parker 2014, Brussels, Belgium

Quote from Kaarlo Tuori (2011)²

"In legal practices, lawyers inevitably employ doctrinal theories with their principles and concepts but are not necessarily conscious of their importance." ... "Only in hard cases do judges feel the need to transform their knowledge of dogmatic theories from practical into discursive form, to specify and assess their significance."

² Ratio and Voluntas: The Tension Between Reason and Will in Law, Routledge 2016, NY, USA



- commercial Forensic Science Providers (FSPs)
- FSPs directly affiliated with police authorities
conformist organizations
- FSPs affiliated to a certain ministry
- FSPs looking for more resources

commercial

police

justice

military

underfinanced

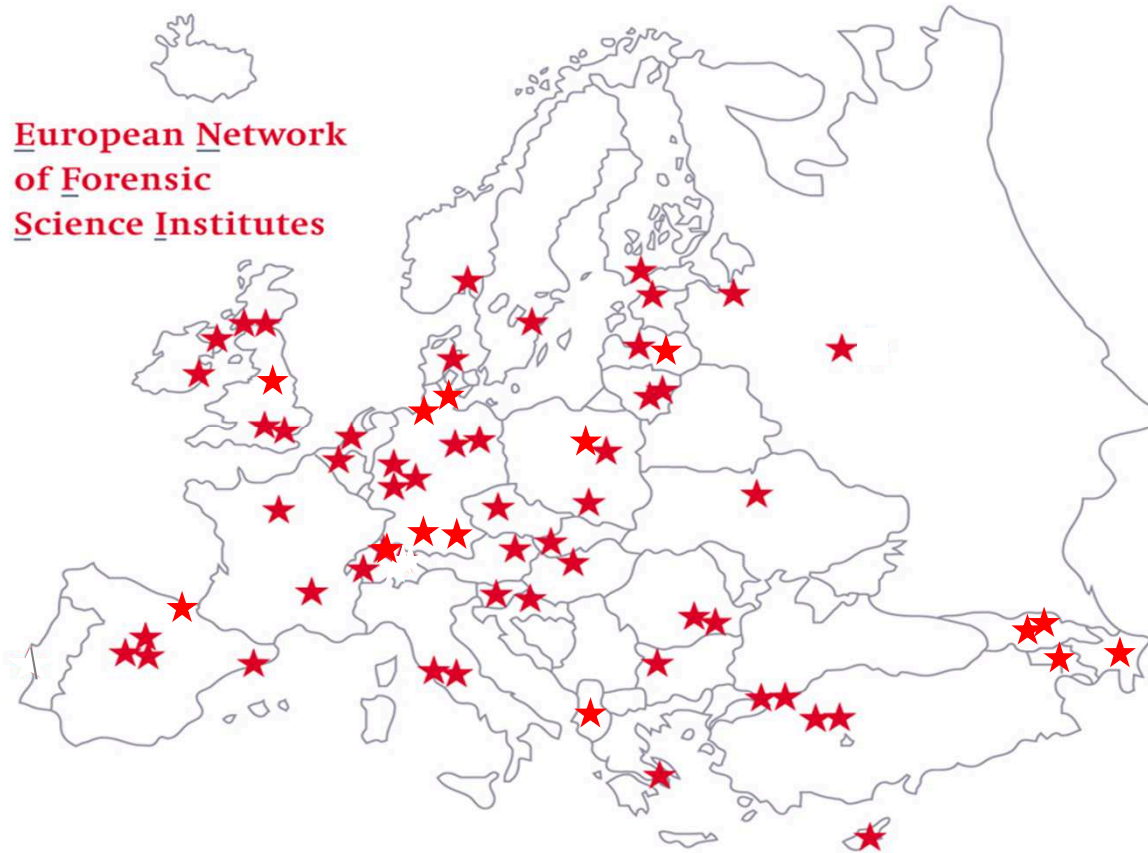


stakeholders

⇒ associations and **networks**



European Network
of Forensic
Science Institutes



★ 66 institutes from 36 countries



has been identified by the European Commission as a body in a de facto *monopoly situation* as it is the only network of Forensic Science Institutes of the Member States in Europe.



Monopoly Projects (MP)

2009-2014: Σ over 4.3 Mio €

Central issues

- Transfer of knowledge from more developed forensic institutions to new members
- Harmonisation of methods and procedures across Europe
- Encouragement for all ENFSI laboratories to comply with best practice and international standards for quality and competence assurance and implementation of a quality management system such as ISO/IEC 17025



⇒ **associations** and networks



Association of Forensic Science Providers

Current members

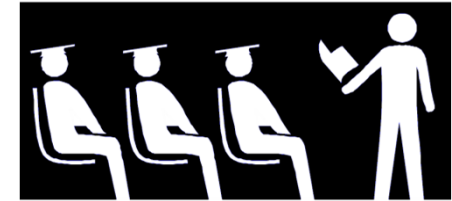
- ★ SPA Forensic Services
- ★ Eolaiocht Fhoireinseach Eireann
- ★ Forensic Science Northern Ireland
- ★ LGC Forensics
- ★ Cellmark Forensic Services
- ★ Key Forensic Services
- ★ Environmental Scientifics Groups
- ★ Defence Science and Technology Laboratory (DTSL)

Apparently police-related FSPs from England and Wales are not members of the AFSP.



Objectives

- To be the voice of forensic science providers within the United Kingdom and the Republic of Ireland, recognised as such by other key stakeholders, including the Regulator, legislators, investigators, lawyers and the judiciary.
- To influence, for the more effective delivery of justice, the application of best practice and appropriate standards for forensic science within the criminal justice system.
- To exchange good practice in the delivery of forensic science to the appropriate standards.
- To develop and promote continually improving standards in forensic science.
- To influence the development of forensic science end-to-end service delivery policies in relation to scientific quality.



A few examples of scholars

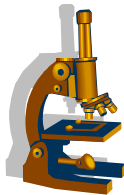
- University of Lausanne, Faculty of Law, Criminal Justice and Public Administration, School of Criminal Justice, Switzerland
- University of Edinburgh, School of Mathematics and Maxwell Institut, Scotland
- Leiden University, Institute for Criminal Law and Criminology, Netherlands
- University of Strathclyde, Centre for Forensic Science, Glasgow
- ...

stakeholders

⇒ mixed roles



- can be statutory bodies within






- do casework and research as a

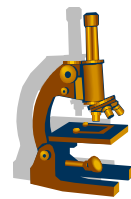


- Lab director can lead an  MP Project

stakeholders' incentives

⇒ brief overview

  legal certainty, speedy and effective legal proceedings 
sufficient evidence for a realistic prospect of conviction, probable cause, streamlined forensic reporting (SFR)

 client satisfaction: speedy, reliable, unbiased and economical service, ideally non-destructive methods, high scientific level, accreditation
further interests according to affiliation and situation

commercial **police** **justice** **military** **underfinanced**

 ensuring the quality of development and delivery of forensic science ..

 leading position in science, promoting favorite topics, attract academics to E&T, consultancy, broaden financial basis



stakeholders' missions

⇒ associations and networks



To represent the common views of the providers of independent forensic science within the United Kingdom and Ireland with regard to the maintenance and development of quality and best practice in forensic science and expert opinion in support of the justice system, from scene to court.

The purpose of ENFSI is to share knowledge, exchange experiences and come to mutual agreements in the field of forensic science. ENFSI is recognized as an expert group in the field of forensic sciences.



ENFSI is recognized as a pre-eminent voice in forensic science worldwide by ensuring the quality of development and delivery of forensic science throughout Europe.

According to the workshop results of a recent EU conference on the need for European cooperation in the field of forensics (European Forensic Science Area 2020: the way forward, May 2016) "[Communication between forensic experts and judicial personnel should be improved](#)". (See all 13 conclusions if necessary.)



General country-specific variables

- Size of the country and system of government (federal, central, secular, religious)
- Wealth and political stability
- Jurisdiction and procedural tradition
- Number and turf of law enforcement agencies
- Education system

Willingness to change

- Users (stakeholders) will change their habits when the pain of their current situation is greater than their perceived pain of adopting a possible solution.
(according to the change function¹)

¹ Coburn, P. (2006). The Change Function: why some technologies take off and others crash and burn. Penguin Group



country specific E&T situation for customers

- Isolated offers by universities, FSPs and national professional associations
- e. g. in Germany: German Judicial Academy, ...
- According to results of the ENFSI ForJust Project 2009: in Germany priority rather on field specific technical subjects than on communication formats
- Police academies in Germany have never addressed Bayesian reasoning in syllabus.
- In Germany police authorities control the contents and the expenses for E&T of many forensic practitioners as well as the resources for those who are capable to teach the police as a customer of forensic science services.



Verbal communication scales

"empirically validated verbal communication scales, and even alternate formulations for expressing likelihood ratios, might not fulfill the purpose of assisting the court or facilitating effective and accurate communication" (Martire and Watkins, 2015)

Reasons for continued resistance (Fenton et al 2016)

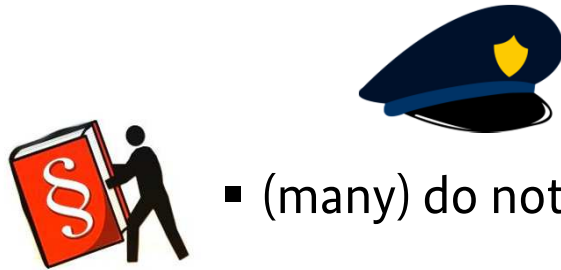
"Standard resistance to the use of Bayes, LR models are inevitably over-simplified, The mutual exclusivity of hypotheses is not respected in all LR uses, The prior misconception, The LR for source level hypotheses tells us nothing about offense level hypotheses, Confusion about LR being expressed on a verbal scale, Continued use of manual methods of calculation"

Sceptic of the existing data used for activity level LR calculations

Different everyday working life of researchers and practitioners

stakeholders' barriers

⇒ clients



- (many) do not see any reason for a change of reporting formats
- are suffering from time and cost-cutting pressure (fear additional load)
- (many) lack knowledge, training and education
- (some) may fail to understand that actually they are being true

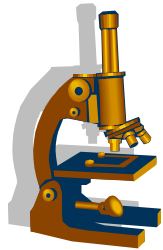
Bayesians

- country-specific rules as to the scope of juries
- time for cooperation in studies regarding decision-making process



stakeholders' barriers

⇒ Forensic Science Providers (FSP)



- perceive a lack of customers' demand ...
- customer satisfaction
 - key element in quality management (relevant for accreditation)
 - change of reporting formats only by mutual agreements with customers
 - add. costs, presumably long transition state, divergent customers' demands
 - additional burden for FSPs that have already trouble with ISO/IEC 17025
- (many) lack knowledge, training and education
- (many) are government-related, i. e. part of a conformist organisation
- are suffering from time and cost-cutting pressure (fear additional load)

stakeholders' barriers

⇒ Bayesian researchers and scholars



- (some) focus on theory and have less interest in implementation tasks
- (some) appear to lack an understanding for troubles and obstacles coming from professional practice
- (many) prefer writing about certain cases and fallacies that could have been avoided, (very few) publish on reasons for continued resistance
- (many) underestimate the level of sound working and reporting by traditional formats even in complex cases
- (a few proponents) even ascribe lack of scientific integrity to those who do not follow their claimed "standard" that combines generally accepted codes of conduct with further demands for evaluative reporting

- Identify all stakeholders. Consider their influences, incentives and barriers.
- Explore the effectiveness of already existing (country specific) implementation(s).
- Show awareness of all reasons for barriers, obstacles and reservations. Consider studies with regard to possible risks of too quick implementation.
- Exploit country specific E&T opportunities for legal and forensic experts.
- Understand the proportionality of efforts in adjustments of communication formats.
- Think of (country specific) small steps and beneficial solutions for all stakeholders.
- Increase efforts to influence school curricula.
- Be patient, allow discussions in an open and unbiased way.




suggestions

⇒ Concrete

- Researchers may enhance direct communication with legal experts
- Focus on certain forensic fields (digital evidence, DNA, skin marks)
- Establish task forces consisting of Bayes-trained forensic and legal experts
- Understand how E&T for forensic and legal experts is organized in certain countries and how well it works. Then plan specific courses.
- Try pilot projects with stakeholders using BNs to model the correct relevant hypotheses and the full causal context of the evidence (according to the proposal of Fenton et al). Include intelligence and investigative reporting.
- Facilitate that forensic and legal experts may meet more frequently out of court to address communication and interpretation concepts.
- Show convincing time and cost advantages of using Bayes in law.
- Await evaluation results from NL and SE. Consider adaptable things for E&T purpose.

little steps

- Continue information exchange of country specific experiences with LR-approach within ENFSI WGs (invited speaker, collaborative exercises)  ✓
- Check interest and willingness of forensic expert colleagues on national level, initiate E&T with professional lecturers from universities, if necessary ✓
- Inform judges and prosecutors about LR-approach on occasion of regular field specific E&T (e.g. German Judicial Academy, already done regarding DNA) ✓
- Initiate nationwide customer surveys regarding Bayes and law (by QM)
- Inform legal experts and police about LR-approach and ongoing discussions on the occasion of field specific articles in national languages (e. g. in Germany: Munich Lawyers Handbook, C.H. Beck; Handbook for the Prosecutor, Heymanns) ✓
- Forensic experts should use natural frequencies in the reports instead of probabilities at least.



Thank you for your attention!

